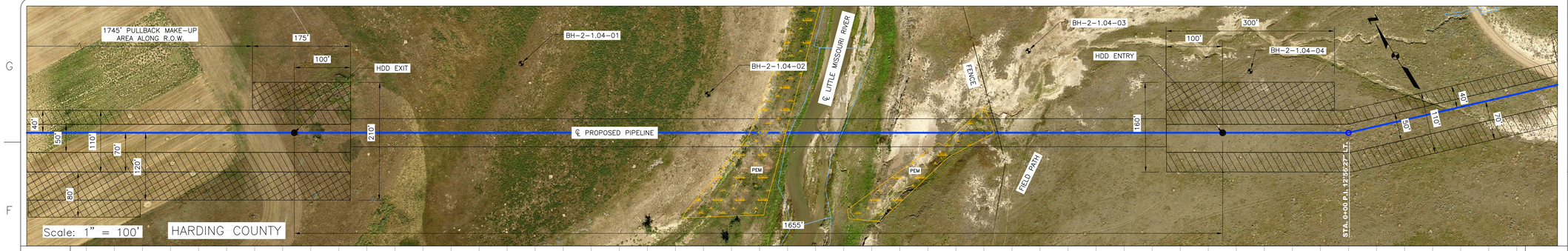

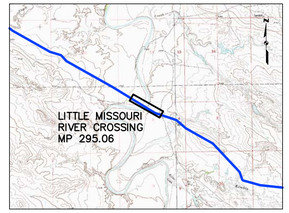

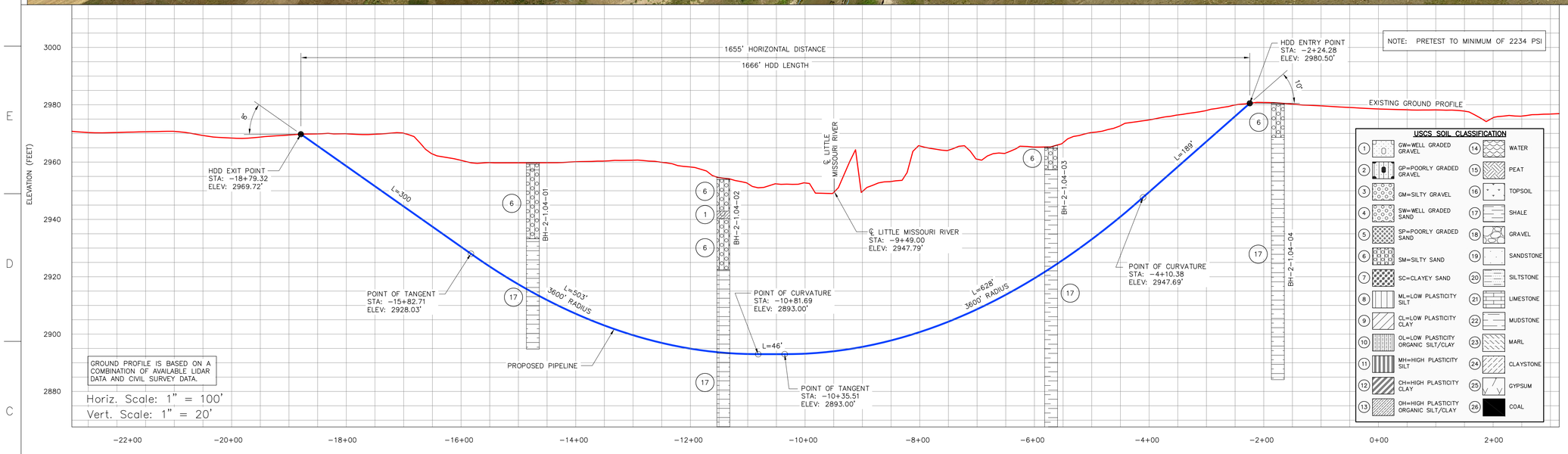

USCS SOIL CLASSIFICATION

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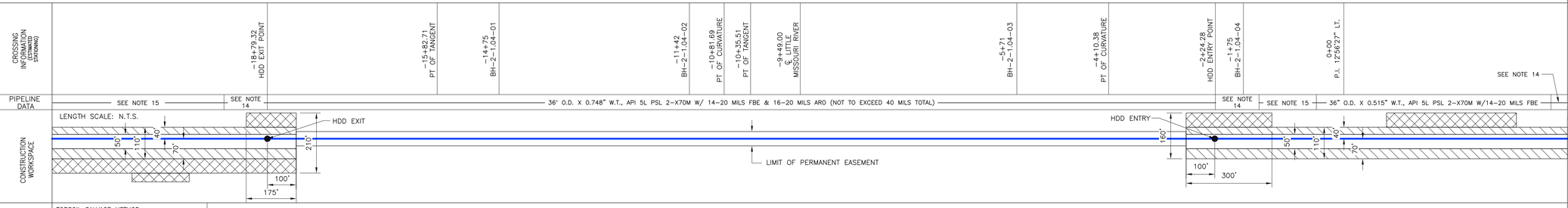
2	GP=POORLY GRADED GRAVEL	15	PEAT
3	GM=SILTY GRAVEL	16	TOPSOIL
4	SW=WELL GRADED SAND	17	SHALE
5	SP=POORLY GRADED SAND	18	GRAVEL
6	SM=SILTY SAND	19	SANDSTONE
7	SC=CLAYEY SAND	20	SILTSTONE
8	ML=LOW PLASTICITY SILT	21	LIMESTONE
9	CL=LOW PLASTICITY CLAY	22	MUDSTONE
10	OL=LOW PLASTICITY ORGANIC SILT/CLAY	23	MARL
11	MH=HIGH PLASTICITY SILT	24	CLAYSTONE
12	CH=HIGH PLASTICITY CLAY	25	GYPSUM
13	OH=HIGH PLASTICITY ORGANIC SILT/CLAY	26	COAL



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14) 36" O.D. X 0.618" W.T., API 5L PSL 2-X70M W/14-20 MILS & 16-20 MILS ARO (NOT TO EXCEED 40 MILS TOTAL)

15) 36" O.D. X 0.572" W.T., API 5L PSL 2-X70M W/14-20 MILS FBE

LEGEND

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- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- WARNING SIGN
- PIPELINE ROUTE
- CATHODIC PROTECTION TEST STATION
- ROAD CL
- ROAD EDGE
- FIELD PATH
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- PERMANENT EASEMENT BOUNDARY
- TEMPORARY WORKSPACE BOUNDARY
- ADDITIONAL TEMPORARY WORKSPACE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- EXISTING GROUND
- WATER BODY
- WETLAND BOUNDARY
- HEADCUT AREA
- EXCLUSION FENCE

REFERENCE DRAWINGS

DRAWING No	TITLE
4365-03-ML-02-005	ALIGNMENT SHEET

ISSUED FOR CONSTRUCTION 2013-05-31

REVISION

REV No	DATE	DESCRIPTION
00	2013-05-31	ISSUED FOR CONSTRUCTION

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2095406	EXP	TLB	BLS	KJM	KJM	EXP

PROFESSIONAL ENGINEER/RPT

FIRM: EXP ENERGY SERVICES, INC.

FIRM LICENSE: FB034023

REGISTERED PROFESSIONAL ENGINEER — REG. NO. 11683 — KEVIN JAMES MCGLYNN — SOUTH DAKOTA

PERMIT/ ENG. APPROVAL

DATE

REV. NO.	DATE	PERMIT NUMBER:

TransCanada — In business to deliver

exp Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36 2014) HARDING SECTION

FIA #	CHAINAGE:	DISCIPLINE #
4365	MP 295.06	03

LITTLE MISSOURI RIVER HDD INSTALLATION PROPOSED KEYSTONE XL PROJECT HARDING COUNTY, SOUTH DAKOTA

SCALE	DRAWING No	REV
AS SHOWN	4365-03-ML-03-001	00

TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

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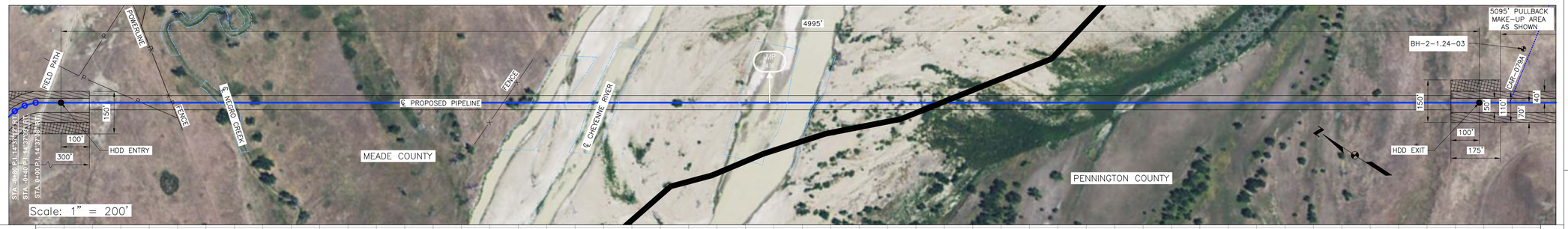

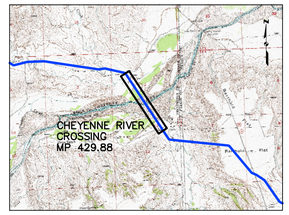

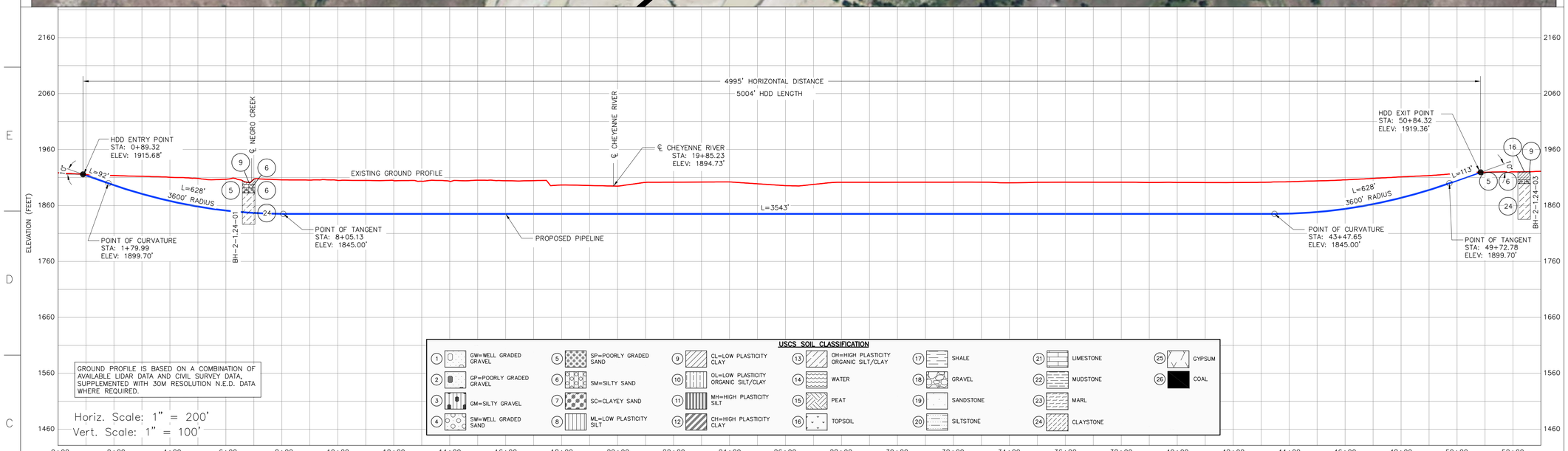

GROUND PROFILE IS BASED ON A COMBINATION OF AVAILABLE LIDAR DATA AND CIVIL SURVEY DATA, SUPPLEMENTED WITH 30M RESOLUTION N.E.D. DATA WHERE REQUIRED.

USCS SOIL CLASSIFICATION

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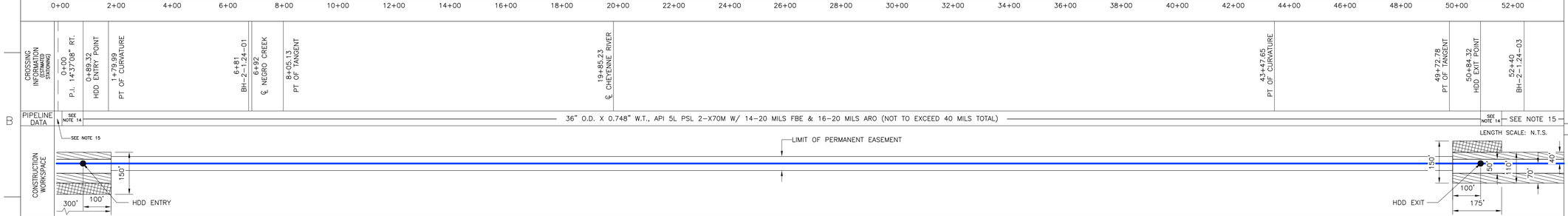

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14) 36" O.D. X 0.618" W.T., API 5L PSL 2-X70M W/14-20 MILS & 16-20 MILS ARO (NOT TO EXCEED 40 MILS TOTAL)
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REFERENCE DRAWINGS

DRAWING No	TITLE
4367-03-ML-02-026	ALIGNMENT SHEET

ISSUED FOR CONSTRUCTION 2013-05-31

REVISION

REV No	DATE	DESCRIPTION
00	2013-05-31	ISSUED FOR CONSTRUCTION

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2095406	EXP	TLB	BLS	KJM	KJM	EXP

PROFESSIONAL ENGINEER/RPT

FIRM: EXP ENERGY SERVICES, INC.
FIRM LICENSE: FB034023

REGISTERED PROFESSIONAL ENGINEER — REG. NO. 11683 — KEVIN JAMES MCGLYNN — SOUTH DAKOTA — 6-27-13

PERMIT/ ENG. APPROVAL — DATE

REV. NO.	DATE	PERMIT NUMBER:

TransCanada — In business to deliver

exp Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36 2014) FAITH SECTION

FIA # 4367 | CHAINAGE: MP 429.88 | DISCIPLINE # 03

CHEYENNE RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
MEADE & PENNINGTON COUNTY, SOUTH DAKOTA

SCALE AS SHOWN | DRAWING No 4367-03-ML-03-001 | REV 00

TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

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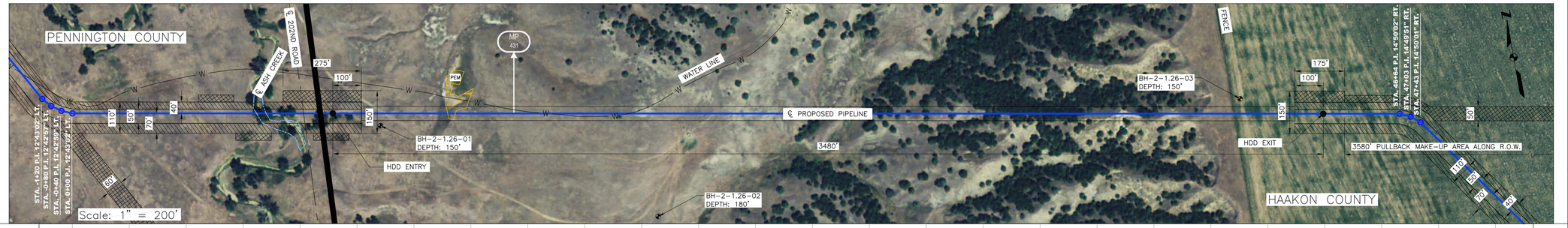

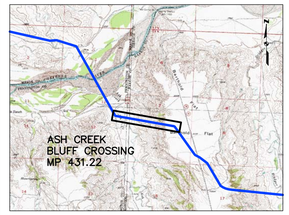

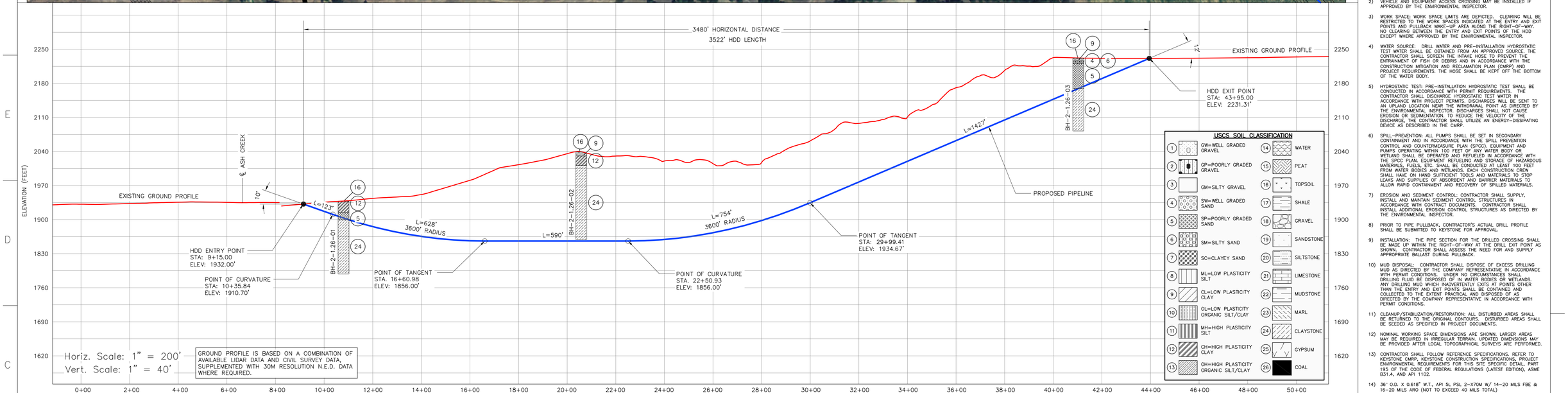

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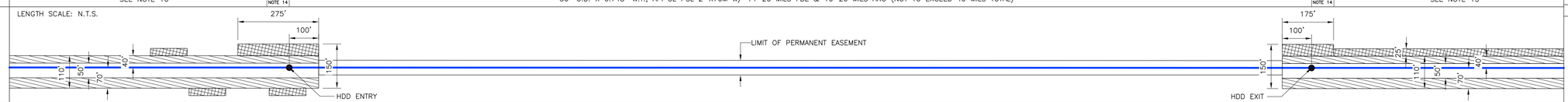
15) 36" O.D. X 0.465" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE

16) 36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE

CROSSING INFORMATION (ESTIMATED STATIONING)	0+00 P.I. 12°43'02" LT.	6+64 ℄ ASH CREEK	9+15.00 HDD ENTRY POINT	10+80 BH-2-1.26-01	10+35.84 PT. OF CURVATURE	16+60.98 PT. OF TANGENT	20+58 BH-2-1.26-02	22+50.93 PT. OF CURVATURE	29+99.41 PT. OF TANGENT	41+03 BH-2-1.26-03	43+95.00 HDD EXIT POINT	46+64 P.I. 14°50'02" RT.	47+03 P.I. 14°49'51" RT.	47+43 P.I. 14°50'01" RT.
PIPELINE DATA	SEE NOTE 16		SEE NOTE 14	36" O.D. X 0.748" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO (NOT TO EXCEED 40 MILS TOTAL)							SEE NOTE 14	SEE NOTE 15		



ENVIRONMENTAL MITIGATION/RECLAMATION	
	TOPSOIL SALVAGE METHOD
	STREAMS
	WETLANDS
	TIMING CONSTRAINTS
	MILEPOST
	MONITORING
	RECLAMATION
	SPECIAL CONSIDERATIONS

LEGEND

- CL P.I.
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- WARNING SIGN
- PIPELINE ROUTE
- CATHODIC PROTECTION TEST STATION
- ROAD CL
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- TEMPORARY ACCESS ROAD
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- WATER BODY
- WETLAND BOUNDARY
- HEADCUT AREA
- EXCLUSION FENCE

REFERENCE DRAWINGS

DRAWING No	TITLE
4367-03-ML-02-027	ALIGNMENT SHEET

ISSUED FOR CONSTRUCTION 2013-05-31

REVISION

REV No	DATE	DESCRIPTION
00	2013-05-31	ISSUED FOR CONSTRUCTION

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2095406	EXP	TLB	BLS	KJM	KJM	EXP

PROFESSIONAL ENGINEER/RPT

FIRM: EXP ENERGY SERVICES, INC.

FIRM LICENSE: FB034023

REGISTERED PROFESSIONAL ENGINEER — REG. NO. 11683 — KEVIN JAMES MCGLYNN — SOUTH DAKOTA — Jun 31, 2013

PERMIT/ ENG. APPROVAL — DATE

REV. NO.	DATE	PERMIT NUMBER:

TransCanada — In business to deliver

exp Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36 2014) FAITH SECTION

FIA #	CHAINAGE:	DISCIPLINE #
4367	MP 431.22	03

ASH CREEK BLUFF HDD INSTALLATION
KEYSTONE XL PROJECT
PENNINGTON & HAAKON COUNTY, SOUTH DAKOTA

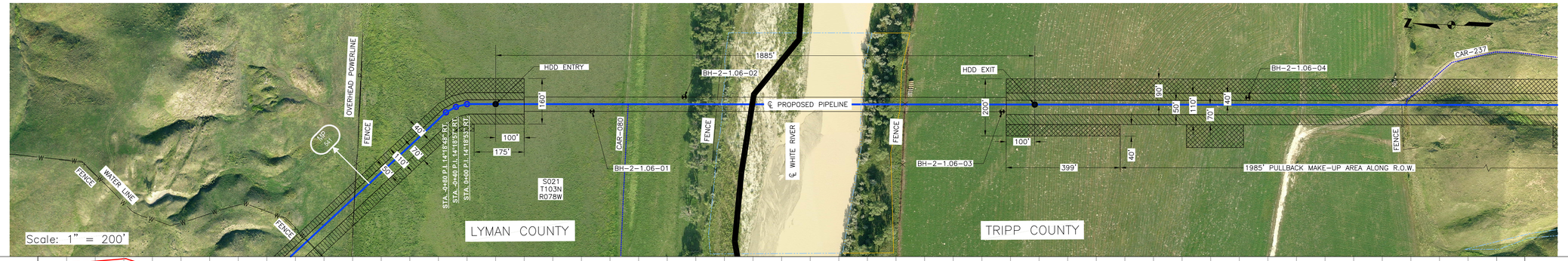
SCALE	DRAWING No	REV
AS SHOWN	4367-03-ML-03-007	00

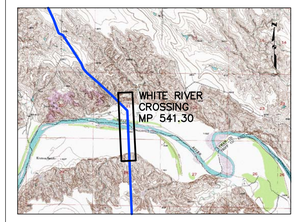
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

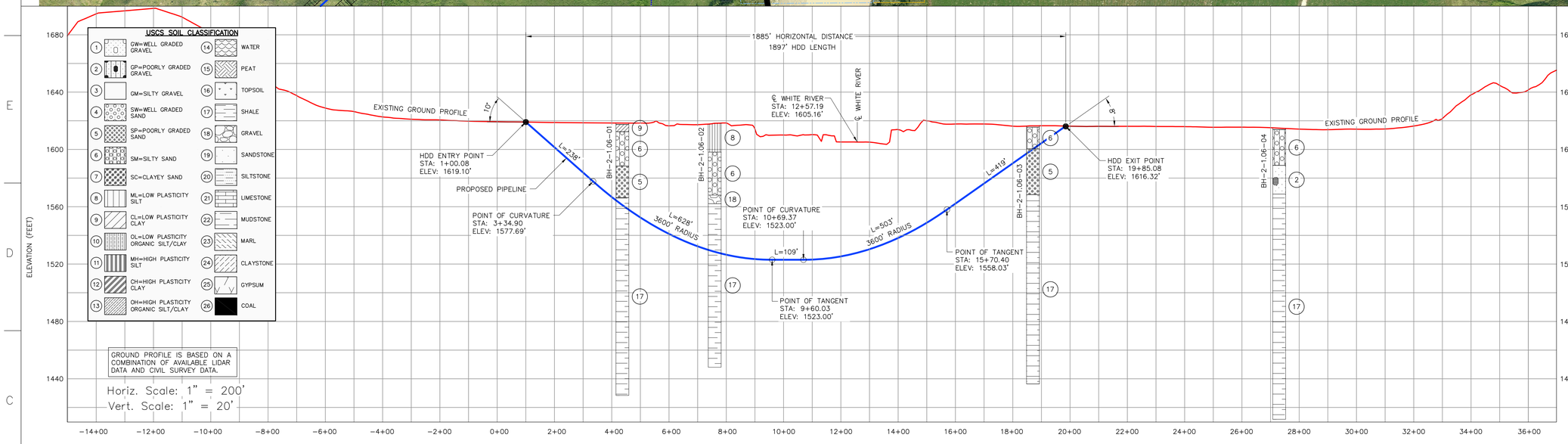
PLOTTED SIZE: ANSI D (22x34)

016803

TC_UD_BR.DWG 22X34







INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.

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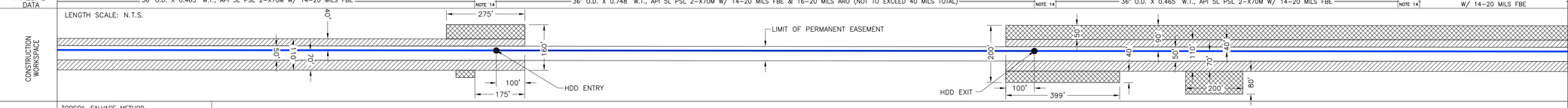
14) 36" O.D. X 0.618" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO (NOT TO EXCEED 40 MILS TOTAL)



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DRAWING No	TITLE
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ISSUED FOR CONSTRUCTION 2013-05-31

REVISION

REV No	DATE	DESCRIPTION
00	2013-05-31	ISSUED FOR CONSTRUCTION

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2095406	EXP	TLB	BLS	KJM	KJM	EXP

PROFESSIONAL ENGINEER/RPT: FIRM: EXP ENERGY SERVICES, INC. FIRM LICENSE: FB034023

PERMIT/ ENG. APPROVAL: DATE

REGISTERED PROFESSIONAL ENGINEER REG. NO. 11683 KEVIN JAMES MCGLYNN SOUTH DAKOTA

REV. NO.	DATE	PERMIT NUMBER:

TransCanada — In business to deliver

exp Energy Services Inc.
T +1.850.385.5441 | F +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36 2014) MURDO SECTION

FIA #	CHAINAGE:	DISCIPLINE #
4369	MP 541.30	03

WHITE RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
LYMAN & TRIPP COUNTY, SOUTH DAKOTA

SCALE	DRAWING No	REV
AS SHOWN	4369-03-ML-03-001	00

TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

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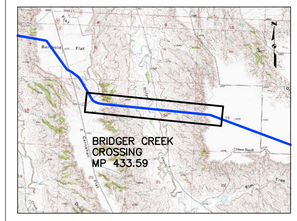

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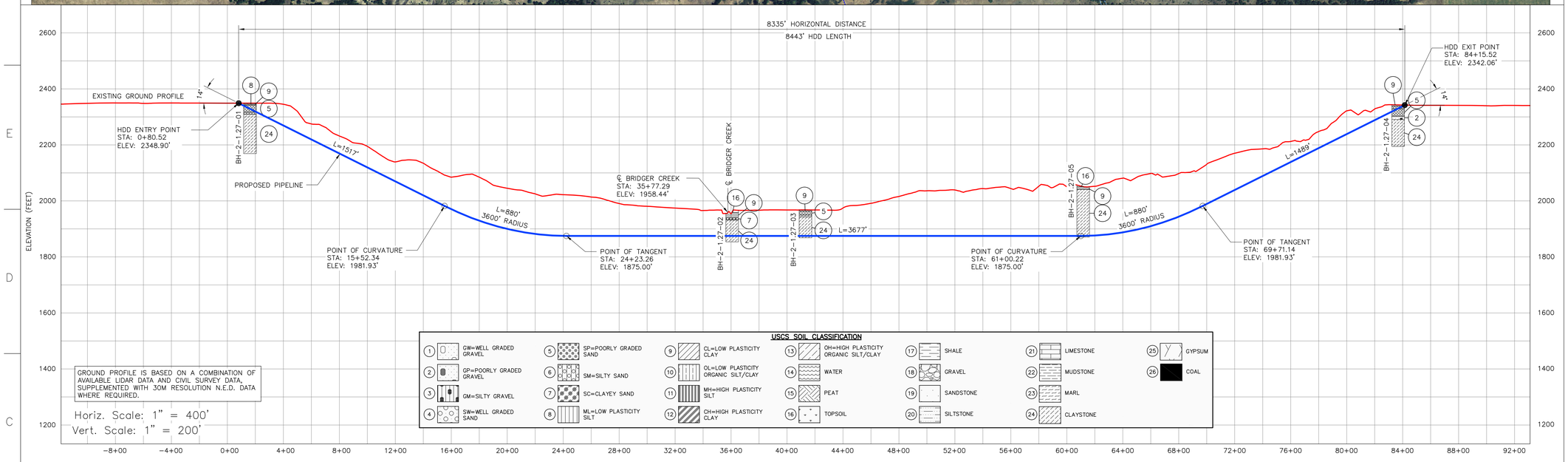
14) 36" O.D. X 0.618" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO (NOT TO EXCEED 40 MILS TOTAL)

15) 36" O.D. X 0.465" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE



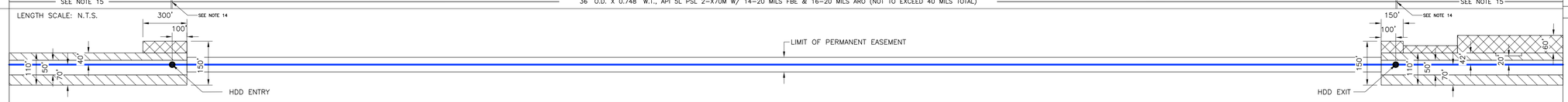
USCS SOIL CLASSIFICATION

1 GW=WELL GRADED GRAVEL	5 SP=POORLY GRADED SAND	9 CL=LOW PLASTICITY CLAY	13 OH=HIGH PLASTICITY ORGANIC SILT/CLAY	17 SHALE	21 LIMESTONE	25 GYPSUM
2 GP=POORLY GRADED GRAVEL	6 SM=SILTY SAND	10 OL=LOW PLASTICITY ORGANIC SILT/CLAY	14 WATER	18 GRAVEL	22 MUDSTONE	26 COAL
3 GM=SILTY GRAVEL	7 SC=CLAYEY SAND	11 MH=HIGH PLASTICITY SILT	15 PEAT	19 SANDSTONE	23 MARL	
4 SW=WELL GRADED SAND	8 ML=LOW PLASTICITY SILT	12 CH=HIGH PLASTICITY CLAY	16 TOPSOIL	20 SILTSTONE	24 CLAYSTONE	

CROSSING INFORMATION (NOMINAL STATIONING)	-7+03 P.I. 11°04'00" LT.	-4+78 P.I. 08°15'03" LT.	-2+57 P.I. 05°54'38" LT.	0+00 P.I. 03°07'45" LT.	0+80.52 HDD ENTRY POINT	1+62 BH-2-1.27-01	15+52.34 PT OF CURVATURE	24+23.26 PT OF TANGENT	35+77.29 ℄ BRIDGER CREEK	36+08 BH-2-1.27-02	41+31 BH-2-1.27-03	61+00.22 PT OF CURVATURE	61+17 BH-2-1.27-05	69+71.14 PT OF TANGENT	83+68 BH-2-1.27-04	84+15.52 HDD EXIT POINT	85+06 P.I. 14°34'38" RT.
PIPELINE DATA	SEE NOTE 15																SEE NOTE 15

PIPELINE DATA: 36" O.D. X 0.748" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO (NOT TO EXCEED 40 MILS TOTAL)

CONSTRUCTION WORKSPACE — LENGTH SCALE: N.T.S.



ENVIRONMENTAL MITIGATION/RECLAMATION
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REFERENCE DRAWINGS

DRAWING No	TITLE
4367-03-ML-02-028	ALIGNMENT SHEET
4367-03-ML-02-029	ALIGNMENT SHEET

ISSUED FOR CONSTRUCTION 2013-05-31

REVISION

REV No	DATE	DESCRIPTION
00	2013-05-31	ISSUED FOR CONSTRUCTION

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2095406	EXP	TLB	BLS	KJM	KJM	EXP

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL

FIRM: EXP ENERGY SERVICES, INC. — DATE

FIRM LICENSE: FB034023

REGISTERED PROFESSIONAL ENGINEER — REG. NO. 11683 — KEVIN JAMES MCGLYNN — SOUTH DAKOTA

REV. NO. — DATE — PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver

exp Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36 2014) FAITH SECTION

FIA #	CHAINAGE:	DISCIPLINE #
4367	MP 433.59	03

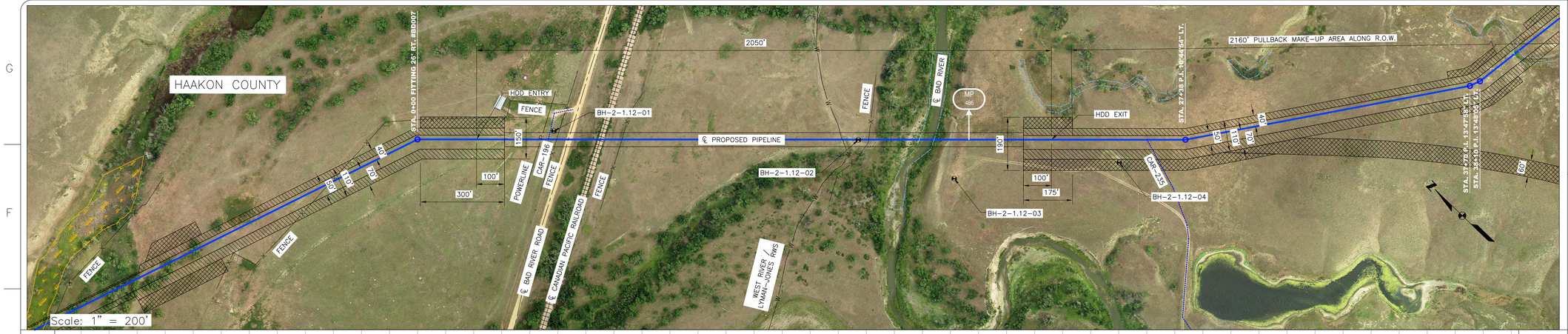
BRIDGER CREEK HDD INSTALLATION
KEYSTONE XL PROJECT
HAAKON COUNTY, SOUTH DAKOTA

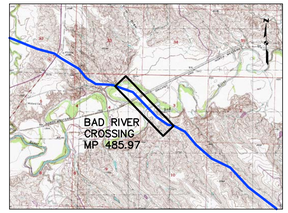
SCALE	DRAWING No	REV
AS SHOWN	4367-03-ML-03-003	00

PLOTTED SIZE: ANSI D (22x34)

TC_UD_BR.DWG 22X34

016805





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8) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.

9) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK.

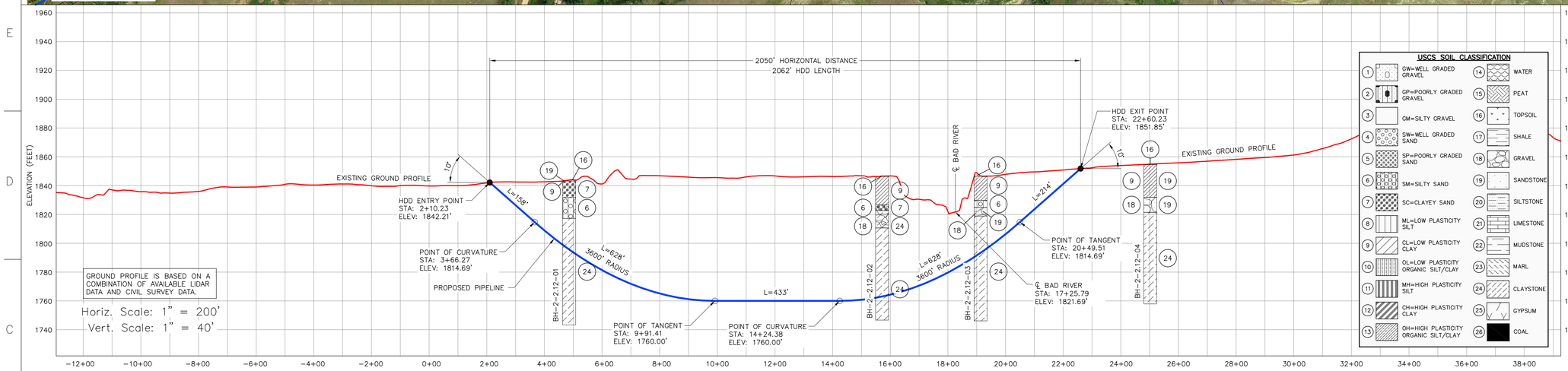
10) MUD DISPOSAL: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATER BODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT POINTS SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PRACTICAL AND DISPOSED OF AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.

11) CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED IN PROJECT DOCUMENTS.

12) NOMINAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN IRREGULAR TERRAIN. UPDATED DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.

13) CONTRACTOR SHALL FOLLOW REFERENCE SPECIFICATIONS. REFER TO KEYSTONE CMRP, KEYSTONE CONSTRUCTION SPECIFICATIONS, PROJECT ENVIRONMENTAL REQUIREMENTS FOR THIS SITE SPECIFIC DETAIL, PART 195 OF THE CODE OF FEDERAL REGULATIONS (LATEST EDITION), ASME B31.4, AND API 1102.

14) 36" O.D. X 0.618" W.T., API 5L PSL 2-X70M W/14-20 MILS & 16-20 MILS ARO (NOT TO EXCEED 40 MILS TOTAL)

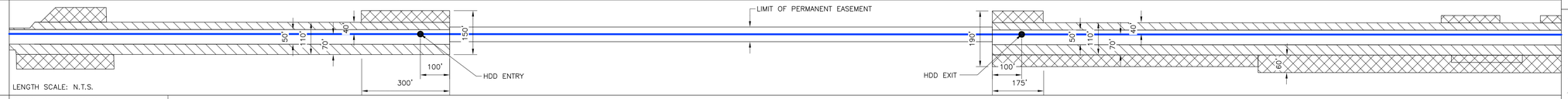


USCS SOIL CLASSIFICATION

1	GW=WELL GRADED GRAVEL	14	WATER
2	GP=POORLY GRADED GRAVEL	15	PEAT
3	GM=SILTY GRAVEL	16	TOPSOIL
4	SW=WELL GRADED SAND	17	SHALE
5	SP=POORLY GRADED SAND	18	GRAVEL
6	SM=SILTY SAND	19	SANDSTONE
7	SC=CLAYEY SAND	20	SILTSTONE
8	ML=LOW PLASTICITY SILT	21	LIMESTONE
9	CL=LOW PLASTICITY CLAY	22	MUDSTONE
10	OL=LOW PLASTICITY ORGANIC SILT/CLAY	23	MARL
11	MH=HIGH PLASTICITY SILT	24	CLAYSTONE
12	CH=HIGH PLASTICITY CLAY	25	GYPSUM
13	OH=HIGH PLASTICITY ORGANIC SILT/CLAY	26	COAL

CROSSING INFORMATION (ESTIMATED STATIONING)	0+00 FITTING 26° RT. #BD007	2+10.23 HDD ENTRY POINT	3+66.27 PT OF CURVATURE	4+86 BH-2-1.12-01	9+91.41 PT OF TANGENT	14+24.38 PT OF CURVATURE	15+71 BH-2-1.12-02	17+25.79 ℄ BAD RIVER	19+13 BH-2-1.12-03	20+49.51 PT OF TANGENT	22+60.23 HDD EXIT POINT	25+02 BH-2-1.12-04	27+38 P.I. 10°44'54" LT.	37+70 P.I. 13°47'58" LT.	38+10 P.I. 13°48'05" LT.

PIPELINE DATA				
	36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ 14-20 MILS	SEE NOTE 14	36" O.D. X 0.748" W.T., API 5L PSL 2-X70M W/ 14-20 MILS & 16-20 MILS OF ARO (NOT TO EXCEED 40 MILS TOTAL)	SEE NOTE 14	36" O.D. X 0.465" W.T., API 5L PSL 2-X70M W/ 14-20 MILS



ENVIRONMENTAL MITIGATION/RECLAMATION	
	TOPSOIL SALVAGE METHOD
	STREAMS
	WETLANDS
	TIMING CONSRAINTS
	MILEPOST
	MONITORING
	RECLAMATION
	SPECIAL CONSIDERATIONS

LEGEND

- CL P.I.
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- WARNING SIGN
- PIPELINE ROUTE
- CATHODIC PROTECTION TEST STATION
- ROAD CL
- ROAD EDGE
- FIELD PATH
- RAILWAY
- FENCE
- FOREIGN PIPELINE
- WATER LINE
- OVERHEAD POWERLINE
- UNDERGROUND UTILITY
- TELEPHONE LINE
- PROPERTY PARCEL
- SECTION LINE
- COUNTY LINE
- PERMANENT EASEMENT BOUNDARY
- TEMPORARY WORKSPACE BOUNDARY
- ADDITIONAL TEMPORARY WORKSPACE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- EXISTING GROUND
- WATER BODY
- WETLAND BOUNDARY
- HEADCUT AREA
- EXCLUSION FENCE

REFERENCE DRAWINGS

DRAWING No	TITLE
4368-03-ML-02-027	ALIGNMENT SHEET
4368-03-ML-03-028	ALIGNMENT SHEET

ISSUED FOR CONSTRUCTION 2013-05-31

REVISION

REV No	DATE	DESCRIPTION
00	2013-05-31	ISSUED FOR CONSTRUCTION

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2095406	EXP	TLB	BLS	KJM	KJM	EXP

PROFESSIONAL ENGINEER/RPT

FIRM: EXP ENERGY SERVICES, INC.

FIRM LICENSE: FB034023

REGISTERED PROFESSIONAL ENGINEER — REG. NO. 11683 — KEVIN JAMES MCGLYNN — SOUTH DAKOTA

PERMIT/ ENG. APPROVAL

DATE

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver

exp Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36 2014) HAAKON SECTION

FIA #	CHAINAGE:	DISCIPLINE #
4368	MP 485.97	03

BAD RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
HAAKON COUNTY, SOUTH DAKOTA

SCALE	DRAWING No	REV
AS SHOWN	4368-03-ML-03-001	00

PLOTTED SIZE: ANSI D (22x34)

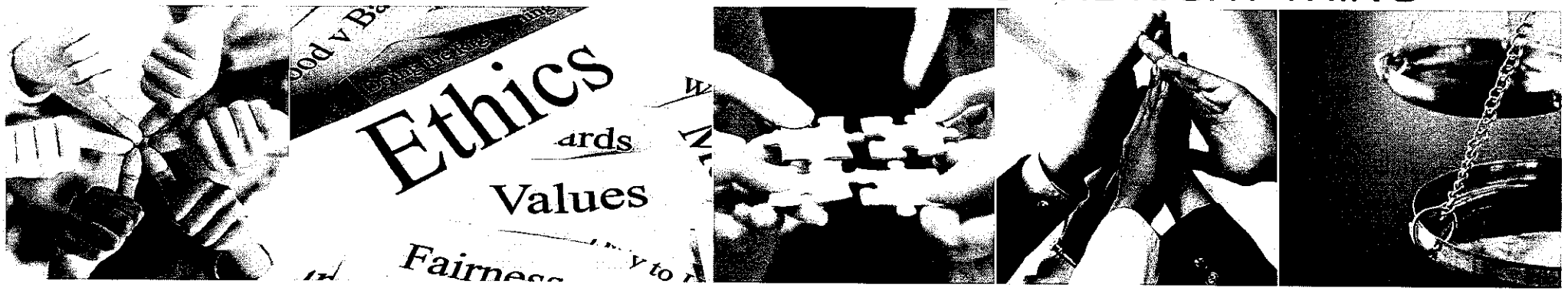
016806

TC_UD_BR.DWG 22X34

TRANSCANADA

CODE OF BUSINESS ETHICS

MAKING THE RIGHT CHOICES – DOING THE RIGHT THING



TransCanada
In business to deliver

Message From Russ Girling

TransCanada prides itself on being a company that all of our stakeholders (whether they are customers, suppliers, investors, lenders, regulators, neighbors, or employees), can count on to make the right choices and do the right thing.

While our corporate values, namely Collaboration, Integrity, Responsibility, and Innovation, form the foundation of how we do business, our Code of Business Ethics (COBE) goes one step further. COBE helps us put those values into practice in all of our daily decisions and activities. In this way, COBE helps to clarify what making the right choices and doing the right thing really means.

Making the right choices and doing the right thing is a serious matter. Fundamentally, it's our license to do business. It's essential that you carefully read and ensure you understand the principles set out in COBE, and that you refer to it regularly. It will help you with guidance on ethical situations you face at work, and it will help you understand the type of behavior expected of you. you. You are required to complete your COBE training and certification each year. Remember – all of us benefit by working for a company that makes the right choices and does the right thing. It takes all of us making the right choices and doing the right thing together to ensure TransCanada continues to be a company our stakeholders can count on.

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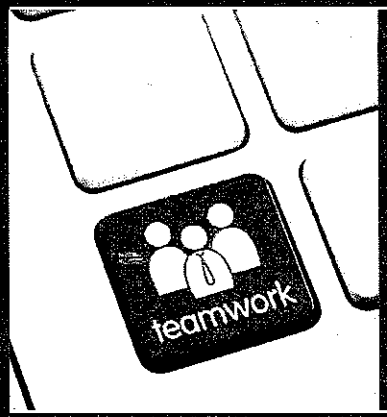
WHAT DOES

MAKING THE RIGHT CHOICES AND DOING THE RIGHT THING

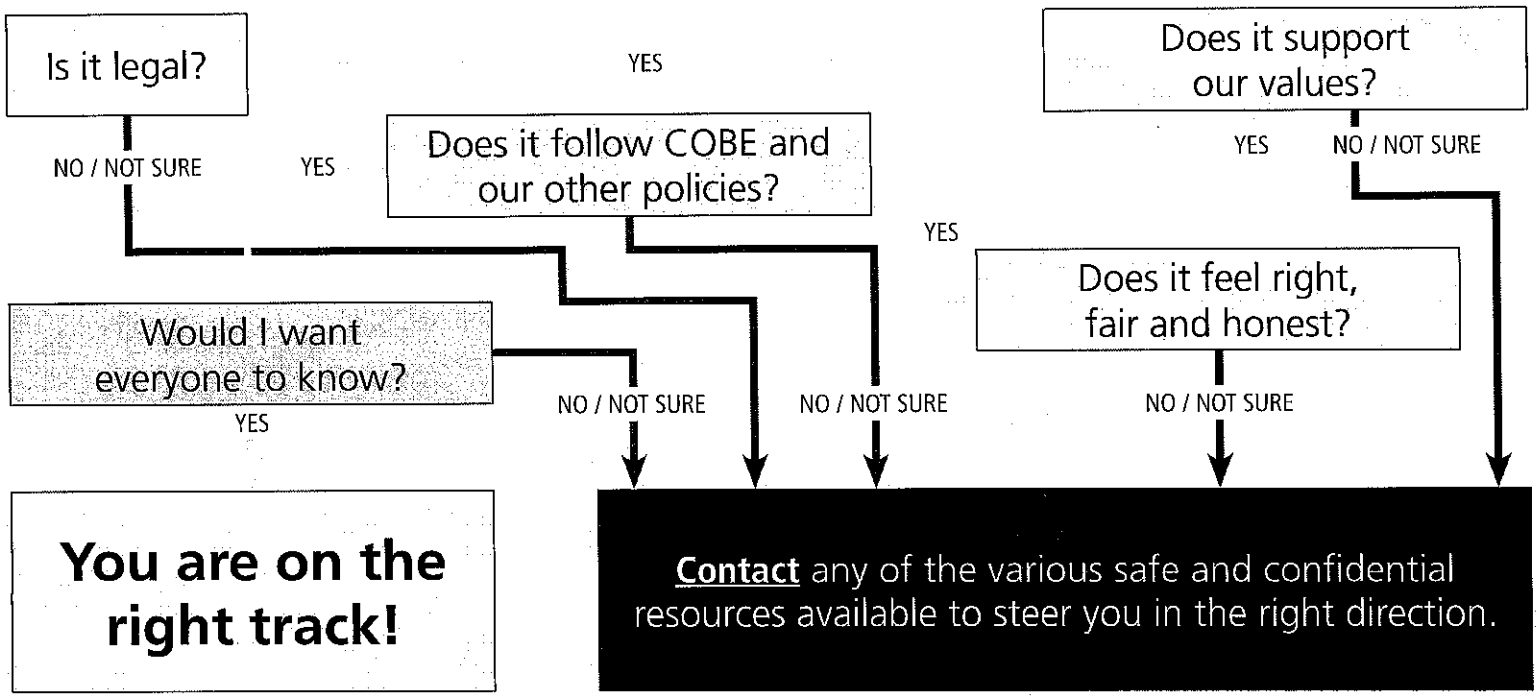
MEAN?



At TransCanada, making the right choices and doing the right thing isn't just a catch-phrase – it's fundamental to how we do business. But what does it really mean to make the right choices and do the right thing? At a minimum, it means:

- We comply with the applicable legal requirements and corporate policies that impact us in our jobs;
- We follow the principles set out in COBE;
- We report, through appropriate internal channels, any instances of actual or suspected non-compliance with legal requirements or with COBE that we become aware of;
- We do not retaliate against anyone for the good-faith reporting of an incident or issue; and
- We support others in making the right choices and doing the right thing.

Making the Right Choices – Doing the Right Thing



Even if we try our best to make the right choices and do the right thing, there are times when the right thing isn't completely clear. It's at those times that we need to ask ourselves some fundamental questions. The above guide to making the right choices and doing the right thing is intended to help you to identify the right path in those situations.

If in doubt, ask – consequences of violations can be serious

If you are ever unsure of how to make the right choices and do the right thing, it is always better to **ask**. The consequences of violating the law, COBE or any other corporate policy are very serious and can include discipline up to and including termination. In addition, in some circumstances, inappropriate conduct may need to be reported to the authorities, and TransCanada could bring legal action against those involved. By asking before you act, you protect both yourself and the Company.

Does COBE apply to everyone?

COBE applies to all employees, directors and officers of TransCanada Corporation and its wholly-owned subsidiaries and operated entities in all countries in which TransCanada conducts business. Contract workers and independent consultants must also comply with TransCanada's COBE or their own companies' equivalents to the extent such equivalents meet or exceed the standards set out in COBE. We expect our vendors and suppliers to comply with equally high standards. If you are a contract worker or independent consultant and are unsure of what standard you need to comply with, you should contact your employer or one of TransCanada's **resources**.

Are there situations where I don't have to comply with COBE?

Only the Chief Compliance Officer has the authority to waive any individual's compliance with COBE. Waivers for executive officers and Board members must be approved by the Board of Directors (or a committee of the Board) and disclosed if required. TransCanada employees and officers are required to complete the annual COBE training; you will be required, in conjunction with that training, to certify that you understand and are in compliance with all legal requirements, corporate policies and COBE.

What does Making the Right Choices and Doing the Right Thing require?

Making the Right Choices and Doing the Right Thing requires that we:

- Collaborate;
- Act with Integrity;
- Act Responsibly; and
- Innovate.

Kristine Delkus
Executive Vice President, General Counsel and Chief Compliance Officer

TransCanada is committed to ethical and lawful business conduct – making the right choices and doing the right thing every time.

MAKING THE RIGHT CHOICES AND DOING THE RIGHT THING REQUIRES THAT WE COLLABORATE

We work together as one Company to make the right choices and do the right thing. TransCanada has set up an ethics and compliance organization that works across TransCanada's various departments, business lines, functions and regions to help ensure we make the right choices and do the right thing together.

Collaboration means:

Compliance Organization

We look to the ethics and compliance organization and the resources that have been put in place to help us to make the right choices and do the right thing.

The various members of the ethics and compliance organization are available to work with you and support you in making the right choices and doing the right thing in your day to day work. Click on the following for short descriptions of how the different members of TransCanada's Compliance Organization fit into the bigger picture.

Compliance Coordinators

Corporate Compliance Department

Internal Audit

Human Resources and Harassment Investigation Coordinator

Compliance Committee

Chief Compliance Officer

Audit Committee of Board of Directors

Leaders

TransCanada's leaders play a special role in ensuring we all make the right choices and do the right thing together.

If you are a leader, you have the following responsibilities in addition to complying with the principles set out in COBE:

- inspiring your direct reports and any contract workers or independent consultants reporting to you to act ethically by setting an ethical tone within your team;
- reinforcing the importance of making the right choices and doing the right thing relative to other corporate objectives (for example, profits and cost management);
- setting an example by modeling exemplary ethical business conduct;
- both through your words and your actions, creating a safe environment in which individuals are encouraged to speak up if they are aware of or suspect a legal or ethical violation;
- accepting reports of violations that individuals may bring to you, and understanding your obligation to report these issues as appropriate to your Compliance Coordinator, the Corporate Compliance Department, Internal Audit, the Harassment Investigation Coordinator or Privacy Officer, or the **Ethics Help Line**;
- ensuring that your direct reports understand and act in accordance with all legal and ethical requirements that impact them in their jobs, that they know how to report actual or suspected non-compliance with the law or COBE or to ask questions regarding ethical or legal matters, and that they complete all required ethics and compliance-related training;
- assisting and supporting individuals who are unsure how to make the right choices and do the right thing;
- working with Human Resources, your Compliance Coordinator, the Corporate Compliance Department and Internal Audit to ensure that violations of legal requirements or COBE by your direct reports are addressed appropriately (including discipline as appropriate); and
- working with your Compliance Coordinator and the Corporate Compliance Department to reward individuals who have demonstrated exceptional positive ethical behaviour or actions that reduce the risk of legal violations.

Reporting Legal and Ethical Violations

We report any non-compliance with TransCanada's COBE or any legal obligation, so that it can be addressed as appropriate. We do so with confidence that our confidentiality and identity will be protected to the greatest extent possible, and that retaliation for good-faith reporting is prohibited.

How do I report an issue or seek guidance?

You are required to report any actual or suspected violation of the law or of COBE of which you may become aware. We take every report seriously and provide immunity from disciplinary action for good-faith reporting of incidents and issues.

Resources

To report an issue, or if you would like guidance on how to make the right choices and do the right thing in a particular situation, the following resources are available to you:

- Your leader;
- Your Human Resources Consultant;
- Your Compliance Coordinator;
- The Corporate Compliance Department;
- Internal Audit; and
- The Law Department.

In addition, you should report harassment issues to the Harassment Investigation Coordinator, and privacy issues to the Privacy Officer. Fraud, accounting, or financial reporting issues should be reported to Internal Audit.

For contact information – **click here**.

If you don't feel comfortable speaking to any of the above people or if you would like to remain anonymous, you can contact the **Ethics Help Line**.

Questions or concerns regarding corporate policies other than COBE that are not otherwise mentioned above should be brought to the attention of **policy_services@transcanada.com**.

Ethics Help Line

- Canada / U.S. 1.888.920.2042
  Mexico 001.800.840.7907
  www.transcanada.com/ethics

The Ethics Help Line is operated by an independent third party service provider. The service provider does not have caller ID and does not provide TransCanada with information on your identity unless you expressly give the service provider your name. No attempt will be made to determine your identity if you choose not to provide it.

All calls to the Ethics Help Line are free of charge, and can be made in English, French or Spanish 24 hours a day, 7 days a week, 365 days a year.

You may use the Ethics Help Line either to report any actual or suspected issues or to ask questions. When you make a report through the Ethics Help Line, you can choose whether or not you want to remain anonymous.

If you choose to remain anonymous you will be given a code known as a "report key" which you can use to call back for updates or to provide additional details. In this way the Company can provide you with information on how your report is being managed, or get more information from you without discovering your identity.

Reports made to the Ethics Help Line are forwarded to a limited number of individuals within TransCanada. Internal Audit is responsible for investigating issues raised and ensuring all calls are addressed appropriately. Particularly serious issues are reported to the Audit Committee of the Board of Directors.

If the issue raises an immediate threat to safety or security, you should contact Corporate Security, local police or other emergency services as appropriate.

All reports are taken seriously

Regardless of the means used to report, you can feel confident that the report will be taken seriously and that it will be investigated and addressed as appropriate, in accordance with **TransCanada's Procedure for the Investigation, Management and Reporting of Instances of Non-Compliance**. Harassment issues are investigated by the Harassment Investigation Coordinator in accordance with the **Harassment Free Workplace Policy**.

Confidentiality/anonymity

Your confidentiality and your identity (if known) will also be protected to the greatest extent possible. The information you provide will be shared only with those who need to know in order to ensure the issue is properly investigated and addressed.

Non-Retaliation Policy

We support and encourage you to report suspected incidents of non-compliance with applicable laws, regulations, and authorizations, as well as hazards, potential hazards, incidents involving health and safety or the environment, and "near-misses". We take every report seriously, investigate each report to identify facts, and effect improvements to our practices and procedures when warranted. We ensure immunity from disciplinary action or retaliation for you for the good-faith reporting of such concerns. If you have reported concerns and believe that you have been a victim of retaliation, or if you are aware of or suspect retaliation against anyone else for reporting concerns, you should report the retaliation immediately to the Ethics Helpline. Reports to the Ethics Helpline can be made anonymously.

Paul Miller
Executive Vice-President and President,
Liquids Pipelines

We count on everyone to report issues. Retaliation for good faith reporting is not tolerated.

Participation in investigations and audits

Employees, contract workers, independent consultants, directors and officers are required to participate in investigations and audits if and as requested.

QUESTION: I suspect one of my colleagues has violated a COBE provision, but I'm not sure my suspicions are correct. I'm concerned I'll be labeled a tattle-tale (or worse) if I report it. What should I do?

ANSWER: If you suspect misconduct, you should report it, so that it can be investigated. If it turns out not to be an issue, there will be no harm done. Violations of the law or COBE that are not reported, however, cannot be addressed, and that can seriously undermine the Company. If that happens, we all suffer. If you report the issue, your confidentiality and identity will also be protected and if any retaliation is found to occur, it will be taken very seriously.

Karl Johannson
Executive Vice-President and President, Natural Gas Pipelines

Reporting of incidents of non-compliance is so important since it's really the only way we can find out about underlying problems and fix them. It allows us to learn from our mistakes and continually get better at making the right choices and doing the right thing.

MAKING THE RIGHT CHOICES AND DOING THE RIGHT THING

REQUIRES THAT WE ACT WITH INTEGRITY

We act with high ethical standards and we comply with the legal requirements and corporate policies applicable to us in our jobs. We make the right choices and do the right thing, even when others don't and even when making the wrong choices and doing the wrong thing seems easier or better for the bottom line.

Acting with Integrity means:

Trading with Integrity

We engage only in transactions that have a legitimate business purpose, and we do not interfere with the normal functioning of the markets in which we operate and transact. We also report transactions in accordance with all legal requirements.

The markets for oil, gas, power and transmission only work effectively if they function in a fair, efficient and openly competitive way, such that prices are determined based on competitive supply and demand.

We conduct business in a way that promotes a fair, efficient, and openly competitive operation of the market and complies with market manipulation laws. Market manipulation laws prohibit any actions intended to interfere with the normal functioning of markets through fraud or deception of others, or increases or decreases in capacity or prices in contravention of market manipulation laws or other local market rules.

Some examples of illegal market manipulation include artificially increasing or decreasing generation or transmission capacity, making especially high or low bids that may be prohibited by market rules, and entering into both purchase and sale transactions at the same time (so that there is no net change in beneficial ownership), in order to falsely increase the perception of trading volumes (this is known as "wash trading"). It may also include intentionally losing money on transactions that impact prices in order to obtain the benefit of those prices in other transactions.

While the previous examples are intended as a general discussion, market rules and obligations vary by jurisdiction. You must be knowledgeable about the particular rules applicable to the market(s) in which you trade and be careful never to enter transactions that are illegal under local laws or other local market rules, or to otherwise interfere in the normal functioning of the markets.

You should also always ensure that you accurately report transactions so that TransCanada can meet its legal reporting obligations.

Alex Pourbaix
Executive Vice-President and
President, Development

The choices we make and the things we do, whether on the trading floor, in the field, or in the boardroom, have real consequences. So making the right choices and doing the right thing matters.

Competing Fairly

We compete vigorously and fairly, based on price, quality and service and do not interfere with our customers' or other market participants' ability to do the same.

A competitive marketplace in the energy and transmission services that TransCanada provides helps to ensure fair prices and customer choice and in turn, results in the industry as a whole providing more effective, better service. We believe in vigorous, fair competition and comply with all laws designed to protect the ability of companies to compete freely.

In particular, you should never engage in any illegal acts that are intended to, or that are likely to have the effect of, reducing competition. The most serious and most common of such acts is collusion, which is entering into an agreement (usually with one or more competitors) to reduce competition. Examples of such agreements include agreements to:

- fix prices;
- decrease capacity or volume available to customers;
- allocate customers or markets among competitors; or
- boycott certain customers or suppliers.

Even sharing competitively sensitive information (such as information regarding prices, capacity, volume, customers or markets) with competitors can be seen as evidence of collusion. As such, you need to be very careful whenever you have contact with competitors (whether in trade association meetings, at conferences, through participation in benchmarking groups or in negotiating or otherwise dealing with actual or potential joint venture partners who are also TransCanada competitors) to avoid sharing competitively sensitive information. You must never enter into an agreement to reduce competition, or that is likely to have that effect.

Competition/antitrust laws must also be kept in mind when you are involved in joint purchasing arrangements, negotiating acquisitions or divestitures, joint venture arrangements and the like, particularly when the parties are TransCanada competitors.

QUESTION: While at a trade association meeting recently, a few competitors I was sitting with at dinner started talking about their pricing. I knew it wasn't appropriate, so I didn't say anything. Did I do the right thing?

ANSWER: While you were right not to participate in the discussion, when in such a situation, it's a good idea to take the further step of making clear to everyone that the discussion is inappropriate and that you will not participate. If the inappropriate discussion continues, you should physically remove yourself from the situation. You should also document what happened and report the matter. This will help to protect you and TransCanada in case anyone ever points to the fact that you were part of a group in which an inappropriate discussion took place.

Avoiding Bribery and Corruption

We always conduct our business in a legal and ethical manner. Part of behaving ethically means that we do not participate in any corrupt activities and maintain compliance with all applicable Anti-Bribery and Anti-Corruption laws and regulations of each jurisdiction in which we conduct business.

Corruption in both business and government is a problem since it prevents fair and open competition based on merit.

We do not provide either private parties or government officials (including employees of state-owned companies, members of international organizations, political parties and candidates for office) with payments, kickbacks, gifts, or anything else of value (including benefits such as entertainment, charitable contributions or employment opportunities) for the purpose of improperly influencing such parties' actions or decisions in favour of TransCanada. Even if the intent is not to influence, you should not provide a payment or benefit to any third party, if it could appear to be improper.

Since TransCanada can be held responsible for improper payments and benefits provided by agents, contractors, suppliers and other third parties acting on TransCanada's behalf, we must also do our best to ensure that we only deal with legitimate, reputable parties, and that they understand their obligation not to provide such improper payments or benefits in connection with the business they do for TransCanada.

In addition you must ensure that any legitimate expenditures, including their nature and purpose, are accurately reported, so that there is no question whether they were made for an improper purpose.

For more information, please refer to the Avoiding Bribery and Corruption Policy.

Political Contributions and Government Lobbying

We respect the political process, and only make political contributions and engage in lobbying activities that are legal and transparent.

Laws concerning political contributions and government lobbying are aimed at preventing corruption in government and at ensuring the proper functioning of the political process. While the rules can be complex and vary greatly from jurisdiction to jurisdiction. In some jurisdictions we are not allowed to make political donations at all. In other jurisdictions, the amount of political donations and the ways in which they may be made are restricted, and they often require registration of lobbyists and reporting of certain contacts with government officials.

TransCanada's Government Relations group manages all of TransCanada's political donations. Lobbying-related activities are managed between the Stakeholders Relations Department for federal, state or provincial government and the Operations and Major Projects Department for municipal governments. To ensure that we comply with all legal requirements, you must seek approval from the appropriate department before engaging in these activities on behalf of TransCanada.

Refer to the **Avoiding Bribery and Corruption** for more information on payments to government officials.

QUESTION: I am very politically active. Is that allowed?

ANSWER: TransCanada absolutely allows you to participate in the political process as an individual, in accordance with your own political views and the laws and regulations governing this activity. In doing so, however, you may not use TransCanada's name, nor indicate that you represent TransCanada, unless you have been authorized to do so.

Accounting, Financial Reporting, and Fraud Prevention

We are open and forthright in reporting our financial condition to investors and lenders, as well as in reporting our costs to customers and regulators. We ensure that our accounting and financial records and reporting are fair, accurate, understandable and complete, and we do not falsify financial documents or records, or misstate or misrepresent the nature of costs or expenditures.

In order to make informed investment decisions, our investors need to know that our accounting records and financial reporting are accurate and complete. Our lenders similarly require that we disclose certain information to them regarding the Company's financial condition. In addition, TransCanada's customers and regulators rely on the accuracy of our accounting records to ensure that pipeline tolls are calculated in a fair and transparent manner.

You must ensure that all transactions that you engage in, or that you approve, whether under a TransCanada contract or as an individual business expense, are reported and that the reporting is accurate, complete and complies with all applicable accounting and legal requirements. You must also follow all relevant corporate policies and other requirements respecting the transaction (for example, spending limits and obtaining of approvals).

You should never engage in "off the record" or other transactions or accounts that do not fully and accurately state the nature and amount of specific transactions.

You must also never falsify any invoice, expenditure, time sheet or other document related to a Company cost or revenue. Doing so constitutes fraud and is prohibited. For more information, please see the **Avoiding Bribery and Corruption Policy** and TransCanada's Policies on **Risk Management and Financial Reporting**.

Public Disclosure of Information

We ensure that public statements regarding the Company are provided in a timely manner, are fair, accurate and complete, comply with legal requirements and corporate policies, and preserve and protect TransCanada's reputation and brand.

In order to ensure that all potential investors receive information that could be material to a decision to buy or sell TransCanada shares or other securities, TransCanada must disclose material information regarding the Company publicly and in a timely manner.

In addition, we need to ensure that information released to the media or the public regarding the Company is accurate and fairly stated and that a clear and consistent message is provided to our various stakeholders.

TransCanada has policies and procedures regarding proper public disclosure of information, and you should always use those prescribed channels. If you receive an inquiry from an external source you should direct it to the appropriate Company representative for response.

The groups managing these inquiries include:

Media/Charitable Organizations /Elected Officials	Stakeholder Relations
Investors/ Lenders/ Analysts	Investor Relations and Corporate Communications
Regulatory Agencies	Law Department
Employment Related	Human Resources

In the age of social media, it is easy to broadly and publicly communicate information. We need to be particularly aware of our obligations to disclose Company information only in accordance with legal and internal requirements. For more information, please see TransCanada's **Public Disclosure Policy**. Also see the **Corporate Communication Policy**.

Dan Marchand
Executive Vice-President
and Chief Financial Officer

I can't stress enough how important accurate, timely and complete financial reporting and public disclosure is – it's what gives us access to the financial markets and builds with investors and lenders confidence and trust in our Company.

Preventing Money Laundering and Terrorist Financing

We expect our customers and suppliers to be vigilant in ensuring that the payments we make and the methods of payment we use are legitimate and legal.

Even if we make the right choices and do the right thing, there could be instances in which our customers and suppliers do not. Laws concerning money laundering and terrorist financing are in place to deter criminal and terrorist activities of those with whom we might do business.

In order to ensure compliance with these laws, you, when acting on behalf of TransCanada, must exercise care before agreeing to do business with a third party. You should ensure that it is a legitimate, reputable business and you must recognize and report any suspicious payments or transactions.

Examples of such suspicious payments or transactions include any request by a third party to have a payment deposited into a personal rather than a business account; transactions with entities other than those involved in the underlying contract or business deal; or payments or other transactions involving a country other than that in which the parties to the contract or business deal are located. Payments of cash, unusual financing arrangements, fictitious invoices or other efforts by a third party to conceal the true purpose of a payment or transaction also raise concerns.

DID YOU KNOW...

Ignoring the signs that a transaction or payment initiated by a third party is not legitimate can result in TransCanada being found complicit in any illegal activity that may be associated with the transaction, even if the Company did not expressly authorize it.

Avoiding Insider Trading and Tipping

We do not use material non-public information to trade in shares or other securities, or provide such information to others for that purpose.

We all have access to non-public information regarding TransCanada, and sometimes we also have access to non-public information regarding customers, suppliers and other business partners.

To the extent non-public information that you are aware of could be material to a decision to buy or sell shares in TransCanada or another company (for example, if the information relates to a pending merger or acquisition, a new project or project approval or financial results that have not yet been made public), you and your immediate family members are not permitted to use that information to trade in the relevant company's shares or other securities.

You must also be careful not to provide that information to anyone else who might use it for that purpose.

To the extent that you are a Company insider, you have the additional obligation not to trade in TransCanada shares and other securities during black-out periods. For more information, please see the **Trading Policy for Employees and Insiders**.

International Trade

When engaging in international business, we comply with all international trade restrictions and licensing requirements, as well as all customs and taxation requirements.

International trade laws prohibit or restrict trade with certain countries that are subject to embargoes or sanctions, as well as with certain individuals and organizations (e.g. entities that have ties to actual or suspected terrorists or drug traffickers). These laws also prohibit or restrict imports and exports of certain types of goods, information and technologies – particularly those that could be used in weapons applications, but also including certain chemicals and commodities, such as oil and gas liquids. They also prohibit or restrict certain exports where the product will ultimately be put to military or weapons-related uses.

These laws also often impose stringent reporting obligations. As a transmission provider, TransCanada is even responsible for certain import/export-related reporting in respect of commodities that it transports across an international border through its pipeline, even though it does not own or control the transported commodities.

In addition, TransCanada has customs compliance obligations in connection with all cross-border transactions. Some examples of these transactions include inter-office packages, inter-company inventory transfers and sales, gifts from vendors and all cross border movements of material, information or technology.

Before engaging in any international transaction or sending electronic or other information or technology to another country (even to others within TransCanada who are located in a different country than you), TransCanada must ensure that it is legally permitted, considering the nature of the goods, information or technology, the counterparty with which you are dealing, the country in which the counterparty is located and the use of the goods, information or technology. TransCanada must also ensure that all applicable licensing requirements are met, and that it complies with all reporting and customs obligations. This includes ensuring the goods shipped are valued correctly for customs purposes.

DID YOU KNOW...

Even if TransCanada does not have title to a product it has purchased when it crosses a border (e.g. because it takes title on delivery), it may nevertheless be responsible for import and/or export compliance based on certain terms of the purchase contract. It is important to ensure the contract does not contain terms that result in TransCanada inadvertently taking on these obligations.

Complying with Regulatory Requirements

We are committed to meeting our obligations under all regulations and tariffs.

As a regulated Company, TransCanada is subject to many regulatory requirements, including those of the National Energy Board (NEB), the Federal Energy Regulatory Commission (FERC) and the North American Energy Reliability Corporation (NERC), among others. In addition, TransCanada's transmission providers are subject to tariffs that we must comply with.

Although it is impossible to list all of these requirements in COBE, you must ensure that you are familiar with the specific requirements applicable to you in your job. These can include reporting requirements and compliance with technical or other standards.

To the extent that the requirements of more than one jurisdiction apply, you must use the highest of the various standards.

QUESTION: I'm not a lawyer. How can I be expected to know all of the laws that might apply to my job or even be able to understand them?

ANSWER: While you are not expected to know all of the ins and outs of every law, you do need to have a basic understanding of the different areas of law that impact you in your job, so that you can spot potential issues and seek help from an expert. Your leaders and the ethics and compliance organization (particularly your Compliance Coordinator, the Corporate Compliance Department, and the Law Department) are also available to help you if you have questions about your legal obligations and are available to provide training on legal requirements that may be applicable to your team.

Inter-Affiliate Interactions

We ensure that the Non-Regulated affiliates of our transmission businesses do not receive an unfair advantage over other customers, and that they are not cross-subsidized at the expense of our transmission customers.

As a transmission provider, TransCanada is subject to Canadian Codes of Conduct in Canada and the Standards of Conduct in the U.S (Inter-affiliate Codes/Standards of Conduct). These Codes/Standards of Conduct are intended to ensure that our Non-Regulated affiliates do not receive an unfair advantage over other customers, whether as a result of discriminatory treatment or the sharing of information, personnel or resources. The Canadian Codes also prohibit the cross-subsidization of our Non-Regulated affiliates at the expense of our transmission customers.

In order to ensure compliance with the Inter-Affiliate Codes/Standards of Conduct, you must observe the following rules in your day to day activities:

- Regulated transmission providers may not give undue preference to any customer, whether it is an affiliated TransCanada entity or not – all customers must be treated equally;
- Regulated personnel must function independently of Non-Regulated personnel (e.g. they cannot perform the same jobs or report to the same leaders);
- Regulated and Shared personnel must not share, or act as a conduit for the sharing of Regulated information* with Non-Regulated Personnel;
- Any violations of the Inter-Affiliate Codes/Standards of Conduct must be reported to the Corporate Compliance Department, since TransCanada is legally required to either publicly post such information on its web site or report it to our regulators; and
- Non-Regulated entities must pay their fair share of any costs incurred by our Regulated transmission providers, so as not to burden our transmission customers with costs our Non-Regulated entities benefit from.

*Regulated information (which may not be shared with Non-Regulated personnel) includes commercial, financial, strategic, planning, operational and customer information of our transmission providers. For more information, please see TransCanada's **Inter-Affiliate Codes/Standards of Conduct**.

Avoiding Conflicts of Interest

We act in TransCanada's best interests, avoiding situations that could place us in a conflict, or even create a perception of conflict and we report such situations if and when they arise.

We all have an obligation to act in the best interests of TransCanada. To the extent our personal interests conflict or have the potential to conflict with TransCanada's, our ability to honour this obligation and to make objective decisions on behalf of the Company are compromised.

It is for this reason that you must avoid situations that can result in potential conflicts. If you ever find yourself in a situation that creates a potential conflict, you should report it. If you are a director, you should not participate in any decision or action in which there is a real or apparent conflict.

The following are some examples of situations that create potential conflicts of interest.

Investments and financial interests

TransCanada employees and officers or any member of their family may not own, control or direct a material financial interest (greater than 1%) in a competitor, or in a vendor, supplier, customer or other business which does or seeks to do business with TransCanada.

Outside employment and other business activities

TransCanada employees and officers may not engage in outside business activities, (e.g. as a consultant, employee, or director), that are in conflict with or detrimental to the interests of TransCanada. This can include:

- being involved in a business that competes with TransCanada or that does or seeks to do business with TransCanada;
- outside business activities that interfere with your day to day responsibilities at TransCanada. Unless specifically approved by your leader, you are expected to spend your full time and attention performing your job during your hours of work;
- an outside business activity that requires you to violate your confidentiality or other obligations to TransCanada; and
- an outside business activity that would be detrimental to TransCanada's reputation.

Outside directorships

TransCanada employees and officers may not serve as a director, officer, partner, consultant or in any other role in an unaffiliated organization, including a charitable or non-profit organization, if that activity is detrimental to the Company. Directorships in unaffiliated entities require the consent of your leader and of the Governance Committee of the Board of Directors in the case of the Chief Executive Officer and any member of the Executive Leadership Team.

Directors' Independence

In order to maintain their independence and to ensure that no relationships exist that may violate applicable corporate, securities and competition laws, all directors of TransCanada are required to have their independence assessed annually and also periodically in the event of a material change in their respective primary employment status or in the event they wish to join another board of directors, whether private or public. All candidates to TransCanada's board of directors are required to meet these independence standards, legal requirements and other standards before they can be formally considered for appointment. A director is required to declare any material interest that he or she may have in a material contract or transaction and recuse himself or herself from related deliberations and approval.

Corporate opportunities

You may not take personal advantage of a business opportunity that you discover through the use of Company assets, property, information or your position with TransCanada, or use Company assets, property, information or your position with TransCanada for personal gain or to compete with TransCanada.

Political office, appointments to boards or tribunals

TransCanada employees and officers may not serve in a political office or on an administrative board or tribunal, if that office, board or tribunal has or may have decision-making authority in respect of any aspect of TransCanada's business (such as the approval or projects or the issuing of permits).

Personal relationships

TransCanada employees and officers may not be in a reporting relationship with or otherwise involved in hiring, delegating work or making compensation decisions with respect to someone with whom you have a family or other significant personal relationship. Some examples of such relationships include but are not limited to a spouse, sibling, child, parent, cousin, and any "step", "common-law" or "in-law" variations of these relationships.

Contract workers and independent consultants

Contract workers and independent consultants must not directly or indirectly offer employment to TransCanada employees during the currency of their contract and for a reasonable time after their contract ends. Further, contract workers and independent consultants must not offer preferential pricing or benefits to individual TransCanada employees.

QUESTION: I own units of a mutual fund that invests in shares of one of our suppliers. Is that a problem?

ANSWER: If your investment in the supplier is through a mutual fund, it is unlikely that you would own more than 1% of the stock of the supplier. Because of the indirect nature of the investment, it is also less of a concern than if you owned the shares directly. Your ownership of mutual fund units is not a problem.

Dealing Fairly with Customers, Suppliers and other Stakeholders

We are fair and honest in our dealings with customers, suppliers and other stakeholders and we honour our obligations and commitments to them.

Treating customers, suppliers and other stakeholders fairly requires that you enter into business relationships based on merit and objective criteria, such as price, quality and service. It also requires that you are honest and forthright when dealing with others (never omitting important facts, manipulating another person or situation, or misrepresenting yourself or TransCanada), and that you honour TransCanada's contractual, regulatory and other commitments.

You should never make business decisions on behalf of TransCanada based on personal relationships, unfair bias or the potential for personal gain.

Giving and accepting gifts/entertainment/benefits

In order to ensure that your integrity and objectivity are not compromised, you should also be prudent in offering or accepting gifts, entertainment or anything else of value (including golf games, meals, or tickets to sporting or other similar events) to or from anyone or any organization that is a competitor or that TransCanada does or seeks to do business with, or that TransCanada requires a consent or approval from. While giving and accepting gifts can help to build and maintain strong business relationships, depending on the nature of and the context in which such gifts/entertainment/benefits are given, they can also cloud one's judgement or be seen to improperly influence business decisions.

The following considerations should be taken into account whenever you are faced with the prospect of giving or accepting a gift/entertainment/benefit:

- You should never give, offer, promise or approve a gift/entertainment/benefit that could violate applicable anti-bribery/anti-corruption legislation. Gifts/entertainment/benefits given to government officials and employees of government or government-owned entities are particularly sensitive (see the section on **Avoiding Bribery and Corruption** for more information on anti-bribery/anti-corruption legislation).
- You should never solicit or request a gift/entertainment/benefit;
- You should never give or accept a gift/entertainment/benefit in exchange for a business advantage (including entering into a contract or other business relationship, obtaining or giving more favourable business terms, obtaining a consent or approval), or where giving or accepting the gift/entertainment/benefit could even create the appearance that it might be for such purpose. Accepting and giving gifts/entertainment/benefits are particularly sensitive when TransCanada is seeking supplier bids for goods or services or when TransCanada is seeking to provide energy or transmission services to a prospective customer, including where a contract is being renewed;
- You should never give or accept cash, cash equivalents (other than gift cards and gift certificates), shares, or other securities; and
- You should never give or accept a gift/entertainment/benefit that could be considered offensive or in poor taste, or that could damage TransCanada's reputation.

- Occasional gifts/entertainment/benefits may be given or accepted as standard, customary business courtesies, provided the following criteria are taken into account:
  - whether the value of the gift/entertainment/benefit is lavish or extravagant in the context of the relationship, including the relative value of the gift/entertainment/benefit in the country involved;
  - whether the gift/entertainment/benefit is a customary business courtesy;
  - whether there is a business reason for the gift/entertainment/benefit;
  - the frequency of gifts/entertainment/benefits;
  - in the case of entertainment or similar benefits, whether a representative of both TransCanada and the organization giving or accepting the entertainment/benefit is present;
  - whether the person receiving the gift/entertainment/benefit could easily reciprocate;
  - whether the gift/entertainment/benefit appears to be fair and impartial;
  - whether the gift/entertainment/benefit creates or appears to create an obligation;
  - whether the gift/entertainment/benefit improperly influences or appears to improperly influence a business decision;
  - whether the gift/entertainment/benefit could result in compromised objectivity;
  - whether the gift/entertainment/benefit is intended to be shared or whether it is given to an individual; and
  - whether the gift/entertainment/benefit is legal and complies with the policies of TransCanada and the employer of the giver or recipient.

You should also always ensure that the costs of gifts/entertainment/benefits that you give are reported accurately and fully. For more information, please refer to the **Business Expense Policy**.

Dealing fairly with competitors

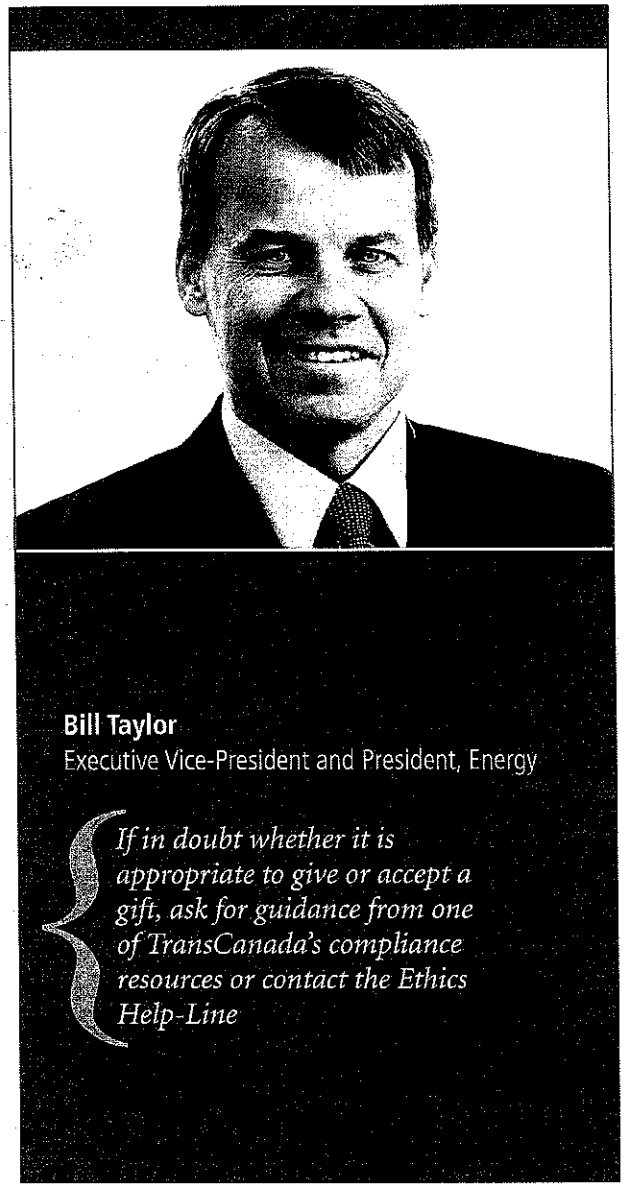
You must also ensure that you use only legitimate means (such as searches of public information) to obtain competitive intelligence. You must never use deceit or misrepresent yourself to obtain such information, and you should never take advantage of information you receive in error (for example, e-mails, faxes or documents someone sent you in error, or documents left in a meeting room or in a public place).

Use of company name for personal gain

Finally, you must never use the Company's name or purchasing power or your employment status to obtain personal discounts or rebates from vendors, unless those discounts or rebates are available to all employees.

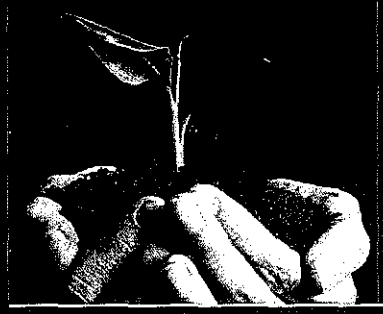
QUESTION: One of TransCanada's existing auto leasing suppliers has invited me to attend their annual product roll-out, which will be held in Las Vegas. It is a big event that all customers are invited to. The supplier has offered to pay for all flights and accommodation, in addition to the meals that will be provided as part of the event. The supplier's contract is not currently up for renewal, and I am not the person responsible for making the decision whether to renew. Can I attend?

ANSWER: Since TransCanada has an existing business relationship with the supplier and is not currently involved in any renewal or other negotiations and since the event is an annual (i.e. infrequent) business-related event, attended by many customers as well as supplier representatives, it is all right for you to attend, with your leader's approval. However, since the value of the event is significant, the supplier's payment for flights and accommodation could create a perception of conflict and/or an obligation on the part of TransCanada. Furthermore, TransCanada would not be in a position to reciprocate. So, the flights and accommodation should be paid for by TransCanada. You may accept the meals provided by the supplier as part of the event.



MAKING THE RIGHT CHOICES AND DOING THE RIGHT THING

REQUIRES THAT WE ACT RESPONSIBLY



In doing business, we consider the impact of our actions on TransCanada, on all of our stakeholders, on the environment and on the communities in which we operate. Acting responsibly includes protecting TransCanada's assets and those of third parties, protecting the health and safety of our workers, our neighbours and the public, protecting the environment, being a good ambassador of TransCanada, respecting human rights, being a good neighbour and member of the communities in which we live and work, and maintaining a respectful and productive workplace.

Acting responsibly means:

Protecting Confidential Information

We protect TransCanada's confidential information, and that of our customers, suppliers and other stakeholders, from improper disclosure and use.

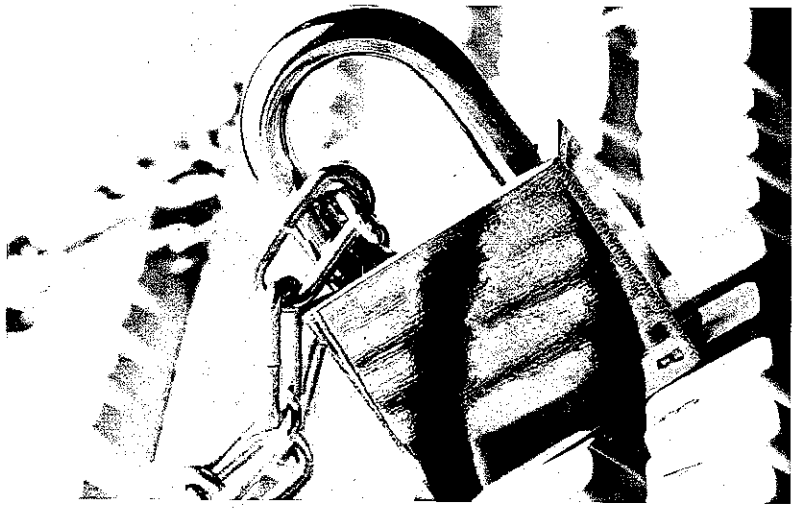
We all routinely have access to confidential information. TransCanada confidential information includes all TransCanada non-public information that may be of use to competitors or harmful to TransCanada or its customers, suppliers or other stakeholders, if disclosed. It can include information regarding TransCanada's business, operations, finances, strategies or business plans, projects, proposed mergers, acquisitions and divestitures, engineering designs and legal proceedings.

Because such information is sensitive and can be used by competitors or others to TransCanada's detriment, it must be protected. You should not disclose such information to anyone who does not need to know the information (including within TransCanada). Any disclosures to external parties that are required to be made for legitimate business reasons should only be made if the recipient has signed a Confidentiality or Non-Disclosure Agreement. You should also be careful not to talk about, view or leave confidential information in a location where it could be overheard or seen by an unauthorized person (e.g. on an airplane or other public place), and you should store confidential information in a secure location, such as a locked cabinet or a password-protected or other access-restricted folder if the information is electronic. When disposing of confidential information, you should do so in a secure manner, which may include shredding of hard copies.

TransCanada's stakeholders also often provide TransCanada with their own confidential information and require, through Confidentiality or Non-Disclosure Agreements, that this information be protected from inappropriate disclosure or use. You must honour the terms of any such Confidentiality or Non-Disclosure Agreements and safeguard the information in the same way you would TransCanada's confidential information. Even if there is no Confidentiality or Non-Disclosure Agreement in place, you should always protect customer-specific information.

You must also continue to maintain the confidentiality of all confidential information obtained while at TransCanada after you leave the Company, as your obligations of confidentiality are on-going. This means that you may not disclose any confidential information to anyone after you leave TransCanada, including your new employer.

For more information see the **Information Management** and **Information Security Policies Here**.



Protecting and Respecting Intellectual Property Rights

We preserve TransCanada's intellectual property rights and respect and honour those of third parties.

Intellectual property can include trade secrets, that is, any information that gives the owner an economic advantage over its competitors and that the owner takes reasonable steps to keep confidential, as well as copyrights, trademarks and patents.

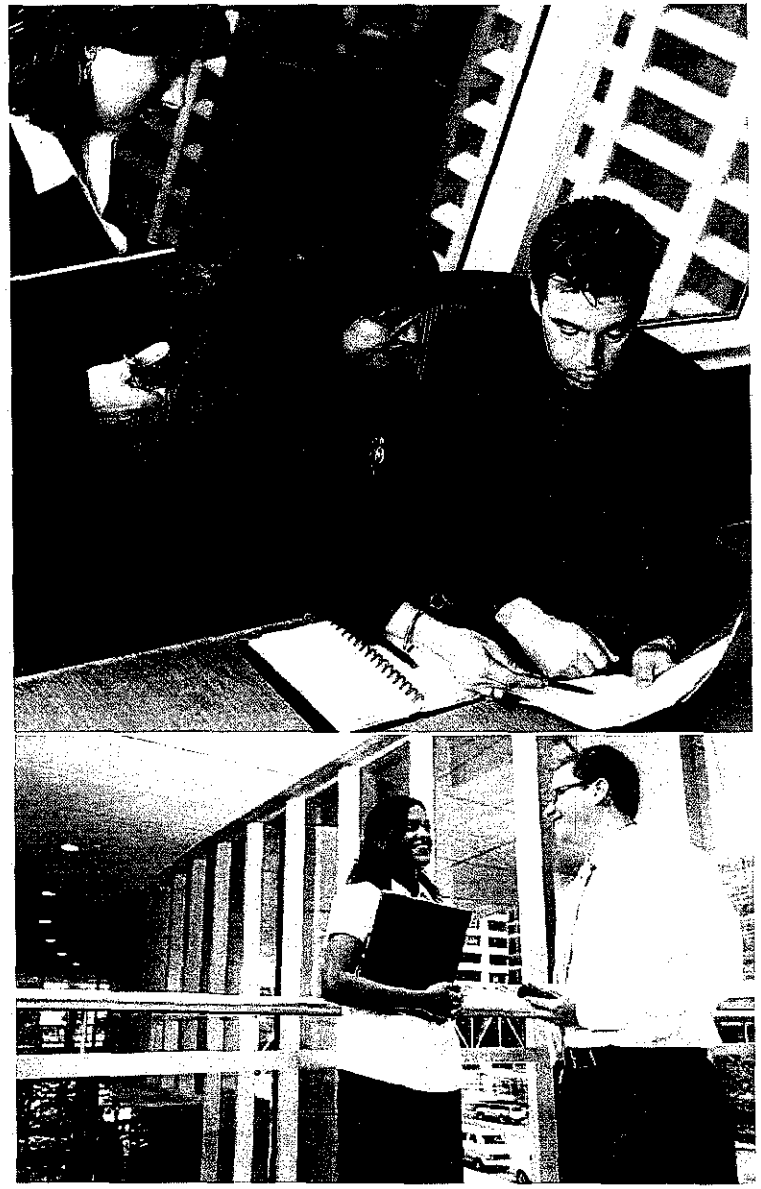
TransCanada owns all inventions, discoveries and copyrighted material made or developed by TransCanada's employees, contract workers or independent consultants in the course of and relating to their employment, contract or engagement with the Company, unless a written release is obtained or the issue is covered by contract.

TransCanada's intellectual property is an important Company asset. Since intellectual property rights can be lost if they are misused or not protected, you must take steps to protect these rights. This includes keeping trade secrets confidential and consistently using TransCanada's trademarks solely as authorized, including not altering fonts, formats, colours or other details.

You must also respect and honour the intellectual property rights of third parties. This includes complying with the terms of license agreements that TransCanada has entered into with vendors. These license agreements often prohibit the sharing of user names and passwords, as well as the copying, distributing or disclosing of the licensed information to any individuals within TransCanada that are not licensed users.

Respecting and honouring third party intellectual property rights also includes complying with copyright legislation, by not copying protected material without either a license to do so, or the permission of the owner.

Finally, you must respect third party patents and trade secrets by not using improper means to obtain such information, and by not using confidential third party information for a purpose other than that for which it was provided.



Protecting and Using TransCanada's Assets

We protect TransCanada's assets and use them only for legitimate business purposes.

You have an obligation to be a good steward of the assets that TransCanada provides to help you perform your job, including equipment, facilities, furniture, computers, telephones, supplies, tools, personal protective equipment, corporate credit cards, and other resources. This means protecting these assets from loss, theft, damage and misuse.

You must comply with all security protocols, for example, locking your laptop, and not letting strangers into Company facilities without a TransCanada escort and/or appropriate identification. For more information see the **Corporate Security Policy**.

Although TransCanada resources are intended to be used for business purposes, occasional limited personal use of Company resources such as telephones, photocopiers, and the internet are permitted. Such use should not be excessive. You must never use Company resources for any illegal or inappropriate purposes, such as viewing pornography, engaging in hate-based communications or other activities, downloading pirated movies or other illegal material or other inappropriate use. TransCanada reserves the right to monitor Company computer use, and employees should not assume any right of privacy with respect to either their use of, or data stored on, TransCanada's computer systems. TransCanada regularly monitors employee use of its equipment and systems, and anything that comes to TransCanada's attention as a result of such monitoring may be the subject of disciplinary action. For more information please see the Policy on **Acceptable Usage of Electronic Information Resources**.

QUESTION: I sometimes use my Company computer to access Facebook or Twitter during my lunch break and I talk about my personal life. Is that allowed?

ANSWER: Limited personal use of corporate assets to access social media on your own time is acceptable. However you need to keep in mind that you are using a corporate computer and accessing the internet through a TransCanada IP address. So, you must be careful to ensure that you do not post inappropriate or offensive content, nor do or say anything that could reflect poorly on TransCanada. TransCanada also has the right to monitor your personal use of its equipment and systems and you should not expect your use of TransCanada assets for these purposes to be private. TransCanada regularly monitors employee use of its equipment and systems and you may be subject to disciplinary action for any inappropriate or offensive use that comes to TransCanada's attention as a result of such monitoring.

Managing and Maintaining the Security of Information

We recognize the importance of corporate records as valuable assets of the Company and we manage, protect and preserve these assets accordingly.

Information assets can include everything from memos, e-mails, accounting records, invoices and contracts, to technical drawings, recordings of trade-related phone calls, records of safety or other incidents, marketing literature and other similar types of records. They can also be in any form or on any media, including, paper, cd, dvd, voice recordings or other electronic formats.

All of these assets are important Company records that TransCanada may be required to produce in the event of a legal or regulatory proceeding, audit or investigation. It is important that you manage and retain these assets in accordance with all legal requirements and corporate policies. In particular, you must never destroy an information asset in the event of an actual or pending legal or regulatory proceeding.

It is also important to protect the security of TransCanada's information assets. You must comply with all internal policies and procedures concerning information security. Additional information can be found in TransCanada's **Corporate and Information Security Policies**.

Protecting Health and Safety, and the Environment

We consider the impact of our actions on stakeholders, the environment and the communities in which we operate. We act responsibly to protect the health and safety of our workers, our neighbours and the public. We are responsible stewards of the environment.

Whether you work in a field location or in an office setting, you must always ensure that you comply with all health, safety and environment-related legal requirements, as well as TransCanada's corporate policies. This includes appropriate use of personal protective equipment, not smoking at TransCanada work sites (except in designated smoking areas), completing all health and safety-related training, complying with ergonomic practices, preventing environmental leaks and spills, and complying with all reporting obligations to governmental agencies, to name just a few requirements.

All injuries and environmental damage are preventable if we apply a 24/7 approach to health, safety and environmental protection. Policies on health, safety and environment can be found **here**.

We encourage the reporting of all Health, Safety and Environment related hazards, potential hazards, incidents and near-hits. We take every report seriously, investigate to identify facts and ensure immunity from disciplinary action for the good-faith reporting of all incidents and issues.

QUESTION: I'm working on a big project and it's very important to the Company that it be completed on-time and on-budget. I'm concerned that I might be injured if I rush my work, but I'm feeling a lot of pressure to do so. What should I do?

ANSWER: You should never compromise your or anyone else's safety. If someone is pressuring you to do so, you should report the issue.

Being Fit for Work

We do not compromise our ability to do our jobs or the safety of others through the use of illicit drugs, alcohol or medications.

Given the nature of TransCanada's business, it is essential that all workers be fit to perform their jobs. The use of illicit drugs, alcohol and medications can impair your judgement and productivity and can lead to serious accidents and health and safety concerns – not only for yourself, but also for your coworkers and the public.

TransCanada prohibits the use of illicit drugs and limits the use of alcohol and medications to specific situations in which they can be used responsibly, and without risk to safety.

You must ensure you understand and comply with TransCanada's internal policies concerning the use of alcohol and drugs and ensure you are fit to perform to your job. For more information please consult the **Alcohol and Drug Policies** for employees and **contract workers**.

Being Socially Responsible

We respect human rights and we are committed to being a good neighbour and supporting and enhancing the communities in which we live and work.

Some of the most important communities our business impacts are the Aboriginal and Native American communities. We are committed to working with these communities, to develop positive, long term relationships based on mutual trust and respect, recognizing their diversity and the importance they place on the land, their culture and their traditional way of life.

TransCanada partners in supporting safe, healthy and vibrant Aboriginal and Native American communities by investing in various community, cultural, educational and environmental initiatives and events. For more information, please see the **Stakeholder Engagement Commitment Guiding Principle**, and the **Aboriginal** and **Native American Relations Policies**.

In addition to working with the Aboriginal and Native American communities, we also work hard to build and maintain relationships with other landowners. We recognize the importance of farming to their communities, and actively support farming-related organizations.

We also understand the importance that community, charitable and other similar non-governmental organizations play in making the communities in which we live and work better places. TransCanada actively support these organizations and encourages you to also become involved.

You are encouraged to volunteer and to contribute to charitable and other community-based organizations, including during work hours if approved by your leader. Charitable donations should not, however, be made to improperly influence government officials or others. Please see the section on **Avoiding Bribery and Corruption** for more information.

Jim Baggs
Executive Vice President,
Operations and Engineering

TransCanada supports and enhances the communities where we live and work by operating in a safe, ethically, socially and environmentally sustainable manner.

Being a Good Ambassador of TransCanada

We recognize that we are ambassadors of TransCanada and conduct ourselves in a manner that is respectful and appropriate and that will not harm TransCanada's reputation.

You must keep in mind that you are a representative of TransCanada. The things you say and do should reflect the Company's core values. You should not speak publicly on behalf of TransCanada unless authorized to do so. Any posting or statement on an external website, including personal sites or in other media should be considered a public statement.

Even on your personal time, you must not participate in any illegal or inappropriate statements or activities that could be detrimental to the Company or its reputation with TransCanada's name or brand. For example, while you may indicate on your social media profile(s) that TransCanada is your employer, if you do so, you must ensure that you do not post inappropriate content that could reflect poorly on the Company.

For more information see the **Public Disclosure Policy** and **Corporate Communication Policy**.

Protecting Individuals' Privacy

We respect and protect the privacy rights of our employees and other stakeholders, to their personal information.

TransCanada takes very seriously the fact that its employees, contract workers, independent consultants, customers, suppliers and other stakeholders have entrusted the Company with their personal information. The Company is committed to protecting that information in compliance with all legal requirements.

Some examples of personal information include an individual's name, home address, telephone number, identification numbers (such as an employee number or a social insurance/social security number), financial information and medical information.

You should never collect, store, access, use or disclose personal information for an inappropriate purpose or by inappropriate or illegal means. To the extent that you have personal information of any individual as a result of your work at TransCanada, whether the individual is an employee, a landowner, a shareholder, or a party that TransCanada does business with (to name just a few examples), you may not disclose that personal information to others, either within or outside TransCanada, without the express approval of TransCanada's Privacy Officer or the individual's consent. Use of personal information must be limited to the business purposes for which the information was provided. You should also protect and safeguard personal information from inappropriate access, by keeping it in a locked cabinet, or in a password protected or otherwise restricted folder, memory stick or other similar storage device, if the information is electronic.

If the information is requested by anyone within or outside the Company, or if it needs to be disclosed for any legitimate reason, you should check with TransCanada's Privacy Officer before taking any action.

For more information, please see the **Protection of Personal Information Policy**.

Maintaining a Harassment, Violence and Weapons-Free Workplace

We treat one another with dignity and respect and are committed to maintaining a work environment that is free of harassment, violence and weapons.

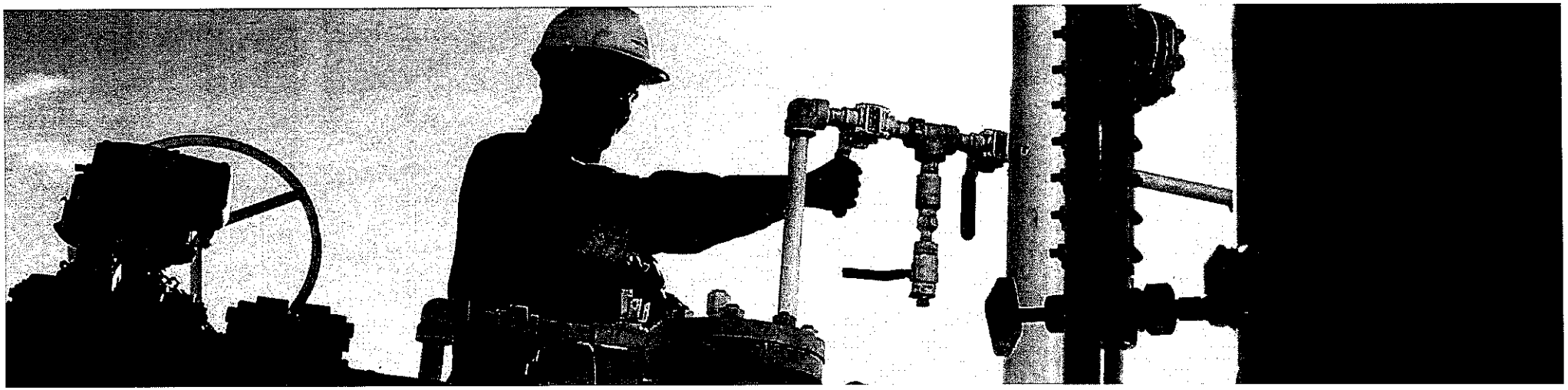
Everyone deserves the opportunity to do their job in safe environment, without fear of harassment or violence (including the use of weapons).

You must always be respectful to your co-workers, and be sensitive to the way in which others may react to your behaviours and comments. Always try to resolve differences in a calm and respectful manner, without resorting to insults, threats or violence.

TransCanada prohibits any behaviour that is intimidating, hostile, offensive, threatening, violent, demeaning or humiliating, or of a sexual nature, that either interferes with an individual's work performance or creates an inappropriate work environment. In particular, you should never take actions or make unwanted comments or gestures that relate to gender, race, national or ethnic origin, disability, religion, age, sexual orientation, marital status, family status, veteran status, National Guard or reserve unit obligations, a conviction, or any other legally protected status.

While on Company business or when on TransCanada property or premises, you must also not possess, use or transport a dangerous or potentially dangerous weapon, such as a firearm, knife, club, electronic weapon or explosive device, unless authorized by law or policy.

For more information, please see the **Harassment-Free Workplace Policy** and the **Weapons in the Workplace Policy**.



Diversity and Employment Equity/Equal Opportunity

We respect and embrace our differences and are committed to principles of employment equity/equal opportunity, non-discrimination and accommodation.

TransCanada believes that our differences make us stronger. The Company promotes and encourages a culture of diversity, inclusion and acceptance, prohibits any form of discrimination on legally prohibited grounds, and requires reasonable accommodation of differences. We recognize that in some cases, treating people fairly requires that you treat them equally and in other cases it requires that you accommodate their differences.

TransCanada requires you to be inclusive and to demonstrate respect for and acceptance of others. While acting on behalf of TransCanada, you must never discriminate against anyone on the basis of a legally prohibited ground, including gender, race, national or ethnic origin, colour, religion, age, sexual orientation, marital status, family status, veteran status, disability or conviction.

If you are a leader or are otherwise responsible for employment-related decisions, you must make those decisions objectively, in compliance with all legal requirements and corporate policies, on the basis of the Company's and the job's requirements, and without discrimination on the basis of a prohibited ground. You also must never discount an individual due to a difference which can reasonably be accommodated. Reasonable accommodation of differences must also be provided as and when required.

Please see TransCanada's Respectful Workplace Policies for more information.

- **Canada Respectful Workplace**
- **US Respectful Workplace**
- **Mexico Respectful Workplace**

WENDY HANRAHAN
Executive Vice-President, Corporate Services

The different perspectives that a diverse workforce provides are invaluable. They enrich not only our work product, but also our work experience. That's why it's so important that we respect and embrace others' differences.

MAKING THE RIGHT CHOICES AND DOING THE RIGHT THING

REQUIRES THAT WE BE INNOVATIVE

In all of our activities we find new and better ways to comply with the law and act ethically. Being innovative means:

- We actively seek out new and better ways to do things;
- We have the courage to challenge the status quo; and
- We embrace and enable positive change.

You are encouraged to suggest or develop new procedures and methods of working that will help to ensure TransCanada's compliance with legal and ethical requirements. Even if you don't have a solution, you should speak up if you see something that needs to be improved. Any of the **people listed here** may be contacted or alternatively, you can contact the **Ethics Help Line**.

If you are aware of someone who has improved TransCanada's compliance or ethics related processes or activities, or who has pointed out a flaw in the way we currently do things that will allow for improvement, we want to know about it. Contact the **Corporate Compliance Department.**

For more specific policy information on any of the topics referred to in COBE please refer to the Corporate Policies page on Infocus, or contact any member of the ethics and compliance organization or the Ethics Help Line.

MAKING THE RIGHT CHOICES – DOING THE RIGHT THING

TransCanada

In business to deliver

December, 2014

Prepared for:
TransCanada Keystone Pipeline, LP
Houston, Texas

Keystone XL Pipeline Project

Preliminary Pre-Construction Notification to the U.S. Army Corps of Engineers Omaha District – South Dakota

July 2013

July, 2013

Jeff Breckenridge
U.S. Army Corps of Engineers
28563 Powerhouse Road
Room 120
Pierre, South Dakota 57501

Dear Mr. Breckenridge:

Please find attached the TransCanada Keystone Pipeline, LP (Keystone) Nationwide Permit (NWP) 12 Pre-Construction Notification (PCN) package for portions of the proposed Keystone XL Pipeline Project (Project) located within the USACE Omaha District in South Dakota.

The U.S. Department of State (DOS), as the lead federal agency, is in the process of supplementing the Final Environmental Impact Statement (FEIS) that was issued in August of 2011. The draft Supplemental EIS (SEIS) was released for public comment in the 1st quarter of 2013, and is expected to be finalized in the 4th quarter of 2013. The SEIS addresses Project changes since the August 2011 FEIS, most notably the route change implemented in Nebraska.

Attached is a preliminary draft of Keystone's PCN package for USACE review. Keystone expects to file the final PCN package after the SEIS is finalized and issued.

Please find enclosed the following documents for your review:

- Standard Form 4345. The Standard Form 4345 and additional information required for the form is included at the front of this package. Wetland and waterbody crossing tables are attached with estimates of temporary and permanent wetland and waterbody impacts, the applicable PCN criteria, and the anticipated construction method for each wetland and waterbody crossing. Keystone has adopted the USACE Regulatory Guidance Letter 08-02, dated June 26, 2008 on jurisdiction and has assumed all waters identified are waters of the U.S. and does not request formal jurisdictional concurrence. All mitigation proposed is also based upon all waters identified, not just waters of the U.S.
- Wetland and Waterbody PCN Mapbook. Wetland and waterbody crossings requiring PCN are illustrated on a U.S. Geological Survey (USGS) topographic base at a scale of 1:6,000, as well as on an aerial photographic base at the same scale. The pipeline mileposts and anticipated construction work spaces are included. The aerial photographic base was produced by the National Agricultural Imagery Program (NAIP) from aerial imagery acquired in 2010.
- Wetland Delineation Report.
- The Keystone XL Pipeline Project Construction Mitigation and Reclamation Plan (CMRP). This document provides typical wetland and waterbody crossing procedures, as well as upland construction methods.
- Horizontal Directional Drill Frac-out Contingency Plan.

- Horizontal directional drill site-specific drawings.

Upon completion of your review, Keystone would like to conduct a meeting with you to review and discuss your comments on this permit package. Thank you again for your assistance, should you require additional information or have questions with respect to this submittal, please do not hesitate to contact me at 713-693-6467.

Sincerely,

Steve Craycroft, Keystone XL Pipeline Project
Contract Environmental Compliance Manager

Cc:
Sandra Barnet TransCanada
Steve Marr, TransCanada
Jon Schmidt, exp

Prepared for:
TransCanada Keystone Pipeline, LP
Houston, Texas

Keystone XL Pipeline Project

Preliminary Pre-Construction Notification to the U.S. Army Corps of Engineers Omaha District – South Dakota

July 2013

Keystone XL Pipeline Project

Preliminary Pre-Construction Notification Package

South Dakota

Submitted to the United States Army Corps of Engineers
Omaha District - South Dakota State Office

July 2013

U.S. ARMY CORPS OF ENGINEERS

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

33 CFR 325. The proponent agency is CECW-CO-R.

OMB APPROVAL NO. 0710-0003
EXPIRES: 28 FEBRUARY 2013

Public reporting for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)
First - Sandra Middle - Last - Barnett	First - Steve Middle - Last - Craycroft
Company - TransCanada Keystone Pipeline, LP	Company - TransCanada Keystone Pipeline, LP
E-mail Address -	E-mail Address - stephen_craycroft@transcanada.com
6. APPLICANT'S ADDRESS:	**9. AGENT'S ADDRESS:**
Address- 2700 Post Oak Blvd, Suite 400	Address- 2700 Post Oak Blvd, Suite 400
City - Houston State - Texas Zip - 77056 Country - U.S.	City - Houston State - Texas Zip - 77056 Country - U.S.
7. APPLICANT'S PHONE NOs. w/AREA CODE	**10. AGENTS PHONE NOs. w/AREA CODE**
a. Residence b. Business 713-693-6443 c. Fax	a. Residence b. Business 713-693-6467 c. Fax

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Steve Craycroft to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

SIGNATURE OF APPLICANT DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)
Keystone XL Pipeline Project

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
See attached Block 13	Address See attached Block 14
15. LOCATION OF PROJECT Latitude: ◦N see attached block 15 Longitude: ◦W	City - State- Zip-

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)
State Tax Parcel ID see attached block 16 Municipality see attached block 14
Section - attached block 16 Township - see attached block 16 Range - see attached block 16

17. DIRECTIONS TO THE SITE
See attached Block 17

18. Nature of Activity (Description of project, include all features)
See attached Block 18

19. Project Purpose (Describe the reason or purpose of the project, see instructions)
See attached Block 19

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge
See attached Block 20

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards

See attached Block 21

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)
Acres
or
Linear Feet See attached Block 22

23. Description of Avoidance, Minimization, and Compensation (see instructions)
See attached Block 18

24. Is Any Portion of the Work Already Complete? ☐ Yes ☒ No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- See attached Block 25

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
See attached Block 26					

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Table of Contents

Support Information for the Keystone XL Pipeline Project Preliminary Pre-Construction Notification

Figures

Tables

Attachments

Pre-Construction Notification for NWP 12
Department of the Army Permit Form 4345

To supplement the attached United States Army Corps of Engineers' (USACE) Application for Department of the Army Permit, Form 4345, additional information necessary for the Pre-Construction Notification (PCN) requirements is included in the following sections. The Blocks in Form 4345 are referenced below and the tables and figures are presented after the Block text.

Blocks 5 through 10. Applicant's Name and Address.

Applicant
TransCanada Keystone Pipeline, LP
Sandra Barnett – Manager, Environmental
Keystone Pipeline Projects
2700 Post Oak Boulevard, Suite 400
Houston, Texas 77056
(713) 693-6443

Authorized Agent
Steve Craycroft
Contract Environmental Compliance Manager
Keystone XL Pipeline Project
2700 Post Oak Boulevard, Suite 400
Houston, Texas 77056
(713) 693-6467

Block 12. Project Name or Title. Keystone XL Pipeline Project (Project).

Block 13. Name of Waterbody. The Project crosses numerous wetlands and waterbodies through the USACE Omaha District in South Dakota. A subset of the wetlands and waterbodies crossed by the Project require PCN to the USACE based on Nationwide Permit 12 Conditions, the Nationwide Permit program General Conditions, and/or Regional Condition requirements. The PCN requirements evaluated for the Project in South Dakota are provided in **Table 1**. The locations, names (if available), hydrologic unit code (HUC), and other information related to the wetlands and waterbodies crossed by the Project and requiring PCN are provided in **Table 2**. The individual PCN waterbody and wetland crossings are illustrated on the maps contained in the Map Volume PCN Wetland and Stream Features (**Attachment A**) at a scale of 1:6,000. All wetlands and waterbodies found within the Environmental Study Area[1] are included in the Wetland Delineation Report provided in **Attachment B**. As indicated in **Attachment B**, TransCanada Keystone Pipeline, LP (Keystone) is electing to use a preliminary jurisdictional determination (preliminary JD) for the Project, in accordance with USACE Regulatory Guidance Letter 08-02, dated June 26, 2008. To support the USACE's preliminary JD evaluation for the Project, a completed Jurisdictional Determination Form is included as **Attachment D** of the Wetland Delineation Report.

Block 14. Project Address. Not Applicable. The Project is a linear pipeline through the USACE Omaha District and across the State of South Dakota.

[1] The width of the Environmental Study Area (ESA) for the pipeline is 300 feet total, 150 feet on either side of the centerline. For the access roads, the ESA is 100 feet total, 50 feet on either side of the centerline. The entire area within the boundary of the pump stations and auxiliary facilities was included in the ESA.

Block 15. Location of Project. Figure 1 provides an overview of the Project within the State of South Dakota. Within this jurisdiction, the Project will cross Harding, Butte, Perkins, Meade, Pennington, Haakon, Jones, Lyman and Tripp counties.

Block 16. Other Location Descriptions. Table 2 provides PCN wetland and waterbody crossing locations by pipeline milepost and by latitude/longitude coordinates. None of the wetlands and waterbodies crossed by the Project's access roads or located within the boundary of the auxiliary facilities require PCN to the USACE based on the Nationwide Permit 12 Conditions, the Nationwide Permit program General Conditions, and/or Regional Condition triggers.

Block 17. Directions to Site. See Block 15 for map (**Figure 1**) depicting an overview of the Project.

Block 18. Nature of Activity. The primary activities within the jurisdiction of the USACE Omaha District in South Dakota will be: 1) the installation of a 36-inch mainline steel pipeline within a standard 110-foot wide construction right-of-way (ROW); 2) construction of seven pump stations; and 3) installation of 15 mainline isolation valves at intervals along the pipeline route in South Dakota. These segments within South Dakota are part of the larger pipeline project that will deliver crude oil from Canada to the United States (U.S.).

ENVIRONMENTAL IMPACTS AND MITIGATION

The Department of State (DOS) is conducting a supplemental National Environmental Policy Act (NEPA) analysis of the Final Environmental Impact Statement (FEIS) issued in August 2011 for the Project, including evaluation of impacts to wetlands, streams, rivers, and other waters of the U.S.; historic properties; and biological resources. The DOS's initial Biological Assessment (BA) was finalized on May 19, 2011 and the U.S. Fish and Wildlife Service's (USFWS) Biological Opinion (BiOp) was finalized on September 23, 2011. To accompany the development of the SEIS, the DOS updated the BA with the USFWS and issued the revised BA with the draft SEIS (1st quarter 2013). The final updated BiOP was issued by USFWS on May 15, 2013. The DOS, the Advisory Council on Historic Preservation, the State Historic Preservation Officers, and other parties developed a Programmatic Agreement for compliance with Section 106 of the National Historic Preservation Act that was included in the FEIS. The DOS may amend the existing Programmatic Agreement in conjunction with the findings of the final SEIS.

Keystone is committed to protecting waterbodies, wetlands, and their associated resources. Throughout the planning phase of the Project, engineers and environmental staff designed the pipeline route, construction procedures, and a compliance program that will minimize environmental impacts during construction and restoration of the Project.

The pipeline route has been refined several times to reduce waterbody and wetland impacts through:

- Avoiding waterbody and wetland crossings where feasible;
- Minimizing the number of times a single waterbody is crossed; and
- Crossing waterbodies perpendicularly whenever possible.

During consultation activities with federal and state agencies and local stakeholders, additional reroutes were incorporated to avoid or minimize impacts to significant resources or concerns identified. In addition, timing windows were established in the Project schedule to protect biological resources, such as spawning fish and threatened/endangered species. Additional mitigation measures are discussed in greater detail in the Project's Construction Mitigation and Reclamation Plan (CMRP) (**Attachment C**), and include:

- Erosion and sediment controls implemented during and after construction;
- Environmental training of all Project workers and supervisors;
- Best management practices incorporated into the Project design and construction;
- Stream and wetland construction procedures designed to minimize impacts during construction and reclamation of the crossings;
- Spill prevention and clean-up procedures;
- Hazardous materials handling guidelines; and
- Clean-up, seeding and reclamation details to ensure the effective stabilization of the ROW and Project disturbances.

Keystone's CMRP provides typical procedures for wetland and waterbody crossings, as well as erosion and sediment control measures that will be installed during construction and stabilization/revegetation of the Project.

THREATENED AND ENDANGERED SPECIES

Within the jurisdiction of the USACE Omaha District in South Dakota, potential habitat exists for the following federally-listed threatened or endangered species: The whooping crane (*Grus americana*), piping plover (*Charadrius melodus*), interior least tern (*Sternula antillarum*), American burying beetle (*Nicrophorus americanus*), and western prairie fringed orchid (*Platanthere praeclara*). Potential Project impacts and survey findings (where applicable) are discussed below for each of the above-referenced species.

Whooping Crane

The Project is within the primary migration pathway of the whooping crane through the central Great Plains. Suitable whooping crane roosting and/or foraging habitats occur within the Project area at major river crossings including the Cheyenne River and the White River in South Dakota. In addition to the major river crossings, there is the potential for suitable stopover habitat within wetlands, shallow areas of reservoirs, and stockponds within the Project area in South Dakota.

No direct impacts to the whooping crane are anticipated from the construction of the proposed Project. The Cheyenne and White rivers would be crossed by horizontal directional drilling (HDD), so potential habitat loss, alteration, or fragmentation would be negligible within the delineated boundaries of the Cheyenne and White rivers. Minimal hand clearing of vegetation and limited equipment access would be required within the riparian areas of these rivers in order to use the HDD electronic guidance system that is associated with the drilling equipment and in order to access these rivers to potentially withdraw water for the proposed Project's HDD and hydrostatic tests. Any vegetation disturbance within the HDD would be allowed to completely revegetate following construction.

The primary construction-related impacts would be disturbance and potential exposure to small fuel spills and leaks from construction machinery. The chance for construction-related spills within whooping crane roosting and foraging habitat is minimal. The CMRP (**Attachment C**) includes measures to minimize the likelihood of a spill occurring and to promptly respond to and clean-up spills that may occur.

If pipeline construction–related activities were to occur in close proximity to migrating whooping cranes during spring and fall migration periods, Environmental Monitors would complete a brief survey of any wetland or riverine habitat areas potentially used by whooping cranes. The survey would be conducted in the morning before starting equipment using the Whooping Crane Survey Protocol previously developed by USFWS and Nebraska Games and Parks Commission as outlined in the *2012 Technical Assistance Letter for the TransCanada Keystone XL Pipeline* issued by the USFWS Nebraska Ecological Services Field Office. If whooping cranes are sighted during the morning surveys or any time during the day, then Keystone would immediately contact the USFWS and South Dakota Department of Game, Fish and Parks (SDGFP) for further

instruction and require that all human activity and equipment start-up would be delayed within USFWS determined distance of the cranes. Work would resume once the birds left the area. The Environmental Monitor would record the sighting, bird departure time, and work start time on the survey form. Additionally, the USFWS would notify the Compliance Manager of whooping crane migration locations during the spring and fall migrations through information gathered from the whooping crane tracking program. If the migratory sighting locations are within a USFWS approved distance from construction activities, then Environmental Monitors would conduct protocol level surveys of the appropriate portions of the Project.

Downshielding of lights would be done should HDD occur at night during the spring and fall whooping crane migratory period in areas that provide suitable stopover habitat.

Piping Plover

The Cheyenne River crossing on the border of Meade, Pennington and Haakon counties in South Dakota has historically supported breeding populations of piping plovers. During a meeting with Keystone representatives on June 10, 2008, SDGFP stated that breeding piping plovers are not located within the proposed Project area. Therefore no impacts to the piping plover or its breeding habitat would be anticipated from the construction of the Project within South Dakota.

Though the piping plover is not anticipated to occur within the Project area in South Dakota based on the result of the field surveys and consultation with SDGFP, the BiOp requires that if construction were to occur during the plover breeding season (April 15 through September 1), pre-construction surveys and daily surveys would occur in coordination with USFWS within 0.25-mile from Cheyenne River crossing to ensure that there are no nesting pairs within 0.25-mile of the construction area. If occupied piping plover nests are found, then construction within 0.25-mile of the nest would be suspended until the nest is no longer active.

Downshielding of lights would be used if night time work is necessary for the HDD crossings of the Cheyenne River if the HDD site lacks vegetative screening, and an active piping plover nest is located within 0.25 mile of the HDD site.

Interior Least Tern

The Cheyenne River crossing on the border of Meade, Pennington and Haakon counties in South Dakota has historically supported, or currently supports, breeding populations of interior least terns. During field surveys conducted in July 2008 and June 2011, no interior least terns were observed at the proposed crossing location.

No direct impacts to least tern breeding habitat would be anticipated at these locations, since pipeline placement across the Cheyenne River will be completed by the HDD method. Minimal hand clearing of vegetation and limited human access would be required within the riparian areas of these rivers in order to use HDD electronic guidance system that is associated with the drilling equipment and in order for equipment to access these rivers to potentially withdraw water for the Project's HDD and hydrostatic tests.

The primary construction-related impacts would be disturbance and potential exposure to small fuel spills and leaks from construction machinery. The chance of construction-related spills within least tern habitat is minimal because all hazardous materials such as fuels and oils would be stored at least 100 feet away from surface waters and these types of spills or leaks generally are small in volume and are cleaned up quickly. Additionally, Keystone's CMRP (**Attachment C**) provides the best management practices that will be implemented to reduce the potential for impacts due to construction-related spills as previously briefly described in the impact evaluation for the whooping crane. Indirect impacts could result from increased noise and human presence at work site locations if breeding terns are located within 0.25-mile of the Project.

If construction occurs within a 0.25-mile of the Cheyenne River crossing during the breeding season (May 1 to September 1 inclusive), then pre-construction surveys would occur in coordination with USFWS within 0.25-mile from the Cheyenne River crossing to ensure that there are no nesting pairs within 0.25-mile of the construction area. If active nest sites are identified, the USFWS would be notified and appropriate protection measures would be implemented on a site-specific basis in coordination with the USFWS. These protection measures may include: temporarily delaying work until the nest is no longer active.

Downshielding of lights would be used if night time work is necessary for the HDD crossings of the Cheyenne River if the HDD site lacks vegetative screening, and an active tern nest is located within 0.25 mile from the HDD site.

American Burying Beetle

Suitable American burying beetle (ABB) habitat is located along the proposed Project route south of Highway 18 in Tripp County, South Dakota. A windshield survey to assess potential ABB habitat was conducted along the proposed Project route in Tripp County in 2012.

Direct impacts to ABB as a result of construction during vegetation clearing, site grading and trench excavation would result in temporary habitat loss, potential alteration of suitable habitat to unsuitable habitat, temporary habitat fragmentation where the pipeline is not already collocated with other utilities, and the potential mortality to eggs, larvae and adults through construction vehicle traffic and exposure during excavation. Artificial lighting has the potential to disrupt foraging and increase predation on the American burying beetle. Most normal construction would take place during daylight hours and construction areas would not generally use artificial lighting. Activities that could potentially require lighting could include critical pipeline tie-ins, HDD crossings, and certain work required after sunset due to weather, safety or other Project requirements. HDD crossings would require 24-hour operation until the crossing is completed. Localized fuel spills may occur during construction, however, Keystone would develop and implement a Spill Prevention Control and Countermeasures Plan for potential construction-related fuel spills which would mitigate and avoid any short-term impacts.

Burying beetles, including the ABB, are sensitive to soil moisture and die quickly when desiccated (Bedick et al. 2006). Under laboratory conditions, American burying beetles seek soils containing high moisture levels during periods when they are inactive. During construction, soil moisture may be reduced across the ROW as the site is prepared by removing vegetation and topsoil and grading. Equipment operations within the ROW would compact the substrate. During reclamation, sub-soil and soil would be de-compacted and vegetation cover would be re-established within both the temporary and permanent ROW. Native vegetation seed would generally be used, unless otherwise directed by the landowner. As stated in the Project CMRP (**Attachment C**) the objectives of reclamation and revegetation are to return the disturbed areas to approximate pre-construction vegetation, use, and capability. This involves treatment of soil as necessary to preserve approximate pre-construction capability and stability in a manner consistent with the original vegetation cover and land use

In addition to the preveously described best management practices, Keystone has committed to incorporating the following conservation measures as part of the proposed Project to prevent potential direct or indirect impacts to the ABB:

- Vehicle traffic used in support of preconstruction activites will be confined to approved access roads.
- Construction methods will be used involving sequential replacement of topsoil and reestablishment of natural vegetation to restore natural soil hydrology within the construction ROW and avoid long-term impacts to ABB habitat.
- Keystone will train all workers operating in ABB habitat and would include discussion of habitat, biology, reasons for their decline, and responsibilities of all workers for the

protection of the species (including removing food wastes from the ROW each day, reporting any ABB sightings to an environmental inspector, and avoiding bringing dogs and cats to the ROW). Keystone will produce a full color Endangered Species Card with a picture of the ABB and all of this information summarized on the card. The card will be handed out to all construction workers operating in ABB habitat.

- Signs will be posted at all access points to the ROW highlighting the areas as ABB habitat and reminding workers to follow special restrictions in the area.
- Keystone will down-shield lighting and install sodium vapor-type lights or equivalent in coordination with USFWS in instances when construction activities would occur in suitable habitat areas in Tripp Country to avoid attracting the species to the construction site.
- Keystone will down-shield lighting and install sodium vapor-type lights or equivalent in coordination with USFWS at auxiliary facilities within areas occupied by the ABB.
- Keystone will provide compensation for temporary construction and permanent operations impacts to the ABB as part of a Habitat Conservation Trust in areas southwest of Highway 18 in Tripp County, South Dakota.
- Keystone will provide funding for compliance monitoring. The DOS will designate USFWS or an agreed-upon third-party, such as a nongovernmental organization, that would work with USFWS to ensure that vegetation restoration efforts were successful for ABB habitat, as agreed between the DOS, USFWS, and Keystone.
- Keystone will reseed disturbed areas in prime, good, fair, and marginal ABB habitats with a seed mix that corresponds to the appropriate Construction/Reclamation (Con/Rec) unit for that property. Should a landowner-directed seed mix be determined to not result in full restoration as stipulated in the Reclamation Performance Bond then the subject acreage amount reseeded will be debited from temporary ABB habitat impacts and credited to permanent ABB habitat impacts and the total donation amount to the ABB Trust will be recalculated.
- Keystone will set aside funds for a restoration performance bond upon issuance of a Presidential Permit and prior to initiating Project construction in South Dakota. The bond would be applied to supplemental vegetation restoration that could be necessary if restoration for ABB beetle habitat failed, as agreed between the DOS, USFWS, and Keystone.

Western Prairie Fringed Orchid

The known distribution of the western prairie fringed orchid includes the Project area south of Highway 18 in Tripp County, South Dakota. Populations in South Dakota are possibly extirpated but factors that indicate the species could still be present include: 1) incomplete surveys in areas of suitable habitat crossed by the Project route on private lands, and 2) erratic flowering patterns with long dormancies that make detection difficult. Surveys to assess habitat suitability and occurrence of the species were completed in June 2009 and May and June 2011 and 2012 in Tripp County. No western prairie fringed orchids were observed in the surveyed areas in South Dakota.

Construction of the Project could potentially disturb western prairie fringed orchid communities when vegetation is cleared and graded. Construction of permanent auxiliary facilities also could displace plant communities for the lifetime of the Project. Revegetation of the pipeline could introduce or expand invasive plant species, especially leafy spurge, Kentucky bluegrass, and Canada thistle into the Project area, potentially contributing to the decline of western prairie fringed orchid. Keystone has developed weed and vegetation monitoring plans to prevent the spread of invasive plant species as a consequence of the proposed Project construction and operation. These plans are in the CMRP (**Attachment C**), and would be updated prior to construction.

Keystone commits to implementation of the following conservation measures for identified populations and for areas that provide suitable habitat but could either not be surveyed or surveyor could not be done when the plant is flowering:

- Complete habitat suitability surveys prior to construction. Survey results will be submitted to the USFWS for review.
- Keystone will re-route the pipeline around individual plants or populations within the proposed Project footprint to the extent practicable and/or allowed by the landowner. Compensation through a Habitat Conservation Trust will be provided in areas that cannot be avoided. Keystone will transplant individual plants that would be affected by construction activities to other locations where suitable habitat is available, when feasible and/or when approved by the land owner if on private land. This action will be done in coordination with USFWS.
- Keystone will reduce the width of the construction ROW, the amount of reduction dependent on the circumstances, in areas where orchid populations have been identified. This will be done in coordination with USFWS. Keystone will salvage and segregate topsoil appropriately where populations have been identified to preserve native seed sources in the soil for use in revegetation efforts in the ROW.
- Keystone will provide compensation for impacts to the western prairie fringed orchid as part of a Habitat Conservation Trust in areas where the species is likely to be impacted southwest of Highway 18 in Tripp County, South Dakota. Compensation will be based on total acres impacted where western prairie fringed orchid presence was confirmed and in areas with suitable habitat that were not surveyed during the blooming period. Compensation will not be provided for habitat in areas where surveys were completed for western prairie fringed orchids and they were not found.
- Keystone will restore and monitor construction-related impacts to wet meadow habitats identified as suitable for the western prairie fringed orchid consistent with USACE guidelines as follows. The disturbed areas shall be reseeded concurrent with the project or immediately upon completion. Revegetation shall be acceptable when ground cover of desirable species reaches 75%. If this seeding cannot be accomplished by September 15 the year of project completion, then an erosion blanket shall be placed on the disturbed areas. The erosion blanket shall remain in place until ground cover of desirable species reaches 75%. If the seeding can be accomplished by September 15, all seeded areas shall be properly mulched to prevent additional erosion.

PERMANENT FACILITIES

Pipeline Facilities

Construction of the pipeline facilities will require trees and vegetation to be cleared from the ROW. Grading of the work area will establish a stable and safer work surface for pipe installation. Once grading is complete, a trench will be excavated to a depth sufficient to provide approximately four feet of soil cover over the buried pipeline in wetland and upland areas and a minimum of five feet of cover for stream crossings. Where wetland conditions permit topsoil salvage during excavation, soil conservation will be conducted through salvaging topsoil from the reduced 85-foot construction corridor and temporarily storing the topsoil within the ROW limits. After the welded pipeline is installed in the trench, the subsoil will be backfilled into the trench and the topsoil will be replaced on top of the subsoil. Standard industry boring techniques will be employed to cross under significant highway and railroad crossings.

To install pipelines under watercourses, Keystone will adopt the standard open cut (wet or dry) crossing methods or use the HDD crossing method. During open cut crossing installations, material excavated from the trench line at stream crossings less than 30 feet wide will be stored on the banks of the streams. For waterbodies greater than 30 feet in width, excavated trench materials may be temporarily stored in-stream (without blocking stream flow) while the trench is

being excavated and the pipeline carried into place and installed in the trench. Immediately following installation of the pipeline at stream crossings, the trench will be backfilled, and original stream contours will be re-established to the extent practicable.

Keystone will use HDD crossing methods under select rivers. Disturbance will be limited to the temporary deployment of telemetry cable and placement of a hose and limited equipment access to carry a pump to draw water from the waterbody for drilling mud makeup and hydrostatic testing of the pull section. Additional minor disturbance may be required for equipment to carry and place water withdrawal pumps and dewatering lines to support the mainline hydrostatic testing operations. Within the USACE Omaha District in South Dakota, the following water of the U.S. are planned to be crossed with the HDD crossings method; the Little Missouri River in Harding County, the Cheyenne River in Meade and Pennington counties, the Bridger Creek in Haakon County, the Bad River in Haakon County, and the White River in Lyman County. In the event that inadvertent returns of drilling mud occur to the surface of the ground, Keystone will implement the measures outlined in the attached HDD Frac-Out Contingency Plan (**Attachment D**). HDD drawings for these crossings are provided in **Attachment E**.

Auxiliary Facilities

As proposed, construction of the Project's auxiliary facilities would not result in permanent impacts to any waters of the U.S. within the Omaha District in South Dakota.

Pump Stations

Seven pump stations will be constructed in South Dakota adjacent to the pipeline ROW and will vary from 7 to 12 acres in size. Pump station locations are provided in **Table 3**.

Pump stations will require electrical power that will be supplied by regional power utilities suppliers. Power lines will be constructed and operated by electrical power utilities and all relevant construction and operational permits will be obtained by these utilities through their applicable approval process.

Valves

Pipeline valves will be located within pump station facilities and at intervals along the pipeline ROW within fenced enclosures. Keystone will not impact any waters of the U.S. with valve placement. Valves will generally be located near existing roads to allow easy access.

Access Roads

Permanent access roads will be required for pump stations and certain valve locations. In general, these access roads will be routed to avoid permanent impacts to wetlands greater than 0.10 of an acre. There is one permanent access road proposed. Construction of this permanent access road will not result in the permanent impact greater than 0.10 of an acre on each of the waterbodies that the access road crosses.

TEMPORARY FACILITIES

Construction of the Project will require the use of a number of temporary facilities not adjacent to the pipeline mainline. These facilities include contractor yards, contractor camps, pipe storage yards, rail sidings, and access roads, discussed in more detail below. These areas will be restored during clean-up after pipeline construction is completed. As with the pipeline ROW, temporary fills of wetlands and waterbodies may be required to provide stable access. Examples of possible temporary fills include but are not limited to temporary crossing of streams and rivers that are not Section 10 waters. Keystone will remove all temporary fill and restore the original contours of wetlands and waterbodies during clean-up. There will be no permanent filling of waters of the U.S. associated with the temporary facilities.

Contractor Yards

Each pipeline construction segment (spread) will have at least one contractor yard, generally 30 acres in area. Contractor yards would be used as muster points, for equipment and personnel mobilization, equipment storage and maintenance, training, and other pipeline construction support activities.

Pipe Storage Yards

Pipe storage yards will be required to stage pipe along the proposed pipeline route to reduce haul times and facilitate efficient transport to the ROW. Pipe storage yards would be approximately 30 acres in area.

Railroad Sidings

A number of railroad sidings will be used to facilitate the unloading of pipe from railcars. Railroad sidings would generally be greater than 100 acres in area.

Contractor Camps

Contractor Camps would be established to minimize the effects of the pipeline work force on communities with limited housing resources. Each spread will have approximately 1,000 members in the total workforce, including contractors, inspection and construction management staff. The contractor camps would be approximately 80 acres in area. In some locations, contractor camps may be collocated with contractor yards.

Access Roads

Temporary access roads will be necessary to provide ingress and egress for vehicles and equipment at regular intervals along the pipeline route. At the crossing of the Cheyenne River, Keystone will install and use a temporary equipment access bridge for the transfer of construction equipment across the waterbody. No permanent fill will occur as a result of the installation and use of the temporary bridge.

Block 19. Project Purpose. The purpose of the Project is to provide the infrastructure necessary to transport crude oil production from the Western Canadian Sedimentary Basin and the Bakken supply basin in Montana and North Dakota to delivery points in Petroleum Administration Defense District (PADD) III in response to the market demand of refineries in PADD III for heavy crude oil. This market demand is driven by the need of refiners in PADD III to replace current feed stocks of heavy crude oil obtained from other foreign sources with crude from more stable and reliable sources. The Project will transport crude oil from the oil supply hub near Hardisty, Alberta, Canada to an interconnection with the existing Keystone mainline in Steele City, Nebraska.

Block 20. Reason for Discharge. Excavation of the pipeline trench will require the temporary placement of fill (trench spoils, rock, etc.) within the ROW in wetlands and in some waterbodies. These trench materials will then be returned to the pipeline trench, and the original contours and elevations will be re-established to the extent practical. In addition, to provide a stable access and reduce rutting, compaction, erosion, and sedimentation, temporary access across wetlands and streams may require the temporary placement of fill, as described below and in the Project's CMRP (**Attachment C**).

Block 21. Types of Material Being Discharged. Spoil (soil, sand, rocks, etc.) will be excavated from the pipeline trench in wetlands and within stream channels. Excavated materials will be returned to the trench in wetlands and waterbodies immediately after the pipeline is installed in the trench. In addition, timber mats, timber rip-rap or clean rock and flumes may be used to provide stable temporary access across streams and wetlands. Materials used to provide access through wetlands will likely remain in place for longer than 90 days before being removed during final cleanup activities. All of these materials will be removed from within wetlands and waterbodies at the completion of construction.

Block 22. Surface Areas in Acres of Wetlands or Other Waters Filled. The surface areas of wetlands and other waters crossed by the pipeline have been divided into watersheds defined by USGS HUCs (see **Figure 2** for the watershed boundaries within South Dakota. **Table 2** list the waters of the U.S. crossed by the Project requiring a PCN, the reason for the PCN, and the temporary and permanent acreage calculations for each wetland or waterbody. **Table 4** provides the overall summaries of the acreages of temporary and permanent disturbances to waters of the U.S. requiring a PCN, by wetland type (e.g. palustrine emergent marsh) or stream within each HUC watershed.

Temporary access crossing materials (timber mats, timber riprap and rock and flume crossing materials) will be completely removed from wetlands and waterbodies at the completion of construction. Disturbances associated with temporary equipment access methods will be restored and stabilized after the bridging equipment access materials are removed.

Block 23. Description of Avoidance, Minimization, and Compensation. See Block 18 above.

Block 24. Is Any Portion of the Work Already Complete? No.

Block 25. Addresses of Adjoining Property Owners, Lessees, etc., Whose Property Adjoins the Waterbody. Not applicable.

Block 26. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application. Table 5 provides a summary of other Project permits and approvals.

Figure 1 Route through South Dakota Counties

Figure 2 Route through HUCs

Each of the Pre-Construction Notification (PCN) criteria provided in **Table 1** was evaluated for applicability to the Project. Waters of the U.S. found to meet these criteria are listed in **Table 2** and include a code for the applicable PCN criteria. The codes are listed below. **Attachment F** contains the list of USACE Regional Conditions for South Dakota.

Table 1. Keystone XL Pipeline Project – Pre-Construction Notification Requirement Analysis Omaha District, South Dakota

Nationwide Permit 12 PCN Conditions/ Criteria	Source	Applicability to Keystone Project in South Dakota
Waters of the U.S. where activity may affect a federally listed species or designated critical habitat or if the project is located in – or in the vicinity of – designated critical habitat.	General Conditions	**Applicable**
Waters of the U.S. where activity has the potential to affect historic properties listed, eligible for listing, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties.	General Conditions	Not applicable
Mechanized land clearing in a forested wetland for the ROW.	NWP 12	Not Applicable
Section 10 Permit required.	NWP 12	Not Applicable
Utility line in waters of the U.S. exceeds 500 feet	NWP 12	**Applicable**
Utility line is placed within a jurisdictional area and it runs parallel to a stream bed within that jurisdictional area	NWP 12	Not Applicable
Permanent loss of > 0.10 acre.	NWP 12	Not Applicable
Permanent access roads constructed above-grade for >500 feet.	NWP 12	Not Applicable
Permanent access roads constructed of impervious materials.	NWP 12	Not Applicable
Regulated activities located within 100 feet of the water source in natural spring areas.	Regional Condition, South Dakota	Not Applicable
Regulated activities between October 15 and April 1 involving the discharge of dredged or fill material into cold water streams when water flow is present.	Regional Condition, South Dakota	Not Applicable
Prohibits the use of unsuitable materials including the discharge of unsuitable materials in waters of the U.S.	Regional Condition, South Dakota	Not Applicable
Regulated activities within wetlands classified as peatlands.	Regional Condition, South Dakota	Not Applicable

Nationwide Permit 12 PCN Conditions/ Criteria	Source	Applicability to Keystone Project in South Dakota
The use of a borrow site in conjunction with any regulated activities.	Regional Condition, South Dakota	Not Applicable

Table 2. Keystone XL Pipeline Project – Mainline Wetland and Waterbody Crossings within the USACE Omaha District Requiring Pre-Construction Notification – South Dakota

Feature ID	MP[1]	Crossing Distance[2] (Feet)	Type[3]	Name	Crossing Method[4]	HUC Sub Basin[5]	Temporary Disturbance (Acres)	Permanent Disturbance (Acres)	Latitude (WGS84)	Longitude (WGS84)
S312ME012	429.85	123	PER	Cheyenne River	HDD	Lower Cheyenne	0.1414[6]	0.0000	44.508492	-102.0136
S312ME011	429.89	102	INT	Cheyenne River	HDD	Lower Cheyenne	0.1174[6]	0.0000	44.508031	-102.01321
S312ME010	430.00	169	PER	Cheyenne River	HDD	Lower Cheyenne	0.1933[6]	0.0000	44.506721	-102.0121
S312PN002	430.03	12	PER	Cheyenne River	HDD	Lower Cheyenne	0.0139[6]	0.0000	44.506291	-102.01172
S7ALY001	541.30	488	PER	White River	HDD	Lower White	0.5575[7]	0.0000	43.705588	-100.1702
W_UTM14_08449	541.36	137	PSS	N/A	HDD	Lower White	0.1568[7]	0.0000	43.704742	-100.17011

[1] MP = milepost

[2] Crossing distance measured at proposed pipeline centerline.

[3] INT = Intermittent Waterbody; PER = Perennial Waterbody; PSS = Palustrine Scrub Shrub Wetland

[4] HDD = Horizontal directional drill method. The final crossing technique will be determined at the time of construction, based on the field conditions at the time of construction. The HDD construction technique is described in the Project's CMRP.

[5] HUC Sub Basin = Name of 8-digit USGS Hydrologic Unit Code

[6] Temporary impacts is based on a 110-foot wide temporary construction right-of-way.

[7] Temporary impacts is based on a 50-foot wide temporary construction right-of-way.

Table 3. Keystone XL Pipeline Project – Pump Station Locations – South Dakota

Pump Station ID	Milepost	County	Acres
PS-15	288.65	Harding	9.20
PS-16	337.32	Harding	11.30
PS-17	391.54	Meade	11.00
PS-18	444.63	Haakon	8.50
PS-19	500.50	Jones	9.10
PS-20	550.93	Tripp	7.80
PS-21	598.95	Tripp	8.40

Table 4. Keystone XL Pipeline Project – Summary of Wetland and Waterbody Acreage Crossed by the Mainline in the USACE Omaha District Requiring Pre-Construction Notification, by HUC Sub Basin[1] – South Dakota

Water Feature Type[2]	Boxelder		South Fort Grand		Upper Moreau		South Fork Moreau	
	Temp[3] Impacts (Acres)	Perm[4] Impacts (Acres)	Temp Impacts (Acres)	Perm Impacts (Acres)	Temp Impacts (Acres)	Perm Impacts (Acres)	Temp Impact (Acres)	Perm Impacts (Acres)
PEM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PSS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Stream	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Water Feature Type[2]	Cherry		Lower Cheyenne		Bad		Medicine	
	Temp Impacts (Acres)	Perm Impacts (Acres)	Temp Impacts (Acres)	Perm Impacts (Acres)	Temp Impacts (Acres)	Perm Impacts (Acres)	Temp Impacts (Acres)	Perm Impacts (Acres)
PEM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PSS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Stream	0.0000	0.0000	0.4660[5]	0.0000	0.0000	0.0000	0.0000	0.0000

Water Feature Type[2]	Lowe White		Ponca		Keya Paha		Total	
	Temp Impacts (Acres)	Perm Impacts (Acres)	Temp Impacts (Acres)	Perm Impacts (Acres)	Temp Impacts (Acres)	Perm Impacts (Acres)	**Temp Impacts (Acres)**	**Perm Impacts (Acres)**
PEM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0000**	**0.0000**
PSS	0.1568[6]	0.0000	0.0000	0.0000	0.0000	0.0000	**0.1568**	**0.0000**
Stream	0.5575[6]	0.0000	0.0000	0.0000	0.0000	0.0000	**1.0235**	**0.0000**

[1] HUC Sub Basin = Name of 8-digit USGS Hydrologic Unit Code.

[2] PEM = Palustrine Emergent Marsh, PSS = Palustrine Scrub Shrub Wetland, Stream = Includes intermittent waterbodies and perennial waterbodies.

[3] Temp = Temporary

[4] Perm = Permanent

[5] Calculations of temporary impacts are based on a 110-foot wide temporary construction right-of-way.

[6] Calculations of temporary impacts are based on a 50-foot wide temporary construction right-of-way.

Table 5. Keystone XL Pipeline Project – Permits, Licenses, Approvals, and Consultation Requirements

Agency	Permit or Consultation/Authority	Agency Action
Federal		
U.S. Department of State (DOS)	Presidential Permit, Executive Order 13337 of April 30, 2004 (69 Fed. Reg. 25299, et seq.)	Considers approval of cross-border facilities.
	National Environmental Policy Act (NEPA)	Lead federal agency for the environmental review in connection with consideration of Presidential Permit application
	Section 106 of the National Historic Preservation Act (NHPA)	Supervises and coordinates compliance with Section 106 of NHPA and consultation with interested Tribal agencies
	Section 7 of the Endangered Species Act (ESA)	Coordinates ESA consultation with the United States Fish and Wildlife Service (USFWS)
Bureau of Land Management (BLM)	Right-of-way (ROW) grant(s) and short-term ROWs under the Federal Land Policy and Management Act of 1976 as amended (FLPMA) and Temporary Use Permit under Section 28 (MLA)	Considers approval of ROW grant and temporary use permits for the portions of the Project that would encroach on public lands
	Archeological Resources Protection Act (ARPA) Permit	Considers issuance of cultural resource use permit to survey, excavate or remove cultural resources on federal lands
	Notice to Proceed	Following issuance of a ROW grant and approval of the Project's POD, considers the issuance of a Notice to Proceed with Project development and mitigation activities for federal lands
	Section 106 (NHPA)	Responsible for compliance with Section 106 of NHPA and consultation with interested Tribal agencies
U.S. Corps of Engineers (USACE) – Omaha	Section 404, Clean Water Act (CWA)	Considers issuance of Section 404 permits for the placement of dredge or fill material in waters of the U.S., including wetlands
	Section 10 Permit (Rivers and Harbors Act of 1899)	Considers issuance of Section 10 permits for pipeline crossings of navigable waters
	Section 106 (NHPA)	Responsible for compliance with Section 106 of NHPA and consultation with interested Tribal agencies
U.S. Fish and Wildlife Service (USFWS)	ESA Section 7 Consultation, Biological Opinion	Biological Opinion issued May 15, 2013
U.S. Bureau of Reclamation (Reclamation)	ROW Grant and Temporary Use Permit under Section 28 of the MLA	Determines if ROW grant issued under MLA by BLM is in compliance with Reclamation standards
	Section 106 (NHPA)	Responsible for compliance with Section 106 of NHPA and consultation with interested Tribal agencies
Federal Highway Administration (FHA)	Crossing Permit	Considers issuance of permits for the crossing of federally funded highways
U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety (OPS)	49 CFR Part 195 – Transportation of Hazardous Liquids by Pipeline	Reviews design, construction, operations, maintenance, and emergency operations plan (termed Emergency Response Plan [ERP]), inspection of pipeline projects, including Integrity Management Programs and identifying high consequence areas prior to installation

Table 5. Keystone XL Pipeline Project – Permits, Licenses, Approvals, and Consultation Requirements

Agency	Permit or Consultation/Authority	Agency Action
	49 CFR Part 194 – Response Plans for Onshore Pipelines	Reviews Response Plans (termed Pipeline Spill Response Plan [PSRP]) prior to initiation of operation and within 2 years of startup approves the PSRP.
U.S. Environmental Protection Agency (EPA), Regions VII, VIII	Section 401, CWA, Water Quality Certification	Considers approval of water use and crossing permits for non-jurisdictional waters (implemented through each state's Water Quality Certification Program)
	Section 402, CWA, National Pollutant Discharge Elimination System (NPDES)	Reviews and issues NPDES permit for the discharge of hydrostatic test water (implemented through each state's Water Quality Certification Program, where required)
U.S. Department of Agriculture – Natural Resources Conservation Service (NRCS)	Section 106 (NHPA)	Responsible for compliance with Section 106 of NHPA and consultation with interested Tribal agencies
U.S. Department of Agriculture – Farm Service Agency (FSA)	Section 106 (NHPA)	Responsible for compliance with Section 106 of NHPA and consultation with interested Tribal agencies
U.S. Department of Agriculture – Rural Utilities Services (RUS)	Section 106 (NHPA)	Responsible for compliance with Section 106 of NHPA and consultation with interested Tribal agencies
Western Area Power Administration (Western)	Section 106 (NHPA)	Responsible for compliance with Section 106 of NHPA and consultation with interested Tribal agencies
Advisory Council on Historic Preservation (ACHP)	Consultation	Advises federal agencies during the Section 106 consultation process; signator to the Programmatic Agreement
U.S. Department of Treasury – Bureau of Alcohol, Tobacco, and Firearms	Treasury Department Order No. 120-1 (former No. 221), effective 1 July 1972	Considers issuance of permit to purchase, store, and use explosives should blasting be required
South Dakota[A]		
South Dakota Historical Society[B]	Consultation under Section 106, NHPA	Reviews and comments on activities potentially affecting cultural resources
South Dakota Public Utilities Commission (SDPUC)	Energy Conversion and Transmission Facilities Act	A PUC Certificate was issued March 2010
Department of Environment and Natural Resources, Surface Water Quality Program	Section 401, CWA, Water Quality Certification	Considers issuance of permit for stream and wetland crossings; consult for Section 404 process
	Hydrostatic Testing/Dewatering & Temporary Water Use Permit (SDG070000)	Considers issuance of General Permit regulating hydrostatic test water discharge, construction dewatering to waters of the state, and Temporary Water use Permit South Dakota General Permit for Temporary Discharge Activities Issued April 2013
	SDLC 24A-18 (oil spill response plans)	Review and consider approving crude oil pipeline spill response plans
Department of Game, Fish, and Parks	Consultation	Consults regarding natural resources
Department of Transportation	Crossing Permits	Considers issuance of permits for crossing of state highways
County Road Departments	Crossing Permits	Considers issuance of permits for crossing of county roads

Table 5. Keystone XL Pipeline Project – Permits, Licenses, Approvals, and Consultation Requirements

Agency	Permit or Consultation/Authority	Agency Action
County and Local Authorities	Pump Station Zoning Approvals, where required	Reviews under county approval process
	Special or Conditional Use Permits, where required	Reviews under county approval process

[A] Permits associated with construction camps are described in the August 26, 2011 FEIS Section 2.2.7.4

[B] The SHPO has the opportunity to review federal agency decisions under Section 106 of the NHPA, but this is not a legal obligation

Discussion of Map Volume
(PCN Wetland and Stream Features – Attachment A)

The U.S. Geological Survey (USGS) topographic maps were enlarged to depict the wetlands and waterbodies crossed by the Project and requiring Pre-Construction Notification to the USACE. A legend is provided on the first page, but generally the centerline is shown in red with thin white solid lines depicting the limit of the proposed temporary construction ROW. A label on each wetland or waterbody provides the feature identification number that corresponds to the tables provided. Mileposts are also depicted along the centerline and correspond to the features listed in **Table 2**.

The 2010 NAIP aerial photography based sheets depict the same information as shown on the USGS topographic maps and both versions are provided in both color and black and white (a total of four sets of maps).

Attachment A

Map Volume
PCN Wetland and Stream Features
(bound separately)

ATTACHMENT B

Wetland Delineation Report
(bound separately)

ATTACHMENT C

Keystone XL Pipeline Project
Construction Mitigation and Reclamation Plan

ATTACHMENT D

Horizontal Directional Drill Frac-out Contingency Plan

ATTACHMENT E

Horizontal Directional Drill Site-Specific Drawings

ATTACHMENT F

2012 Nationwide Permits
Regional Conditions
Omaha District
State of South Dakota

TransCanada Keystone Pipeline, LP

Houston, Texas

Keystone XL Pipeline Project

Draft Wetland Delineation Survey Report
Omaha District – South Dakota

July 2013

Keystone XL Pipeline Project

Draft Wetland Delineation Survey Report

South Dakota

Submitted to the United States Army Corps of Engineers

Omaha District - South Dakota State Office

July 2013

Acronym Glossary

bpd	barrels per day
CWA	Clean Water Act
EPA	Environmental Protection Agency
ESA	Environmental Study Area
FAC	facultative plants
FACU	facultative upland plants
FACW	facultative wetland plants
GIS	Geographical Information System
GPS	Global Positioning System
JD	jurisdictional determination
Keystone	TransCanada Keystone Pipeline, LP
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
NWP	Nationwide Permit
OBL	wetland obligate plants
PCN	Pre-Construction Notification
PEM	palustrine emergent wetland
PFO	palustrine forested wetland
Project	Keystone XL Pipeline Project
PSS	palustrine scrub shrub wetland
ROW	right-of-way
SD DENR	South Dakota Department of Environment and Natural Resources
SD GFP	South Dakota Game, Fish and Parks
UPL	obligate upland plants
U.S.	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

Executive Summary

TransCanada Keystone Pipeline, LP (Keystone) is proposing to construct and operate a crude oil pipeline and related facilities from Hardisty, Alberta, Canada, to Steele City, Nebraska in the United States (U.S.). The project, known as the Keystone XL Pipeline Project (Project), will have a nominal capacity to deliver up to 830,000 barrels per day (bpd) of crude oil from an oil supply hub near Hardisty to an existing Keystone Pipeline system in Steele City in Fallon County, Nebraska.

In total, the Project will consist of approximately 1,202 miles of 36-inch diameter mainline pipeline, consisting of about 327 miles in Canada and 875 miles within the U.S., with 315.32 miles occurring within South Dakota. Keystone proposes to start construction in 2014.

The USACE Omaha District has jurisdiction over activities that may affect waters of the U.S. in Montana, South Dakota, and Nebraska. This report addresses only South Dakota. The primary proposed construction activities within South Dakota will be: 1) the installation of a 36-inch mainline steel pipeline (Harding County, South Dakota through Tripp County, South Dakota) within a standard 110-foot wide construction right-of-way (ROW); 2) construction of seven (7) pump stations; and 3) installation of mainline isolation valves at intervals along the pipeline. In addition to the ROW, pipeline construction will require the use of temporary and permanent access roads, construction yards, pipeline yards, temporary work camps, and other related auxiliary facilities. Route maps are located in **Attachment A**.

Keystone conducted wetlands assessment and delineation surveys in South Dakota at various times from June 2008 through May 2013. The field methodologies that were employed by trained biologists were conducted in accordance with the 1987 *U.S. Army Corps of Engineers Wetland Delineation Manual* (USACE 1987) and the *2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (*Version 2.0*; USACE 2010). A survey corridor of 300 feet was investigated on all properties along the specified pipeline corridor where access was granted by the property owner. A survey corridor width of 100 feet was investigated for proposed access roads. These widths were assessed to allow flexibility of the final alignment, associated work space, and installation techniques associated with the proposed pipeline construction activities. The survey corridor is often larger than the area proposed for construction disturbance. Therefore, some features within the survey corridor would be avoided in their entirety by the proposed construction footprint. For pump stations and temporary facilities, the acreage to be purchased and/or leased for each station/facility was surveyed and results provided in this report.

This report details the Project components under the jurisdiction of the Omaha District of the USACE in South Dakota. Environmental features, including wetlands, waterbodies, listed species, critical habitat, and land use, were assessed and documented. Field investigations identified the number of crossings of features by county.

Contents

List of Tables

1.0 Introduction

This report summarizes the results of the environmental field survey activities in South Dakota that were performed by TransCanada Keystone Pipeline, LP (Keystone) from June 2008 through May 2013 for the proposed Keystone XL Pipeline Project (Project). Specifically, this report details the results for the United States Army Corps of Engineers (USACE), Omaha District in South Dakota. The scope of work involved conducting an environmental field investigation including wetland assessments and delineations, waterbody assessments and delineations, and evaluation of land use along the Project. The wetland assessment and delineation were conducted to determine if potential jurisdictional wetlands and/or potentially jurisdictional waters of the United States (U.S.) exist within the proposed Project areas and to determine the approximate boundaries of each feature. All features that were identified within the Environmental Study Area (ESA) are summarized in this report.

Field survey methods and results are presented and discussed in this report. Project maps are included as **Attachment A**, copies of field data sheets and photographs are included on compact disc as **Attachment B**, and results are summarized in tables in **Attachment C**.

1.1 Project and Site Description

Keystone is proposing to construct and operate a crude oil pipeline and related facilities from Hardisty, Alberta, Canada, to Steele City, Nebraska, United States. The Project will have the nominal capacity to deliver 830,000 barrels per day (bpd) of crude oil from an oil supply hub near Hardisty to existing Keystone Pipeline system in Steele City, Nebraska. The length of the Project is approximately 875 miles, from the Canada/U.S. border to Steele City in Jefferson County, Nebraska. Keystone proposes to start construction in 2013. For portions of the Project falling within the jurisdiction of the USACE Omaha District in Montana and Nebraska, separate Pre-Construction Notification (PCN) packages (including wetland delineation reports) will be prepared and submitted.

The USACE Omaha District has jurisdiction over activities that may affect waters of the U.S. along the Project route in South Dakota. The Project route will include 315.32 miles of pipeline in South Dakota. **Table 1** (**Attachment C**) provides a mileage breakdown of the Project route by county for South Dakota. In addition to the pipeline, Keystone will construct permanent and temporary construction access roads, temporary facilities (including contractor yards, pipe yards, rail sidings, and construction camps) and aboveground permanent facilities, including pump stations, delivery facilities, and mainline valves. Route maps are located in **Attachment A**.

2.0 Survey Methods

The following sections describe the background information that was utilized and methods that were implemented by trained biologists. The proposed alignments and pump stations were evaluated to determine land uses and the location of wetlands and waterbodies within the Project's ESA. The ESA is further defined in Section 2.1.2.

2.1 Regulations and Definitions

The USACE regulates wetlands and special aquatic sites determined to be waters of the U.S. under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act.

The USACE and the U.S. Environmental Protection Agency (EPA) define wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands typically include swamps, marshes, bogs, and other similar areas" (USACE 1987).This definition takes into consideration three distinct environmental parameters: hydrology, soil, and vegetation. Positive wetland indicators of all three parameters are normally present in wetlands.

The Clean Water Act (1977) defines the term "Waters of the U.S." as:

a. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

b. All interstate waters including interstate wetlands;

c. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

    1. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or

    2. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

    3. Which are used or could be used for industrial purpose by industries in interstate commerce;

d. All impoundments of waters otherwise defined as waters of the U.S. under the definition;

e. Tributaries of waters identified in paragraphs (a) through (d) above;

f. The territorial seas;

g. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (g).

    1. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA (other than cooling ponds as defined in 40 Code of Federal Regulations 123.11(m), which also meet the criteria of this definition) are not waters of the U.S.

h. Waters of the U.S. do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with the EPA.

Depending on individual circumstances, when the USACE declines jurisdiction over a wetland in South Dakota, jurisdiction may fall to the state agencies responsible for regulating wetlands under Section 401 of the CWA. In South Dakota, jurisdiction would fall to the U.S. Fish and Wildlife Service (USFWS), the South Dakota Department of Environment and Natural Resources (SD DENR), or the South Dakota Game, Fish and Parks (SD GFP).

2.1.1 Desktop Analysis

Prior to conducting the environmental field activities, staff completed a desktop analysis of the following sources:

- USFWS National Wetlands Inventory (NWI) Maps;
- US Geological Survey (USGS) 7.5-minute Topographic Quadrangle Maps;
- Aerial Photography (2008 through 2012);
- Natural Resources Conservation Service (NRCS) Soil Surveys;
- USGS Land Use and Land Cover Data;
- SD GFP state lists and USFWS federal lists of threatened and endangered species.

Habitats associated with the proposed alignment were evaluated using field observations, interpretation of aerial photography, and interpretation of USGS 7.5-minute topographic maps. The objectives of this data review were to identify wetlands and other waters of the U.S. intersected by the proposed pipeline route, including intermittent and ephemeral streams, and to identify specific wetlands and other waters of the U.S. that will require field evaluation to confirm their status and to identify potential habitat suitable for threatened and endangered species. Areas identified for field verification included:

1) NWI-mapped wetlands intercepted by the pipeline route that are not farmed;

2) Areas that appear to meet the USACE's three-parameter criteria for wetlands (discussed below), but are not mapped on NWI maps; and

3) Forested areas where wetland boundaries could not be estimated from aerial photographs.

Additional areas to be field verified were included as recommended by the USACE Omaha District. Areas identified on the NWI maps as farmed wetlands or agricultural or roadway drainage ditches were eliminated from field delineations.

2.1.2 Field Survey

Areas selected for field verification were surveyed by trained biologists along the proposed alignment. The survey corridor (also referred to as the Environmental Study Area or ESA) along the proposed alignment was 300 feet in width centered on the centerline of the proposed pipeline. In areas where the Project is collocated with existing pipelines, the survey width was adjusted to 100 feet on the collocated portion of the proposed centerline and 200 feet on the non-collocated side. Access roads were surveyed 100 feet in width centered on the centerline of each proposed access road. Pump stations and temporary facilities were surveyed in their entirety. Land parcels were only surveyed if landowner permission for access was granted. Using common

wetland survey tools such as shovels and soil augers, the Munsell Soil Color Chart, USACE field data sheets, plant indicator lists, and visual observation for plant identification, the biological survey crews implemented the three parameter approach set forth in the 1987 *U.S. Army Corps of Engineers Wetland Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (*2.0*; USACE 2010). As identified in the *USACE Wetland Delineation Manual*, a "three-parameter" approach was used for the delineation of the selected wetlands in the field. Biologists determined whether the hydrology, wetland vegetation, and hydric soil conditions characteristic of wetlands existed within the surveyed area. Evaluation of these parameters is discussed below.

2.2 Wetlands

2.2.1 Vegetation

Dominant vegetation was identified to species (occasionally to genus) and then classified according to the *National List of Plant Species that Occur in Wetlands: North Plains Region 4* (USFWS 1988). The indicator status identifies a range of probabilities that an individual species would be found in wetland or upland areas in a defined region (USACE 1987). Obligate (OBL) plants are those found within wetlands more than 99 percent of the time. Facultative wetland (FACW) plants are found in wetlands 67 to 99 percent of the time. Facultative (FAC) plants are found in wetlands 33 to 66 percent of the time. Facultative upland (FACU) plants are found in wetlands 1 to 33 percent of the time. Obligate upland (UPL) plants are found in wetlands less than 1 percent of the time. The indicator status is further defined by a plus sign (+) or a minus sign (–), indicating the species preference for areas on the wetter or drier end of the probability range. If more than 50 percent of the dominant species in a community are found to have wetland indicator status of OBL, FACW, or FAC (excluding FAC–), the plant community is determined to be hydrophytic or wetland.

2.2.2 Hydric Soils

Hydric soils are soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation. Hydric soil indicators relate to color, structure, organic content, and the presence of reducing conditions. Initially, soils were identified using the respective county soil surveys. Soils were then examined in the field by hand excavating test pits ranging from 6 to 12 inches in diameter and 12 to 20 inches deep in areas exhibiting different plant communities. Typically, soil observations were focused on the area immediately below the 'A' horizon (topmost mineral horizon) or 10 inches, whichever is shallower. Color characteristics (hue, value, and chroma) were recorded using Munsell Soil Color Charts (Kollmorgen Corporation 1992). Subsequently, soils were assessed as to type and whether they met the criteria for hydric (wetland) or non-hydric (non-wetland) per criteria outlined in the *USACE Wetland Delineation Manual* (USACE 1987).

2.2.3 Hydrology

Hydrological characteristics were determined by field observation as well as examining aerial photographs, USGS topographic maps, Federal Emergency Management Agency Flood Hazard Maps, and NWI maps to identify distinct features that are typically associated with wetlands and wetland habitats. Field observations were made to determine if primary and secondary indicators of hydrology, as outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (*2.0*; USACE 2010), were present. Primary indicators for wetland hydrology in the Great Plains Region include: surface water, soil saturation within 12 inches of the soil surface, water marks on vegetation, drift lines, water-borne drift deposits, and oxidized rhizospheres (root channels) associated with living roots. Secondary indicators for wetland hydrology include: drainage patterns, moss trim lines, saturation visible on aerial imagery, geomorphic position, and a positive FAC-Neutral test (comparative dominance of FACW and OBL vegetative species versus FACU and UPL vegetative species). During field examinations, hydrological wetland indicators were

assessed, including saturated soil, the presence of standing water, and visible drainage patterns at each sampling point.

2.2.4 Documentation

As described in the *USACE Wetland Delineation Manual* (USACE 1987), areas where all three parameters met the wetland criteria were labeled as wetlands. Vegetation, soil, and hydrology data were collected at each sample point within the wetlands and in immediately adjacent uplands and were then entered onto a standardized wetland delineation field data form. The form also included a field sketch, which illustrated the wetlands and uplands. Photographs were taken showing a representative view of each wetland visited.

Trimble® GPS Pathfinder™ PRO-XRS and Trimble GeoXT™ Global Positioning System (GPS) units were used to record wetland and waterbody locations identified by biologists. The Trimble PRO-XRS uses the "Rover" data collection system, which is supported by differential corrections input from community base stations proximate to the project area. Trimble GeoXT receivers are equipped with EVEREST™ multipath rejection technology to provide submeter accuracy. Multipath rejection technology accomplishes a high level of accuracy by filtering satellite signals that are reflected by neighboring objects. The result is a clearer signal from satellites and a more accurate reading.

Identified features along the survey corridor were distinctly named in order to distinguish each feature. Features were labeled in the following manner: F-N-CC-000, where:

F = Feature Type (stream, wetland habitat, etc.)

N = team number

CC = two-letter County abbreviation

000 = number of feature within each county, representative to each team

Alternatively, some features were labeled with additional symbols where desktop delineation was conducted and/or extensions of previously-identified features were delineated during subsequent surveys. In addition to the nomenclature described above, these features were labeled using one of the following systems:

F_UTM_000, where

UTM = Universal Transverse Mercator

or

F_TROW_000, where

TROW = company name

or

F0000, where

0000 = number of feature within county, representative to each team

or

SOADD 00, where

SOADD = desktop stream feature

After collection, GPS / Geographical Information System (GIS) data were added to a GIS database that was created using ESRI ArcMap™ 9.3.1 software. Maps were created in GIS to illustrate the locations of surveyed features within the ESA (**Attachment A**). Additionally, field data sheets, photographs and GPS survey data were compiled and maintained by Keystone. Field data sheets and photographs are provided in digital format (compact disc) in **Attachment B.**

2.2.5 Wetland Characterization

Wetlands were classified according to the Cowardin System, as described in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin 1979). This hierarchical system aids resource managers and others by providing uniformity of concepts and terms used to define wetlands using hydrologic, geomorphic, chemical, and biological factors.

2.3 Waterbodies

Waterbodies include linear water features (i.e., streams, rivers, and man-made ditches) as well as open water features (i.e., ponds, lakes). Linear waterbodies were classified by use as observed in the field and/or as determined from reviewing available data (e.g., maps) and include man-made ditches, streams, and rivers. Open waterbody features were classified as ponds or lakes. Applicable data were gathered for each waterbody feature including: bank height, bank slope, stream flow direction and type, water appearance, stream substrate, aquatic habitats, channel conditions, and disturbances, and were documented on Waterbody Data Sheets, which are provided digitally in **Attachment B**. Waterbody Data Sheets were completed for surveyed stream crossings whether or not they supported adjunct wetland plant communities. If both wetlands and other waters of the U.S. were present, a Waterbody Data Sheet and a Routine Wetland Determination Form were completed for the survey site.

Identified waterbodies were surveyed using GPS technologies as described above in Section 2.2.4. Data points were collected along the upper banks or edges of the features within the ESA.

2.4 Uplands

Upland communities were characterized according to their proximity to adjacent wetlands (i.e., a distinguishable transition from wetland communities to upland [non-wetland] communities) and for total coverage for the proposed pipeline alignment. Characterization included significant habitat changes, species composition, and sensitive or critical habitats. Vegetation identified in upland areas associated with wetlands is identified on data sheets in **Attachment B**.

3.0 Results

The results of the wetland and waterbody field surveys for the Project are presented in the following sections. General descriptions of the soils, hydrology, and vegetation are discussed by feature type and summarized in applicable sections. Pertinent attachments include the following: **Attachment B**, field data sheets and photographs; and **Attachment C**, results tables. The results presented in this report are based on a review of available information, desktop analysis, and formal wetland delineations.

3.1 Wetlands

Within the Project ESA (as defined in Section 2.1.2) in the USACE Omaha District in South Dakota, 88 individual crossings of wetlands were identified;

- ESA: 88 total individual crossings of wetlands:
  - 84 individual crossings of palustrine emergent wetlands (PEMs);
  - 3 individual crossings of palustrine forested wetlands (PFO); and
  - 1 crossing of a palustrine shrub scrub wetland (PSS).

Tables 2, 3, and 4 (**Attachment C**) identify all wetlands found within the ESA on the Project within the USACE Omaha District in South Dakota.

3.1.1 Vegetation

The dominant vegetation types that are found in wetland communities can be found in **Attachment B** and **Table 5** (**Attachment C**). Vegetation types identified in upland areas associated with wetlands is also included in **Attachment B**. Sources used to identify plants include, but are not limited to: Harrington 1977; Hitchcock 1971; Knobel 1980; Little 1980; Mitsch and Gosselink 1993; Mohlenbrock 2002; Niering and Olmstead 1992; and Reed 1988.

3.1.2 Soils

Soil associations crossed by the Project in the USACE Omaha District in South Dakota can be found in **Table 6** (**Attachment C**). Sources used to determine the soil types include: USDA; NRCS, Soil Survey Geographic (STATSGO) Database, 2000 and 2002; and Kollmorgen Instrument Corporation, 1992.

3.1.3 Hydrology

The hydrological indicators that are associated with identified wetlands can vary due to wetland location and wetland development. Primary indicators of wetland hydrology observed for delineated wetlands include: inundation, soil saturation within 12 inches of the soil surface, water marks on vegetation, drift lines, water-borne drift deposits, and oxidized rhizospheres (root channels) associated with living roots. Secondary indicators observed for wetland hydrology include: drainage patterns, moss trim lines, saturation visible on aerial imagery, geomorphic position, and a positive FAC-Neutral test (comparative dominance of FACW and OBL vegetative species versus FACU and UPL vegetative species).

Project location maps provided in **Attachment A** show waters of the U.S. identified within the Project ESA. Field crews found that wetlands identified and classified during the field surveys were not always illustrated on the NWI maps. In addition, some areas illustrated on the NWI maps as wetlands did not meet the criteria to be

designated as wetlands. Detailed information on each feature surveyed in the field is provided on the USACE Wetland Data Sheets that can be found in **Attachment B**.

3.2 Waterbodies

The majority of waterbodies that were identified consist of intermittent/ephemeral washes with well to poorly defined bed and bank structures. Perennial waterbodies were identified within the ESA as well. These perennial features generally hold water year round and contain a well-defined bed and bank with channelized structure. In total, within the Project ESA in the USACE Omaha District in South Dakota 312 individual crossings of waterbodies were identified;

- ESA: 312 total individual crossings of waterbodies:
    - 35 individual crossings of perennial waterbodies;
    - 119 individual crossings of intermittent waterbodies;
    - 133 individual crossings of ephemeral waterbodies;
    - 11 individual crossings of man-made waterbodies;
    - 8 individual crossings of open waterbodies; and
    - 6 individual crossings of seasonal waterbodies.

Tables 2, 3, and 4 (**Attachment C**) list all waterbodies identified within the ESA in the USACE Omaha District in South Dakota.

4.0 Preliminary Jurisdictional Determination

As outlined in USACE Regulatory Guidance Letter No. 08-02 dated June 26, 2008, Keystone has elected to use a preliminary jurisdictional determination (JD) to voluntarily waive or set aside questions regarding Section 404 of the CWA and Sections 9 and 10 of the River and Harbors Act of 1899 jurisdiction for the Project. Keystone is requesting USACE authorization of the Project under Nationwide Permit (NWP) 12 (PCN bound separately) and understands that the following conditions apply when not requesting an approved JD:

- Keystone has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters;
- Keystone has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions;
- Keystone has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization;
- Keystone can accept a permit authorization and thereby agree to comply with all terms and conditions of that permit, including whatever mitigation requirements the USACE has determined to be necessary;
- That undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes Keystone's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as practicable;
- Keystone accepting a permit authorization (e.g. signing a proffered individual permit) or undertaking any activity in reliance on any form of USACE permit authorization based on preliminary JD constitutes agreement that all wetlands and other waterbodies on the site affected in any way by that activity are jurisdictional waters of the U.S., and precludes any challenge to such jurisdiction in any administrative appeal or in Federal Court; and
- Whether Keystone elects to use either an approved JD or preliminary JD, that JD will be processed as soon as practicable.

To support the USACE's preliminary JD evaluation for the Project, a completed Preliminary Jurisdictional Determination Form is included in **Attachment D**.

5.0 Summary and Conclusions

In total, the Project will consist of approximately 1,202 miles of 36-inch diameter mainline pipeline, consisting of about 327 miles in Canada and 875 miles within the U.S., and 315.32 miles within South Dakota. It will interconnect with an existing Keystone Pipeline system in Steele City, Nebraska that will allow for the delivery of product to existing refinery markets on the Texas Gulf Coast. Keystone proposes to start construction in 2013. Within the jurisdiction of the Omaha District in South Dakota, the Project will cross Harding, Butte, Perkins, Meade, Pennington, Haakon, Jones, Lyman, and Tripp counties. For portions of the Project falling within the jurisdiction of the USACE Omaha District in Montana and Nebraska, separate PCN packages (including delineation reports) will be prepared and submitted.

This report summarizes information from 2008, 2009, 2010, 2011, 2012, and 2013 field survey activities conducted within the Omaha District in South Dakota. Environmental features, including wetlands, waterbodies, listed species, critical habitat, and land use, were assessed and documented. The following number of individual crossings of features have been identified within the ESA in the Omaha District in South Dakota:

- 88 total individual crossings of wetlands including 84 of PEMs, 3 of PFOs, and 1 of a PSS.
- 312 total individual crossings of waterbodies including 35 of perennial waterbodies, 119 of intermittent waterbodies, 133 of ephemeral waterbodies, 11 of man-made waterbodies, 8 of open waterbodies, and 6 of seasonal waterbodies.

Habitats associated with the proposed alignment were assigned using field observations and interpretation of aerial photography. These habitats were observed to be dominated by range and agricultural lands, but also included open spaces, wetlands, developed (commercial/industrial, and residential), ROW, and open water.

6.0 References

6.1 Reference Documents

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Attachment A

Figures – Wetland and Waterbody Map Book

(Submitted in a separate 11x17 binder, Book 2 of 2)

Attachment B

Field Data Sheets, Photographs and Data Upload Tables

(Provided on compact disc)

Attachment C

Tables

Table 1 – Keystone XL Pipeline Project – South Dakota State and County Crossing Lengths – Mainline

State	County / County Abbreviation	Distance (miles)
South Dakota	Harding (HA)	72.74
	Butte (BU)	3.79
	Perkins (PE)	15.28
	Meade (ME)	52.63
	Pennington (PN)	0.77
	Haakon (HK)	58.70
	Jones (JO)	39.94
	Lyman (LY)	11.78
	Tripp (TR)	59.69
	Total	315.32

Table 2 - Keystone XL Pipeline Project - Wetland and Waterbody Crossings within the ESA – Mainline, USACE Omaha District, South Dakota

Feature ID	MP [1]	Crossing Distance [2] (Feet)	Type [3]	Name	HUC SUB Basin [4]	Area Within ESA [5] (Acres)	Latitude (WGS84)	Longitude (WGS84)
S275HA001	286.63	27	EPH	UNNAMED TRIBUTARY TO BOXELDER CREEK	Boxelder	0.2042	45.882886	-104.027466
S_UTM13_07772	288.17	-	MABO	UNNAMED TRIBUTARY TO BOXELDER CREEK	Boxelder	0.2161	45.867311	-104.006290
W104HA001	292.35	195	PEM	N/A	Upper Little Missouri	0.6081	45.835643	-103.932768
W0002	292.64	19	PEM	N/A	Upper Little Missouri	0.2427	45.833740	-103.927795
S29HA001	292.64	24	INT	SHAW CREEK	Upper Little Missouri	0.0736	45.833714	-103.927666
W0002	292.65	62	PEM	N/A	Upper Little Missouri	0.2878	45.833668	-103.927563
W0003	293.61	21	PEM	N/A	Upper Little Missouri	0.1558	45.826842	-103.910192
S_UTM13_04433	293.61	16	EPH	UNNAMED TRIBUTARY TO LITTLE MISSOURI RIVER	Upper Little Missouri	0.0960	45.826814	-103.910124
W0003	293.62	25	PEM	N/A	Upper Little Missouri	0.1495	45.826758	-103.910050
W567HA001	293.62	-	PEM	N/A	Upper Little Missouri	0.0817	45.826909	-103.909877
W_UTM13_04445	295.04	64	PEM	N/A	Upper Little Missouri	0.5426	45.815809	-103.885304
S312HA001	295.06	93	PER	LITTLE MISSOURI RIVER	Upper Little Missouri	0.6009	45.815720	-103.884850
S29HA002	295.07	-	PER	LITTLE MISSOURI RIVER	Upper Little Missouri	0.0001	45.815803	-103.884456
W567HA002	295.11	67	PEM	N/A	Upper Little Missouri	0.2602	45.815295	-103.884406
S302HA001	296.89	18	EPH	UNNAMED TRIBUTARY TO KIMBLE CREEK	Upper Little Missouri	0.0668	45.800211	-103.855254
S_UTM13_04476	297.64	-	INT	UNNAMED TRIBUTARY TO KIMBLE CREEK	Upper Little Missouri	0.0043	45.797971	-103.840630
S_UTM13_04476	297.65	11	INT	UNNAMED TRIBUTARY TO KIMBLE CREEK	Upper Little Missouri	0.0616	45.797521	-103.840460
S500HA001	298.42	14	EPH	UNNAMED TRIBUTARY TO KIMBLE CREEK	Upper Little Missouri	0.0490	45.792377	-103.827587
S123HA003	300.01	17	INT	UNNAMED TRIBUTARY TO KIMBLE CREEK	Upper Little Missouri	0.2853	45.781885	-103.798976
S_UTM13_09874	300.35	-	INT	KIMBLE CREEK	Upper Little Missouri	0.0864	45.778539	-103.793653

Table 2 - Keystone XL Pipeline Project - Wetland and Waterbody Crossings within the ESA – Mainline, USACE Omaha District, South Dakota

Feature ID	MP [1]	Crossing Distance [2] (Feet)	Type [3]	Name	HUC SUB Basin [4]	Area Within ESA [5] (Acres)	Latitude (WGS84)	Longitude (WGS84)
W_UTM13_04537	300.38	109	PEM	N/A	Upper Little Missouri	0.6119	45.778537	-103.792773
S_UTM13_04536	300.38	18	INT	KIMBLE CREEK	Upper Little Missouri	0.1436	45.778400	-103.792738
S_UTM13_04536	300.47	-	INT	KIMBLE CREEK	Upper Little Missouri	0.0095	45.777877	-103.791203
S_UTM13_04536	300.49	-	INT	KIMBLE CREEK	Upper Little Missouri	0.0253	45.777634	-103.790873
S123HA002	300.52	-	OW	KIMBLE CREEK	Upper Little Missouri	0.1798	45.777289	-103.790440
S_UTM13_04536	300.55	-	INT	KIMBLE CREEK	Upper Little Missouri	0.0528	45.777012	-103.789996
W0004	303.45	18	PEM	N/A	Upper Little Missouri	0.2061	45.754375	-103.740194
S_UTM13_07045	303.45	-	INT	DRY HOUSE CREEK	Upper Little Missouri	0.0136	45.754197	-103.740608
S_UTM13_07045	303.46	17	INT	DRY HOUSE CREEK	Upper Little Missouri	0.1610	45.754370	-103.739953
W0004	303.46	12	PEM	N/A	Upper Little Missouri	0.1897	45.754310	-103.739896
S0346	305.18	28	EPH	UNNAMED TRIBUTARY TO JONES CREEK	South Fork Grand	0.0951	45.742788	-103.709641
S_UTM13_04604	306.16	-	INT	UNNAMED TRIBUTARY TO JONES CREEK	South Fork Grand	0.1087	45.732522	-103.695890
S_UTM13_04604	306.31	18	INT	UNNAMED TRIBUTARY TO JONES CREEK	South Fork Grand	0.1713	45.730495	-103.694888
S_UTM13_04614	306.99	50	INT	UNNAMED TRIBUTARY TO JONES CREEK	South Fork Grand	0.2942	45.722323	-103.687176
S_UTM13_04624	307.79	27	INT	UNNAMED TRIBUTARY TO JONES CREEK	South Fork Grand	0.4760	45.713017	-103.677529
S_UTM13_04635	309.13	21	EPH	UNNAMED TRIBUTARY TO JONES CREEK	South Fork Grand	0.1822	45.695899	-103.665011
S_UTM13_04657	311.25	26	EPH	UNNAMED TRIBUTARY TO RUSH CREEK	South Fork Grand	0.1111	45.669676	-103.645880
S_UTM13_04657	311.32	19	EPH	UNNAMED TRIBUTARY TO RUSH CREEK	South Fork Grand	0.4254	45.669124	-103.645102
S_UTM13_04657	311.34	-	EPH	UNNAMED TRIBUTARY TO RUSH CREEK	South Fork Grand	0.0026	45.668318	-103.645414
S500HA011	312.70	29	INT	UNNAMED TRIBUTARY TO RUSH CREEK	South Fork	0.2015	45.649598	-103.642669

Table 2 - Keystone XL Pipeline Project - Wetland and Waterbody Crossings within the ESA – Mainline, USACE Omaha District, South Dakota

Feature ID	MP [1]	Crossing Distance [2] (Feet)	Type [3]	Name	HUC SUB Basin [4]	Area Within ESA [5] (Acres)	Latitude (WGS84)	Longitude (WGS84)
					Grand			
W500HA006	312.88	-	PEM	N/A	South Fork Grand	0.2752	45.647800	-103.639825
W500HA005	313.85	-	PEM	N/A	South Fork Grand	0.1970	45.637160	-103.626899
W500HA004	314.06	279	PEM	N/A	South Fork Grand	1.2329	45.635519	-103.623332
W500HA003	314.93	-	PEM	N/A	South Fork Grand	0.0789	45.627551	-103.609152
W500HA003	314.98	-	PEM	N/A	South Fork Grand	0.0078	45.627235	-103.608211
W500HA002	316.23	32	PEM	N/A	South Fork Grand	0.4640	45.618637	-103.586582
W302HA008	320.46	-	PEM	N/A	South Fork Grand	0.2276	45.590787	-103.518739
S0359	321.38	24	EPH	UNNAMED TRIBUTARY TO SOUTH FORK GRAND RIVER	South Fork Grand	0.1262	45.578129	-103.513231
S123HA006	321.60	33	PER	SOUTH FORK GRAND RIVER	South Fork Grand	0.2895	45.574949	-103.511993
S0360	321.65	14	EPH	UNNAMED TRIBUTARY TO SOUTH FORK GRAND RIVER	South Fork Grand	0.0769	45.574454	-103.511657
W103HA001	322.32	-	PEM	N/A	South Fork Grand	0.0965	45.564853	-103.508575
S124HA008	326.39	10	PER	CLARKS FORK CREEK	South Fork Grand	0.0682	45.528006	-103.449830
S_UTM13_04896	332.27	15	INT	WEST SQUAW CREEK	South Fork Grand	0.1215	45.477364	-103.357521
W302HA002	332.39	5	PEM	N/A	South Fork Grand	0.0861	45.476115	-103.355270
S_UTM13_07391	332.40	14	PER	WEST SQUAW CREEK	South Fork Grand	0.1102	45.476077	-103.355232
S_UTM13_07396	332.60	-	EPH	UNNAMED TRIBUTARY TO WEST SQUAW CREEK	South Fork Grand	0.0230	45.473910	-103.352571
S_UTM13_07396	332.69	19	EPH	UNNAMED TRIBUTARY TO WEST SQUAW CREEK	South Fork Grand	0.1468	45.473194	-103.351739
S304HA001	333.96	13	INT	UNNAMED TRIBUTARY TO WEST SQUAW CREEK	South Fork Grand	0.2571	45.455986	-103.346654
S500HA009	338.79	21	INT	UNNAMED TRIBUTARY TO WOLF CREEK	Upper Moreau	0.3411	45.390220	-103.321708

Table 2 - Keystone XL Pipeline Project - Wetland and Waterbody Crossings within the ESA – Mainline, USACE Omaha District, South Dakota

Feature ID	MP [1]	Crossing Distance [2] (Feet)	Type [3]	Name	HUC SUB Basin [4]	Area Within ESA [5] (Acres)	Latitude (WGS84)	Longitude (WGS84)
S304HA002	339.21	12	EPH	WOLF CREEK	Upper Moreau	0.0998	45.385267	-103.316017
S500HA007	340.78	38	INT	UNNAMED TRIBUTARY TO WOLF CREEK	Upper Moreau	0.3983	45.367768	-103.295469
S_UTM13_07104	343.09	74	INT	RED BUTTE CREEK	Upper Moreau	0.5814	45.348558	-103.257382
S_UTM13_07109	344.03	106	INT	GIANNONATTI CREEK	Upper Moreau	0.4974	45.340615	-103.241823
S_UTM13_07109a	344.04	-	INT	UNNAMED TRIBUTARY TO GIANNONATTI CREEK	Upper Moreau	0.0355	45.340836	-103.241659
S_UTM13_06057	345.19	55	EPH	UNNAMED TRIBUTARY TO NORTH FORK MOREAU RIVER	Upper Moreau	0.3224	45.329341	-103.224335
W302HA007	346.81	-	PEM	N/A	Upper Moreau	0.0115	45.312615	-103.201091
S0379	346.81	39	EPH	LITTLE COWBOY CREEK	Upper Moreau	0.3769	45.312986	-103.200844
S0380	347.12	25	EPH	UNNAMED TRIBUTARY TO NORTH FORK MOREAU RIVER	Upper Moreau	0.0904	45.310413	-103.195552
S123HA011	347.95	-	MABO	POND	Upper Moreau	0.1024	45.304173	-103.180969
S123HA012	350.17	-	MABO	POND	Upper Moreau	0.0651	45.288897	-103.140978
S302HA004	351.30	-	OW	LAKE	Upper Moreau	0.0848	45.278744	-103.123282
S23HA002	351.71	-	Seasonal	SPRING CREEK	Upper Moreau	0.0033	45.275914	-103.115916
W23HA002	351.76	194	PEM	N/A	Upper Moreau	1.5416	45.275204	-103.115577
S312HA002	351.78	52	INT	SPRING CREEK	Upper Moreau	0.5209	45.275155	-103.115182
S23HA002	351.80	-	Seasonal	SPRING CREEK	Upper Moreau	0.0046	45.274454	-103.115044
S_UTM13_04876	352.40	17	INT	UNNAMED TRIBUTARY TO SPRING CREEK	Upper Moreau	0.1629	45.269492	-103.104824
S_UTM13_05005	353.38	21	EPH	UNNAMED TRIBUTARY TO SPRING CREEK	Upper Moreau	0.2153	45.261236	-103.088539
S_UTM13_05016	354.91	36	INT	DRY CREEK	Upper Moreau	0.2305	45.246050	-103.066548
S_UTM13_05019	355.49	36	EPH	UNNAMED TRIBUTARY TO DRY CREEK	Upper Moreau	0.3048	45.240224	-103.058180
S302HA002	357.15	5	EPH	UNNAMED TRIBUTARY TO NORTH FORK MOREAU RIVER	Upper Moreau	0.0275	45.223643	-103.033720
exp-WB-13507	357.16	-	EPH	UNNAMED TRIBUTARY TO NORTH FORK MOREAU RIVER	Upper Moreau	0.0102	45.223833	-103.033412
W_UTM13_05228	359.15	69	PEM	N/A	Upper Moreau	0.7382	45.205402	-103.002760
S275BU001	360.99	109	PER	NORTH FORK MOREAU RIVER	Upper Moreau	0.7083	45.187413	-102.974751
S_UTM13_05257	361.62	38	INT	UNNAMED TRIBUTARY TO NORTH FORK MOREAU RIVER	Upper Moreau	0.2782	45.181689	-102.964648
W302BU001	361.88	-	PEM	N/A	Upper Moreau	0.1414	45.178501	-102.961890

Table 2 - Keystone XL Pipeline Project - Wetland and Waterbody Crossings within the ESA – Mainline, USACE Omaha District, South Dakota

Feature ID	MP [1]	Crossing Distance [2] (Feet)	Type [3]	Name	HUC SUB Basin [4]	Area Within ESA [5] (Acres)	Latitude (WGS84)	Longitude (WGS84)
W302BU001	361.93	-	PEM	N/A	Upper Moreau	0.2903	45.177905	-102.961226
S275PE001	363.49	18	EPH	UNNAMED TRIBUTARY TO NORTH FORK MOREAU RIVER	Upper Moreau	0.2803	45.163791	-102.936682
S5APE001	363.65	-	MABO	POND	Upper Moreau	0.0060	45.161841	-102.934725
S_UTM13_06521	365.64	18	MABO	POND	South Fork Moreau	0.4512	45.141971	-102.905490
S567PE001	366.34	-	EPH	UNNAMED TRIBUTARY TO SOUTH FORK MOREAU RIVER	South Fork Moreau	0.0145	45.134195	-102.897065
exp-WB-13509	366.35	19	EPH	UNNAMED TRIBUTARY TO SOUTH FORK MOREAU RIVER	South Fork Moreau	0.1194	45.134175	-102.896515
S_UTM13_05506	368.24	29	EPH	UNNAMED TRIBUTARY TO SOUTH FORK MOREAU RIVER	South Fork Moreau	0.5910	45.116184	-102.868344
S5APE002	368.91	118	PER	SOUTH FORK MOREAU RIVER	South Fork Moreau	1.0271	45.109133	-102.858027
S_UTM13_05522	369.39	73	EPH	UNNAMED TRIBUTARY SOUTH FORK MOREAU RIVER	South Fork Moreau	1.4229	45.104244	-102.850455
S312PE001	370.58	19	INT	BEVERLY CREEK	South Fork Moreau	0.1310	45.091626	-102.835134
S_UTM13_05613	372.48	16	EPH	UNNAMED TRIBUTARY TO BEVERLY CREEK	South Fork Moreau	0.1502	45.074577	-102.805483
S_UTM13_05613	372.53	35	EPH	UNNAMED TRIBUTARY TO BEVERLY CREEK	South Fork Moreau	0.2761	45.074017	-102.804883
S_UTM13_05620	373.39	33	EPH	UNNAMED TRIBUTARY TO BEVERLY CREEK	South Fork Moreau	0.1469	45.064641	-102.793189
S_UTM13_05731	377.04	28	EPH	UNNAMED TRIBUTARY TO BIG CEDAR CREEK	Upper Moreau	0.2884	45.042120	-102.731596
S_UTM13_05733	377.39	25	EPH	UNNAMED TRIBUTARY TO BIG CEDAR CREEK	Upper Moreau	0.2475	45.039615	-102.725676
S_UTM13_05735	377.67	26	EPH	UNNAMED TRIBUTARY TO BIG CEDAR CREEK	Upper Moreau	0.2076	45.036678	-102.721796
S_UTM13_05738	377.77	44	EPH	UNNAMED TRIBUTARY TO BIG CEDAR CREEK	Upper Moreau	0.2069	45.035528	-102.720379
W_UTM13_0740	378.17	14	PEM	N/A	Upper Moreau	0.0848	45.031007	-102.715344
S_UTM13_05743	378.17	24	INT	UNNAMED TRIBUTARY TO CEDAR CREEK	Upper Moreau	0.2372	45.030944	-102.715296
W_UTM13_0740	378.18	26	PEM	N/A	Upper Moreau	0.1761	45.030886	-102.715230
S_UTM13_05746	378.38	18	EPH	UNNAMED TRIBUTARY TO BIG CEDAR CREEK	Upper Moreau	0.1752	45.028727	-102.712765
S_UTM13_05748	378.46	32	INT	UNNAMED TRIBUTARY TO BIG CEDAR CREEK	Upper Moreau	0.2501	45.027680	-102.711530
S567ME001	380.78	3	EPH	UNNAMED TRIBUTARY TO WEST BRANCH PINE CREEK	Cherry	0.0195	45.001710	-102.682363

Table 2 - Keystone XL Pipeline Project - Wetland and Waterbody Crossings within the ESA – Mainline, USACE Omaha District, South Dakota

Feature ID	MP [1]	Crossing Distance [2] (Feet)	Type [3]	Name	HUC SUB Basin [4]	Area Within ESA [5] (Acres)	Latitude (WGS84)	Longitude (WGS84)
S_UTM13_04944	381.60	37	EPH	UNNAMED TRIBUTARY TO WEST BRANCH PINE CREEK	Cherry	0.3205	44.993104	-102.670668
S_UTM13_06001	381.67	25	EPH	UNNAMED TRIBUTARY TO WEST BRANCH PINE CREEK	Cherry	0.1305	44.992380	-102.669542
S_UTM13_04948	381.74	-	INT	UNNAMED TRIBUTARY TO WEST BRANCH PINE CREEK	Cherry	0.0882	44.991834	-102.668446
S6AME001	383.18	21	INT	WEST BRANCH PINE CREEK	Cherry	0.1651	44.976744	-102.648685
s7ame001	387.83	7	PER	MIDDLE BRANCH PINE CREEK	Cherry	0.2491	44.923601	-102.590728
W_UTM13_04983	388.08	12	PEM	N/A	Cherry	0.2330	44.921032	-102.586892
S_UTM13_08629	388.09	66	INT	UNNAMED TRIBUTARY TO MIDDLE BRANCH PINE CREEK	Cherry	0.2453	44.920993	-102.586858
W_UTM13_04983	388.11	11	PEM	N/A	Cherry	0.4776	44.921055	-102.586622
S_UTM13_07428	389.11	19	EPH	UNNAMED TRIBUTARY TO PINE CREEK	Cherry	0.1474	44.912617	-102.570582
S_UTM13_07429	389.38	-	EPH	UNNAMED TRIBUTARY TO PINE CREEK	Cherry	0.0730	44.911005	-102.565485
S_UTM13_07429	389.41	18	EPH	UNNAMED TRIBUTARY TO PINE CREEK	Cherry	0.1647	44.910474	-102.565317
W567ME001	398.52	42	PEM	N/A	Cherry	0.3210	44.819441	-102.435085
W567ME002	398.99	14	PEM	N/A	Cherry	0.1766	44.815084	-102.428204
W567ME003	399.73	37	PEM	N/A	Cherry	0.2576	44.807015	-102.417922
W567ME004	400.06	44	PEM	N/A	Cherry	0.3447	44.803419	-102.413594
S_UTM13_05156	400.06	7	INT	UNNAMED TRIBUTARY TO PINE CREEK	Cherry	0.0493	44.803315	-102.413753
S_UTM13_05156	400.08	-	INT	UNNAMED TRIBUTARY TO PINE CREEK	Cherry	0.0039	44.803459	-102.412999
S_UTM13_05156	400.18	-	INT	UNNAMED TRIBUTARY TO PINE CREEK	Cherry	0.0128	44.801862	-102.412494
S_UTM13_05156	400.26	24	INT	UNNAMED TRIBUTARY TO PINE CREEK	Cherry	0.1934	44.801351	-102.411621
W0009	400.91	-	PEM	N/A	Cherry	0.0362	44.794249	-102.402070
W0009	400.93	-	PEM	N/A	Cherry	0.0101	44.794136	-102.401822
W0009	400.93	3	PEM	N/A	Cherry	0.0008	44.793800	-102.402016
S_UTM13_05171	400.94	81	EPH	UNNAMED TRIBUTARY TO PINE CREEK	Cherry	0.6884	44.793744	-102.401944
W0009	400.96	47	PEM	N/A	Cherry	0.2473	44.793646	-102.401703
S_UTM13_05178	401.23	20	EPH	UNNAMED TRIBUTARY TO PINE CREEK	Cherry	0.1740	44.790775	-102.397710
S_UTM13_05191	402.00	26	EPH	UNNAMED TRIBUTARY TO SULPHUR CREEK	Cherry	0.3334	44.783036	-102.386156

Table 2 - Keystone XL Pipeline Project - Wetland and Waterbody Crossings within the ESA – Mainline, USACE Omaha District, South Dakota

Feature ID	MP [1]	Crossing Distance [2] (Feet)	Type [3]	Name	HUC SUB Basin [4]	Area Within ESA [5] (Acres)	Latitude (WGS84)	Longitude (WGS84)
S_UTM13_05196	402.23	18	EPH	UNNAMED TRIBUTARY TO SULPHUR CREEK	Cherry	0.2056	44.780965	-102.382966
S_UTM13_04258	402.78	15	EPH	UNNAMED TRIBUTARY TO SULPHUR CREEK	Cherry	0.1395	44.775100	-102.375652
S275ME005	403.35	62	EPH	UNNAMED TRIBUTARY TO SULPHUR CREEK	Cherry	0.5613	44.767689	-102.370246
S275ME006	404.07	69	PER	SULPHUR CREEK	Cherry	0.5311	44.758712	-102.363168
S_UTM13_05474	408.69	-	OW	POND	Cherry	0.0588	44.707159	-102.308898
S_UTM13_01124	410.08	120	EPH	UNNAMED TRIBUTARY TO CHERRY CREEK	Cherry	0.3666	44.692135	-102.290130
S_UTM13_01124	410.25	27	EPH	UNNAMED TRIBUTARY TO CHERRY CREEK	Cherry	0.2942	44.690398	-102.287868
S_UTM13_01124	410.27	-	EPH	UNNAMED TRIBUTARY TO CHERRY CREEK	Cherry	0.0100	44.690318	-102.287157
S106ME008	410.93	6	INT	UNNAMED TRIBUTARY TO SPRING CREEK	Cherry	0.0675	44.684980	-102.276972
S_UTM13_14774	411.93	21	INT	UNNAMED TRIBUTARY TO RED OWL CREEK	Cherry	0.1834	44.678605	-102.258568
S103ME006	413.06	32	PER	RED OWL CREEK	Cherry	0.1549	44.669907	-102.239152
S128ME001	413.06	-	PER	RED OWL CREEK	Cherry	0.1131	44.669508	-102.239351
S103ME007	413.10	-	EPH	UNNAMED TRIBUTARY TO RED OWL CREEK	Cherry	0.0396	44.669783	-102.238240
S_UTM13_14787	413.81	41	INT	UNNAMED TRIBUTARY TO RED OWL CREEK	Cherry	0.3005	44.664266	-102.225977
S_UTM13_14798	414.19	-	INT	UNNAMED TRIBUTARY TO RED OWL CREEK	Cherry	0.0525	44.661067	-102.220211
W500ME001	422.10	-	PEM	N/A	Lower Cheyenne	0.5223	44.578054	-102.112752
s7ame003	423.54	-	INT	WEST BRANCH NARCELLE CREEK	Lower Cheyenne	0.0652	44.562534	-102.094418
S_UTM13_05823	423.61	-	INT	WEST BRANCH NARCELLE CREEK	Lower Cheyenne	0.0664	44.562149	-102.093142
S_UTM13_05918	423.89	12	INT	NARCELLE CREEK	Lower Cheyenne	0.1062	44.561131	-102.087522
s7ame004	423.94	-	INT	NARCELLE CREEK	Lower Cheyenne	0.0294	44.560479	-102.087235
s7ame005	424.05	16	INT	NARCELLE CREEK	Lower Cheyenne	0.1369	44.559235	-102.085640
S312ME002	424.11	-	INT	NARCELLE CREEK	Lower Cheyenne	0.3100	44.558939	-102.084400
S312ME003	424.56	-	INT	NARCELLE CREEK	Lower Cheyenne	0.1942	44.552598	-102.083026
S312ME004	424.85	-	INT	NARCELLE CREEK	Lower Cheyenne	0.1895	44.548982	-102.081825
S312ME005	424.94	-	INT	NARCELLE CREEK	Lower Cheyenne	0.2899	44.547698	-102.080933
S312ME006	425.48	26	INT	UNNAMED TRIBUTARY TO NARCELLE CREEK	Lower Cheyenne	0.2042	44.541889	-102.074347
exp-WB-13502	425.61	33	INT	NARCELLE CREEK	Lower Cheyenne	0.4530	44.540171	-102.072563
S312ME001	425.75	-	INT	NARCELLE CREEK	Lower Cheyenne	0.1478	44.538592	-102.071899

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Feature ID	MP [1]	Crossing Distance [2] (Feet)	Type [3]	Name	HUC SUB Basin [4]	Area Within ESA [5] (Acres)	Latitude (WGS84)	Longitude (WGS84)
exp-WB-13503	425.75	76	INT	NARCELLE CREEK	Lower Cheyenne	0.2628	44.538939	-102.071404
S106ME006	427.31	-	OW	POND	Lower Cheyenne	0.0020	44.520825	-102.057684
S312ME007	427.73	35	EPH	UNNAMED TRIBUTARY TO NARCELLE CREEK	Lower Cheyenne	0.2234	44.515917	-102.052397
S312ME008	428.05	99	EPH	UNNAMED TRIBUTARY TO NARCELLE CREEK	Lower Cheyenne	0.7472	44.515994	-102.046229
S312ME009	428.14	49	INT	NARCELLE CREEK	Lower Cheyenne	0.3845	44.516002	-102.044398
S312ME015	429.17	63	INT	NEGRO CREEK	Lower Cheyenne	0.6754	44.513883	-102.024245
W312ME001	429.22	-	PFO	N/A	Lower Cheyenne	0.2480	44.514138	-102.022737
S312ME014	429.23	-	INT	NEGRO CREEK	Lower Cheyenne	0.1896	44.513516	-102.022688
exp-WB-13508	429.64	45	INT	NEGRO CREEK	Lower Cheyenne	0.0800	44.511281	-102.015836
S312ME013	429.64	11	INT	NEGRO CREEK	Lower Cheyenne	0.1143	44.510973	-102.016027
S312ME012	429.85	123	PER	CHEYENNE RIVER	Lower Cheyenne	0.8975	44.508500	-102.013603
S312ME011	429.89	102	INT	CHEYENNE RIVER	Lower Cheyenne	0.6936	44.508026	-102.013191
S312ME010	430.00	169	PER	CHEYENNE RIVER	Lower Cheyenne	1.1341	44.506729	-102.012108
S312PN002	430.03	12	PER	CHEYENNE RIVER	Lower Cheyenne	0.0803	44.506293	-102.011633
S312PN003	430.80	-	INT	UNNAMED TRIBUTARY TO ASH CREEK	Lower Cheyenne	0.0481	44.495925	-102.002950
S312PN001	430.83	34	INT	ASH CREEK	Lower Cheyenne	0.2558	44.497754	-102.001794
W312HK002	430.96	27	PEM	N/A	Lower Cheyenne	0.1900	44.497701	-101.999356
S8AHK003	433.59	34	PER	BRIDGER CREEK	Lower Cheyenne	0.1301	44.482504	-101.954996
S312HK001	433.59	-	INT	BRIDGER CREEK	Lower Cheyenne	0.0447	44.482218	-101.954994
S8AHK003	433.59	-	PER	BRIDGER CREEK	Lower Cheyenne	0.0910	44.482057	-101.954977
W312HK001	434.66	-	PEM	N/A	Lower Cheyenne	1.0914	44.481163	-101.933527
W_UTM14_05132	437.90	91	PEM	N/A	Lower Cheyenne	0.3069	44.456305	-101.880842
W_UTM14_05132	437.93	32	PEM	N/A	Lower Cheyenne	1.0686	44.455549	-101.879494
W8AHK001	438.75	-	PEM	N/A	Lower Cheyenne	0.7328	44.445722	-101.871443
W_UTM14_08434	439.78	-	PEM	N/A	Lower Cheyenne	0.1597	44.433139	-101.860363
S_UTM14_05123	440.12	-	OW	UNNAMED TRIBUTARY TO ELM TREE DRAW	Lower Cheyenne	0.0109	44.428751	-101.857047
S_UTM14_08952	440.44	13	EPH	UNNAMED TRIBUTARY TO ELM TREE DRAW	Lower Cheyenne	0.0954	44.425086	-101.853172
S_UTM14_04940	442.61	20	EPH	UNNAMED TRIBUTARY TO HAXBY DRAW	Lower Cheyenne	0.2764	44.398125	-101.830587

Table 2 - Keystone XL Pipeline Project - Wetland and Waterbody Crossings within the ESA – Mainline, USACE Omaha District, South Dakota

Feature ID	MP [1]	Crossing Distance [2] (Feet)	Type [3]	Name	HUC SUB Basin [4]	Area Within ESA [5] (Acres)	Latitude (WGS84)	Longitude (WGS84)
S_UTM14_04948	443.14	24	EPH	UNNAMED TRIBUTARY TO HAXBY DRAW	Lower Cheyenne	0.1563	44.392677	-101.823114
S_UTM14_04973	445.79	17	INT	UNNAMED TRIBUTARY TO WEST PLUM CREEK	Lower Cheyenne	0.2899	44.370075	-101.780391
S308HK002	448.35	48	PER	WEST PLUM CREEK	Lower Cheyenne	0.3365	44.345210	-101.742912
S308HK001	448.47	13	INT	UNNAMED TRIBUTARY TO WEST PLUM CREEK	Lower Cheyenne	0.1915	44.343716	-101.742185
S567HK001	449.69	-	EPH	UNNAMED TRIBUTARY TO WEST PLUM CREEK	Lower Cheyenne	0.0129	44.332215	-101.724234
exp-WB-0257	449.69	19	EPH	UNNAMED TRIBUTARY TO WEST PLUM CREEK	Lower Cheyenne	0.0855	44.331791	-101.724178
W_UTM14_08431	452.87	24	PEM	N/A	Lower Cheyenne	0.1959	44.305139	-101.673109
S275HK003	452.88	82	EPH	UNNAMED TRIBUTARY TO WEST PLUM CREEK	Lower Cheyenne	0.5499	44.305157	-101.672726
W_UTM14_08431	452.90	109	PEM	N/A	Lower Cheyenne	0.7403	44.304947	-101.672689
W_UTM14_08431	452.91	-	PEM	N/A	Lower Cheyenne	0.0483	44.305120	-101.672211
S_UTM14_14347	454.49	22	EPH	UNNAMED TRIBUTARY TO WEST PLUM CREEK	Lower Cheyenne	0.1907	44.291833	-101.646404
S_UTM14_04739	459.64	29	EPH	UNNAMED TRIBUTARY TO BUZZARD CREEK	Bad	0.3125	44.246810	-101.565025
S_UTM14_04741	459.82	24	EPH	UNNAMED TRIBUTARY TO BUZZARD CREEK	Bad	0.2221	44.245257	-101.562138
W308HK001	462.01	103	PEM	N/A	Bad	0.6394	44.225477	-101.527734
S_UTM13_15946	465.32	-	INT	WITCHER HOLES CREEK	Bad	0.0673	44.198869	-101.473047
S108HK001	465.33	28	Seasonal	WITCHER HOLES CREEK	Bad	0.2040	44.198482	-101.472777
S_UTM14_08959	466.04	27	EPH	UNNAMED TRIBUTARY TO WITCHER HOLES CREEK	Bad	0.4666	44.192772	-101.461993
S_UTM14_08959	466.16	-	EPH	UNNAMED TRIBUTARY TO WITCHER HOLES CREEK	Bad	0.0930	44.191334	-101.460052
S275HK002	469.41	166	EPH	SQUAW CREEK	Bad	1.1960	44.165711	-101.404715
S275HK002	469.52	-	EPH	SQUAW CREEK	Bad	0.0076	44.164852	-101.403487
S567HK002	472.81	-	EPH	UNNAMED TRIBUTARY TO NOWLIN CREEK	Bad	0.0020	44.139633	-101.347971
S567HK002	472.82	-	EPH	UNNAMED TRIBUTARY TO NOWLIN CREEK	Bad	0.0050	44.139553	-101.347830
exp-WB-0258	472.83	19	EPH	UNNAMED TRIBUTARY TO NOWLIN CREEK	Bad	0.1108	44.139044	-101.347826
S275HK001	475.18	86	EPH	MUD CREEK	Bad	0.2773	44.123730	-101.306472
S_UTM14_05033	475.35	33	EPH	UNNAMED TRIBUTARY TO MUD CREEK	Bad	0.2496	44.123008	-101.303069
S567HK003	477.14	24	EPH	JACK DAILEY CREEK	Bad	0.2234	44.118295	-101.268199
S_UTM14_06829	478.67	25	INT	UNNAMED TRIBUTARY TO JACK DAILEY CREEK	Bad	0.4367	44.112159	-101.238657
S_UTM14_08970	479.22	29	EPH	UNNAMED TRIBUTARY TO JACK DAILEY CREEK	Bad	0.2045	44.111125	-101.227729

Table 2 - Keystone XL Pipeline Project - Wetland and Waterbody Crossings within the ESA – Mainline, USACE Omaha District, South Dakota

Feature ID	MP [1]	Crossing Distance [2] (Feet)	Type [3]	Name	HUC SUB Basin [4]	Area Within ESA [5] (Acres)	Latitude (WGS84)	Longitude (WGS84)
S8AHK006	483.71	31	PER	MITCHELL CREEK	Bad	0.2543	44.088367	-101.144194
W8AHK002	485.31	-	PEM	N/A	Bad	0.2675	44.079089	-101.115669
W108HK001	485.34	84	PEM	N/A	Bad	0.4665	44.079374	-101.114788
S8AHK008	485.97	52	PER	BAD RIVER	Bad	0.3158	44.074516	-101.104587
S_UTM14_08073	486.06	-	EPH	UNNAMED TRIBUTARY TO BAD RIVER	Bad	0.0578	44.073828	-101.103016
S_UTM14_08073	486.13	-	EPH	UNNAMED TRIBUTARY TO BAD RIVER	Bad	0.0071	44.073145	-101.101906
S_UTM14_08075	486.38	20	EPH	UNNAMED TRIBUTARY TO BAD RIVER	Bad	0.2343	44.071018	-101.097870
S0320	487.36	25	EPH	UNNAMED TRIBUTARY TO BAD RIVER	Bad	0.2865	44.063041	-101.082076
S_UTM14_08077	487.46	64	EPH	UNNAMED TRIBUTARY TO BAD RIVER	Bad	0.4166	44.062391	-101.080297
S_UTM14_06745	490.12	32	INT	UNNAMED TRIBUTARY TO SOUTH CREEK	Bad	0.3801	44.040832	-101.037553
S_UTM14_06741	491.15	17	EPH	SOUTH CREEK	Bad	0.2129	44.035546	-101.017599
S_UTM14_06741	491.19	-	EPH	SOUTH CREEK	Bad	0.0385	44.035006	-101.017158
S_UTM14_88888	491.27	57	EPH	UNNAMED TRIBUTARY TO SOUTH CREEK	Bad	0.2625	44.035091	-101.015378
S_UTM14_06735	492.68	111	INT	UNNAMED TRIBUTARY TO SOUTH CREEK	Bad	0.6061	44.027588	-100.989336
S_UTM14_06735	492.86	59	INT	UNNAMED TRIBUTARY TO SOUTH CREEK	Bad	0.5847	44.026491	-100.985896
S308JO001	496.65	19	INT	UNNAMED TRIBUTARY TO DRY CREEK	Bad	0.0971	44.008264	-100.914908
W308JO001	497.24	19	PEM	N/A	Bad	0.1166	44.008017	-100.902991
S313JO001	498.35	21	INT	DRY CREEK	Bad	0.1912	44.002999	-100.882242
S108JO001	499.13	12	Seasonal	UNNAMED TRIBUTARY TO DRY CREEK	Bad	0.0972	43.998303	-100.867949
S_UTM14_08974	501.24	27	INT	UNNAMED TRIBUTARY TO ASH DRAW	Bad	0.3160	43.984041	-100.831580
S103JO001	501.85	-	PER	ASH DRAW	Bad	0.0380	43.980598	-100.819973
exp-WB-0256	501.85	11	PER	ASH DRAW	Bad	0.0668	43.980999	-100.820125
S23JO001	506.19	13	INT	WHITE CLAY CREEK	Bad	0.1233	43.977671	-100.734344
S308JO003	506.84	-	MABO	POND	Bad	0.1767	43.973387	-100.723277
W308JO002	507.38	35	PEM	N/A	Bad	0.2263	43.970685	-100.713052
S_UTM14_14161	507.39	-	EPH	UNNAMED TRIBUTARY TO WHITE CLAY CREEK	Bad	0.0469	43.970250	-100.713064
S_UTM14_14167	509.09	35	EPH	UNNAMED TRIBUTARY TO WHITE CLAY CREEK	Bad	0.3636	43.960488	-100.683283
S275JO001	509.89	9	INT	UNNAMED TRIBUTARY TO WHITE CLAY CREEK	Bad	0.0939	43.957109	-100.667729

Table 2 - Keystone XL Pipeline Project - Wetland and Waterbody Crossings within the ESA – Mainline, USACE Omaha District, South Dakota

Feature ID	MP [1]	Crossing Distance [2] (Feet)	Type [3]	Name	HUC SUB Basin [4]	Area Within ESA [5] (Acres)	Latitude (WGS84)	Longitude (WGS84)
S_UTM14_14173	510.05	26	EPH	UNNAMED TRIBUTARY TO WHITE CLAY CREEK	Bad	0.2581	43.956453	-100.664942
S_UTM14_14177	511.24	57	EPH	UNNAMED TRIBUTARY TO EAST BRANCH WHITE CLAY CREEK	Bad	0.7301	43.949202	-100.643478
S_UTM14_06540	518.93	49	EPH	UNNAMED TRIBUTARY TO BULL CREEK	Lower White	0.4367	43.888018	-100.524101
S_UTM14_06534	519.56	32	INT	UNNAMED TRIBUTARY TO BULL CREEK	Lower White	0.3247	43.883900	-100.513447
W_UTM14_06521	521.74	103	PEM	N/A	Medicine	0.5976	43.868238	-100.475503
S_UTM14_08534	521.75	21	INT	UNNAMED TRIBUTARY TO MEDICINE CREEK	Medicine	0.1397	43.868320	-100.475347
W_UTM14_06521	521.76	97	PEM	N/A	Medicine	0.8534	43.868266	-100.475103
S_UTM14_06515	523.71	14	INT	UNNAMED TRIBUTARY TO WILLIAMS CREEK	Lower White	0.1351	43.855303	-100.440291
S_UTM14_06510	524.90	52	EPH	WILLIAMS CREEK	Lower White	0.3380	43.847175	-100.420090
S_UTM14_06503	526.61	85	INT	UNNAMED TRIBUTARY TO WILLIAMS CREEK	Lower White	0.3908	43.835108	-100.390203
S_UTM14_06503	526.66	-	INT	UNNAMED TRIBUTARY TO WILLIAMS CREEK	Lower White	0.0542	43.834341	-100.389469
S6ALY002	534.42	15	INT	SEDLANO CREEK	Lower White	0.0903	43.781120	-100.253960
S567LY002	534.56	-	EPH	UNNAMED TRIBUTARY TO SEDLANO CREEK	Lower White	0.0292	43.781008	-100.250914
exp-WB-0259	534.57	18	EPH	UNNAMED TRIBUTARY TO SEDLANO CREEK	Lower White	0.0831	43.780578	-100.250941
S_UTM14_06408	535.20	43	INT	UNNAMED TRIBUTARY TO SEDLANO CREEK	Lower White	0.3423	43.775122	-100.241391
S_UTM14_06399	537.50	70	INT	UNNAMED TRIBUTARY TO SEDLANO CREEK	Lower White	0.4729	43.750687	-100.210712
S567LY003	540.33	9	EPH	UNNAMED TRIBUTARY TO WHITE RIVER	Lower White	0.0469	43.715739	-100.181316
S567LY003	540.43	-	EPH	UNNAMED TRIBUTARY TO WHITE RIVER	Lower White	0.0637	43.714916	-100.180226
S567LY003	540.47	-	EPH	UNNAMED TRIBUTARY TO WHITE RIVER	Lower White	0.0000	43.714508	-100.179722
S567LY003	540.51	-	EPH	UNNAMED TRIBUTARY TO WHITE RIVER	Lower White	0.0066	43.714110	-100.179086
S567LY004	540.56	11	EPH	UNNAMED TRIBUTARY TO WHITE RIVER	Lower White	0.0813	43.713889	-100.177919
S567LY005	540.79	7	EPH	UNNAMED TRIBUTARY TO WHITE RIVER	Lower White	0.0200	43.711794	-100.174615
exp-WB-0260	540.79	-	EPH	UNNAMED TRIBUTARY TO WHITE RIVER	Lower White	0.0120	43.711583	-100.174821
S7ALY001	541.30	488	PER	WHITE RIVER	Lower White	3.3554	43.705588	-100.170197
W_UTM14_08449	541.36	137	PSS	N/A	Lower White	0.8950	43.704742	-100.170113
S567TR001	543.24	-	EPH	UNNAMED TRIBUTARY TO LITTLE DOG CREEK	Lower White	0.0434	43.680216	-100.160000
S106TR002	543.31	1	EPH	UNNAMED TRIBUTARY TO LITTLE DOG CREEK	Lower White	0.0018	43.679255	-100.159226
S567TR002	543.54	96	PER	LITTLE DOG CREEK	Lower White	0.7646	43.676728	-100.156351

Table 2 - Keystone XL Pipeline Project - Wetland and Waterbody Crossings within the ESA – Mainline, USACE Omaha District, South Dakota

Feature ID	MP [1]	Crossing Distance [2] (Feet)	Type [3]	Name	HUC SUB Basin [4]	Area Within ESA [5] (Acres)	Latitude (WGS84)	Longitude (WGS84)
S567TR003	543.69	8	EPH	UNNAMED TRIBUTARY TO LITTLE DOG CREEK	Lower White	0.0582	43.674825	-100.154641
S_UTM14_06291	546.58	33	EPH	UNNAMED TRIBUTARY TO COTTONWOOD CREEK	Lower White	0.7912	43.640246	-100.127167
S_UTM14_06292	546.77	31	INT	UNNAMED TRIBUTARY TO COTTONWOOD CREEK	Lower White	0.3140	43.636421	-100.124170
S7ATR002	547.33	34	INT	COTTONWOOD CREEK	Lower White	0.2529	43.629120	-100.120486
S313TR001	547.38	-	INT	COTTONWOOD CREEK	Lower White	0.0009	43.628878	-100.119653
S313TR001	547.39	-	INT	COTTONWOOD CREEK	Lower White	0.0044	43.628767	-100.119503
S7ATR002	547.39	-	INT	COTTONWOOD CREEK	Lower White	0.0846	43.628650	-100.119433
S313TR001	547.41	-	INT	COTTONWOOD CREEK	Lower White	0.0107	43.628561	-100.119226
S7ATR001	547.44	-	INT	COTTONWOOD CREEK	Lower White	0.0188	43.627611	-100.119395
S313TR002	547.46	-	INT	UNNAMED TRIBUTARY TO COTTONWOOD CREEK	Lower White	0.0237	43.628010	-100.118377
S_UTM14_06248	550.22	35	EPH	UNNAMED TRIBUTARY TO COTTONWOOD CREEK	Lower White	0.3528	43.595441	-100.087711
S_UTM14_06248	550.35	-	EPH	UNNAMED TRIBUTARY TO COTTONWOOD CREEK	Lower White	0.2482	43.594010	-100.086197
S_UTM14_06248	550.50	-	EPH	UNNAMED TRIBUTARY TO COTTONWOOD CREEK	Lower White	0.0048	43.592037	-100.084869
S_UTM14_08552	552.37	58	EPH	UNNAMED TRIBUTARY TO OWL CREEK	Lower White	0.7144	43.567629	-100.072570
S_UTM14_08552	552.52	63	EPH	UNNAMED TRIBUTARY TO OWL CREEK	Lower White	0.3274	43.565501	-100.070813
W_UTM14_06217	553.90	99	PEM	N/A	Lower White	0.6503	43.547986	-100.057536
S_UTM14_08559	553.91	29	INT	UNNAMED TRIBUTARY TO OWL CREEK	Lower White	0.2148	43.547841	-100.057496
W_UTM14_06217	553.92	85	PEM	N/A	Lower White	0.6126	43.547714	-100.057515
S_UTM14_06212	555.69	27	INT	UNNAMED TRIBUTARY TO OWL CREEK	Lower White	0.2040	43.525801	-100.039988
S_UTM14_06206	555.89	35	EPH	UNNAMED TRIBUTARY TO OWL CREEK	Lower White	0.2595	43.523330	-100.038932
W_UTM14_06201	557.56	339	PEM	N/A	Lower White	2.4089	43.501738	-100.024907
S_UTM14_08586	557.59	34	INT	OWL CREEK	Lower White	0.2189	43.501358	-100.024483
S_UTM14_06175	561.66	-	EPH	UNNAMED TRIBUTARY TO OWL CREEK	Lower White	0.0540	43.451802	-99.981998
S_UTM14_06175	561.75	21	EPH	UNNAMED TRIBUTARY TO OWL CREEK	Lower White	0.5016	43.450348	-99.981023
S_UTM14_14369	564.64	20	INT	UNNAMED TRIBUTARY TO HOLLOW CREEK	Lower White	0.3149	43.415341	-99.951795
W104TR009	564.71	-	PEM	N/A	Lower White	0.0475	43.414754	-99.951138
S_UTM14_06163	565.06	41	EPH	UNNAMED TRIBUTARY TO DOG EAR CREEK	Lower White	0.2250	43.411109	-99.947088
S7ATR004	570.19	15	INT	DOG EAR CREEK	Lower White	0.1390	43.351430	-99.888934

Table 2 - Keystone XL Pipeline Project - Wetland and Waterbody Crossings within the ESA – Mainline, USACE Omaha District, South Dakota

Feature ID	MP [1]	Crossing Distance [2] (Feet)	Type [3]	Name	HUC SUB Basin [4]	Area Within ESA [5] (Acres)	Latitude (WGS84)	Longitude (WGS84)
S7ATR003	570.64	15	INT	MUDDY CREEK	Lower White	0.1078	43.346025	-99.883558
W_UTM14_08509	576.96	75	PEM	N/A	Lower White	0.7090	43.271329	-99.812594
S_UTM14_06121	576.97	26	INT	SAND CREEK	Lower White	0.2319	43.271121	-99.812467
W_UTM14_08509	576.98	39	PEM	N/A	Lower White	0.3142	43.271112	-99.812384
W_UTM14_06114	577.83	107	PEM	N/A	Lower White	0.7139	43.261611	-99.802426
W104TR008	578.25	-	PEM	N/A	Lower White	0.4228	43.256601	-99.797845
W_UTM14_06111	578.47	321	PEM	N/A	Lower White	1.3229	43.253407	-99.796489
W104TR001	579.18	233	PEM	N/A	Lower White	0.8548	43.247553	-99.785891
W104TR002	580.64	-	PFO	N/A	Ponca	0.1193	43.230399	-99.769328
W104TR003	580.69	-	PFO	N/A	Ponca	0.0549	43.229737	-99.768955
W_UTM14_06103	580.85	-	PEM	N/A	Ponca	0.1966	43.227460	-99.768004
S5ATR002	581.09	11	INT	PONCA CREEK	Ponca	0.0735	43.224306	-99.766268
S_UTM14_08574	584.51	26	EPH	UNNAMED TRIBUTARY TO PONCA CREEK	Ponca	0.2519	43.184949	-99.727286
S_UTM14_06042	585.37	18	EPH	UNNAMED TRIBUTARY TO PONCA CREEK	Ponca	0.1185	43.174426	-99.719088
S275TR001	595.37	6	INT	LUTE CREEK	Keya Paha	0.0608	43.061190	-99.602577
S_UTM14_05998	596.43	12	INT	UNNAMED TRIBUTARY TO LUTE CREEK	Keya Paha	0.1466	43.050992	-99.588436
S_UTM14_05994	597.08	21	EPH	UNNAMED TRIBUTARY TO BUFFALO CREEK	Keya Paha	0.1790	43.043335	-99.580889
S_UTM14_05990	597.47	-	EPH	UNNAMED TRIBUTARY TO BUFFALO CREEK	Keya Paha	0.0121	43.038596	-99.576758
W275TR001	597.47	-	PEM	N/A	Keya Paha	0.1246	43.038538	-99.576709
S_UTM14_05990	597.48	24	EPH	UNNAMED TRIBUTARY TO BUFFALO CREEK	Keya Paha	0.1150	43.038616	-99.576072
S_UTM14_05988	597.71	39	EPH	UNNAMED TRIBUTARY TO BUFFALO CREEK	Keya Paha	0.2763	43.035681	-99.574120
S_UTM14_05977	598.64	35	EPH	UNNAMED TRIBUTARY TO BUFFALO CREEK	Keya Paha	0.1917	43.025116	-99.563180
S5ATR006	599.99	-	OW	POND	Keya Paha	0.1067	43.008507	-99.549386
S5ATR005	600.03	60	Seasonal	BUFFALO CREEK	Keya Paha	0.2918	43.008338	-99.548434

[1] MP = Milepost.

[2] Crossing distance measured at proposed pipeline centerline. For features that would not be crossed by the proposed pipeline centerline, but would be within the 110-foot ROW, an en-dash (-) is indicated.

[3] PEM = Palustrine Emergent Marsh, PSS = Palustrine Scrub Shrub Wetland, PFO = Palustrine Forested Wetland, PER = Perennial Waterbody, INT = Intermittent Waterbody, EPH = Ephemeral Waterbody, MABO = Man-made Waterbody, OW = Open Water, Seasonal = Seasonal Waterbody.

[4] HUC SUB Basin = Name of 8-digit USGS Hydrologic Unit Code.

[5] Feature acreage is based on a standard 300-ft wide Environmental Study Area as discussed in Section 2.1.2.

Table 3 - Keystone XL Pipeline - Wetland and Waterbody Crossings within the ESA – Access Roads, USACE Omaha District, South Dakota

Access Road ID	Feature ID	Name	Type[1]	Crossing Distance[2] (Feet)	AREA Within ESA[3] (Acres)	HUC Sub Basin[4]	Latitude (WGS84)	Longitude (WGS84)
CAR-163	S500HA012	UNNAMED TRIBUTARY TO WAGONEER CREEK	INT	59	0.1455	Upper Little Missouri	45.863567	-103.970169
CAR-163	S128HA002	WAGONER CREEK	INT	-	0.0031	Upper Little Missouri	45.863439	-103.986480
CAR-163	S128HA002	WAGONER CREEK	INT	-	0.0100	Upper Little Missouri	45.863451	-103.988220
CAR-163	S128HA002	WAGONER CREEK	INT	-	0.0021	Upper Little Missouri	45.863692	-103.989437
CAR-163	S128HA002	WAGONER CREEK	INT	-	0.0068	Upper Little Missouri	45.863642	-103.989541
CAR-163	W109HA001	N/A	PEM	-	0.0579	Upper Little Missouri	45.863468	-103.987869
CAR-163	W109HA001	N/A	PEM	46	0.1804	Upper Little Missouri	45.863520	-103.989347
CAR-151	S109HA003	DIPPING VAT CREEK	EPH	6	0.0145	Upper Little Missouri	45.833983	-103.933646
CAR-150	S109HA002	SHAW CREEK	PER	53	0.0932	Upper Little Missouri	45.833204	-103.929432
CAR-150	W109HA002	N/A	PEM	-	0.0487	Upper Little Missouri	45.832558	-103.929053
CAR-041	S104HA004	KIMBLE CREEK	INT	-	0.0183	Upper Little Missouri	45.801264	-103.871053
CAR-041	S104HA004	KIMBLE CREEK	INT	-	0.0008	Upper Little Missouri	45.801561	-103.871490
CAR-041	S104HA004	KIMBLE CREEK	INT	29	0.0627	Upper Little Missouri	45.801500	-103.872102
CAR-041	W302HA001	N/A	PEM	57	0.1155	Upper Little Missouri	45.801501	-103.871844
CAR-173	S123HA004	COTTONWOOD CREEK	PER	16	0.0257	South Fork Grand	45.733229	-103.611060
CAR-173	exp-WB-13022	POND	OW	-	0.0021	South Fork Grand	45.733051	-103.624685
CAR-173	exp-WB-13020	UNNAMED TRIBUTARY TO COTTONWOOD CREEK	INT	-	0.0104	South Fork Grand	45.733272	-103.646724
CAR-173	exp-WB-13018	UNNAMED TRIBUTARY TO COTTONWOOD CREEK	INT	-	0.0047	South Fork Grand	45.733472	-103.646671

Table 3 - Keystone XL Pipeline - Wetland and Waterbody Crossings within the ESA – Access Roads, USACE Omaha District, South Dakota

Access Road ID	Feature ID	Name	Type[1]	Crossing Distance[2] (Feet)	AREA Within ESA[3] (Acres)	HUC Sub Basin[4]	Latitude (WGS84)	Longitude (WGS84)
CAR-173	exp-WB-13021	UNNAMED TRIBUTARY TO JONES CREEK	INT	-	0.0108	South Fork Grand	45.733491	-103.674528
CAR-173	exp-WB-13021	UNNAMED TRIBUTARY TO JONES CREEK	INT	-	0.0079	South Fork Grand	45.733500	-103.674754
CAR-173	exp-WB-13510	POND	OW	-	0.0291	South Fork Grand	45.733684	-103.674788
CAR-230	S302HA009	RUSH CREEK	PER	-	0.0095	South Fork Grand	45.630053	-103.644779
CAR-230	S302HA009	RUSH CREEK	PER	-	0.0058	South Fork Grand	45.629900	-103.644553
CAR-230	S302HA009	RUSH CREEK	PER	-	0.0179	South Fork Grand	45.630022	-103.644266
CAR-230	S302HA009	RUSH CREEK	PER	-	0.0130	South Fork Grand	45.629785	-103.644390
CAR-230	W302HA006	N/A	PEM	-	0.0179	South Fork Grand	45.630826	-103.641135
CAR-230	W302HA006	N/A	PEM	1	0.0342	South Fork Grand	45.630776	-103.640903
CAR-231	S124HA009	CLARK FORK CREEK	PER	68	0.1543	South Fork Grand	45.532336	-103.422469
CAR-231	exp-WB-13031	UNNAMED TRIBUTARY TO CLARKS FORK CREEK	INT	-	0.0360	South Fork Grand	45.521580	-103.420630
CAR-231	exp-WB-13030	UNNAMED TRIBUTARY TO CLARKS FORK CREEK	INT	-	0.0079	South Fork Grand	45.521707	-103.420828
CAR-231	exp-WL-13008	N/A	PEM	-	0.0849	South Fork Grand	45.548242	-103.422673
CAR-232	S302HA003	UNNAMED TRIBUTARY TO SQUAW CREEK	EPH	8	0.0275	South Fork Grand	45.414569	-103.278716
CAR-232	S302HA005	EAST SQUAW CREEK	INT	-	0.0001	South Fork Grand	45.408847	-103.278921
CAR-232	S302HA005	EAST SQUAW CREEK	INT	-	0.0020	South Fork Grand	45.408739	-103.278864
CAR-232	S302HA005	EAST SQUAW CREEK	INT	-	0.0023	South Fork Grand	45.408708	-103.278584
CAR-232	exp-WB-13032	UNNAMED TRIBUTARY TO RED BUTTE CREEK	PER	-	0.0155	Upper Moreau	45.357934	-103.258757
CAR-232	exp-WB-13511	UNNAMED TRIBUTARY TO RED BUTTE CREEK	PER	-	0.0464	Upper Moreau	45.358116	-103.258861

Table 3 - Keystone XL Pipeline - Wetland and Waterbody Crossings within the ESA – Access Roads, USACE Omaha District, South Dakota

Access Road ID	Feature ID	Name	Type[1]	Crossing Distance[2] (Feet)	AREA Within ESA[3] (Acres)	HUC Sub Basin[4]	Latitude (WGS84)	Longitude (WGS84)
CAR-232	exp-WB-13034	UNNAMED TRIBUTARY TO RED BUTTE CREEK	PER	-	0.0001	Upper Moreau	45.357436	-103.264360
CAR-232	exp-WB-13034	UNNAMED TRIBUTARY TO RED BUTTE CREEK	PER	16	0.1003	Upper Moreau	45.357553	-103.265105
CAR-232	W302HA003	N/A	PEM	-	0.0963	South Fork Grand	45.412048	-103.278873
CAR-233	S302HA006	UNNAMED TRIBUTARY TO SPRING CREEK	EPH	3	0.0108	Upper Moreau	45.341536	-103.175688
CAR-233	S302HA007	UNNAMED TRIBUTARY TO SPRING CREEK	EPH	6	0.0163	Upper Moreau	45.339415	-103.176855
CAR-233	S302HA008	LITTLE COWBOY CREEK	EPH	5	0.0119	Upper Moreau	45.341065	-103.196662
CAR-233	W302HA004	N/A	PEM	-	0.0127	Upper Moreau	45.340906	-103.173010
CAR-233	W302HA004	N/A	PEM	-	0.0245	Upper Moreau	45.340918	-103.173149
CAR-233	W302HA005	N/A	PEM	217	0.3847	Upper Moreau	45.329635	-103.218455
CAR-048A	S_UTM13_09963	UNNAMED TRIBUTARY TO SOUTH FORK MOREAU RIVER	EPH	-	0.0274	South Fork Moreau	45.082356	-102.887279
CAR-048A	S_UTM13_12245	UNNAMED TRIBUTARY TO SOUTH FORK MOREAU RIVER	EPH	-	0.0383	South Fork Moreau	45.082526	-102.887200
CAR-048A	S_UTM13_09965	UNNAMED TRIBUTARY TO SOUTH FORK MOREAU RIVER	EPH	-	0.0960	South Fork Moreau	45.082764	-102.882749
CAR-048A	S_UTM13_09967	UNNAMED TRIBUTARY TO SOUTH FORK MOREAU RIVER	EPH	-	0.0090	South Fork Moreau	45.082545	-102.882273
CAR-048A	exp-WB-13512	UNNAMED TRIBUTARY TO SOUTH FORK MOREAU RIVER	EPH	-	0.0443	South Fork Moreau	45.082703	-102.870287
CAR-048A	S_UTM13_09972	UNNAMED TRIBUTARY TO SOUTH FORK MOREAU RIVER	EPH	-	0.0128	South Fork Moreau	45.082530	-102.870187
CAR-048A	S_UTM13_09972	UNNAMED TRIBUTARY TO SOUTH FORK MOREAU RIVER	EPH	-	0.0006	South Fork Moreau	45.082480	-102.869716
CAR-048A	S_UTM13_09978	UNNAMED TRIBUTARY TO BEVERLY CREEK	EPH	16	0.0397	South Fork Moreau	45.089345	-102.845829
CAR-159	S275ME004	WEST BRANCH PINE CREEK	Seasonal	21	0.0625	Cherry	44.954785	-102.636895

Table 3 - Keystone XL Pipeline - Wetland and Waterbody Crossings within the ESA – Access Roads, USACE Omaha District, South Dakota

Access Road ID	Feature ID	Name	Type[1]	Crossing Distance[2] (Feet)	AREA Within ESA[3] (Acres)	HUC Sub Basin[4]	Latitude (WGS84)	Longitude (WGS84)
CAR-159	W275ME005	N/A	PEM	-	0.1232	Cherry	44.964325	-102.651775
CAR-159	W275ME004	N/A	PEM	-	0.0673	Cherry	44.963493	-102.650285
CAR-159	W275ME003	N/A	PEM	-	0.0557	Cherry	44.960522	-102.646760
CAR-159	W275ME002	N/A	PEM	-	0.0189	Cherry	44.954404	-102.631471
CAR-167	S308ME001	UNNAMED TRIBUTARY TO SULPHUR CREEK	EPH	6	0.0285	Cherry	44.748732	-102.372645
CAR-079A	S307PN001	UNNAMED TRIBUTARY TO CHEYENNE RIVER	PER	24	0.0590	Lower Cheyenne	44.501574	-102.002085
CAR-313	S307HK001	BRIDGER CREEK	EPH	21	0.0492	Lower Cheyenne	44.472830	-101.950229
CAR-052A	W275HK001	N/A	PEM	-	0.0580	Bad	44.119727	-101.247916
CAR-052A	W275HK001	N/A	PEM	-	0.0121	Bad	44.119693	-101.247646
CAR-235	S308HK003	UNNAMED TRIBUTARY TO BAD RIVER	EPH	8	0.0150	Bad	44.067313	-101.120590
CAR-235	S308HK003	UNNAMED TRIBUTARY TO BAD RIVER	EPH	-	0.1071	Bad	44.065223	-101.117894
CAR-235	S308HK003	UNNAMED TRIBUTARY TO BAD RIVER	EPH	-	0.0313	Bad	44.064177	-101.116236
CAR-236	S106TR001	LITTLE DOG CREEK	INT	22	0.0679	Lower White	43.675436	-100.152305

[1] PEM= Palustrine Emergent Wetland, PER = Perennial Waterbody, INT = Intermittent Waterbody, EPH = Ephemeral Waterbody, Seasonal = Seasonal Waterbody.
[2] Crossing distance measured at proposed access road centerline. For features that would not be crossed by the proposed access road centerline, but would be within the 30-foot ROW, an en-dash (-) is indicated.
[3] Feature acreage is based on a standard 100-foot wide Environmental Survey Area, as discussed in Section 2.1.2.
[4] HUC Sub Basin = Name of 8-digit USGS Hydrologic Unit Code.

Table 4 - Keystone XL Pipeline - Wetland and Waterbody Crossings within the ESA – Auxiliary Sites, USACE Omaha District, South Dakota

Facility Type	Facility ID	Facility Name	Facility Size (Acres)	Feature ID	Feature Name	Type [1]	Linear Feet In Proposed Facility Boundary[2]	Area Within Proposed Facility Boundary (Acres)	HUC SUB Basin[3]
Rail Siding	Harrold_14	Harrold Rail Siding	248.63	S275HU003	POND	MABO	344.27	0.5810[4]	Medicine Knoll
Rail Siding	Harrold_14	Harrold Rail Siding	248.63	S275HU002	POND	MABO	1717.24	8.5164[4]	Medicine Knoll
Rail Siding	Harrold_14	Harrold Rail Siding	248.63	S275HU002	POND	MABO	578.45	0.6299[4]	Medicine Knoll
Rail Siding	Harrold_14	Harrold Rail Siding	248.63	S275HU002	POND	MABO	569.22	0.5032[4]	Medicine Knoll
Rail Siding	Harrold_14	Harrold Rail Siding	248.63	S275HU001	POND	MABO	729.01	3.3945[4]	Medicine Knoll
Construction Camp	CC02a SITE 1	Harding Construction Camp	108.33	W312HA001	N/A	PEM	329.09	0.9967[4]	South Fork Grand

[1] PEM = Palustrine Emergent Wetland; MABO = Man-made Waterbody.

[2] Approximate length of feature (feet) measured across the feature at the widest possible linear distance.

[3] HUC Sub Basin = Name of 8-Digit USGS Hydrologic Unit Code.

[4] Wetlands will be avoided throughout construction and operation of the rail siding engineering controls.

Table 5 – Keystone XL Pipeline Project – Typical Wetland Plant Species – South Dakota

WETLAND TYPE	SCIENTIFIC NAME	COMMON NAME	STRATUM[1]	INDICATOR
PEM	*Carex rostrata*	beaked sedge	H	OBL
	Distichlis spicata	saltgrass	H	FACW
	Elymus repens	quackgrass	H	FAC
	Juncus balticus	mountain rush	H	OBL
	Juncus torreyi	Torrey's rush	H	FACW
	Panicum virgatum	switchgrass	H	FAC
	Polygonum pensylvanicum	Pennsylvania smartweed	H	FACW
	Rumex crispus	curly dock	H	FACW
	Scirpus americanus	chairmaker's bulrush	H	OBL
	Spartina pectinata	prairie cordgrass	H	FACW
	Typha latifolia	broadleaf cattail	H	OBL
PFO	*Salix amygdaloides*	peachleaf willow	T	FACW
	Solidago gigantea	giant goldenrod	H	FACW
	Sporobolus airoides	alkali sacaton	H	FAC

[1] H = herbaceous, T= tree.

Table 6 - South Dakota Soil Characterization Along the Proposed Project

COUNTY	SYMBOL	NAME	DRAINAGE CLASSIFICATION	PERCENT SLOPE	HYDRIC SOIL	TEXTURE DESCRIPTIOIN
Harding	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes	Archon -Well drained Bullock – Well drained	Archin - 0 to 4 Bullock – 0 to 4	No	Fine sandy loams
Harding	AtA	Assinniboine-Archin fine sandy loams, 0 to 3 percent slopes	Assiniboine – Well Drained Archin – Well drained	Assiniboine - 0 to 3 Archin – 0 to 3	No	Fine sandy loams
Harding	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes	Bullock – Well drained Cabbart – Well drained	Bullock - 6 to 9 Parchin - 6 to 25	No	Sandy loams
Harding	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes	Bullock – Well drained Parchin-Slickspots – Well drained	Bullock - 2 to 9 Parchin – 2 to 9 Slickspots – 2 to 9	No	Sandy clay
Harding	CdE	Cabbart-Delridge loams, 15 to 40 percent slopes	Cabbart – Well drained Delridge – Well drained	Cabbart - 25 to 40 Delridge - 15 to 25	No	Loam
Harding	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	Cabbart – Well drained Rock – Well drained	Cabbart - 15 to 40 Rock – 15 to 40	No	Sandy loams
Harding	EcA	Eapa-Archin complex, 0 to 3 percent slopes	Eapa – Well drained Archin – Well drained	Eapa - 0 to 3 Archin – 0 to 3	No	Loamy clay
Harding	GdA	Gerdrum silt loam, 0 to 4 percent slopes	Well drained	Gerdrum - 0 to 4	No	Silt loam
Harding	Ge	Glendive fine sandy loam	Well drained	Glendive - 0 to 2	No	Fine sandy loams
Harding	Ha	Hanly fine sandy loam	Somewhat excessively drained	Hanly - 0 to 1	No	Fine sandy loams
Harding	Hb	Hanly loamy fine sand	Somewhat excessively drained	Hanly - 0 to 2	No	Loamy fine sand
Harding	Hd	Hanly-Dogiecreek fine sandy loams	Hanly - Somewhat excessively drained Dogiecreek - Poorly drained	Hanly - 0 to 2 Dogiecreek - 0 to 3	Hanly - No Dogiecreek - Yes	Fine sandy loams
Harding	Hh	Havre-Harlake complex	Harve – Well drained Harlake –Well drained	Harve - 0 to 2 Harlake – 0 to 2	No	Loam
Harding	Ke	Korchea loam	Well drained	Korchea - 0 to 2	No	Loam
Harding	Kg	Korchea loam, channeled	Well drained	Korchea - 0 to 2	No	Loam
Harding	Km	Korchea-Archin complex	Korchea – Well drained Archin – Well drained	Korchea - 0 to 2 Archin – 0 to 2	No	Loamy clay
Harding	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes	Parchin – Well drained Bullock – Well drained	Parchin - 2 to 9 Bullock – 2 to 9	No	Fine sandy loams

Table 6 - South Dakota Soil Characterization Along the Proposed Project

COUNTY	SYMBOL	NAME	DRAINAGE CLASSIFICATION	PERCENT SLOPE	HYDRIC SOIL	TEXTURE DESCRIPTIOIN
Harding	RhB	Rhame fine sandy loam	Well drained	Rhame - 2 to 6	No	Fine sandy loams
Harding	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes	Rhame – Well drained Parchin – Well drained	Rhame - 2 to 6 Parchin – 2 to 6	No	Fine sandy loams
Harding	SaA	Sage loam	Poorly drained	Sage - 0 to 2	Yes	Loam
Harding	TvB	Trey-Parchin-Bullock complex, 2 to 9 percent slopes	Trey – Well drained Parchin – Well drained	Trey - 2 to 9 Parchin - 2 to 6 Bullock - 2 to 6	No	Sandy clay
Harding	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes	Twilight – Well drained Blackhall –Well drained	Twilight - 9 to 15 Blackhall - 15 to 25	No	Fine sandy loams
Harding	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes	Twilight – Well drained Parchin – Well drained	Twilight - 9 to 15 Parchin - 6 to 9	No	Fine sandy loams
Harding	ZbC	Zeona-Blownout land complex, 2 to 15 percent slopes	Zeona – Excessively drained Blowout – Excessivley drained	Zeona - 2 to 15 Blownout – 0 to 15	No	Sands
Butte	Ha	Hanly loamy fine sand	Somewhat excessively drained	Hanly - 0 to 6	No	Loamy fine sand
Butte	ZeB	Zeona loamy fine sand, 0 to 6 percent slopes	Excessively drained	Zeona - 0 to 6	No	Loamy fine sand
Perkins	AaB	Bullock-Parchin loams, 0 to 9 percent slopes	Bullock – Well drained Parchin – Well drained	Bullock - 0 to 9 Parchin – 0 to 9	No	Loam
Perkins	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes	Bullock – Well drained Slickspots – Well drained	Bullock - 0 to 15 Slickspots – 0 to 15	No	Loamy clay
Perkins	Bb	Banks loamy fine sand	Somewhat excessively drained	Banks - 0 to 2	No	Loamy fine sand
Perkins	Sd	Shambo loam, channeled	Well drained	Shambo - 0 to 2	No	Loam
Perkins	Tb	Trembles soils, channeled	Well drained	Trembles - 0 to 2	No	Loam
Meade	AsC	Assinniboine fine sandy loam, 6 to 9 percent slopes	Well drained	Assinniboine - 6 to 9	No	Fine sandy loams
Meade	BmE	Blackhall-Twilight fine sandy loams, 9 to 40 percent slopes	Blackhall – Well drained Twilight – Well drained	Blackhall - 25 to 40 Twilight - 9 to 15	No	Fine sandy loams
Meade	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes	Bullock – Well drained Parchin – Well drained	Bullock - 0 to 4 Parchin – 0 to 4	No	Fine sandy loams
Meade	BsB	Bullock-Slickspots complex, 0 to 4 percent slopes	Bullock – Well drained Slickspots – Well drained	Bullock - 0 to 4 Slickspots – 0 to 4	No	Sandy clay
Meade	CaD	Cabbart loam, 9 to 40 percent slopes	Cabbart – Well drained	Cabbart - 9 to 40	No	Loam

Table 6 - South Dakota Soil Characterization Along the Proposed Project

COUNTY	SYMBOL	NAME	DRAINAGE CLASSIFICATION	PERCENT SLOPE	HYDRIC SOIL	TEXTURE DESCRIPTIOIN
Meade	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes	Delridge – Well drained Cabbart – Well drained	Delridge - 6 to 14 Cabbart – 6 to 15	No	Loam
Meade	EaB	Eapa loam, 2 to 6 percent slopes	Well drained	Eapa - 2 to 6	No	Loam
Meade	EdB	Eapa-Delridge loams, 2 to 6 percent slopes	Eapa – Well drained Delridge – Well drained	Eapa - 2 to 6 Delridge – 2 to 6	No	Loam
Meade	EgB	Eapa-Grail complex, 2 to 6 percent slopes	Eapa – Well drained Grail – Well drained	Eapa - 2 to 6 Grail – 2 to 6	No	Loam
Meade	GaA	Gerdrum loam, 0 to 4 percent slopes	Well drained	Gerdrum - 0 to 4	No	Loam
Meade	Gc	Glenberg fine sandy loam	Well drained	Glenberg - 0 to 2	No	Fine sandy loams
Meade	Hb	Havre loam	Well drained	Harve - 0 to 2	No	Loam
Meade	Hc	Havre loam, channeled	Well drained	Harve - 0 to 2	No	Loam
Meade	Ld	Lohmiller silty clay loam	Well drained	Lohmiller - 0 to 2	No	Silty clay loam
Meade	Lg	Lohmiller silty clay loam, channeled	Well drained	Lohmiller - 0 to 2	No	Silty clay loam
Meade	NuB	Nunn clay loam, 2 to 6 percent slopes	Well drained	Nunn - 2 to 6	No	Clay loam
Meade	PeB	Pierre clay, 2 to 6 percent slopes	Well drained	Pierre - 2 to 6	No	Clay
Meade	SaD	Samsil clay, 6 to 25 percent slopes	Well drained	Samsil - 6 to 25 Rock – 6 to 25	No	Clay
Meade	SbE	Samsil-Rock outcrop complex, 15 to 40 percent slopes	Samsil - Well drained Rock – Well drained	Samsill - 15 to 40 Rock – 15 to 40	No	Clay
Meade	St	Stetter clay	Well drained	Stetter - 0 to 2	No	Clay
Meade	SwA	Swanboy clay	Well drained	Swanboy - 0 to 2	No	Clay
Pennington	Gb	Glenberg fine sandy loam	Well drained	Glenberg - 0 to 3	No	Fine sandy loams
Pennington	Ha	Haverson silt loam	Well drained	Haverson - 0 to 1	No	Silt loam
Pennington	Lo	Lohmiller silty clay	Well drained	Lohmiller - 0 to 2	No	Silty clay
Haakon	Ab	Albaton silty clay, depressional	Very poorly drained	Albaton - 0 to 1	Yes	Silty clay
Haakon	Bu	Bullcreek clay, 0 to 6 percent slopes	Well drained	Bullcreek - 0 to 6	No	Clay
Haakon	Ct	Capa-Wendte, channeled, complex	Capa – Moderately well drained Wendte – Moderately well drained	Capa - 0 to 4 Wendte - 0 to 2	No	Clayey loam
Haakon	Eg	Egas silty clay loam	Poorly drained	Egas - 0 to 2	Yes	Silty clay loam
Haakon	KmB	Kirley-Ottumwa complex, 2 to 6 percent slopes	Kirley – Well drained Ottumwa – Well drained	Kirley - 2 to 6 Ottumwa – 2 to 6	No	Clayey loam

Table 6 - South Dakota Soil Characterization Along the Proposed Project

COUNTY	SYMBOL	NAME	DRAINAGE CLASSIFICATION	PERCENT SLOPE	HYDRIC SOIL	TEXTURE DESCRIPTIOIN
Haakon	KnD	Kirley-Vivian complex, 6 to 15 percent slopes	Kirley - Well drained Vivian - excessively drained	Kirley - 9 to 15 Vivian - 6 to 15	No	Clayey loam
Haakon	Ko	Kolls clay	Poorly drained	Kolls - 0 to 1	Yes	Clay
Haakon	LaD	Lakoma silty clay, 6 to 15 percent slopes	Well drained	Lakoma - 6 to 15	No	Silty clay
Haakon	Lp	Lohmiller silty clay, channeled	Well drained	Lohmiller - 0 to 2	No	Silty clay
Haakon	Nb	Nimbro silty clay loam	Well drained	Nimbro - 0 to 2	No	Silty clay loam
Haakon	Nc	Nimbro silty clay loam, channeled	Moderately well drained	Nimbro - 0 to 2	No	Silty clay loam
Haakon	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes	Okaton – Well drained Lakoma – Well drained	Okaton - 25 to 40 Lakoma - 15 to 25	No	Silty clays
Haakon	OtB	Ottumwa silty clay, 3 to 6 percent slopes	Ottumwa – Well drained	Ottumwa - 3 to 6	No	Silty clay
Haakon	OvA	Ottumwa-Capa complex, 0 to 3 percent slopes	Ottumwa - Well drained Capa - Moderately well drained	Ottumwa - 0 to 2 Capa - 0 to 3	No	Clayey loam
Haakon	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes	Okaton – Well drained Lakoma – Well drained	Ottumwa - 3 to 6 Lakoma – 3 to 6	No	Silty clays
Haakon	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes	Okaton – Well drained Lakoma – Well drained	Ottumwa - 6 to 9 Lakoma – 6 to 9	No	Silty clays
Haakon	SbF	Samsil clay, 25 to 60 percent slopes	Samsil – Well drained	25 to 60	No	Clay
Haakon	SoE	Sansarc-0pal clays, 9 to 40 percent slopes	Sansarc – Well drained Opal – Well drained	Sansarc - 25 to 40 Opal - 9 to 25	No	Clays
Haakon	StF	Schamber-Samsil complex, 6 to 60 percent slopes	Schamber – Well drained Samsil – Well drained	Schamber - 6 to 60 Samsil – 6 to 60	No	Loamy clay
Haakon	Wd	Wendte-Herdcamp silty clays, channeled	Wendte - Well drained Herdcamp - Very poorly drained	Wendte - 0 to 2 Herdcamp – 0 to 2	Wendte - No Herdcamp - Yes	Silty clays
Jones	Bu	Bullcreek clay, 0 to 6 percent slopes	Well drained	Bullcreek - 0 to 6	No	Clay
Jones	Hb	Herdcamp-Bullcreek complex	Herdcamp - Very poorly drained Bullcreek - Well drained	Herdcamp - 0 to 1 Bullcreek – 0 to 1	Herdcamp -Yes Bullcreek - No	Clayey loam
Jones	LaD	Lakoma silty clay, 6 to 15 percent slopes	Well drained	Lakoma - 6 to 15	No	Silty clay
Jones	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes	Okaton – Well drained Lakoma – Well drained	Okaton - 15 to 40 Lakoma - 15 to 25	No	Silty clays

Table 6 - South Dakota Soil Characterization Along the Proposed Project

COUNTY	SYMBOL	NAME	DRAINAGE CLASSIFICATION	PERCENT SLOPE	HYDRIC SOIL	TEXTURE DESCRIPTIOIN
Jones	OkE	Okaton-Wendte-Bullcreek complex, 0 to 45 percent slopes	Okaton - Well drained Wendte - Moderately well drained Bullcreek - Well drained	Okaton - 6 to 45 Wendte - 0 to 2 Bullcreek - 0 to 6	No	Clayey loam
Jones	OpB	Opal clay, 3 to 6 percent slopes	Well drained	Opal - 3 to 6	No	Clay
Jones	OpC	Opal clay, 6 to 9 percent slopes	Well drained	Opal - 6 to 9	No	Clay
Jones	OpD	Opal clay, 6 to 15 percent slopes	Well drained	Opal - 6 to 15	No	Clay
Jones	PrC	Promise clay, 6 to 9 percent slopes	Well drained	Promise - 6 to 9	No	Clay
Jones	PsA	Promise-Bullcreek clays	Promise – Well drained Bullcreek – Well drained	Promise - 0 to 3 Bullcreek – 0 to 3	No	Clays
Jones	Wd	Wendte silty clay, channeled	Moderately well drained	Wendte - 0 to 1	No	Silty clay
Lyman	BuA	Bullcreek clay, 0 to 6 percent slopes	Well drained	Bullcreek - 0 to 6	No	Clay
Lyman	LbD	Lakoma-Okaton silty clays, 6 to 15 percent slopes	Lakoma – Well drained Okaton – Well drained	Lakoma - 9 to 15 Okaton - 6 to 15	No	Silty clays
Lyman	MnC	Millboro-Boro silty clays, 6 to 9 percent slopes	Millboro – Well drained Boro – Well drained	Millboro - 6 to 9 Boro – 6 to 9	No	Silty clays
Lyman	SbE	Sansarc-Opal clays, 9 to 40 percent slopes	Sansarc – Well drained Opal – Well drained	Sansarc - 15 to 40 Opal - 9 to 25	No	Clays
Tripp	AtD	Anselmo-Longpine fine sandy loams, 10 to 20 percent slopes	Anselmo – Well drained Longpine – Well drained	Anselmo - 10 to 17 Longpine - 10 to 20	No	Fine sandy loams
Tripp	BOD	Boyd-Okaton association, 9 to 25 percent slopes	Boyd – Well drained Okaton – Well drained	Boyd - 9 to 25 Okaton – 9 to 25	No	Clayey loam
Tripp	Bp	Bridgeport complex	Well drained	Bridgeport - 0 to 2	No	Loam
Tripp	Bt	Bridgeport complex, channeled	Well drained	Bridgeport - 0 to 2	No	Loam
Tripp	Cc	Carter silty clay loam	Well drained	Carter - 0 to 2	No	Silty clay loam
Tripp	DmA	Doger-Elsmere complex, 0 to 3 percent slopes	Doger - Well drained Elsmere - Somewhat poorly drained	Doger - 0 to 3 Elsmere – 0 to 3	No	Loamy sands
Tripp	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	Somewhat excessively drained	Dunday - 6 to 9	No	Loamy fine sand
Tripp	Em	Elsmere fine sandy loam	Somewhat poorly drained	Elsmere - 0 to 2	No	Fine sandy loam

Table 6 - South Dakota Soil Characterization Along the Proposed Project

COUNTY	SYMBOL	NAME	DRAINAGE CLASSIFICATION	PERCENT SLOPE	HYDRIC SOIL	TEXTURE DESCRIPTIOIN
Tripp	Es	Erd-Capa complex	Erd - Somewhat poorly drained Capa - Moderately well drained	Erd - 0 to 1 Capa - 0 to 2	No	Clayey loam
Tripp	Ic	Inavale complex, channeled	Excessively drained	Inavale - 0 to 2	No	Sandy loam
Tripp	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes	Lakoma – Well drained Millboro – Well drained	Lakoma - 5 to 9 Millboro – 5 to 9	No	Clayey loam
Tripp	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes	Manter – Well drained Anselmo – Well drained	Manter - 15 to 30 Anselmo - 15 to 17	No	Fine sandy loams
Tripp	MoB	Millboro silty clay, 3 to 6 percent slopes	Well drained	Millboro - 3 to 6	No	Silty clay
Tripp	Mr	Munjor fine sandy loam	Moderately well drained	Munjor - 0 to 2	No	Silt loam
Tripp	Mu	Munjor fine sandy loam	Well drained	Munjor - 0 to 2	No	Fine sandy loam
Tripp	OBE	Okaton-Lakoma association, 15 to 40 percent slopes	Okaton – Well drained Lakoma – Well drained	Okaton - 15 to 40 Lakoma - 15 to 25	No	Clayey loam
Tripp	OpC	Opal clay, 3 to 9 percent slopes	Opal – Well drained	Opal - 3 to 9	No	Clay
Tripp	ReB	Reliance silty clay loam, 3 to 6 percent slopes	Reliance – Well drained	Reliance - 3 to 6	No	Silty clay loam
Tripp	SAE	Sansarc-Opal association, 15 to 40 percent slopes	Sansarc – Well drained Opal – Well drained	Sansarc - 25 to 40 Opal - 15 to 25	No	Clayey loam
Tripp	Sw	Bullcreek clay	Bullcreek – Well drained	Bullcreek - 0 to 6	No	Clay
Tripp	VnD	Valentine-Longpine complex, 6 to 15 percent slopes	Valentine - Excessively drained Longpine - Well drained	Valentine - 6 to 15 Longpine – 6 to 15	No	Sandy loam
Tripp	Wb	Wann fine sandy loam	Somewhat poorly drained	Wann - 0 to 2	No	Fine sandy loam
Tripp	Wk	Whitelake-Lute fine sandy loams	Whitelake - Moderately well drained Lute - Somewhat poorly drained	Whitelake - 0 to 2 Lute – 0 to 2	No	Fine sandy loams

Attachment D

Preliminary Jurisdictional Determination Form

Keystone XL Pipeline Project – Pre-Jurisdictional Determination Form for Mainline Crossings in the USACE Omaha District, Montana

Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-001-S275HA001	S275HA001	286.6	27	EPH	Boxelder	0.0734	0.0000	45.882940	-104.027598	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-002-S_UTM13_07772	S_UTM13_07772	288.2	-	MABO	Boxelder	0.0080	0.0000	45.867543	-104.006359	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-003-S_UTM13_07772	S_UTM13_07772	288.2	-	MABO	Boxelder	0.0160	0.0000	45.867329	-104.005970	
NWO-2009-00305-PIE-004-W104HA001	W104HA001	292.4	195	PEM	Upper Little Missouri	0.2784	0.0000	45.835549	-103.932930	Non-Section 10; Wetland
NWO-2009-00305-PIE-005-W0002	W0002	292.6	-	PEM	Upper Little Missouri	0.0000[6]	0.0000	45.833827	-103.928244	Non-Section 10; Wetland
NWO-2009-00305-PIE-006-W0002	W0002	292.6	19	PEM	Upper Little Missouri	0.0614	0.0000	45.833724	-103.927711	
NWO-2009-00305-PIE-007-S29HA001	S29HA001	292.6	24	INT	Upper Little Missouri	0.0224	0.0000	45.833683	-103.927597	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-008-W0002	W0002	292.7	62	PEM	Upper Little Missouri	0.0832	0.0000	45.833631	-103.927544	Non-Section 10; Wetland
NWO-2009-00305-PIE-009-W0003	W0003	293.6	21	PEM	Upper Little Missouri	0.0399	0.0000	45.826877	-103.910402	Non-Section 10; Wetland
NWO-2009-00305-PIE-010-S_UTM13_04433	S_UTM13_04433	293.6	16	EPH	Upper Little Missouri	0.0224	0.0000	45.826859	-103.910333	Non-Section 10; Non-Wetland

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-011-W567HA001	W567HA001	293.6	-	PEM	Upper Little Missouri	0.0054	0.0000	45.826895	-103.910223	Non-Section 10; Wetland
NWO-2009-00305-PIE-012-W0003	W0003	293.6	25	PEM	Upper Little Missouri	0.0434	0.0000	45.826770	-103.910237	Non-Section 10; Wetland
NWO-2009-00305-PIE-013-W_UTM13_04445	W_UTM13_04445	295.0	64	PEM	Upper Little Missouri	0.0754[6]	0.0000	45.815847	-103.885177	Non-Section 10; Wetland
NWO-2009-00305-PIE-014-S312HA001	S312HA001	295.1	93	PER	Upper Little Missouri	0.1062[6]	0.0000	45.815722	-103.884886	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-015-W567HA002	W567HA002	295.1	67	PEM	Upper Little Missouri	0.0631[6]	0.0000	45.815315	-103.883978	Non-Section 10; Wetland
NWO-2009-00305-PIE-016-S302HA001	S302HA001	296.9	18	EPH	Upper Little Missouri	0.0284	0.0000	45.800169	-103.855284	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-017-S_UTM13_04476	S_UTM13_04476	297.7	11	INT	Upper Little Missouri	0.0266	0.0000	45.797525	-103.840441	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-018-S500HA001	S500HA001	298.4	14	EPH	Upper Little Missouri	0.0239	0.0000	45.792301	-103.827550	Non-Section 10; Non-Wetland

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-019-S123HA003	S123HA003	300.0	17	INT	Upper Little Missouri	0.0448	0.0000	45.781728	-103.798756	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-020-W_UTM13_04537	W_UTM13_04537	300.4	109	PEM	Upper Little Missouri	0.1611	0.0000	45.778444	-103.792880	Non-Section 10; Wetland
NWO-2009-00305-PIE-021-S_UTM13_04536	S_UTM13_04536	300.4	18	INT	Upper Little Missouri	0.0400	0.0000	45.778417	-103.792846	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-022-W0004	W0004	303.5	18	PEM	Upper Little Missouri	0.0298	0.0000	45.754506	-103.740380	Non-Section 10; Wetland
NWO-2009-00305-PIE-023-S_UTM13_07045	S_UTM13_07045	303.5	17	INT	Upper Little Missouri	0.0258	0.0000	45.754453	-103.740272	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-024-W0004	W0004	303.5	12	PEM	Upper Little Missouri	0.0317	0.0000	45.754382	-103.740209	Non-Section 10; Wetland
NWO-2009-00305-PIE-025-S_UTM13_07045	S_UTM13_07045	303.5	-	INT	Upper Little Missouri	0.0086	0.0000	45.754259	-103.740120	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-026-S_UTM13_07045	S_UTM13_07045	303.5	-	INT	Upper Little Missouri	0.0005	0.0000	45.754176	-103.740054	
NWO-2009-00305-PIE-027-S0346	S0346	305.2	28	EPH	South Fork Grand	0.0437	0.0000	45.742813	-103.709731	Non-Section 10; Non-Wetland

Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-028-S_UTM13_04604	S_UTM13_04604	306.3	18	INT	South Fork Grand	0.0490	0.0000	45.730432	-103.694888	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-029-S_UTM13_04614	S_UTM13_04614	307.0	50	INT	South Fork Grand	0.1212	0.0000	45.722313	-103.687194	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-030-S_UTM13_04624	S_UTM13_04624	307.8	27	INT	South Fork Grand	0.0687	0.0000	45.712928	-103.677316	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-031-S_UTM13_04635	S_UTM13_04635	309.1	21	EPH	South Fork Grand	0.0707	0.0000	45.695878	-103.665120	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-032-S_UTM13_04657	S_UTM13_04657	311.2	26	EPH	South Fork Grand	0.0570	0.0000	45.669795	-103.645774	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-033-S_UTM13_04657	S_UTM13_04657	311.3	19	EPH	South Fork Grand	0.0703	0.0000	45.668859	-103.645292	
NWO-2009-00305-PIE-034-S500HA011	S500HA011	312.7	29	INT	South Fork Grand	0.0734	0.0000	45.649538	-103.642696	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-035-W500HA005	W500HA005	313.8	-	PEM	South Fork Grand	0.0101	0.0000	45.637270	-103.626733	Non-Section 10; Wetland
NWO-2009-00305-PIE-036-W500HA004	W500HA004	314.1	279	PEM	South Fork Grand	0.4268	0.0000	45.635364	-103.623238	Non-Section 10; Wetland

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-037-W500HA002	W500HA002	316.2	32	PEM	South Fork Grand	0.1660	0.0000	45.618634	-103.586665	Non-Section 10; Wetland
NWO-2009-00305-PIE-038-S0359	S0359	321.4	24	EPH	South Fork Grand	0.0559	0.0000	45.578092	-103.513263	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-039-S123HA006	S123HA006	321.6	33	PER	South Fork Grand	0.0808	0.0000	45.574973	-103.512002	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-040-S0360	S0360	321.6	14	EPH	South Fork Grand	0.0353	0.0000	45.574371	-103.511789	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-041-S124HA008	S124HA008	326.4	10	PER	South Fork Grand	0.0252	0.0000	45.527903	-103.449906	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-042-S_UTM13_04896	S_UTM13_04896	332.3	15	INT	South Fork Grand	0.0405	0.0000	45.477292	-103.357483	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-043-W302HA002	W302HA002	332.4	5	PEM	South Fork Grand	0.0287	0.0000	45.476118	-103.355476	Non-Section 10; Wetland
NWO-2009-00305-PIE-044-S_UTM13_07391	S_UTM13_07391	332.4	14	PER	South Fork Grand	0.0352	0.0000	45.476125	-103.355408	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-045-S_UTM13_07391	S_UTM13_07391	332.4	-	PER	South Fork Grand	0.0022	0.0000	45.476165	-103.355173	

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-046-S_UTM13_07396	S_UTM13_07396	332.7	19	EPH	South Fork Grand	0.0488	0.0000	45.473164	-103.351739	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-047-S304HA001	S304HA001	334.0	13	INT	South Fork Grand	0.0526	0.0000	45.455697	-103.346670	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-048-S500HA009	S500HA009	338.8	21	INT	Upper Moreau	0.0640	0.0000	45.390058	-103.321480	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-049-S304HA002	S304HA002	339.2	12	EPH	Upper Moreau	0.0442	0.0000	45.385164	-103.316031	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-050-S500HA007	S500HA007	340.8	38	INT	Upper Moreau	0.1521	0.0000	45.367782	-103.295472	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-051-S_UTM13_07104	S_UTM13_07104	343.1	74	INT	Upper Moreau	0.1898	0.0000	45.348330	-103.257056	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-052-S_UTM13_07109	S_UTM13_07109	344.0	106	INT	Upper Moreau	0.2106	0.0000	45.340594	-103.242138	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-053-S_UTM13_06057	S_UTM13_06057	345.2	55	EPH	Upper Moreau	0.1227	0.0000	45.329378	-103.224353	Non-Section 10; Non-Wetland

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-054-S0379	S0379	346.8	39	EPH	Upper Moreau	0.0940	0.0000	45.312797	-103.200856	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-055-S0380	S0380	347.1	25	EPH	Upper Moreau	0.0463	0.0000	45.310452	-103.195529	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-056-W23HA002	W23HA002	351.8	194	PEM	Upper Moreau	0.3532	0.0000	45.275068	-103.115396	Non-Section 10; Wetland
NWO-2009-00305-PIE-057-S312HA002	S312HA002	351.8	52	INT	Upper Moreau	0.0854	0.0000	45.274862	-103.115003	
NWO-2009-00305-PIE-058-S_UTM13_04876	S_UTM13_04876	352.4	17	INT	Upper Moreau	0.0530	0.0000	45.269471	-103.105076	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-059-S_UTM13_05005	S_UTM13_05005	353.4	21	EPH	Upper Moreau	0.0838	0.0000	45.261242	-103.088599	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-060-S_UTM13_05016	S_UTM13_05016	354.9	36	INT	Upper Moreau	0.0912	0.0000	45.246002	-103.066562	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-061-S_UTM13_05019	S_UTM13_05019	355.5	36	EPH	Upper Moreau	0.0824	0.0000	45.240104	-103.058218	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-062-S302HA002	S302HA002	357.2	5	EPH	Upper Moreau	0.0143	0.0000	45.223719	-103.033596	Non-Section 10; Non-Wetland

Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-063-exp-WB-13507	exp-WB-13507	357.2	-	EPH	Upper Moreau	0.0077	0.0000	45.223821	-103.033423	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-064-W_UTM13_05228	W_UTM13_05228	359.2	69	PEM	Upper Moreau	0.1289	0.0000	45.205147	-103.002651	Non-Section 10; Wetland
NWO-2009-00305-PIE-065-S275BU001	S275BU001	361.0	109	PER	Upper Moreau	0.2731	0.0000	45.187384	-102.974796	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-066-S_UTM13_05257	S_UTM13_05257	361.6	38	INT	Upper Moreau	0.0913	0.0000	45.181668	-102.964848	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-067-S275PE001	S275PE001	363.5	18	EPH	Upper Moreau	0.0518	0.0000	45.163803	-102.936674	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-068-S275PE001	S275PE001	363.5	-	EPH	Upper Moreau	0.0056	0.0000	45.163779	-102.936335	
NWO-2009-00305-PIE-069-S_UTM13_06521	S_UTM13_06521	365.6	18	MABO	South Fork Moreau	0.0784	0.0000	45.142145	-102.905474	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-070-exp-WB-13509	exp-WB-13509	366.3	19	EPH	South Fork Moreau	0.0540	0.0000	45.134214	-102.896611	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-071-S_UTM13_05506	S_UTM13_05506	368.2	-	EPH	South Fork Moreau	0.0997	0.0000	45.116394	-102.868819	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-072-S_UTM13_05506	S_UTM13_05506	368.2	29	EPH	South Fork Moreau	0.1641	0.0000	45.116025	-102.868152	

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-073-S5APE002	S5APE002	368.9	118	PER	South Fork Moreau	0.3536	0.0000	45.109277	-102.858167	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-074-S_UTM13_05522	S_UTM13_05522	369.3	-	EPH	South Fork Moreau	0.0328	0.0000	45.105279	-102.852258	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-075-S_UTM13_05522	S_UTM13_05522	369.4	73	EPH	South Fork Moreau	0.0657	0.0000	45.104491	-102.851195	
NWO-2009-00305-PIE-076-S312PE001	S312PE001	370.6	19	INT	South Fork Moreau	0.0611	0.0000	45.091613	-102.835130	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-077-S_UTM13_05613	S_UTM13_05613	372.5	16	EPH	South Fork Moreau	0.0467	0.0000	45.074452	-102.805601	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-078-S_UTM13_05613	S_UTM13_05613	372.5	35	EPH	South Fork Moreau	0.0877	0.0000	45.073922	-102.804860	
NWO-2009-00305-PIE-079-S_UTM13_05620	S_UTM13_05620	373.4	33	EPH	South Fork Moreau	0.0736	0.0000	45.064611	-102.793339	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-080-S_UTM13_05731	S_UTM13_05731	377.0	28	EPH	Upper Moreau	0.0978	0.0000	45.042108	-102.731746	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-081-S_UTM13_05733	S_UTM13_05733	377.4	25	EPH	Upper Moreau	0.0604	0.0000	45.039638	-102.725591	Non-Section 10; Non-Wetland

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-082-S_UTM13_05735	S_UTM13_05735	377.7	26	EPH	Upper Moreau	0.0867	0.0000	45.036648	-102.721774	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-083-S_UTM13_05738	S_UTM13_05738	377.8	44	EPH	Upper Moreau	0.1068	0.0000	45.035476	-102.720405	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-084-W_UTM13_0740	W_UTM13_0740	378.2	14	PEM	Upper Moreau	0.0222	0.0000	45.030998	-102.715403	Non-Section 10; Wetland
NWO-2009-00305-PIE-085-S_UTM13_05743	S_UTM13_05743	378.2	24	INT	Upper Moreau	0.0453	0.0000	45.030951	-102.715362	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-086-W_UTM13_0740	W_UTM13_0740	378.2	26	PEM	Upper Moreau	0.0546	0.0000	45.030885	-102.715295	Non-Section 10; Wetland
NWO-2009-00305-PIE-087-S_UTM13_05746	S_UTM13_05746	378.4	18	EPH	Upper Moreau	0.0542	0.0000	45.028655	-102.712784	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-088-S_UTM13_05748	S_UTM13_05748	378.5	32	INT	Upper Moreau	0.0831	0.0000	45.027725	-102.711723	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-089-S567ME001	S567ME001	380.8	3	EPH	Cherry	0.0083	0.0000	45.001714	-102.682232	Non-Section 10; Non-Wetland

Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-090-S_UTM13_04944	S_UTM13_04944	381.6	37	EPH	Cherry	0.1056	0.0000	44.993086	-102.670715	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-091-S_UTM13_06001	S_UTM13_06001	381.7	25	EPH	Cherry	0.0588	0.0000	44.992304	-102.669757	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-092-S6AME001	S6AME001	383.2	21	INT	Cherry	0.0549	0.0000	44.976672	-102.648715	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-093-s7ame001	s7ame001	387.8	7	PER	Cherry	0.0774	0.0000	44.923588	-102.590742	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-094-W_UTM13_04983	W_UTM13_04983	388.1	12	PEM	Cherry	0.0603	0.0000	44.920981	-102.586857	Non-Section 10; Wetland
NWO-2009-00305-PIE-095-S_UTM13_08629	S_UTM13_08629	388.1	66	INT	Cherry	0.0551	0.0000	44.920947	-102.586841	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-096-W_UTM13_04983	W_UTM13_04983	388.1	11	PEM	Cherry	0.0790	0.0000	44.920897	-102.586862	Non-Section 10; Wetland
NWO-2009-00305-PIE-097-S_UTM13_07428	S_UTM13_07428	389.1	19	EPH	Cherry	0.0484	0.0000	44.912559	-102.570577	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-098-S_UTM13_07429	S_UTM13_07429	389.4	18	EPH	Cherry	0.0562	0.0000	44.910459	-102.565291	

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-099-W567ME001	W567ME001	398.5	42	PEM	Cherry	0.0766	0.0000	44.819492	-102.435110	Non-Section 10; Wetland
NWO-2009-00305-PIE-100-W567ME002	W567ME002	399.0	14	PEM	Cherry	0.0236	0.0000	44.815000	-102.428101	Non-Section 10; Wetland
NWO-2009-00305-PIE-101-W567ME003	W567ME003	399.7	37	PEM	Cherry	0.0671	0.0000	44.807009	-102.417971	Non-Section 10; Wetland
NWO-2009-00305-PIE-102-W567ME004	W567ME004	400.1	44	PEM	Cherry	0.0727	0.0000	44.803429	-102.413741	Non-Section 10; Wetland
NWO-2009-00305-PIE-103-S_UTM13_05156	S_UTM13_05156	400.1	7	INT	Cherry	0.0117	0.0000	44.803371	-102.413696	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-104-S_UTM13_05156	S_UTM13_05156	400.3	24	INT	Cherry	0.0730	0.0000	44.801248	-102.411234	
NWO-2009-00305-PIE-105-W0009	W0009	400.9	3	PEM	Cherry	0.0008	0.0000	44.793800	-102.402016	Non-Section 10; Wetland
NWO-2009-00305-PIE-106-S_UTM13_05171	S_UTM13_05171	400.9	81	EPH	Cherry	0.1464	0.0000	44.793670	-102.401923	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-107-W0009	W0009	401.0	47	PEM	Cherry	0.0691	0.0000	44.793561	-102.401744	Non-Section 10; Wetland

Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-108-S_UTM13_05178	S_UTM13_05178	401.2	20	EPH	Cherry	0.0516	0.0000	44.790714	-102.397760	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-109-S_UTM13_05191	S_UTM13_05191	402.0	26	EPH	Cherry	0.1869	0.0000	44.782904	-102.386104	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-110-S_UTM13_05196	S_UTM13_05196	402.2	18	EPH	Cherry	0.0739	0.0000	44.780932	-102.382956	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-111-S_UTM13_04258	S_UTM13_04258	402.8	15	EPH	Cherry	0.0400	0.0000	44.774966	-102.375783	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-112-S275ME005	S275ME005	403.4	62	EPH	Cherry	0.1519	0.0000	44.767705	-102.370260	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-113-S275ME006	S275ME006	404.1	69	PER	Cherry	0.1389	0.0000	44.758684	-102.363190	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-114-S_UTM13_01124	S_UTM13_01124	410.0	-	EPH	Cherry	0.0104	0.0000	44.692569	-102.290925	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-115-S_UTM13_01124	S_UTM13_01124	410.1	120	EPH	Cherry	0.1506	0.0000	44.692102	-102.290128	
NWO-2009-00305-PIE-116-S_UTM13_01124	S_UTM13_01124	410.2	27	EPH	Cherry	0.0836	0.0000	44.690277	-102.287871	

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-117-S106ME008	S106ME008	410.9	6	INT	Cherry	0.0212	0.0000	44.684829	-102.276916	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-118-S_UTM13_14774	S_UTM13_14774	411.9	21	INT	Cherry	0.0545	0.0000	44.678479	-102.258529	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-119-S128ME001	S128ME001	413.1	-	PER	Cherry	0.0032	0.0000	44.669623	-102.239299	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-120-S103ME006	S103ME006	413.1	32	PER	Cherry	0.0722	0.0000	44.669747	-102.239188	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-121-S128ME001	S128ME001	413.1	-	PER	Cherry	0.0000	0.0000	44.669565	-102.239180	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-122-S_UTM13_14787	S_UTM13_14787	413.8	41	INT	Cherry	0.1330	0.0000	44.664189	-102.226011	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-123-W500ME001	W500ME001	422.1	-	PEM	Lower Cheyenne	0.0088	0.0000	44.578082	-102.112517	Non-Section 10; Wetland
NWO-2009-00305-PIE-124-S_UTM13_05918	S_UTM13_05918	423.9	12	INT	Lower Cheyenne	0.0385	0.0000	44.561041	-102.087671	Non-Section 10; Non-Wetland

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-125-s7ame005	s7ame005	424.1	16	INT	Lower Cheyenne	0.0517	0.0000	44.559280	-102.085565	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-126-S312ME006	S312ME006	425.5	26	INT	Lower Cheyenne	0.0642	0.0000	44.541951	-102.074357	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-127-exp-WB-13502	exp-WB-13502	425.6	33	INT	Lower Cheyenne	0.0923	0.0000	44.540386	-102.072692	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-128-exp-WB-13502	exp-WB-13502	425.7	-	INT	Lower Cheyenne	0.0000	0.0000	44.539795	-102.072237	
NWO-2009-00305-PIE-129-exp-WB-13503	exp-WB-13503	425.8	76	INT	Lower Cheyenne	0.0817	0.0000	44.538630	-102.071523	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-130-S312ME001	S312ME001	425.8	-	INT	Lower Cheyenne	0.0313	0.0000	44.538549	-102.071706	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-131-S312ME007	S312ME007	427.7	35	EPH	Lower Cheyenne	0.0996	0.0000	44.515931	-102.052359	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-132-S312ME008	S312ME008	428.1	99	EPH	Lower Cheyenne	0.2236	0.0000	44.515972	-102.046057	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-133-S312ME009	S312ME009	428.1	49	INT	Lower Cheyenne	0.1281	0.0000	44.515972	-102.044448	Non-Section 10; Non-Wetland

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-134-S312ME015	S312ME015	429.2	63	INT	Lower Cheyenne	0.1427	0.0000	44.513920	-102.023870	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-135-exp-WB-13508	exp-WB-13508	429.6	45	INT	Lower Cheyenne	0.0682[6]	0.0000	44.511204	-102.015857	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-136-S312ME013	S312ME013	429.6	11	INT	Lower Cheyenne	0.0359[6]	0.0000	44.511099	-102.015877	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-137-S312ME012	S312ME012	429.9	123	PER	Lower Cheyenne	0.1414	0.0000	44.508492	-102.013604	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-138-S312ME011	S312ME011	429.9	102	INT	Lower Cheyenne	0.1174	0.0000	44.508031	-102.013214	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-139-S312ME010	S312ME010	430.0	169	PER	Lower Cheyenne	0.1933	0.0000	44.506721	-102.012103	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-140-S312PN002	S312PN002	430.0	12	PER	Lower Cheyenne	0.0139	0.0000	44.506291	-102.011718	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-141-S312PN003	S312PN003	430.8	-	INT	Lower Cheyenne	0.0481	0.0000	44.495925	-102.002950	Non-Section 10; Non-Wetland

Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-142-S312PN001	S312PN001	430.8	34	INT	Lower Cheyenne	0.1501	0.0000	44.497688	-102.001795	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-143-W312HK002	W312HK002	431.0	27	PEM	Lower Cheyenne	0.0371[6]	0.0000	44.497550	-101.999413	Non-Section 10; Wetland
NWO-2009-00305-PIE-144-S312HK001	S312HK001	433.6	-	INT	Lower Cheyenne	0.0106[6]	0.0000	44.482291	-101.955096	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-145-S8AHK003	S8AHK003	433.6	34	PER	Lower Cheyenne	0.0346[6]	0.0000	44.482335	-101.955023	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-146-W312HK001	W312HK001	434.6	-	PEM	Lower Cheyenne	0.0039	0.0000	44.480958	-101.933864	Non-Section 10; Wetland
NWO-2009-00305-PIE-147-W312HK001	W312HK001	434.7	-	PEM	Lower Cheyenne	0.3682	0.0000	44.481328	-101.933577	
NWO-2009-00305-PIE-148-W_UTM14_05132	W_UTM14_05132	437.9	-	PEM	Lower Cheyenne	5.2397E-07	0.0000	44.456281	-101.880379	Non-Section 10; Wetland
NWO-2009-00305-PIE-149-W_UTM14_05132	W_UTM14_05132	437.9	91	PEM	Lower Cheyenne	0.1291	0.0000	44.456149	-101.880521	Non-Section 10; Wetland
NWO-2009-00305-PIE-150-W_UTM14_05132	W_UTM14_05132	437.9	-	PEM	Lower Cheyenne	1.9250E-09	0.0000	44.456094	-101.880189	
NWO-2009-00305-PIE-151-W_UTM14_05132	W_UTM14_05132	437.9	32	PEM	Lower Cheyenne	0.0485	0.0000	44.455823	-101.880155	

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-152-W_UTM14_05132	W_UTM14_05132	437.9	27	PEM	Lower Cheyenne	0.0335	0.0000	44.455710	-101.879935	
NWO-2009-00305-PIE-153-W_UTM14_05132	W_UTM14_05132	438.0	-	PEM	Lower Cheyenne	0.0012	0.0000	44.455419	-101.879602	
NWO-2009-00305-PIE-154-W_UTM14_05132	W_UTM14_05132	438.0	-	PEM	Lower Cheyenne	0.0039	0.0000	44.455302	-101.879492	Non-Section 10; Wetland
NWO-2009-00305-PIE-155-W_UTM14_05132	W_UTM14_05132	438.0	-	PEM	Lower Cheyenne	1.0652E-06	0.0000	44.455192	-101.879269	
NWO-2009-00305-PIE-156-W_UTM14_08434	W_UTM14_08434	439.8	-	PEM	Lower Cheyenne	0.0238	0.0000	44.433107	-101.860090	Non-Section 10; Wetland
NWO-2009-00305-PIE-157-S_UTM14_08952	S_UTM14_08952	440.4	13	EPH	Lower Cheyenne	0.0372	0.0000	44.425119	-101.853113	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-158-S_UTM14_04940	S_UTM14_04940	442.6	20	EPH	Lower Cheyenne	0.0634	0.0000	44.398140	-101.830706	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-159-S_UTM14_04940	S_UTM14_04940	442.7	-	EPH	Lower Cheyenne	0.0022	0.0000	44.397471	-101.830310	
NWO-2009-00305-PIE-160-S_UTM14_04948	S_UTM14_04948	443.1	24	EPH	Lower Cheyenne	0.0551	0.0000	44.392634	-101.823127	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-161-S_UTM14_04973	S_UTM14_04973	445.8	17	INT	Lower Cheyenne	0.0527	0.0000	44.370012	-101.780381	Non-Section 10; Non-Wetland

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-162-S308HK002	S308HK002	448.4	48	PER	Lower Cheyenne	0.1284	0.0000	44.345171	-101.742950	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-163-S308HK001	S308HK001	448.5	13	INT	Lower Cheyenne	0.0426	0.0000	44.343708	-101.742117	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-164-S567HK001	S567HK001	449.7	-	EPH	Lower Cheyenne	2.1478E-06	0.0000	44.332063	-101.724269	
NWO-2009-00305-PIE-165-exp-WB-0257	exp-WB-0257	449.7	19	EPH	Lower Cheyenne	0.0517	0.0000	44.331895	-101.724274	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-166-W_UTM14_08431	W_UTM14_08431	452.9	24	PEM	Lower Cheyenne	0.0513	0.0000	44.305211	-101.673133	Non-Section 10; Wetland
NWO-2009-00305-PIE-167-S275HK003	S275HK003	452.9	82	EPH	Lower Cheyenne	0.1290	0.0000	44.305124	-101.672984	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-168-W_UTM14_08431	W_UTM14_08431	452.9	109	PEM	Lower Cheyenne	0.1816	0.0000	44.304937	-101.672755	Non-Section 10; Wetland
NWO-2009-00305-PIE-169-S_UTM14_14347	S_UTM14_14347	454.5	22	EPH	Lower Cheyenne	0.0646	0.0000	44.291828	-101.646476	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-170-S_UTM14_04739	S_UTM14_04739	459.6	29	EPH	Bad	0.0882	0.0000	44.246728	-101.564992	Non-Section 10; Non-Wetland

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-171-S_UTM14_04741	S_UTM14_04741	459.8	24	EPH	Bad	0.0741	0.0000	44.245232	-101.562081	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-172-W308HK001	W308HK001	462.0	103	PEM	Bad	0.1965	0.0000	44.225421	-101.527708	Non-Section 10; Wetland
NWO-2009-00305-PIE-173-S_UTM13_15946	S_UTM13_15946	465.3	-	INT	Bad	0.0100	0.0000	44.198651	-101.472943	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-174-S108HK001	S108HK001	465.3	28	Seasonal	Bad	0.1257	0.0000	44.198512	-101.472754	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-175-S_UTM14_08959	S_UTM14_08959	466.0	27	EPH	Bad	0.0692	0.0000	44.192529	-101.461730	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-176-S275HK002	S275HK002	469.4	166	EPH	Bad	0.4479	0.0000	44.165872	-101.404881	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-177-exp-WB-0258	exp-WB-0258	472.8	19	EPH	Bad	0.0385	0.0000	44.139136	-101.347877	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-178-S275HK001	S275HK001	475.2	86	EPH	Bad	0.1388	0.0000	44.123725	-101.306502	Non-Section 10; Non-Wetland

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-179-S_UTM14_05033	S_UTM14_05033	475.4	33	EPH	Bad	0.0825	0.0000	44.123006	-101.302988	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-180-S567HK003	S567HK003	477.1	24	EPH	Bad	0.0712	0.0000	44.118088	-101.268080	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-181-S_UTM14_06829	S_UTM14_06829	478.7	25	INT	Bad	0.0695	0.0000	44.112291	-101.238442	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-182-S_UTM14_08970	S_UTM14_08970	479.2	29	EPH	Bad	0.0639	0.0000	44.110969	-101.227659	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-183-S8AHK006	S8AHK006	483.7	31	PER	Bad	0.0717	0.0000	44.088301	-101.144296	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-184-W8AHK002	W8AHK002	485.3	-	PEM	Bad	0.0039	0.0000	44.079223	-101.115429	Non-Section 10; Wetland
NWO-2009-00305-PIE-185-W108HK001	W108HK001	485.3	84	PEM	Bad	0.1397	0.0000	44.079247	-101.115092	Non-Section 10; Wetland
NWO-2009-00305-PIE-186-S8AHK008	S8AHK008	486.0	52	PER	Bad	0.0597[6]	0.0000	44.074481	-101.104583	Non-Section 10; Non-Wetland

Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-187-S_UTM14_08075	S_UTM14_08075	486.4	20	EPH	Bad	0.0609	0.0000	44.070983	-101.098008	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-188-S0320	S0320	487.4	25	EPH	Bad	0.0739	0.0000	44.062994	-101.082280	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-189-S0320	S0320	487.4	-	EPH	Bad	0.0055	0.0000	44.062875	-101.081647	
NWO-2009-00305-PIE-190-S_UTM14_08077	S_UTM14_08077	487.5	64	EPH	Bad	0.1501	0.0000	44.062365	-101.080356	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-191-S_UTM14_06745	S_UTM14_06745	490.1	32	INT	Bad	0.0794	0.0000	44.040802	-101.037257	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-192-S_UTM14_06741	S_UTM14_06741	491.2	17	EPH	Bad	0.0447	0.0000	44.035460	-101.017786	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-193-S_UTM14_06741	S_UTM14_06741	491.2	-	EPH	Bad	0.0015	0.0000	44.035578	-101.017537	
NWO-2009-00305-PIE-194-S_UTM14_88888	S_UTM14_88888	491.3	57	EPH	Bad	0.1074	0.0000	44.035090	-101.015443	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-195-S_UTM14_06735	S_UTM14_06735	492.7	111	INT	Bad	0.2430	0.0000	44.027475	-100.989185	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-196-S_UTM14_06735	S_UTM14_06735	492.9	59	INT	Bad	0.1795	0.0000	44.026439	-100.985806	

Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-197-S308JO001	S308JO001	496.6	19	INT	Bad	0.0385	0.0000	44.008180	-100.914795	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-198-W308JO001	W308JO001	497.2	19	PEM	Bad	0.0309	0.0000	44.007989	-100.902893	
NWO-2009-00305-PIE-199-S313JO001	S313JO001	498.3	21	INT	Bad	0.0544	0.0000	44.002886	-100.882116	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-200-S108JO001	S108JO001	499.1	12	Seasonal	Bad	0.0311	0.0000	43.998202	-100.867854	
NWO-2009-00305-PIE-201-S_UTM14_08974	S_UTM14_08974	501.2	27	INT	Bad	0.0701	0.0000	43.983820	-100.831361	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-202-exp-WB-0256	exp-WB-0256	501.8	11	PER	Bad	0.0315	0.0000	43.980888	-100.819935	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-203-S23JO001	S23JO001	506.2	13	INT	Bad	0.0514	0.0000	43.977641	-100.734391	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-204-S308JO003	S308JO003	506.8	-	MABO	Bad	0.0138	0.0000	43.973181	-100.723224	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-205-W308JO002	W308JO002	507.4	35	PEM	Bad	0.0660	0.0000	43.970551	-100.713124	Non-Section 10; Wetland
NWO-2009-00305-PIE-206-S_UTM14_14167	S_UTM14_14167	509.1	35	EPH	Bad	0.1398	0.0000	43.960372	-100.683225	Non-Section 10; Non-Wetland

Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-207-S275JO001	S275JO001	509.9	9	INT	Bad	0.0483	0.0000	43.957136	-100.667770	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-208-S_UTM14_14173	S_UTM14_14173	510.0	26	EPH	Bad	0.0746	0.0000	43.956419	-100.664960	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-209-S_UTM14_14177	S_UTM14_14177	511.2	57	EPH	Bad	0.3043	0.0000	43.949157	-100.643222	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-210-S_UTM14_06540	S_UTM14_06540	518.9	49	EPH	Lower White	0.1086	0.0000	43.888057	-100.524356	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-211-S_UTM14_06540	S_UTM14_06540	519.0	55	EPH	Lower White	0.0953	0.0000	43.887868	-100.523886	
NWO-2009-00305-PIE-212-S_UTM14_06534	S_UTM14_06534	519.6	32	INT	Lower White	0.1629	0.0000	43.883871	-100.513494	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-213-W_UTM14_06521	W_UTM14_06521	521.7	103	PEM	Medicine	0.1832	0.0000	43.868285	-100.475489	Non-Section 10; Wetland
NWO-2009-00305-PIE-214-S_UTM14_08534	S_UTM14_08534	521.7	21	INT	Medicine	0.0340	0.0000	43.868187	-100.475297	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-215-W_UTM14_06521	W_UTM14_06521	521.8	97	PEM	Medicine	0.1556	0.0000	43.868100	-100.475128	Non-Section 10; Wetland

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-216-S_UTM14_06515	S_UTM14_06515	523.7	14	INT	Lower White	0.0413	0.0000	43.855275	-100.440377	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-217-S_UTM14_06510	S_UTM14_06510	524.9	52	EPH	Lower White	0.1286	0.0000	43.847109	-100.420088	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-218-S_UTM14_06503	S_UTM14_06503	526.6	85	INT	Lower White	0.1652	0.0000	43.834992	-100.390105	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-219-S6ALY002	S6ALY002	534.4	15	INT	Lower White	0.0339	0.0000	43.781055	-100.253818	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-220-S567LY002	S567LY002	534.6	-	EPH	Lower White	0.0060	0.0000	43.780846	-100.250926	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-221-exp-WB-0259	exp-WB-0259	534.6	18	EPH	Lower White	0.0391	0.0000	43.780688	-100.250921	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-222-S_UTM14_06408	S_UTM14_06408	535.2	43	INT	Lower White	0.1288	0.0000	43.775080	-100.241356	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-223-S_UTM14_06399	S_UTM14_06399	537.5	70	INT	Lower White	0.1874	0.0000	43.750679	-100.210768	Non-Section 10; Non-Wetland

Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-224-S567LY003	S567LY003	540.3	9	EPH	Lower White	0.0188	0.0000	43.715959	-100.181384	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-225-S567LY004	S567LY004	540.6	11	EPH	Lower White	0.0311	0.0000	43.713841	-100.177918	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-226-S567LY005	S567LY005	540.8	7	EPH	Lower White	0.0135	0.0000	43.711749	-100.174659	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-227-exp-WB-0260	exp-WB-0260	540.8	-	EPH	Lower White	0.0052	0.0000	43.711613	-100.174780	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-228-S7ALY001	S7ALY001	541.3	488	PER	Lower White	0.5575[6]	0.0000	43.705592	-100.170194	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-229-W_UTM14_08449	W_UTM14_08449	541.4	137	PSS	Lower White	0.1568[6]	0.0000	43.704739	-100.170128	Non-Section 10; Wetland
NWO-2009-00305-PIE-230-S567TR001	S567TR001	543.3	-	EPH	Lower White	0.0056	0.0000	43.679904	-100.159954	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-231-S106TR002	S106TR002	543.3	1	EPH	Lower White	0.0018	0.0000	43.679255	-100.159226	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-232-S567TR002	S567TR002	543.5	96	PER	Lower White	0.2280	0.0000	43.676721	-100.156521	

Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-233-S567TR003	S567TR003	543.7	8	EPH	Lower White	0.0235	0.0000	43.674863	-100.154678	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-234-S_UTM14_06291	S_UTM14_06291	546.6	33	EPH	Lower White	0.0785	0.0000	43.639251	-100.126057	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-235-S_UTM14_06292	S_UTM14_06292	546.8	31	INT	Lower White	0.0616	0.0000	43.636691	-100.124176	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-236-S7ATR002	S7ATR002	547.3	34	INT	Lower White	0.1166	0.0000	43.629180	-100.120626	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-237-S_UTM14_06248	S_UTM14_06248	550.2	35	EPH	Lower White	0.0912	0.0000	43.595505	-100.087909	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-238-S_UTM14_08552	S_UTM14_08552	552.4	58	EPH	Lower White	0.2085	0.0000	43.567452	-100.072416	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-239-S_UTM14_08552	S_UTM14_08552	552.5	63	EPH	Lower White	0.1292	0.0000	43.565413	-100.070862	
NWO-2009-00305-PIE-240-W_UTM14_06217	W_UTM14_06217	553.9	99	PEM	Lower White	0.1665	0.0000	43.547994	-100.057717	Non-Section 10; Wetland
NWO-2009-00305-PIE-241-S_UTM14_08559	S_UTM14_08559	553.9	29	INT	Lower White	0.0468	0.0000	43.547843	-100.057595	Non-Section 10; Non-Wetland

Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-242-W_UTM14_06217	W_UTM14_06217	553.9	85	PEM	Lower White	0.1538	0.0000	43.547706	-100.057510	Non-Section 10; Wetland
NWO-2009-00305-PIE-243-S_UTM14_06212	S_UTM14_06212	555.7	27	INT	Lower White	0.0661	0.0000	43.525816	-100.040053	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-244-S_UTM14_06206	S_UTM14_06206	555.9	35	EPH	Lower White	0.1329	0.0000	43.523323	-100.038944	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-245-W_UTM14_06201	W_UTM14_06201	557.6	339	PEM	Lower White	0.6110	0.0000	43.501758	-100.024920	Non-Section 10; Wetland
NWO-2009-00305-PIE-246-S_UTM14_08586	S_UTM14_08586	557.6	34	INT	Lower White	0.0561	0.0000	43.501308	-100.024543	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-247-S_UTM14_06175	S_UTM14_06175	561.8	21	EPH	Lower White	0.0526	0.0000	43.450515	-99.981197	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-248-S_UTM14_06175	S_UTM14_06175	561.8	-	EPH	Lower White	0.0012	0.0000	43.449710	-99.980539	
NWO-2009-00305-PIE-249-S_UTM14_14369	S_UTM14_14369	564.6	20	INT	Lower White	0.0735	0.0000	43.415499	-99.952094	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-250-S_UTM14_06163	S_UTM14_06163	565.1	41	EPH	Lower White	0.0949	0.0000	43.411114	-99.947148	Non-Section 10; Non-Wetland

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-251-S7ATR004	S7ATR004	570.2	15	INT	Lower White	0.0343	0.0000	43.351318	-99.888969	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-252-S7ATR003	S7ATR003	570.6	15	INT	Lower White	0.0386	0.0000	43.345993	-99.883603	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-253-W_UTM14_08509	W_UTM14_08509	577.0	75	PEM	Lower White	0.1379	0.0000	43.271369	-99.812638	Non-Section 10; Wetland
NWO-2009-00305-PIE-254-S_UTM14_06121	S_UTM14_06121	577.0	26	INT	Lower White	0.0626	0.0000	43.271189	-99.812532	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-255-W_UTM14_08509	W_UTM14_08509	577.0	39	PEM	Lower White	0.1316	0.0000	43.271028	-99.812414	Non-Section 10; Wetland
NWO-2009-00305-PIE-256-W_UTM14_06114	W_UTM14_06114	577.8	107	PEM	Lower White	0.1786	0.0000	43.261572	-99.802687	Non-Section 10; Wetland
NWO-2009-00305-PIE-257-W_UTM14_06111	W_UTM14_06111	578.5	321	PEM	Lower White	0.4254	0.0000	43.253427	-99.796730	Non-Section 10; Wetland
NWO-2009-00305-PIE-258-W104TR001	W104TR001	579.2	233	PEM	Lower White	0.3498	0.0000	43.247368	-99.785753	Non-Section 10; Wetland

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-259-W_UTM14_06103	W_UTM14_06103	580.8	-	PEM	Ponca	1.1023E-05	0.0000	43.227545	-99.767835	Non-Section 10; Wetland
NWO-2009-00305-PIE-260-S5ATR002	S5ATR002	581.1	11	INT	Ponca	0.0281	0.0000	43.224254	-99.766275	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-261-S_UTM14_08574	S_UTM14_08574	584.5	26	EPH	Ponca	0.0658	0.0000	43.185001	-99.727421	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-262-S_UTM14_06042	S_UTM14_06042	585.4	18	EPH	Ponca	0.0444	0.0000	43.174404	-99.719123	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-263-S275TR001	S275TR001	595.4	6	INT	Keya Paha	0.0182	0.0000	43.061107	-99.602641	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-264-S_UTM14_05998	S_UTM14_05998	596.4	12	INT	Keya Paha	0.0313	0.0000	43.050902	-99.588576	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-265-S_UTM14_05994	S_UTM14_05994	597.1	21	EPH	Keya Paha	0.0759	0.0000	43.043316	-99.580941	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-266-S_UTM14_05990	S_UTM14_05990	597.5	-	EPH	Keya Paha	0.0004	0.0000	43.038604	-99.576612	Non-Section 10; Non-Wetland

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Waters Name	Feature ID	Milepost	Crossing Distance[1] (Feet)	Type[2]	HUC Sub Basin[3]	Temporary Disturbance[4] (Acres)	Permanent Disturbance[5] (Acres)	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-267-W275TR001	W275TR001	597.5	-	PEM	Keya Paha	0.0150	0.0000	43.038597	-99.576509	Non-Section 10; Wetland
NWO-2009-00305-PIE-268-S_UTM14_05990	S_UTM14_05990	597.5	24	EPH	Keya Paha	0.0400	0.0000	43.038617	-99.576301	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-269-S_UTM14_05988	S_UTM14_05988	597.7	39	EPH	Keya Paha	0.1135	0.0000	43.035623	-99.574127	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-270-S_UTM14_05977	S_UTM14_05977	598.6	35	EPH	Keya Paha	0.0784	0.0000	43.025079	-99.563088	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE-271-S5ATR005	S5ATR005	600.0	60	Seasonal	Keya Paha	0.1108	0.0000	43.008285	-99.548472	Non-Section 10; Non-Wetland

[1] Crossing distance measured at proposed pipeline centerline. A dash (-) indicates the feature is within the construction right-of-way, but does not cross the pipeline centerline.

[2] EPH = Ephemeral Waterbody; INT = Intermittent Waterbody; MABO = Man-made Waterbody, PEM = Palustrine Emergent Marsh; PER = Perennial Waterbody; PSS = Palustrine Scrub Shrub Wetland; Seasonal = Seasonal Waterbody

[3] HUC Sub Basin = Name of 8-Digit USGS Hydrologic Unit Code.

[4] Temporary wetland impacts based on standard 110-foot wide temporary construction right-of-way.

[5] Permanent impacts is based on standard 50-ft wide maintained pipeline easement.

[6] Temporary impact is based on a 50-foot wide temporary construction right-of-way

Waters Name	FEATURE ID	ACCESS ROAD ID	TYPE[1]	CROSSING LENGTH (Feet)[3]	ACRES[2]	HUC SUB BASIN[4]	LATITUDE (WGS84)	LONGITUDE (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-272-S500HA012	S500HA012	CAR-163	INT	59	0.1450[5]	Upper Little Missouri	45.863566	-103.970169	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-273-S128HA002	S128HA002	CAR-163	INT	-	0.0019	Upper Little Missouri	45.863613	-103.989520	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-274-W109HA001	W109HA001	CAR-163	PEM	-	0.0011	Missouri-Little Missouri	45.863519	-103.987676	Non-Section 10; Wetland
NWO-2009-00305-PIE-275-W109HA001	W109HA001	CAR-163	PEM	46	0.0588	Missouri-Little Missouri	45.863552	-103.989438	Non-Section 10; Wetland
NWO-2009-00305-PIE-276-S109HA003	S109HA003	CAR-151	EPH	6	0.0043	Upper Little Missouri	45.833982	-103.933640	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-277-S109HA002	S109HA002	CAR-150	PER	53	0.0324	Upper Little Missouri	45.833189	-103.929441	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-278-S104HA004	S104HA004	CAR-041	INT	29	0.0203	Upper Little Missouri	45.801513	-103.872007	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-279-W302HA001	W302HA001	CAR-041	PEM	57	0.0387	Missouri-Little Missouri	45.801494	-103.871820	Non-Section 10; Wetland
NWO-2009-00305-PIE-280-S123HA004	S123HA004	CAR-173	PER	16	0.0109	South Fork Grand	45.733219	-103.611064	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-281-exp-WB-13021	exp-WB-13021	CAR-173	INT	-	0.0021	South Fork Grand	45.733544	-103.674780	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-282-exp-WB-13021	exp-WB-13021	CAR-173	INT	-	0.0011	South Fork Grand	45.733536	-103.674499	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-283-W302HA006	W302HA006	CAR-230	PEM	1	0.0082	Missouri-Oahe	45.630783	-103.640971	Non-Section 10; Wetland
NWO-2009-00305-PIE-284-S124HA009	S124HA009	CAR-231	PER	68	0.0468	South Fork Grand	45.532327	-103.422470	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-285-exp-WB-13031	exp-WB-13031	CAR-231	INT	-	0.0044	South Fork Grand	45.521617	-103.420687	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-286-exp-WL-13008	exp-WL-13008	CAR-231	PEM	-	0.0034	Missouri-Oahe	45.548246	-103.422604	Non-Section 10; Wetland
NWO-2009-00305-PIE-287-S302HA003	S302HA003	CAR-232	EPH	8	0.0053	South Fork Grand	45.414600	-103.278739	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-288-exp-WB-13034	exp-WB-13034	CAR-232	PER	16	0.0250	Upper Moreau	45.357577	-103.265116	Non-Section 10; Non- Wetland

Waters Name	FEATURE ID	ACCESS ROAD ID	TYPE[1]	CROSSING LENGTH (Feet)[3]	ACRES[2]	HUC SUB BASIN[4]	LATITUDE (WGS84)	LONGITUDE (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-289-S302HA005	S302HA005	CAR-232	INT	-	0.0001	South Fork Grand	45.408737	-103.278780	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-290-exp-WB-13032	exp-WB-13032	CAR-232	PER	-	0.0020	Upper Moreau	45.357973	-103.258790	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-291-S302HA006	S302HA006	CAR-233	EPH	3	0.0022	Upper Moreau	45.341538	-103.175692	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-292-S302HA007	S302HA007	CAR-233	EPH	6	0.0039	Upper Moreau	45.339395	-103.176870	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-293-S302HA008	S302HA008	CAR-233	EPH	5	0.0033	Upper Moreau	45.341095	-103.196669	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-294-W302HA004	W302HA004	CAR-233	PEM	-	0.0027	Missouri-Oahe	45.340889	-103.173139	Non-Section 10; Wetland
NWO-2009-00305-PIE-295-W302HA005	W302HA005	CAR-233	PEM	217	0.1474	Missouri-Oahe	45.329672	-103.218494	Non-Section 10; Wetland
NWO-2009-00305-PIE-296-S_UTM13_09978	S_UTM13_09978	CAR-048A	EPH	16	0.0109	South Fork Moreau	45.089347	-102.845819	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-297-S_UTM13_09963	S_UTM13_09963	CAR-048A	EPH	-	0.0027	South Fork Moreau	45.082407	-102.887286	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-298-S_UTM13_09972	S_UTM13_09972	CAR-048A	EPH	-	0.0007	South Fork Moreau	45.082578	-102.870217	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-299-exp-WB-13512	exp-WB-13512	CAR-048A	EPH	-	0.0044	South Fork Moreau	45.082650	-102.870210	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-300-S_UTM13_09965	S_UTM13_09965	CAR-048A	EPH	-	0.0036	South Fork Moreau	45.082697	-102.882398	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-301-S275ME004	S275ME004	CAR-159	Seasonal	21	0.0142	Cherry	44.954764	-102.636904	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-302-W275ME005	W275ME005	CAR-159	PEM	-	0.0006	Cheyenne	44.964377	-102.651781	Non-Section 10; Wetland
NWO-2009-00305-PIE-303-W275ME003	W275ME003	CAR-159	PEM	-	0.0053	Cheyenne	44.960544	-102.646835	Non-Section 10; Wetland
NWO-2009-00305-PIE-304-W275ME002	W275ME002	CAR-159	PEM	-	0.0002	Cheyenne	44.954348	-102.631473	Non-Section 10; Wetland
NWO-2009-00305-PIE-305-S308ME001	S308ME001	CAR-167	EPH	6	0.0040	Cherry	44.748819	-102.372631	Non-Section 10; Non- Wetland

Waters Name	FEATURE ID	ACCESS ROAD ID	TYPE[1]	CROSSING LENGTH (Feet)[3]	ACRES[2]	HUC SUB BASIN[4]	LATITUDE (WGS84)	LONGITUDE (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE-306-S307PN001	S307PN001	CAR-079A	PER	24	0.0168	Lower Cheyenne	44.501582	-102.002064	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-307-S307HK001	S307HK001	CAR-313	EPH	21	0.0142	Lower Cheyenne	44.472832	-101.950235	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-308-W275HK001	W275HK001	CAR-052A	PEM	-	0.0100	Missouri-White	44.119735	-101.247845	Non-Section 10; Wetland
NWO-2009-00305-PIE-309-S308HK003	S308HK003	CAR-235	EPH	8	0.0047	Bad	44.067309	-101.120593	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-310-S308HK003	S308HK003	CAR-235	EPH	-	0.0029	Bad	44.065178	-101.117677	Non-Section 10; Non- Wetland
NWO-2009-00305-PIE-311-S106TR001	S106TR001	CAR-236	INT	22	0.0161	Lower White	43.675418	-100.152315	Non-Section 10; Non- Wetland

[1] EPH = Ephemeral Waterbody; INT = Intermittent Waterbody; PEM = Palustrine Emergent Marsh; PER = Perennial Waterbody; Seasonal = Seasonal Waterbody.
[2] Crossing distance measured at proposed access road centerline. A dash (-) indicates the feature is within the construction right-of-way, but does not cross the access road centerline.
[3] Feature acreage based on assumed width of 30 feet for access roads.
[4] HUC Sub Basin = Name of 8-Digit USGS Hydrologic Unit Code.
[5] Permanent impacts at this crossing will be kept under 0.10 of an acre through engineering controls.

Waters Name	Facility ID	Feature ID	FACILITY NAME	Type[1]	Approximate Length Of Feature[2] (Feet)	Feature Acreage[3]	HUC Sub Basin[4]	Latitude (WGS84)	Longitude (WGS84)	Class Of Aquatic Resource
NWO-2009-00305-PIE Site 312	Harrold_14	S275HU003	Harrold Rail Siding	MABO	344.27	0.5810[5]	Medicine Knoll	44.524382	-99.759279	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE Site 313	Harrold_14	S275HU002	Harrold Rail Siding	MABO	1717.24	8.5164[5]	Medicine Knoll	44.523895	-99.754061	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE Site 314	Harrold_14	S275HU002	Harrold Rail Siding	MABO	578.45	0.6299[5]	Medicine Knoll	44.524480	-99.754345	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE Site 315	Harrold_14	S275HU002	Harrold Rail Siding	MABO	569.22	0.5032[5]	Medicine Knoll	44.524502	-99.752195	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE Site 316	Harrold_14	S275HU001	Harrold Rail Siding	MABO	729.01	3.3945[5]	Medicine Knoll	44.523579	-99.749846	Non-Section 10; Non-Wetland
NWO-2009-00305-PIE Site 317	CC02a SITE 1	W312HA001	Harding Construction Camp	PEM	329.09	0.9967[5]	South Fork Grand	45.583052	-103.695499	Non-Section 10; Wetland

1 MABO = Man-made Waterbody; PEM = Palustrine Emergent Marsh.

2 Approximate length of feature (feet) measured across the feature at the widest possible linear distance within the proposed facility boundary.

3 Feature acreage within proposed facility boundary.

4 HUC Sub Basin = Name of 8-Digit USGS Hydrologic Unit Code.

5 The waterbodies within Hardold_14 and the wetland identified within CC02a Site 1 will be avoided by construction activities; therefore there will be no temporary or permanent impact to the waterbody or wetland

APPENDIX G

Construction, Mitigation, and Reclamation Plan

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KEYSTONE XL PROJECT

CONSTRUCTION, MITIGATION, AND RECLAMATION PLAN

April 2012
Rev. 4

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9.0 DRAWINGS AND FIGURES

Detail 1	Typical Silt Fence Barrier
Detail 2	Typical Straw or Hay Bale Barrier
Detail 3	Temporary/Permanent Slope Breaker Detail (Water Bars)
Detail 4	Erosion Control Matting Installation
Detail 5	Typical Dewatering Filter Bag
Detail 6	Typical Straw Bale Dewatering Structure
Detail 7	Typical Permanent Trench Breaker
Detail 8	”Dry” Wetland Crossing Method
Detail 9	Standard Wetland Crossing Method
Detail 10	Push/Pull Wetland Crossing Method
Detail 11	Typical Open Cut Wet Crossing Method Non-Flowing Waterbody
Detail 12	Typical Open Cut Wet Crossing Method Flowing Waterbody
Detail 13	Typical Dry Flume Crossing Method
Detail 13a	Typical Dry Flume Crossing Method (Procedures)
Detail 14	Typical Dam and Pump Crossing
Detail 14a	Typical Dam and Pump Crossing (Procedures)
Detail 15	Typical Horizontal Drill (HDD) Site Plan & Profile
Detail 16	Typical Temporary Bridge Crossing
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Deail 22	(Omitted)
Detail 23	Streambank Reclamation – Log Wall
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Detail 25	Typical ROW Layout/Soil Handling 110’ Construction ROW 50’ Easement Drain Tile Crossing
Detail 26	Header/Main Crossovers of Pipeline
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Detail 28	Drainage and Irrigation Temporary Drain Tile Repair
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Detail 30	Equipment Cleaning Station Detail
Detail 31	Equipment Wash Station Detail
Detail 67/67A	Topsoil Conservation—Triple Ditch

1.0 INTRODUCTION

The construction, mitigation, and reclamation requirements described in this Plan apply to work on all of TransCanada Keystone Pipeline, L.P.'s (Keystone's) Keystone XL Project (Project) lands, including the following;

- uplands, including agricultural (cultivated or capable of being cultivated) lands, pasture lands; range lands; grass lands; forested lands; lands in residential, commercial, or industrial areas; lands in public rights of way; and lands in private rights-of-way;
- wetlands; and
- waterbodies and riparian areas.

Keystone, during the construction, operation, and maintenance of the Project, shall implement the construction, mitigation, and reclamation actions contained in this Plan to the extent that they do not conflict with the requirements of any applicable federal, state, or local rules and regulations, or other permits or approvals that are applicable to the Project. Additionally, Keystone may deviate from specific requirements of this Plan on specific private lands as agreed to by landowners or as required to suit actual site conditions as determined and directed by Keystone. All work must be in compliance with federal, state, and local permits.

The Project will be designed, constructed, operated and maintained in a manner that meets or exceeds applicable industry standards and regulatory requirements. Keystone's Integrity Management Plan and Emergency Response Plan outlines the preventative maintenance, inspection, line patrol, leak detection systems, SCADA, and other pipeline integrity management procedures to be implemented during operation of the Project.

2.0 GENERAL CONDITIONS

2.1 Training

Experienced, well-trained personnel are essential for the successful implementation of this Plan. Keystone and its Contractors shall undergo prevention and response, as well as safety training. The program shall be designed to improve awareness of safety requirements, pollution control laws and procedures, and proper operation and maintenance of equipment.

The construction contractor (Contractor), and all of his subcontractors shall ensure that persons engaged in Project construction are informed of the construction issues and concerns and that they attend and receive training regarding these requirements as well as all laws, rules and regulations applicable to the work. Prior to construction, all Project personnel will be trained on environmental permit requirements and environmental specifications, including fuel handling and storage, cultural resource protection methods, stream and wetland crossing requirements, and sensitive species protection measures.

Different levels of training shall be required for different groups of Contractor personnel. Contractor supervisors, managers, field foremen, and other Contractor personnel designated by Keystone shall attend a comprehensive environmental training session. All other Contractor personnel shall attend a training session before the beginning of construction and during construction as environmental issues and incidents warrant. Additional training sessions shall be held for newly assigned personnel prior to commencing work on the Project.

All Contractor personnel shall attend the training session prior to entering the construction right-of-way. All Contractor personnel shall sign an acknowledgement of having attended the appropriate level of training and shall display a hard hat sticker that signifies attendance at environmental training. In order to ensure successful compliance, Contractor personnel shall attend repeat or supplemental training if compliance is not satisfactory or as new, significant new issues arise.

All visitors and any other personnel without specific work assignments shall be required to attend a safety and environmental awareness orientation.

2.2 Environmental Inspection

Keystone will use Environmental Inspectors on each construction spread. The Environmental Inspectors will review the Project activities daily for compliance with state, federal and local regulatory requirements. The Environmental Inspectors will have the authority to stop specific tasks as approved by the Chief Inspector. They can also order corrective action in the event that construction activities violate the provisions of this Plan, landowner requirements, or any applicable permit requirements.

2.3 Advance Notice of Access to Property Prior to Construction

Prior to initially accessing landowners' property, Keystone shall provide the landowner or tenant with a minimum of 24 hours prior notice unless otherwise negotiated with the landowner and as described in the Project line list). Additionally, the landowner or tenant shall be provided with Keystone contact information. Landowners may utilize contact information to inform Keystone of any concerns related to construction.

Prior notice shall consist of a personal contact, a telephone contact, or delivery of written notice to the landowner to inform the landowner of whereby the landowner or tenant is informed of Keystone's intent to initially access the land. The landowner or tenant need not acknowledge receipt of written notice before Keystone can enter the landowner's property.

Keystone will coordinate with managers of public lands to reduce conflicts between construction activities and recreational uses. Keystone will consult with land managers on state and federal lands regarding any necessary construction and maintenance restrictions consistent with management and use of such lands. Damages from disruption of recreational uses of private lands will be the subject of compensation negotiations with individual landowners.

If pipeline activities occur during the winter season Keystone will consult with the appropriate regulatory agencies to establish the appropriate protective measures to avoid or mitigate wildlife seasonal, timing or migration concerns.

2.4 Other Notifications

The Contractor shall notify, in writing, both Keystone and the authority having jurisdiction over any road, railroad, canal, drainage ditch, river, foreign pipeline, or other utility to be crossed by the pipeline at least 48 hours (excluding Saturdays, Sundays, and statutory holidays), or as specified on the applicable permit(s), prior to commencement of pipeline construction, in order that the said authority may appoint an inspector to ensure that the crossing is constructed in a satisfactory manner.

The Contractor shall notify Keystone immediately of any spill of a potentially hazardous substance that creates a sheen on a wetland or waterbody, as well as any existing soil contamination discovered during construction.

The Contractor shall immediately notify Keystone of the discovery of previously unreported historic property, other significant cultural materials, or suspected human remains uncovered during pipeline construction.

The Contractor shall immediately notify Keystone of a Project-related injury to or mortality of a threatened or endangered animal.

2.5 Damages to Private Property

Pipeline construction activities shall be confined to the construction right-of-way, temporary work space, additional temporary work space, and approved access routes.

Keystone shall reasonably compensate landowners for any construction-related damages caused by Keystone which occur on or off of the established pipeline construction right-of-way.

Keystone shall reasonably compensate landowners for damages to private property caused by Keystone beyond the initial construction and reclamation of the pipeline, to include those damages caused by Keystone during future construction, operation, maintenance, and repairs relating to the pipeline.

2.6 Appearance of Worksite

The construction right-of-way shall be maintained in a clean, neat condition at all times. At no time shall litter be allowed to accumulate at any location on the construction right-of-way. The Contractor shall provide a daily garbage detail with each major construction crew to keep the construction right-of-way clear of trash, pipe banding and spacers, waste from coating products, welding rods, timber skids, defective materials and all construction and other debris immediately behind construction operations unless otherwise approved by Keystone. Paper from wrapping or coating products or lightweight items shall not be permitted to be scattered by the wind.

The traveled surfaces of roads, streets, highways, etc. (and railroads when applicable) shall be cleaned free of mud, dirt, or any debris deposited by equipment traversing these roads or exiting from the construction right-of-way.

2.7 Access

Prior to the pipeline's installation, Keystone and the landowner shall reach a mutually acceptable agreement on the route that shall be utilized by the Contractor for entering and exiting the pipeline construction right-of-way should access to the construction right-of-way not be practicable or feasible from adjacent segments of the pipeline construction right-of-way, public road, or railroad right-of-way.

All construction vehicles and equipment traffic shall be confined to the public roads, private roads acquired for use by Keystone, and the construction right-of-way. If temporary private access roads are constructed, they shall be designed to maintain proper drainage and shall be built to minimize soil erosion.

Sufficiently sized gaps shall be left in all spoil and topsoil wind rows and a hard or soft plug shall be left in the trench at all temporary private access roads and obvious livestock or wildlife trails unless the landowner agrees prior to construction that these access points can be blocked during construction.

All construction-related private roads and access points to the right-of-way shall be marked with signs. Any private roads not to be utilized during construction shall also be marked.

2.8 Aboveground Facilities

Locations for aboveground facilities shall be selected in a manner so as to be as unobtrusive as reasonably possible to ongoing agricultural or other landowner activities occurring on the lands adjacent to the facilities. If it is not feasible, to avoid interference, such activities shall be located so as to incur the least hindrance to the adjacent agricultural operations (i.e., located in field corners or areas where at least one side is not used for cropping purposes) provided the location is consistent with the design constraints of the pipeline. Aboveground facilities shall avoid floodplains and wetlands to the maximum extent possible. Additionally, they shall be located to avoid existing drain tile systems to the extent possible. To further reduce visual impacts from aboveground pipeline facilities and structures, Keystone will comply with standard industry painting practices with respect to aboveground facilities. Keystone will address any visual aesthetics issues with landowners in individual consultations.

2.9 Minimum Depth of Cover

The pipeline shall be installed so that the top of the pipe and coating is a minimum depth of 5 feet below the bottom of waterbodies including rivers, creeks, streams, ditches, and drains. This depth shall normally be maintained

over a distance of 15 feet on each side of the waterbody measured from the top of the defined stream channel. If concrete weights or concrete coated pipe is utilized for negative buoyancy of the pipeline, the minimum depth of cover shall be measured from the top of the concrete to the original ground contour. The following table indicates standard depths that would apply to pipeline construction.

Location	Normal Excavation (inches)	For Rock Excavation (inches
Most areas	48	36
All waterbodies	60	36
Dry creeks, ditches, drains, washes, gullies, etc.	60	36
Drainage ditches at public roads and railroads	60	48

Depth of cover requirements may be modified by Keystone based on site-specific conditions. However, all depths shall be in compliance with all established codes.

2.10 Non-Hazardous Waste Disposal

Non-hazardous pipeline construction wastes include human waste, trash, pipe banding and spacers, waste from coating products, welding rods, timber skids, cleared vegetation, stumps, and rock.

All waste which contains (or at any time contained) oil, grease, solvents, or other petroleum products falls within the scope of the oil and hazardous substances control, cleanup, and disposal procedures. This material shall be segregated for handling and disposal as hazardous wastes.

The Contractor shall be responsible for ensuring that human wastes are handled and disposed of exclusively by means of portable, self-contained toilets during all construction operations. Wastes from these units shall be collected by a licensed contractor for disposal only at licensed and approved facilities.

The Contractor shall remove all trash from the construction right-of-way on a daily basis unless otherwise approved or directed by Keystone.

The Contractor shall dispose of HDD drill cuttings and drilling mud at a Keystone-approved location. Disposal options may include spreading over the construction right-of-way in an upland location approved by Keystone, or hauling to an approved licensed landfill or other site approved by Keystone.

The Contractor shall remove all extraneous vegetative, rock, and other natural debris from the construction right-of-way by the completion of cleanup

The Contractor shall remove all trash and wastes from Contractor yards, and Pipe Stockpipe Sites, and staging areas when work is completed at each location.

The Contractor shall dispose of all waste materials at licensed waste disposal facilities. Wastes shall not be disposed of in any other fashion such as un-permitted burying or burning.

2.11 Hazardous Wastes

The Contractor shall ensure that all hazardous and potentially hazardous materials are transported, stored, and handled in accordance with all applicable legislation. Workers exposed to or required to handle dangerous materials shall be trained in accordance with the applicable regulator and the manufacturer's recommendations.

The Contractor shall dispose of all hazardous materials at licensed waste disposal facilities. Hazardous wastes shall not be disposed of in any other fashion such as un-permitted burying or burning.

All transporters of oil, hazardous substances, and hazardous wastes shall be licensed and certified according to the applicable state vehicle code. Incidents on public highways shall be reported to the appropriate agencies.

All hazardous wastes being transported off-site shall be manifested. The manifest shall conform to requirements of the appropriate state agency. The transporter shall be licensed and certified to handle hazardous wastes on the public highways. The vehicles as well as the drivers must conform to all applicable vehicle codes for transporting hazardous wastes. The manifest shall conform to 49 CFR Parts 172.101, 172.202, and 172.203.

If toxic or hazardous waste materials or containers are encountered during construction, the Contractor shall stop work immediately to prevent disturbing or further disturbing the waste material and shall immediately notify Keystone. The Contractor shall not restart work until clearance is granted by Keystone.

2.12 Noise Control

The Contractor shall minimize noise during non-daylight hours and within 1 mile of residences or other noise-sensitive areas such as hospitals, motels or campgrounds. Keystone shall abide by all applicable noise regulations regarding noise near residential and commercial/industrial areas. The Contractor shall provide notice to Keystone if noise levels are expected to exceed bylaws for a short duration. Keystone will give advanced notice to landowners within 500 feet of right-of-way prior to construction, limit the hours during which construction activities with high-decibel noise levels are conducted, coordinate work schedules, and ensure that construction proceeds quickly through such areas. The Contractor shall minimize noise in the immediate vicinity of herds of livestock or poultry operations, which are particularly sensitive to noise.

Keystone will set up a toll-free telephone line for landowners to report any construction noise-related issues.

2.13 Weed Control

Keystone will prepare a weed management plan for each state crossed by the project, as required. In general, these plans will consider the following measures listed below.

Prior to mobilization for the Project, the Contractor shall thoroughly clean all construction equipment, including timber mats, prior to moving the equipment to the job site to limit the potential for the spread of noxious weeds, insects and soil-borne pests. The Contractor shall clean the equipment with high-pressure washing equipment.

Prior to construction, Keystone will mark all areas of the right-of-way which contain infestations of noxious, invasive species or soil-borne pests. Such marking will clearly indicate the limits of the infestation along the right-of-way. During construction, the Contractor shall clean the tracks, tires, and blades of equipment by hand (track shovel) or compressed air to remove excess soil prior to movement of equipment out of weed or soil-borne pest infested areas, or utilize cleaning stations to remove vegetative materials using water under high pressure (see detail Drawings 30 and 31).

In areas of isolated weed populations, the Contractor shall strip topsoil from the full width of the construction right-of-way and store the topsoil separately from other topsoil and subsoil. The Environmental Inspectors will identify these locations in the field prior to grading activities.

The Contractor shall use mulch and straw or hay bales that are free of noxious weeds for temporary erosion and sediment control.

The Contractor shall implement pre-construction treatments such as mowing prior to seed development or herbicide application to areas of noxious weed infestation prior to other clearing, grading, trenching, or other soil disturbing work at locations identified in the construction drawings.

Keystone will implement Best Management Practices (BMPs) for conducting vegetation control where necessary before and after construction. Typical agricultural herbicides, developed in consultation with county or state regulatory agencies, will be used. Herbicide types will be determined based on the weed species requiring control. The Contractor shall apply herbicides, where required, within one week, or as deemed necessary for optimum mortality success, prior to disturbing the area by clearing, grading, trenching, or other soil disturbing work. Herbicides shall be applied by applicators appropriately licensed or certified by the state in which the work is conducted. All herbicides applied prior to construction shall be non-residual or shall have a significant residual effect no longer than 30 days. Herbicides applied during construction shall be non-residual. Keystone will implement BMPs in the use of pesticides and herbicides along the pipeline corridor to reduce potential impacts to avian and wildlife species.

The Contractor shall not use herbicides in or within 100 feet of a wetland or waterbody.

After pipeline construction, on any construction right-of-way over which Keystone will retain control over the surface use of the land after construction (i.e., valve sites, metering stations, pump stations, etc.), Keystone shall provide for weed control to limit the potential for the spread of weeds onto adjacent lands used for agricultural purposes. Any weed control spraying performed by Keystone shall be done by a state-licensed pesticide applicator.

Keystone shall be responsible for reimbursing all reasonable costs incurred by owners of land adjacent to aboveground facilities when the landowners must control weeds on their land which can be reasonably determined to have spread from land occupied by Keystone's aboveground facilities.

2.14 Dust Control

The Contractor shall at all-time control airborne dust levels during construction activities to levels acceptable to Keystone. The Contractor shall employ water trucks, sprinklers or calcium chloride as necessary to reduce dust to acceptable levels. Utilization of calcium chloride is limited to roads.

Dust shall be strictly controlled where the work approaches dwellings, farm buildings, and other areas occupied by people and when the pipeline parallels an existing road or highway. This shall also apply to access roads where dust raised by construction vehicles may irritate or inconvenience local residents. The speed of all Contractor vehicles shall be controlled in these areas. Emissions from construction equipment combustion, open burning, and temporary fuel transfer systems and associated tanks will be controlled to the extent required by state and local agencies through the permit process.

The Contractor shall take appropriate precautions to prevent fugitive emissions caused by sand blasting from reaching any residence or public building. The Contractor shall place curtains of suitable material, as necessary, to prevent wind-blown particles from sand blasting operations from reaching any residence or public building.

Additional measures may be required by state regulations or local ordinances. The Contractor will comply with all applicable state regulations and local ordinances with respect to truck transportation and fugitive dust emissions.

2.15 Off Road Vehicle Control

Keystone shall offer to landowners or managers of forested lands to install and maintain measures to control unauthorized vehicle access to the construction right-of-way where appropriate. These measures may include the following unless otherwise approved or directed by Keystone based on site specific conditions or circumstances:

- signs;
- fences with locking gates;
- slash and timber barriers, pipe barriers, or boulders lined across the

construction right-of-way; and

- conifers or other appropriate trees or shrubs across the construction right-of-way.

2.16 Fire Prevention and Control

The Contractor shall comply with all federal, state, county and local fire regulations pertaining to burning permits and the prevention of uncontrolled fires. The following mitigative measures shall be implemented to prevent fire hazards and control of fires:

- A list of relevant fire authorities and their designated representative to contact shall be maintained on site by construction personnel.
- Adequate firefighting equipment shall be available on site in accordance with the applicable regulatory requirements shall be available on site.
- The level of forest fire hazard shall be posted at the construction office (where visible for workers) and workers shall be made aware of the hazard level and related implications.
- The Contractor shall provide equipment to handle any possible fire emergency. This shall include, although not be limited to, water trucks; portable water pumps; chemical fire extinguishers; hand tools such as shovels, axes, and chain saws; and heavy equipment adequate for the construction of fire breaks when needed.
- Specifically, the Contractor shall supply and maintain in working order an adequate supply of fire extinguishers for each crew engaged in potentially combustible work such as welding, cutting, grinding, and burning of brush or vegetative debris.
- In the event of a fire, the Contractor shall immediately use resources necessary to contain the fire. The Contractor shall then notify local emergency response personnel.
- All tree clearing activities are to be carried out in accordance with local rules and regulations for the prevention of forest fires.
- Burning shall be done in compliance with state, county, or local applicable regulations.
- Any burning will be done within the right-of-way. Only small piles shall be burned to avoid overheating or damage to trees or other structures along the right-of-way.
- Flammable wastes shall be removed from the construction site on a regular basis.
- Flammable materials kept on the construction site must be stored in approved containers away from ignition sources.
- Smoking shall be prohibited around flammable materials.
- Smoking shall be prohibited on the entire construction site when the fire hazard is high.

2.17 Road and Railroad Crossings

Construction across paved roads, highways, and railroads will be in accordance with the requirements of the road and railroad crossing permits and approvals obtained by Keystone. In general, all major paved roads, all primary gravel roads, highways, and railroads will be crossed by boring beneath the road or railroad. Detail drawing 21 illustrates a typical bored road or railroad crossing. Boring requires the excavation of a pit on each side of the feature, the placement of boring equipment in the pit, and boring a hole under the road at least equal to the diameter of the pipe. For long crossings, sections can be welded onto the pipe string just before being pulled through the borehole. Boring will result in minimal or no disruption to traffic at road or railroad crossings. Each boring will be expected to take 1 to 2 days for most roads and railroads and up to 10 days for long crossings such as interstate or four-lane highways.

Most smaller, unpaved roads and driveways will be crossed using the open-cut method where permitted by local authorities or private owners. The open-cut method will require temporary closure of the road to traffic and establishment of detours. If no reasonable detour is feasible, at least one lane of traffic will be kept open, except during brief periods when it is essential to close the road to install the pipeline. Most open-cut road crossings can be finished and the road resurfaced in 1 or 2 days. Keystone will take measures, such as posting signs at open-cut road crossings, to ensure safety and minimize traffic disruptions.

2.18 Adverse Weather

The Contractor shall restrict certain construction activities and work in cultivated agricultural areas in excessively wet soil conditions to minimize rutting and soil compaction. In determining when or where construction activities should be restricted or suspended during wet conditions, the Contractor shall consider the following factors:

- the extent that rutting may cause mixing of topsoil with subsoil layers or damage to tile drains;
- excessive buildup of mud on tires and cleats;
- excessive ponding of water at the soil surface; and
- the potential for excessive soil compaction.

The Contractor shall implement mitigative measures as directed by Keystone in order to minimize rutting and soil compaction in excessively wet soil conditions which may include:

- restricting work to areas on the spread where conditions allow;
- using low ground weight, wide-track equipment, or other low impact construction techniques;
- limiting work to areas that have adequately drained soils or have a cover of vegetation ,such as sod, crops or crop residues, sufficient to prevent mixing of topsoil with subsoil layers or damage to drain tiles; and

- installing geotextile material or construction mats in problem areas.

"Stop work" authority will be designated to the chief inspector but will be implemented when recommended by the Environmental Inspector.

2.19 Cultural Resources

Keystone intends to avoid cultural resources to the extent practicable by rerouting the pipeline corridor and related appurtenances, avoiding construction activities on properties listed in or eligible for listing in the National Register of Historic Places (NRHP), as well as boring or using HDD through culturally sterile soils.

The Contractor shall implement the measures outlined in any unanticipated discovery plan or any Programmatic Agreement that is adopted to minimize disturbance to cultural sites and shall take immediate action as outlined in the Programmatic Agreement if any unanticipated cultural discovery is encountered during construction.

The preferred treatment of any historical property or culturally significant site is avoidance. Where required, Keystone will monitor the construction spread using a cultural resource monitor working under the direction of a professional who meets the standards of the *Secretary of the Interior's Historic Preservation Professional Qualification Standards* (48 FR 44716, September 29, 1983).

Prior to commencing construction, Keystone also will provide an appropriate level of training to all construction personnel so that the requirements of any unanticipated discovery plan or Programmatic Agreement are understood and unanticipated discoveries quickly identified.

In the event an unanticipated cultural discovery is made, the Contractor will immediately halt all construction activities within a 100-foot radius, including traffic; notify the Keystone Environmental Inspector; and implement interim measures to protect the discovery from looting or vandalism. The appropriate federal, state, local, or tribal authorities will be notified of discovery within 48 hours of the initial find. Construction will not proceed within the 100-foot radius of discovery site until all mitigation measures defined in the Programmatic Agreement are concluded and Keystone receives approval from the appropriate agencies that construction may resume. No work or activity within the 100-foot buffer area may take place until approvals are communicated at the spread level by the lead Environmental Inspector.

3.0 SPILL PREVENTION AND CONTAINMENT

Spill prevention and containment applies to the use and management of hazardous materials on the construction right-of-way and all ancillary areas during construction. This includes the refueling or servicing of all equipment with diesel fuel, gasoline, lubricating oils, grease, and hydraulic and other fluids during normal upland applications and special applications within 100 feet of perennial streams or wetlands.

Keystone will prepare a project-specific Spill Prevention Containment and Countermeasure (SPCC) Plan. The Contractor shall provide additional information to complete the SPCC Plan for each construction spread, and shall provide site-specific data that meets the requirements of 40 CFR Part 112 for every location used for staging fuel or oil storage tanks and for every location used for bulk fuel or oil transfer. Each SPCC Plan will be prepared prior to introducing the subject fuel, oil, or hazardous material to the subject location.

3.1 Spill Prevention

3.1.1 Staging Areas

Staging areas (including Contractor yards and pipe stockpile sites) shall be set up for each construction spread. Bulk fuel and storage tanks will be placed only at Contractor yards. No bulk fuel and storage tanks will be placed in the construction ROW. Hazardous materials at staging areas shall be stored in compliance with federal and state laws. The following spill prevention measures shall be implemented by the Contractor:

- Contractor fuel trucks shall be loaded at existing bulk fuel dealerships or from bulk tanks set up for that purpose at the staging area. In the former case, the bulk dealer is responsible for preventing and controlling spills.
- The Environmental Inspector shall inspect the tank site for compliance with the 100-foot setback requirement and approve the tank site prior to installing bulk fuel or storage tanks on the construction yard.
- Fuels and lubricants shall be stored only at designated staging areas. Storage of fuel and lubricants in the staging area shall be at least 100 feet away from the water's edge. Refueling and lubrication of equipment shall be restricted to upland areas at least 100 feet away from streams and wetlands.
- Contractors shall be required to perform all routine equipment maintenance at the staging area and recover and dispose of wastes in an appropriate manner.
- Fixed fuel dispensing locations will be provided with secondary containment to capture fuel from leaks, drips, and overfills.
- Temporary liners, berms, or dikes (secondary containment) shall be constructed around the aboveground bulk tanks, providing 110 percent containment volume of the largest storage tank or trailer within the containment structure, so that potential spill materials shall be contained and collected in specified areas. Tanks shall not be placed in areas subject to periodic flooding or washout.
- Drivers of tank trucks are responsible for safety and spill prevention during tank truck unloading. Procedures for loading and unloading tank trucks shall meet the minimum requirements established by the Department of Transportation.

- Drivers of tank trucks are responsible for setting brakes and chocking wheels prior to off loading. Warning signs requiring drivers to set brakes and chock wheels shall be displayed at all tanks. Proper grounding of equipment shall be undertaken during fuel transfer operations. Drivers shall observe and control the fueling operations at all times to prevent overfilling the temporary tank.
- Prior to departure of any tank truck, all vehicle outlets shall be examined closely by the driver for leakage, tightened, adjusted or replaced to prevent leakage while in transit.
- A supply of sorbent and barrier materials sufficient to allow the rapid containment and recovery of spills shall be maintained at each construction staging area. Sorbent and barrier materials shall also be utilized to contain runoff from contaminated areas.
- Shovels and drums shall be kept at each of the individual staging areas. In the event that small quantities of soil become contaminated, shovels shall be utilized to collect the soil and the material shall be stored in 55-gallon drums. Large quantities of contaminated soil may be bio-remediated on site or disposed in an approved landfill, subject to government approval, or collected utilizing heavy equipment, and stored in drums or other suitable containers prior to disposal. Should contamination occur adjacent to staging areas as a result of runoff, shovels or heavy equipment shall be utilized to collect the contaminated material. Contaminated soil shall be disposed of in accordance with state and federal regulations.
- Temporary aboveground tanks shall be subject to visual inspection on a monthly basis and when the tank is refilled. Inspection records shall be maintained. Operators shall routinely keep tanks under close surveillance and potential leaks or spills shall be quickly detected.
- Visible fuel leaks shall be reported to the Contractors' designated representative and corrected as soon as conditions warrant. Keystone's designated representative shall be informed.
- Drain valves on temporary tanks shall be locked to prevent accidental or unauthorized discharges from the tank.
- Oil and other hazardous materials stored in 350-gallon totes, 55-gallon drums, 5-gallon pails, smaller retail-size containers or other portable containers will be staged or stored in areas with a secondary temporary containment structure. Secondary containment structures may consist of temporary earthen berms with a chemical resistant liner, or a portable containment system constructed of steel, PVC, or other suitable material. The secondary containment structure will be capable of containing 110 percent of the volume of material stored in these areas.

Keystone may allow modification of the above specifications as necessary to accommodate specific situations or procedures. Any modifications must comply with all applicable regulations and permits.

3.1.2 Construction Right-of-Way

The Contractor will ensure that all equipment is free of leaks prior to use on the Project and prior to entering or working in or near waterbodies or wetlands. Throughout construction, the Contractor will conduct regular maintenance and inspections of the equipment to reduce the potential for spills or leaks.

Rubber-tired vehicles (pickup trucks, buses) normally shall refuel at the construction staging areas or commercial gas stations. Tracked machinery (backhoes, bulldozers) shall be refueled and lubricated on the construction right-of-way. Equipment maintenance shall be conducted in staging areas when practical. When impractical, repairs to equipment can be made on the construction right-of-way when approved by Keystone's representative.

Each fuel truck that transports and dispenses fuel to construction equipment or Project vehicles along the construction ROW or within equipment staging and material areas shall carry an oil spill response kit and spill response equipment onboard at all times. In the event that response materials are depleted through use or their condition is deteriorated through age, the materials will be replenished prior to placing the fueling vehicle back into service.

The following preventive measures apply to refueling and lubricating activities on the construction right-of-way:

- Construction activities shall be conducted to allow for prompt and effective cleanup of spills of fuel and other hazardous materials. Each construction crew, including cleanup crews shall have on hand sufficient tools and material to stop leaks and supplies of absorbent and barrier materials to allow rapid containment and recovery of spilled materials. Crew members must know and follow the procedure for reporting spills.
- Refueling and lubricating of construction equipment shall be restricted to upland areas at least 100 feet away from streams and wetlands. Where this is not possible (e.g., trench dewatering pumps), the equipment shall be fueled by designated personnel with special training in refueling, spill containment, and cleanup. The Environmental Inspector shall ensure that signs are installed identifying restricted areas.
- No fuel, oil or hazardous material storage, staging, or transfer other than refueling will occur within 100 feet of any storm drain, drop inlet, or high consequence area (HCA).
- Spent oils, lubricants, filters, etc. shall be collected and disposed of at an approved location in accordance with state and federal regulations.
- Equipment shall not be washed in streams.
- Stationary equipment will be placed within a secondary containment if it will be operated or require refueling within 100 feet of a wetland or waterbody boundary.

Keystone may allow modification of the above specifications as necessary to accommodate specific situations or procedures. Any modifications must comply with all applicable regulations and permits.

3.2 Contingency Plans

The Contractor shall develop emergency response procedures for all incidents (e.g., spills, leaks, fires) involving hazardous materials which could pose a threat to human health or the environment. The procedures shall address activities in all work areas, as well as during transport to and from the construction right-of-way and to any disposal or recycling facility.

3.3 Equipment

The Contractor shall retain emergency response equipment in all areas where hazardous materials are handled or stored. This equipment shall be readily available to respond to a hazardous material emergency. Such equipment shall include, but not be limited to, the following:

- first aid supplies;
- phone or communications radio;
- protective clothing (Tyvek suit, gloves, goggles, boots);
- hand-held fire equipment;
- absorbent material and storage containers;
- non-sparking bung wrench and shovel; and
- brooms and dust pan.

Hazardous material emergency equipment shall be carried in all mechanic and supervisor vehicles. This equipment shall include, at a minimum:

- first aid supplies;
- phone or communications radio;
- 2 sets of protective clothing (Tyvek suit, gloves, goggles, boots);
- 1 non-sparking shovel;
- 6 plastic garbage bags (20 gallon);
- 10 absorbent socks and spill pads;
- Hand-held fire extinguisher;
- barrier tape; and
- 2 orange reflector cones.

Fuel and service trucks shall carry a minimum of 20 pounds of suitable commercial sorbent material.

The Contractor shall inspect emergency equipment weekly, and service and maintain equipment regularly. Records shall be kept of all inspections and services.

3.4 Emergency Notification

Emergency notification procedures between the Contractor and Keystone shall be established in the planning stages of construction. A Keystone representative shall be identified to serve as contact in the event of a spill during construction activities. In the event of a spill meeting government reporting criteria, the Contractor immediately shall notify the Keystone representative who, in turn, shall notify the appropriate regulatory agencies.

Any material released into water that creates a sheen must be reported immediately to Keystone. The Contractor is required to notify Keystone immediately if there is any spill of oil, oil products, or hazardous materials that reaches a wetland or waterbody. Incidents on public highways shall be reported to Keystone and the appropriate agencies by Keystone.

If a spill occurs on navigable waters of the United States, Keystone shall notify the National Response Center (NRC) at 1-800-424-8802. For spills that occur on public lands, into surface waters, or into sensitive areas, the appropriate governmental agency's district office also shall be notified.

3.5 Spill Containment and Countermeasures

In the event of a spill of hazardous material, Contractor personnel shall:

- notify the appointed Keystone representative;
- identify the product hazards related to the spilled material and implement appropriate safety procedures, based on the nature of the hazard;
- control danger to the public and personnel at the site;
- implement spill contingency plans and mobilize appropriate resources and manpower;
- isolate or shutdown the source of the spill;
- block manholes or culverts to limit spill travel;
- initiate containment procedures to limit the spill to as small an area as possible to prevent damage to property or areas of environment concern (e.g., watercourses); and
- commence recovery of the spill and cleanup operations.

When notified of a spill, the Keystone representative shall immediately ensure that:

- Action is taken to control danger to the public and personnel at the site.
- Spill contingency plans are implemented and necessary equipment and manpower are mobilized.

- Measures are taken to isolate or shutdown the source of the spill.
- All resources necessary to contain, recover and clean up the spill are available.
- Any resources requested by the Contractor from Keystone are provided.
- The appropriate agencies are notified. For spills which occur on public lands, into surface waters or into sensitive areas, the appropriate federal or state managing office shall also be notified and involved in the incident.

For a land spill, berms shall be constructed with available equipment to physically contain the spill. Personnel entry and travel on contaminated soils shall be minimized. Sorbent materials shall be applied or, if necessary, heavily contaminated soils shall be removed to an approved facility. Contaminated sorbent materials and vegetation shall also be disposed of at an approved facility.

For a spill threatening a waterbody, berms or trenches shall be constructed to contain the spill prior to entry into the waterbody. Deployment of booms, skimmers, and sorbent materials shall be necessary if the spill reaches the water. The spilled product shall be recovered and the contaminated area shall be cleaned up in consultation with spill response specialists and appropriate government agencies.

4.0 UPLANDS (AGRICULTURAL, FOREST, PASTURE, RANGE AND GRASS LANDS)

4.1 Interference with Irrigation Systems

If existing irrigation systems (flood irrigation, ditch irrigation, pivot, wheel, or other type of spray irrigation systems), irrigation ditches, or sheet flow irrigation shall be impacted by the construction of the pipeline, the following mitigative measures shall be implemented unless otherwise approved or directed by Keystone:

- If it is feasible and mutually acceptable to Keystone and the landowner or landowner's designate, temporary measures shall be implemented to allow an irrigation system to continue to operate across land on which the pipeline is being constructed.
- If the pipeline or temporary work areas intersect an operational (or soon to be operational) pivot or other spray irrigation system, Keystone shall establish with the landowner or landowner's designate an acceptable amount of time the irrigation system may be out of service. If an irrigation system interruption results in crop damages, either on the pipeline construction right-of-way or off the construction right-of-way, the landowner shall be compensated reasonably for all such crop damages.
- If the pipeline or temporary work areas intersect an operational sheet flow irrigation system, Keystone shall establish with the landowner or landowner's designate an acceptable amount of time the irrigation system may be out of service. If an irrigation system interruption results in crop

damages, either on the pipeline construction right-of-way or off the construction right-of-way, the landowner shall be compensated reasonably for all such crop damages.

- Irrigation ditches that are active at the time of construction shall not be stopped or obstructed except for the length of time to install the pipeline beneath the ditch (typically, one day or less) unless otherwise approved or directed by Keystone.

4.2 Clearing

The objective of clearing is to provide a clear and unobstructed right-of-way for safe and efficient construction of the pipeline. The following mitigable measures shall be implemented:

- Construction traffic shall be restricted to the construction right-of-way, existing public roads, and approved private roads.
- Construction right-of-way boundaries including pre-approved temporary workspace shall be clearly staked to prevent disturbance to unauthorized areas.
- If crops are present, they shall be mowed or disced to ground level unless an agreement is made for the landowner to remove.
- Burning is prohibited on cultivated land.
- Construction right-of-way at timber shelterbelts in agricultural areas shall be reduced to the minimum necessary to construct the pipeline.

4.3 Topsoil Removal and Storage

The objective of topsoil handling is to maintain topsoil capability by conserving topsoil for future replacement and reclamation and to minimize the degradation of topsoil from compaction, rutting, loss of organic matter, or soil mixing so that successful reclamation of the right-of-way can occur. The following mitigative measures shall be implemented during topsoil removal and storage unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- In areas designated for topsoil segregation, the actual depth of the topsoil, to a maximum depth of 12 inches, will be stripped from:
    - The area excavated above the pipeline; or
    - The area above the pipeline plus the spoil storage; or
    - The area above the pipeline plus the working side; or
    - Entire ROW

  as required by applicable permit agreements with the landowner or as dictated by site-specific conditions.

- Stripped topsoil is to be stockpiled in a windrow along the edge of the right-of-way. The Contractor shall perform work in a manner to minimize the potential for subsoil and topsoil to be mixed.
- Under no circumstances shall the Contractor use topsoil to fill a low area.
- If required due to excessively windy conditions, topsoil piles shall be tackified using either water or a suitable tackifier (liquid mulch binder).
- Gaps in the rows of topsoil will be left in order to allow drainage and prevent ponding of water adjacent to or on the right-of-way.
- Topsoil shall not be utilized to construct ramps at road or waterbody crossings.
- In areas with defined saline or sodic soil concerns, a triple-ditch method will be used to segregate problem soils as indicated in Detail 67 and 67A.
- If frozen topsoil conditions are encountered during winter construction, specialized construction equipment (i.e. ripping, frozen topsoil cutter, road reclaimer, etc) may be required to adequately segregate and conserve topsoil resources.

4.4 Grading

The objective of grading is to develop a right-of-way that allows the safe passage of equipment and meets the bending limitations of the pipe. The following mitigative measures shall be implemented during grading unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. However, all work shall be conducted in accordance with applicable permits.

- All grading shall be undertaken with the understanding that original contours and drainage patterns shall be re-established to the extent practicable..
- Agricultural areas that have terraces shall be surveyed to establish pre-construction contours to be utilized for restoration of the terraces after construction.
- On steep slopes, or wherever erosion potential is high, temporary erosion control measures shall be implemented.
- Bar ditches adjacent to existing roadways to be crossed during construction shall be adequately ramped with grade or ditch spoil to prevent damage to the road shoulder and ditch.
- Where the construction surface remains inadequate to support equipment travel, timber mats, timber riprap, or other method shall be used to stabilize surface conditions.

The Contractor shall limit the interruption of the surface drain network in the vicinity of the right-of-way using the appropriate methods:

- providing gaps in the rows of subsoil and topsoil in order to prevent any accumulation of water on the land;

- preventing obstructions in furrows, furrow drains, and ditches;
- installing flumes and ramps in furrows, furrow drains, and ditches to facilitate water flow across the construction right-of-way and allow for construction equipment traffic; and
- installing flumes over the trench for any watercourse where flow is continuous during construction.

4.5 Temporary Erosion and Sediment Control

4.5.1 General

Temporary erosion and sediment control measures shall be installed immediately after initial disturbance of the soil, maintained throughout construction (on a daily basis), and reinstalled as necessary until replaced by permanent erosion control structures or restoration of the construction right-of-way is complete.

Specifications and configurations for erosion and sediment control measures may be modified by Keystone as necessary to suit actual site conditions. However, all work shall be conducted in accordance with applicable permits.

The Contractor shall inspect all temporary erosion control measures at least daily in areas of active construction or equipment operation, weekly in areas with no construction or equipment operation, and within 24 hours of each significant rainfall event of 0.5 inches or greater. The Contractor shall repair all ineffective temporary erosion control measures as expediently as practicable.

4.5.2 Sediment Barriers

Sediment barriers shall be constructed of silt fence, staked hay or straw bales, compacted earth (e.g., drivable berms across travel lanes), sand bags, or other appropriate materials.

The Contractor shall install sediment barriers in accordance with Details 1 and 2 or as otherwise approved or directed by Keystone. The Contractor is responsible for properly installing, maintaining, and replacing temporary and permanent erosion controls throughout construction and cleanup. In wetland or riparian zones, the Contractor will install sediment control structures along the construction right-of-way edges prior to vegetation removal where practicable. The aforementioned sediment barriers may be used interchangeably or together depending on site-specific conditions. In most cases, silt fence shall be utilized where longer sediment barriers are required.

Sediment barriers shall be installed below disturbed areas where there is hazard of offsite sedimentation. These areas include:

- the base of slopes adjacent to road crossings;

- the edge of the construction right-of-way adjacent to and upgradient of a roadway, flowing stream, spring, wetland, or impoundment;
- trench or test water discharge locations where required;
- where waterbodies or wetlands are adjacent to the construction right-of-way; (the Contractor shall install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way)
- across the entire construction right-of-way at flowing waterbody crossings;
- right-of-way immediately upslope of the wetland boundary at all standard (saturated or standing water) wetland crossings as necessary to prevent sediment flow into the wetland; (Sediment control barriers are not required at "dry" wetlands.)
- along the edge of the construction right-of-way within standard (saturated or standing water) wetland boundaries as necessary to contain spoil and sediment within the construction right-of-way. Sediment control barriers are not required at "dry" wetlands (Detail 8).

Sediment barriers placed at the toe of a slope shall be set a sufficient distance from the toe of the slope, if possible, in order to increase ponding volume.

Sediment control barriers shall be placed so as not to hinder construction operations. If silt fence or straw bale sediment barriers (in lieu of drivable berms) are placed across the entire construction right-of-way at waterbodies, wetlands, or upslope of roads, a provision shall be made for temporary traffic flow through a gap for vehicles and equipment to pass within the structure. Immediately following each day's shutdown of construction activities, a row of straw bales or a section of silt fence shall be placed across the up gradient side of the gap with sufficient overlap at each end of the barrier gap to eliminate sediment bypass flow, followed by bales tightly fitted to fill the gap. Following completion of the equipment crossing, the gap shall be closed using silt fence or straw bale sediment barrier.

The Contractor shall maintain straw bale and silt fence sediment barriers by removing collected sediment and replacing damaged bales. Sediment shall be removed and placed where it shall not reenter the barrier when sediment loading is greater than 40 percent or if directed by Keystone. If straw bale filters cannot be cleaned out due to access problems, the Contractor shall place a new row of sediment barriers upslope.

The Contractor shall use mulch and straw bales that are free of noxious weeds. Mulch or straw bales that contain evidence of noxious weeds or other undesirable species shall be rejected by the Contractor.

The Contractor shall remove sediment barriers, except those needed for permanent erosion and sediment control, during cleanup of the construction right-of-way.

4.5.3 Trench Plugs

The Contractor shall use trench plugs at waterbody and wetland crossings at the direction of the Environmental Inspector to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the waterbody. Trench plugs shall be of sufficient size to withstand upslope water pressure.

4.5.4 Temporary Slope Breakers (Water Bars)

The Contractor shall install temporary slope breakers on slopes greater than 5% on all disturbed lands at the following recommended spacing:

Slope (%)	Spacing (feet)
5 - 15	300
>15 - 30	200
>30	100

The gradient of each slope breaker shall be 2 to 4 percent.

If so directed by the landowner, the Contractor may not install temporary slope breakers (water bars) in cultivated land.

Temporary slope breakers shall be constructed of soil, silt fence, staked straw bales, sand bags, or similar materials authorized by Keystone.

The Contractor shall direct the outfall of each temporary slope breaker to a stable, well-vegetated area or construct an energy-dissipating device at the end of the slope breaker and off the construction right-of-way as permitted in the landowner agreement as shown in Detail 3. The outfall of each temporary slope breaker shall be installed to prevent sediment discharge into wetlands, waterbodies, or other sensitive resources.

Specifications and configurations for temporary slope breakers may be modified by Keystone as necessary to suit actual site conditions. However, all work shall be conducted in accordance with applicable permits.

4.5.5 Drainage Channels or Ditches

Drainage channels or ditches shall be used on a limited basis to provide drainage along the construction right-of-way and toe of cut slopes as well as to direct surface runoff across the construction right-of-way or away from disturbances and onto natural undisturbed ground. Channels or ditches shall be constructed by the Contractor during grading operations. Where there is inadequate vegetation at the channel or ditch outlet,

sediment barriers, check berms, or other appropriate measures shall be used to control erosion.

4.5.6 Temporary Mulching and Cover Crops

Unless otherwise directed by Keystone, the Contractor shall apply temporary seed and/or mulch on disturbed construction work areas that have been inactive for one month or are expected to be inactive for a month or more. The Contractor shall not apply temporary mulch in cultivated areas unless specifically requested by the landowner or in areas particularly prone to erosion. The Contractor shall not apply mulch within wetland boundaries.

Temporary mulch of straw or equivalent applied on slopes shall be spread uniformly to cover at least 75 percent of the ground surface at an approximate rate of 2 tons per acre of straw or its equivalent. Mulch application on slopes within 100 feet of waterbodies and wetlands shall be increased to an approximate rate of 3 tons per acre.

All seed that is used as a temporary cover crop will be approved and/or provided by Keystone.

4.5.7 Tackifier

When wetting topsoil piles with water does not prevent wind erosion, the Contractor shall temporarily suspend topsoil handling operations and apply a tackifier to topsoil stockpiles at the rate recommended by the manufacturer. The type of Tackifier will be approved by Keystone.

Should construction traffic, cattle grazing, heavy rains, or other related construction activity disturb the tackified topsoil piles and create a potential for wind erosion, additional tackifier shall be applied by the Contractor.

4.6 Stringing

The objective of stringing is to place the line pipe along the construction right-of-way for bending and welding in an expedient and efficient manner.

The Contractor shall utilize one or more of the following mitigative measures as applicable and when necessary to reduce compaction on the working side of the right-of-way or as directed by Keystone. However, all work shall be conducted in accordance with applicable permits.

- prohibiting access by certain vehicles;
- using only machinery possessing low ground pressure (tracks or extra-wide tires);
- limiting access and thus minimizing the frequency of all vehicle traffic;
- digging ditches to improve surface drainage;

- using timber riprap, matting, or geotextile fabric overlain with soil; and
- stopping construction for a period of time.

4.7 Trenching

The objective of trenching is to provide a ditch of sufficient depth and width with a bottom to continuously support the pipeline. During trenching operations, the following mitigative measures shall be implemented unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Where required, subsoil shall be segregated from topsoil in separate, distinct rows with a separation that shall limit any admixing of topsoil and subsoil during handling.
- Triple ditch soil handling will be completed at sites identified by Keystone according to Detail 67 and 67A to prevent soil degradation.
- Gaps must be left in the spoil piles that coincide with breaks in the strung pipe to facilitate natural drainage patterns and to allow the passage of livestock or wildlife.
- Trenching operations shall be followed as closely as practicable by lower in and backfill operations to minimize the length of time the ditch is open.
- Construction debris (e.g., welding debris) and other garbage shall not be deposited in the ditch.
- If trenching, pipe installation and backfill operations take place during frozen soil conditions, final clean-`up (including additional trench compaction, subsoil feathering, final contouring and topsoil replacement) will be delayed until the subsoil and topsoil thaw completely the following spring/summer. A pronounced subsoil berm will be left over the trench line until final clean-up takes place to account for settlement of thawing backfill. Gaps will be left in the berm to maintain cross-ROW drainage

The Contractor shall prepare a blasting plan that is applicable to any locations where blasting will be necessary adjacent to existing high pressure pipelines, overhead or underground utilities, farm operations, or public crossings. The Contractor and its blasting supervisor shall be thoroughly familiar with and comply with the rules and regulations of Occupational Safety and Health Administration (OSHA) and all federal, state, county and local regulations governing blasting operations. Keystone will file the blasting plan with applicable state or local jurisdictions, where required. Excavation and blasting along the ROW may uncover paleontological resources of scientific value. Keystone will consult with the appropriate regulatory agencies in each state on the applicability and requirements for Paleontological Resource Protection Plans. Keystone will prepare and file plans addressing vertebrate fossils with any respective states, as required.

Should blasting be necessary for removal of rock, the following mitigative measures may be implemented:

- The Contractor shall use non-electric initiation systems for all blasting operations. If required by the blasting plan, blasting will be monitored for vibration levels and peak particle velocity. This work shall be performed by a third-party vibration monitoring consultant hired by and reporting to the Constructor Representative. The Contractor shall arrange for detonations to be carried out in cooperation with this consultant.
- Prior to using explosives, the Contractor shall advise residents of the immediate area, in order to prevent any risk of accidents or undue disturbances.
- No blasting shall be done without approval of the Constructor Representative. Prior to any detonation of explosives in the vicinity of a loaded line, dwelling, structure, overhead or underground utility, farm operation, or public crossings, a minimum of 48 hour's notice shall be given to the Constructor Representative, in order that the appropriate people can be notified and the upstream and downstream mainline valves can be staffed.
- The Contractor shall obtain all necessary permits and shall comply with all legal requirements in connection with the use, storage, and transportation of explosives.
- Blasting mats or subsoil may be piled over the trench line to prevent rock from being blown outside the construction right-of-way.
- Each blasting location shall be cleared and cleaned up before and after all blasting operations.
- Blasting shall be carried out during regular, daylight working hours.
- The Contractor shall at all times protect his workers and the public from any injury or harm that might arise from drilling dust and the use of explosives.
- Only workers thoroughly experienced in handling explosives shall be permitted to supervise, handle, haul, load or shoot explosives. In those jurisdictions where the licensing of blasters is mandatory, the Contractor shall provide the Constructor Representative with proof of the required certification for every person so required.
- The drilling pattern shall be set in a manner to achieve smaller rock fragmentation (maximum 1 foot in diameter) in order to use as much as possible of the blasted rock as backfill material after the pipe has been padded in accordance with the specifications.
- Blasting testing of surface-water resources and water wells within 150 feet of the centerline will be performed in compliance with all applicable permits.

4.7.1 Trench Dewatering/Well Points

The Contractor shall make all reasonable efforts to discharge trench water in a manner that avoids damage to adjacent agricultural land, crops, and pasture. Damage includes, but is not limited to, the inundation of crops for more than 24 hours, deposition of sediment in ditches, and the deposition of gravel in fields or pastures.

If trench dewatering is necessary in an area where salt damage to adjacent crops is evident, the Environmental Inspector shall conduct a field conductivity test on the trench water before it is discharged. If the conductivity of the trench water is determined to potentially affect soil quality, it shall not be discharged to areas where salt damage to crops is evident, but shall be directed as feasible so that water flows over a well vegetated, non-cropland area or through an energy dissipater and sediment barrier.

When pumping water from the trench for any reason, the Contractor shall ensure that adequate pumping capacity and sufficient hose is available to permit dewatering as follows:

- No heavily silt-laden trench water shall be allowed to enter a waterbody or wetland directly but shall instead be diverted through a well vegetated area, a geotextile filter bag, or a permeable berm (straw bale or Keystone approved equivalent).
- Trench water shall not be disposed of in a manner which could damage crops or interfere with the functioning of underground drainage systems.

The Contractor shall screen the intake hose and keep the hose either one foot off the bottom of the trench or in a container to minimize entrainment of sediment.

4.8 Welding, Field Joint Coating, and Lowering In

The objectives of welding, field joint coating, and lowering in are to provide continuous segments of pipeline, to provide corrosion protection to the weld areas of the pipeline, and to place the pipeline in the center of the trench, without stress, at the required depth of cover. The following mitigative measures shall be followed during pipe welding, field joint coating, and lowering in, unless otherwise specified by Keystone in response to site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Shavings produced during beveling of the line pipe are to be removed immediately following this operation to ensure that livestock and wildlife do not ingest this material. When welding operations create a continuous line of pipe that may be left in the right-of-way for an extended period of time due to construction or weather constraints, a gap in the welded pipe shall be provided to allow for access at farm road crossings and for passage of livestock and wildlife.
- Prior to the application of epoxy powder, urethane epoxy, or other approved pipe coatings, a tarp shall be placed underneath the pipe in wetlands to collect any overspray of epoxy powder and liquid drippings. Excess powder, liquid, or other hazardous materials (e.g. brushes, rollers, gloves) shall be continuously collected and removed from the construction right-of-way and disposed of in a manner appropriate for these materials.

4.9 Padding and Backfilling

The objective of padding and backfilling is to cover the pipe with material that is not detrimental to the pipeline and pipeline coating. The following mitigative measures shall be utilized during backfilling, unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Excessive water accumulated in the trench shall be eliminated prior to backfilling.
- In the event it becomes necessary to pump water from open trenches, the Contractor shall pump the water and discharge it in accordance with the requirements of the Stormwater Pollution Prevention Plan (SWPPP) in order to avoid damaging adjacent areas. Detail 5 and Detail 6 provide typical examples of dewatering structures.
- If it is impossible to avoid water-related damages (including inundation of crops for more than 24 hours, deposition of sediment in ditches and other water courses, and the deposition of gravel in fields, pastures, and any water courses), Keystone shall reasonably compensate the landowners for the damage and/or shall correct the damage so as to restore the land, crops, pasture, water courses, etc. to their pre-construction condition.
- All pumping of water shall comply with existing drainage laws and local ordinances relating to such activities and provisions of the Clean Water Act.
- Prior to backfilling, all drain tile shall be permanently repaired, inspected, and the repair documented as described in Section 5.5.
- Prior to backfilling, trench breakers shall be installed on slopes where necessary to minimize the potential for water movement down the ditch and potential subsequent erosion.
- During backfill, the stockpiled subsoil shall be placed back into the trench before replacing the topsoil.
- Topsoil shall not be utilized for padding the pipe.
- Backfill shall be compacted to a minimum of 90% of pre-existing conditions where the trench line crosses tracks of wheel irrigation systems (pivots).
- To reduce the potential for ditch line subsidence, spoil shall be replaced and compacted by backhoe bucket or by the wheels or tracks of equipment traversing down the trench.
- The lesser of 4 feet or the actual depth of topsoil cover, shall not be backfilled with soil containing rocks of any greater concentration or size than existed prior to pipeline construction in the pipeline trench, bore pits, or other excavations.

4.10 Cleanup

The objective of cleanup activities shall be to prepare the right-of-way and other disturbed areas to approximate pre-activity ground contours where appropriate and to replace spoil and stockpiled material in a manner which preserves soil

capability and quality to a degree reasonably equivalent to the original or that of representative undisturbed land. The following mitigative measures shall be utilized during cleanup, unless otherwise approved or directed by Keystone based on specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Cleanup shall occur immediately following backfilling operations when weather or seasonal conditions allow.
- All garbage and construction debris (e.g., lathing, ribbon, welding rods, pipe bevel shavings, pipe spacer ropes, end caps, pipe skids) shall be collected and disposed of at approved disposal sites.
- The right-of-way shall be re-contoured with spoil material to approximate pre-construction contours and as necessary to limit erosion and subsidence. Loading of slopes with unconsolidated spoil material shall be avoided during slope re-contouring. Topsoil shall be replaced after re-contouring of the grade with subsoil. The topsoil shall be replaced on the subsoil storage area and over the trench so that after settling occurs, the topsoil's approximate original depth and contour (with an allowance for settling) shall be achieved.
- Where topsoil has been segregated, subsoil shall not be permanently placed on top of topsoil.
- Surface drainage shall be restored and re-contoured to conform to the adjacent land drainage system.
- Erosion control structures such as permanent slope breakers and cross ditches shall be installed on steep slopes where necessary to control erosion by diverting surface run-off from the right-of-way to stable and vegetated off right-of-way areas.
- During cleanup, temporary sediment barriers such as silt fence and hay bale diversions will be removed; accumulated sediment will re-contoured with the rest of the ROW; and permanent erosion controls will be installed as necessary.
- After construction, all temporary access shall be returned to prior construction conditions unless specifically agreed with the landowner or otherwise specified by Keystone.
- Warning signs, aerial markers, and cathodic protection test leads shall be installed in locations in compliance with U.S. Federal code and in locations that shall not impair farming operations where practicable.
- All bridges, fences and culverts existing prior to construction shall be restored to meet or exceed approximate pre-construction conditions. Caution shall be utilized when re-establishing culverts to ensure that drainage is not improved to a point that would be detrimental to existing waterbodies and wetlands.
- All temporary gates installed during construction shall be replaced with permanent fence unless otherwise requested by the landowner.

4.11 Reclamation and Revegetation

The objectives of reclamation and revegetation are to return the disturbed areas to approximately pre-construction use and capability. This involves the treatment of soil as necessary to preserve approximate pre-construction capability and the stabilization of the work surface in a manner consistent with the initial land use.

The following mitigative measures will be utilized unless otherwise approved or directed by Keystone based on site specific conditions or circumstances. However, all work shall be conducted in accordance with applicable permits.

4.11.1 Relieving Compaction

Compaction will typically be relieved in subsoils that have received substantial construction traffic, as determined by Keystone, prior to replacing and respreading topsoil. Compaction will typically not be relieved in topsoils that have been left in place and that have not been driven on. Any rock that is brought to the surface during decompaction activities will be removed until the quantity, size, and distribution of rock is equivalent to that found on adjacent land as determined by the Environmental Inspector. Compaction will typically be relieved as follows:

- Compacted cropland compacted shall be ripped a minimum of 3 passes at least 18 inches deep and all pasture shall be ripped or chiseled a minimum of three passes at least 12 inches deep before replacing topsoil.
- Areas of the construction right-of-way that were stripped for topsoil salvage shall be ripped a minimum of 3 passes (in cross patterns, as practical) prior to topsoil replacement. The approximate depth of ripping shall be 18 inches (or a lesser depth if damage may occur to existing drain tile systems). After ripping, the subsoil surface shall be graded smooth and any subsoil clumps broken up (disc and harrow) in an effort to avoid topsoil mixing.
- The de-compacted construction right-of-way shall be tested by the Contractor at regular intervals for compaction in agricultural and residential areas. Tests shall be conducted on the same soil type under similar moisture conditions in undisturbed areas immediately adjacent to the right-of-way to approximate pre-construction conditions. Penetrometers or other appropriate devices shall be used to conduct tests
- Topsoil shall be replaced to pre-existing depths once ripping and discing of subsoil is complete up to a maximum of 12 inches. Topsoil compaction on cultivated fields shall be alleviated with cultivation methods by the contractor.
- If there is any dispute between the landowner and Keystone as to what areas need to be ripped or chiseled, the depth at which compacted areas should be ripped or chiseled, or the necessity or

rates of lime and fertilizer application, the appropriate NRCS shall be consulted by Keystone and the landowner.

Plowing under of organic matter including wood chips and manure, or planting of a green crop such as alfalfa to decrease soil bulk density and improve soil structure or any other measures in consultation with the Natural Resource Conservation Service (NCRS) shall be considered if mechanical relief of compaction is deemed not satisfactory.

In the first year after construction, Keystone will inspect the ROW to identify areas of erosion or settling. Subsequently, Keystone will monitor erosion and settling through aerial patrols, which are part of Keystone's Integrity Management Plan, and through landowner reporting. Landowner reporting will be facilitated through use of Keystone's toll-free telephone number, which will be made available to all landowners on the ROW. Landowner reporting also may be facilitated through contact with Keystone's field offices.

Keystone plans to minimize impacts on soil productivity that may result from construction activities, but recognizes that some short- to long-term decreases in agricultural productivity are possible. Keystone recognizes its responsibility to restore agricultural productivity on the pipeline ROW and to compensate landowners for demonstrated decreases in productivity that may result from any degradation of agricultural soils along the ROW.

4.11.2 Rock Removal

- Rocks that are exposed on the surface due to construction activity shall be removed from the right-of-way prior to and after topsoil replacement This effort will result in an equivalent quantity, size and distribution of rocks to that found on adjacent lands, as determined by the Environmental Inspectors.
- Clearing of rocks may be carried out with a mechanical rock picker or by manual means, provided that preservation of topsoil is assured. Rock removed from the right-of-way shall be hauled off the landowner's premises or disposed of on the landowner's premises at a location that is mutually acceptable to the landowner and to Keystone.

4.11.3 Soil Additives

If site-specific conditions warrant and if agreed to by the landowner, the Contractor shall apply amendments (fertilizer and soil pH modifier materials and formulations) commonly used for agricultural soils in the area and in accordance with written recommendations from the local soil conservation authority, land management agencies, or landowner. Amendments shall be incorporated into the normal plow layer as soon as possible after application.

4.11.4 Seeding

- The final seed mix shall be based on input from the local Natural Resource Conservation Service and the availability of seed at the time of reclamation. The landowner may request specific seeding requirements during easement negotiations.
- Certificates of seed analysis are required for all seed mixes to limit the introduction of noxious weeds.
- Seed not utilized within 12 months of seed testing shall be approved by Keystone prior to use. Seeding shall follow cleanup and topsoil replacement as closely as possible. Seed shall be applied to all disturbed surfaces (except cultivated fields unless requested by the landowner) as indicated on the construction drawings
- If mulch was applied prior to seeding for temporary erosion control, the Contractor shall remove and dispose of the excess mulch prior to seedbed preparation to ensure that seedbed preparation equipment and seed drills do not become plugged with excess mulch; and to support an adequate seedbed; and to ensure that seed incorporation or soil packing equipment can operate without becoming plugged with mulch.
- Identified seeding areas shall be seeded as specified by Keystone. Seeding rates shall be based on pure live seed.
- Weather conditions, construction right-of-way constraints, site access, topography and soil type shall influence the seeding method to be used (i.e., drill seeding versus broadcast seeding).
- The Contractor shall delay seeding as directed by Keystone until the soil is in the appropriate condition for seeding.
- The Contractor shall use a Truax brand or Keystone approved equivalent-type drill seeder equipped with a cultipacker designed and equipped to apply grass and grass-legume seed mixtures with mechanisms such as seed box agitators to allow even distribution of all species in each seed mix, with an adjustable metering mechanism to accurately deliver the specified seeding rate and with a mechanism such as depth bands to accurately place the seed at the specified depth.
- The Contractor shall operate drill seeders at an appropriate speed so the specified seeding rate and depth is maintained, as directed by Keystone.
- The Contractor shall calibrate drill seeders so that the specified seeding rate is planted. The row spacing on drill seeders shall not exceed 8 inches.
- The Contractor shall plant seed at depths consistent with the local or regional agricultural practices.

- Broadcast or hydro seeding, used in lieu of drilling, shall utilize NRCS-recommended seeding rates. Where seed is broadcast, the Contractor shall use a harrow, cultipacker, or other equipment immediately following broadcasting to incorporate the seed to the specified depth and to firm the seedbed.
- The Contractor shall delay broadcast seeding during high wind conditions if even distribution of seed is impeded.
- The Contractor shall hand rake all areas that are too steep or otherwise cannot be safely harrowed or cultipacked in order to incorporate the broadcast seed to the specified depth.
- Hydro seeding may be used, on a limited basis, where the slope is too steep or soil conditions do not warrant conventional seeding methods. Fertilizer, where specified, may be included in the seed, virgin wood fiber, tackifier, and water mixture. When hydro-seeding, virgin wood fiber shall be applied at the rate of approximately 3,000 pounds per acre on an air-dry weight basis as necessary to provide at least 75% ground cover. Tackifier shall consist of biodegradable, vegetable-based material and shall be applied at the rate recommended by the manufacturer. The seed, mulch, and tackifier slurry shall be applied so that it forms a uniform, mat-like covering of the ground.
- Keystone shall work with landowners to discourage intense livestock grazing of the construction right-of-way during the first growing season by utilization of temporary fencing or deferred grazing, or increased grazing rotation frequency.

4.11.5 Permanent Erosion and Sediment Control

The Contractor shall restore all existing landowner soil conservation improvements and structures disturbed by pipeline construction to the approximate pre-construction line and grade. Soil conservation improvements and structures include, but are not limited to, grassed waterways, toe walls, drop inlets, grade control works, terraces, levees, and farm ponds.

4.11.5.1 Trench Breakers

The Contractor shall install trench breakers in steep terrain where necessary to limit the potential for trench line erosion and at the base of slopes adjacent to waterbodies and wetlands.

Trench breakers shall be constructed of materials such as sand bags, sand/cement bags, bentonite bags, or other suitable materials by the Contractor (Detail 7). The Contractor shall not use topsoil in trench breakers.

4.11.5.2 Permanent Slope Breakers (Water Bars)

Permanent slope breakers (water bars) shall be constructed of soil or, in some instances, sand bags.

The Contractor shall construct permanent slope breakers on the construction right-of-way where necessary to limit erosion, except in cultivated and residential areas. Slope breakers shall divert surface runoff to adjacent stable vegetated areas or to energy-dissipating devices as shown on Detail 3. In general, permanent slope breakers should be installed immediately downslope of all trench breakers. Permanent slope breakers shall be installed as specified on the construction drawings or generally with a minimum spacing as shown on the following table:

Slope (%)	Spacing (feet)
5 - 15	300
>15 – 30	200
>30	100

The gradient (fall) for each slope breaker shall be two percent to four percent unless otherwise approved by Keystone based on site-specific conditions.

The Contractor shall construct slope breakers to divert surface flow to a stable, well-vegetated area. In the absence of a stable area, the Contractor shall construct appropriate energy-dissipating devices at the end of the slope breaker and beyond the area disturbed by construction.

4.11.5.3 Mulching

The Contractor shall apply mulch on all areas with high erosion potential and on slopes greater than 8 percent unless otherwise approved by Keystone based on site-specific conditions or circumstances. The Contractor shall spread mulch uniformly over the area to cover at least 75 percent of the ground surface at an approximate rate of 2 tons per acre of straw or its equivalent. The Environmental Inspector may reduce the application rate or forego mulching an area altogether if there is an adequate cover of rock or organic debris to protect the slope from erosion, or if annual companion crops have stabilized the soil.

Mulch application includes straw mulch, hydro mulch and tackifier or other materials as approved by Keystone.

The Contractor shall use mulch that is free of noxious weeds.

The Contractor shall apply mulch immediately following seeding. The Contractor shall not apply mulch in wetlands.

If a mulch blower is used, the majority of strands of the mulching material shall not be shredded to less than 8 inches in length to allow anchoring. The Contractor shall anchor mulch immediately after application to minimize loss by wind and water.

When anchoring (straw crimping) by mechanical means, the Contractor shall use a tool specifically designed for mulch anchoring with flat, notched disks to properly crimp the mulch to a depth of 2 to 3 inches. A regular farm disk shall not be used to crimp mulch. The crimping of mulch shall be performed across the slope of the ground, not parallel to it. In addition, in areas of steep terrain, tracked vehicles may be used as a means of crimping mulch (equipment running up and down the hill to leave crimps perpendicular to the slope), provided they leave adequate coverage of mulch.

In soils possessing high erosion potential, the Contractor may be required to make two passes with the mulch-crimping tool; passes must be as perpendicular to the others as possible.

When anchoring with liquid mulch binders (tackifiers), the Contractor shall use a biodegradable tackifier derived from a vegetable-based, organic source. The Contractor shall apply mulch binders at rates recommended by the manufacturer.

The Contractor shall limit the use of tackifiers for anchoring straw and the use of hydromulch and tackifier to areas that are too steep or rocky to safely or effectively operate mechanical mulch-anchoring tools. No asphalt-based tackifiers shall be used on the Project.

4.11.5.4 Erosion Control Matting

Erosion control matting shall be applied where shown on the construction drawings as shown on Detail 4. The Contractor shall anchor the erosion control matting with staples or other approved devices.

The Contractor shall use erosion control matting made of biodegradable, natural fiber such as straw or coir (coconut fiber).

The Contractor shall prepare the soil surface and install the erosion control matting to ensure it is stable and the matting makes uniform contact with the soil of the slope face or stream bank with no bridging of rills, gullies, or other low areas.

4.11.5.5 Riprap and Stream Bank Stabilization

Disturbed banks of streambeds and waterbodies shall be restored to their approximate original contours unless otherwise directed. Erosion protection shall be applied as specified in the construction drawings.

Most restored banks will be protected through the use of flexible channel liners installed as specified in Detail 19.

If the original stream bank is excessively steep and unstable and/or flow conditions are severe, a more stable final contour may be specified and alternate stabilization measures may be installed.

Alternate stabilization measures may consist of rock riprap, bio-stabilization, or engineered structures such as brush layering, logwalls, cribwalls, or vegetated geo-grids. See Details 20, 23, and 24.

Stream bank riprap structures shall consist of a layer of stone underlain with approved filter fabric or a gravel filter blanket. Riprap shall extend from the stabilized streambed to the top of the stream bank. Native rock shall be utilized wherever practicable.

4.11.6 Fences

Upon completion of all backfilling, cleanup, and restoration, including mulching and seeding of the construction right-of-way, permanent repairs shall be made to all fences by using either the original material or good quality new material similar to existing fences.

Historic fences shall be carefully reassembled by hand from the original material. Where the original material has deteriorated to a state that makes it unsalvageable, replacement material similar to the original shall be used if possible.

4.11.7 Farm Terraces

Keystone will work with landowners and farm service agencies to ensure restoration of farm terraces to their pre-construction function. Keystone may elect to negotiate a fair settlement with the landowner to employ a local land leveling contractor to restore the terrace.

Before any groundwork is performed in areas with farm terraces, Keystone will conduct a civil survey to document the location and contours of each terrace. Both the channel contour and the terrace berm will be surveyed within the construction right-of-way and up to 100 feet on either side of the ROW boundaries. The pre-construction survey will

provide a baseline to ensure the proper restoration of the terrace following construction.

The Contractor will maintain the pre-disturbance drainage of water along the terrace channel and will install temporary flume pipe for this purpose. As necessary, temporary erosion control measures such as water bars and sediment barriers will be installed and maintained throughout construction to reduce the potential for soil erosion along or off the construction ROW.

Following installation of the pipe, the trench will be backfilled, and the Contractor will restore the terrace contours as agreed to with the landowner.

Should the landowner agree to have a local contractor restore the terraces, the Contractor will backfill the trench and restore the terrace using typical compaction methods for pipeline construction with the understanding that the landowner's contractor will re-excavate the location and re-install the terrace utilizing land levelling equipment and special compaction methods.

Should the landowner desire the Contractor to restore the terraces, the pipeline contractor will compact the trench before the terrace berm is replaced. Following restoration of the terraces, final contours and grades will be re-surveyed and documented with survey notes. Keystone will perform post-construction monitoring and inspection with the landowner's concurrence. Should the terraces require further work, Keystone will either compensate the landowner to perform the work or arrange for a local contractor to perform the work.

4.11.8 Right-of-Way and Pipeline Markers

Upon completion of all backfilling, cleanup and restoration, including mulching and seeding of the construction right-of-way, and during the time when the Contractor is making permanent repairs to fences, the Contractor shall install pipeline markers on each side of all roads, railroads, fence lines, stream crossings, and other areas where the pipeline markers do not conflict with intended land use.

4.12 Pasture and Range Lands

The following mitigative measures shall be implemented in addition to the requirements previously stated in Sections 4.1 thru 4.11 unless otherwise approved by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Access across the right-of-way during construction shall be provided at locations requested by landowners, if practicable.
- Shavings produced during pipe bevel operations are to be removed immediately to ensure that livestock and wildlife do not ingest this material.

- Litter and garbage shall be collected and removed from the construction site at the end of the day's activities.
- Temporary gates shall be installed at fence lines for access to the construction right-of-way. These gates shall remain closed at all times. Upon completion of construction, the temporary gates shall be removed and the permanent fence replaced.
- Feeding or harassment of livestock or wildlife is prohibited.
- Construction personnel shall not be permitted to have firearms or pets on the construction right-of-way.
- All food and wastes shall be stored and secured in vehicles or appropriate facilities.
- Areas of disturbance in native range shall be seeded with a native seed mix after topsoil replacement.
- Improved pasture shall be seeded with a seed mix approved by individual landowners.

4.13 Forested Lands

Mitigation measures are required to ensure that pipeline construction activities have a minimal impact on forested lands.

Clearing, grubbing, and grading of trees, brush, and stumps shall be performed in accordance with the following mitigative measures in addition to the requirements previously stated in Sections 4.1 thru 4.11 unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. Keystone will address mitigation, reclamation and remediation measures with individual landowners and comply with any applicable state requirements. These measures include non-vegetative remediation to reverse impacts on windbreaks, shelterbelts, and living snow fences. Where the pipeline follows an existing ROW in forested areas, Keystone attempted to route the pipeline as close as practical to the existing ROW. All work shall be conducted in accordance with applicable permits.

- Prior to the start of clearing activity, right-of-way boundaries, including pre-approved temporary workspaces, shall be clearly staked to prevent disturbance of unauthorized areas.
- If trees are to be removed from the construction right-of-way, Keystone shall consult with the landowner or landowner's designate to see if there are trees of commercial or other value to the landowner. Timber shall be salvaged as per landowner request.
- If there are trees of commercial or other value to the landowner, Keystone shall allow the landowner the right to retain ownership of the trees with the disposition of the trees to be negotiated prior to the commencement of land clearing and included in the easement agreement.
- If not performed by the landowner, the construction right-of-way Contractor may salvage all marketable timber from designated areas.

- Tree stumps shall be grubbed to a maximum of 5 feet on either side of the trench line and where necessary for grading a level surface for pipeline construction equipment to operate safely.
- Keystone shall follow the landowner's or landowner designee's desires as stated in the easement agreement regarding the disposal of trees, brush, and stumps of no value to the landowner by burning, burial, etc., or complete removal from any affected property.
- Timber salvage operations shall use cut-off-type saw equipment. Felling shall be undertaken in a manner that minimizes butt shatter, breakage, and off ROW disturbance. Skidders or alternate equipment shall be used to transport salvaged logs to stacking sites.
- Trees shall be felled to fall toward the center line of the right-of-way to avoid breaking trees and branches off ROW. Leaners (felled trees that inadvertently fall into adjacent undisturbed vegetation) shall be salvaged.
- Trees and slash falling outside the right-of-way shall be recovered and disposed..
- Salvaged logs shall be limbed and topped before removal from the construction right-of-way. Log decks (if required) shall be oriented to best facilitate loading by picker trucks and be located adjacent to the working side of the right-of-way, where possible.
- The Contractor shall not be allowed to dispose of woody debris in wooded areas along the pipeline right-of-way.
- Pruning of branches hanging over the right-of-way shall be done only when necessary for construction. Any branch that is broken or seriously damaged should be cut off near its fork and the collar of the branch preserved.
- All tree wastes, stumps, tree crowns, brushes, branches, and other forest debris shall be either burned, chipped (using a mobile chipper), or removed from the right-of-way according to Keystone instructions contained in the specific mitigation measures. Burial of this waste material on the site by the Contractor shall require the landowner's authorization. Chips must not be spread over cultivated land. However, they may be spread and incorporated with mineral soil over the forest floor at a density that shall not prevent revegetation of grass.
- Stump removal and brush clearing shall be done with bulldozers equipped with brush rakes to preserve organic matter.
- Decking sites shall be established: (1) approximately 2000 feet apart in timbered areas; (2) on sites located on approved temporary workspace in existing cleared areas; (3) in non-merchantable stands of timber; or (4) if no other options are available, in merchantable timber stands. Deck sites shall be appropriately sized to accommodate the loading equipment.
- If the landowner does not want the timber, the Contractor shall remove decked timber from the construction right-of-way and transport it to a designated all-weather access point or mill

4.14 Residential and Commercial/Industrial Areas

4.14.1 Residential and Commercial Areas

The principal measures that shall be used to mitigate impacts on existing residential and commercial areas include the following unless otherwise directed or approved by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- notifying landowners prior to construction;
- posting warning signs as appropriate;
- reducing the width of construction right-of-way, if practicable, by eliminating the construction equipment passing lane, reducing the size of work crews, or utilizing the “stove pipe” or “drag section” construction techniques;
- removing fences, sheds, and other improvements as necessary for protection from construction activities;
- to the extent possible, preserving mature trees and landscaping while ensuring the safe operation of construction equipment;
- fencing the edge of the construction work area that is within 25 feet to a residence for a distance of 100 feet on either side of the residence to ensure that construction equipment and materials, including the spoil pile, remain within the construction work area;
- limiting the hours during which operations with high-decibel noise levels (i.e., drilling and boring) can be conducted;
- limiting dust impact through prearranged work hours and by utilizing dust minimization techniques;
- ensuring that construction proceeds quickly through such areas, thus minimizing exposure to nuisance effects such as noise and dust;
- maintaining access and traffic flow during construction activities, particularly for emergency vehicles;
- cleaning up construction trash and debris daily;
- fencing or plating open ditches during non-construction activities;
- if the pipeline centerline is within 25 feet of a residence, ensuring that the trench is not excavated until the pipe is ready for installation and that the trench shall be backfilled immediately after pipe installation; and
- immediately after backfilling the trench, restoring all lawn areas, shrubs, specialized landscaping, fences, and other structures within the construction work area to its pre-construction appearance or the requirements of the landowner. Restoration work shall be done by personnel familiar with local horticultural and turf establishment practices.
- to the extent possible, preserving mature trees and landscaping while ensuring the safe operation of construction equipment;

4.14.2 Site-Specific Plans

For any residence or commercial/industrial building closer than 25 feet to the construction work area, Keystone shall prepare a site-specific construction plan. The plan shall include:

- a description of construction techniques to be used;
- a dimensioned site plan that shows, at a minimum:
  - the location of the residence or commercial/industrial area in relation to the new pipeline;
  - the edge of the construction work area;
  - the edge of the new permanent construction right-of-way; and
  - other nearby topographical obstacles including landscaping, trees, structures, roads, parking areas, ditches, and streams; and
- a description of how Keystone would ensure that the trench is not excavated until the pipe is ready for installation and that the trench is backfilled immediately after pipe installation.

4.14.3 Landowner Complaint Resolution Procedure

Keystone shall implement a landowner complaint procedure as follows:

- Landowners should first contact the construction spread office to express their concern over restoration or mitigation of environmental damages on their property. The Construction Manager or his designated representative shall respond to the landowner within 24 hours of receipt of the phone call.
- If the landowner has not received a response or is not satisfied with the response, he can contact Keystone's representative at 1-877-880-4881. The landowner should expect a response within 48 hours.

4.15 Fragile Soil Clean-up and Reclamation/Revegetation

4.15.1 General

Fragile soil types are a result of the high percentage of sand content that exists within the surficial soil. Theses soil types exist within regions found in southern South Dakota and central Nebraska and fragile due to their inherent high wind and water erosion potential, low water holding capacity and arid nature of the region, rolling to steep terrain and usually consists of predominantly native prairie landscapes and supports a variety of uses such as livestock grazing, wildlife habitat and recreational opportunities.

4.15.2 Right-of-way Construction

- KXL will educate construction personnel regarding these areas and the necessity to strictly adhere to Project Best Management Practices (BMPs) designed to minimize impacts.

- Minor route re-alignments will be incorporated through these areas to avoid particularly erosion-prone locations, such as ridge tops and existing blowouts as much as practicable.
- KXL will avoid highly saturated areas, such as wetland, to the maximum extent possible.
- Construction soil handling procedures will strive to reduce the width of disturbance to the native prairie landscape by adopting "Trench-line or Blade-width stripping procedures where practicable.
- Topsoil conservation will be conducted on all areas where excavation occurs.
- Topsoil piles will be protected from erosion through matting, mulching, watering or tackifying as deemed practicable.
- Traffic management limitations will be employed on specific areas possessing high erosion potential or sensitive habitat.

4.15.3 Right-of-Way Reclamation

- Native seed mixes will be developed with input from the local NRCS offices and through collaboration with regional experts. All seed will be certified noxious weed-free and will be calculated on a pure live seed (PLS) basis.
- Straw or native prairie hay may be used as mulch, applied to the right-of-way and crimped into the soil to prevent wind erosion. All mulch will be documented as noxious weed-free.
- Land imprinting may be employed to create impressions in the soil, thereby reducing erosion, improving moisture retention and creating micro-sites for seed germination.
- Sediment logs or straw wattles will be used in place of slope breakers (short terraces) that are constructed of soil. Using sediment logs will result in less soil disturbance to the right-of-way.
- Photodegradable matting will be applied on steep slopes or areas prone to extreme wind exposure such as north- or west-facing slopes and ridge tops. Biodegradable pins will be used in place of metal staples to hold the matting in place.
- Keystone will work with landowners to evaluate fencing the right-of-way from livestock, or alternatively, provide compensation to rest a pasture until vegetation can become established. Management concerns such as livestock access to water or movement within a pasture would be incorporated as necessary.

4.15.4 Post-Construction

Keystone is committed to post-construction monitoring and repair and will monitor reclamation on the right-of-way for several years and repair

erosion and reseed poorly revegetated areas as necessary. During monitoring, landowners are informed of our efforts and intentions.

A noxious weed management plan will be established on these lands pending consultation with state and county experts

4.16 Operations and Maintenance

Operations and maintenance programs, such as vegetation management, pipeline maintenance, integrity surveys, and hydrostatic testing, may have an impact on the final reclamation of the right-of-way. To ensure the integrity of the facility and land surface reclamation of the right-of-way is maintained after completion of construction and that regulatory requirements are adhered to during operations, the following measures shall be implemented unless otherwise directed by Keystone in response to site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Keystone shall monitor the pipeline right-of-way and all stream crossings for erosion or other potential problems that could affect the integrity of the pipeline. Any erosion identified shall be reclaimed as expediently as practicable by Keystone or by compensating to the landowner to reclaim the area.
- Trench depressions on ditch line that may interfere with natural drainage, vegetation establishment, or land use shall be repaired as expediently as practicable by Keystone or by compensating the landowner to repair the area.
- Post-construction monitoring inspections shall be conducted after the first growing season to determine the success of revegetation, unless otherwise required by permit. Areas which have not been successfully re-established shall be revegetated by Keystone or by compensation of the landowner to reseed the area. If, after the first growing season, revegetation is successful, no additional monitoring shall be conducted unless otherwise required by permit.
- In non-agricultural areas, revegetation shall be considered successful if, upon visual survey, the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed lands, unless otherwise required by permit.
- In agricultural areas, revegetation shall be considered successful if crop yields are similar to adjacent undisturbed portions of the same field.
- Restoration shall be considered successful if the surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless requested otherwise by the landowner or land managing agency), revegetation is successful, and drainage has been restored.
- Weed control measures shall be implemented as required by any applicable plan and in conjunction with the landowner.
- Keystone shall be responsible for correcting tile line or irrigation system

repairs that fail, provided those repairs were made by Keystone. Keystone shall not be responsible for tile line or irrigation system repairs which Keystone compensated the landowner to perform.

- When requested by owners in cultivated land, Keystone shall monitor the yield of land impacted by construction with the help of agricultural specialists. If yield deficiencies are indicated compared to yields on unaffected land, Keystone will compensate the landowner for reduced yields and shall implement procedures to return the land to equivalent capability.
- In residential areas, landowners may use the right-of-way provided they do not interfere with the rights granted to Keystone. Trees, bushes, structures, including houses, tool sheds, garages, poles, guy wires, catch basins, swimming pools, trailers, leaching fields, septic tanks, and any other objects not easily removable, shall not be permitted on the permanent construction right-of-way without the written permission of Keystone, because they could impair access for maintenance of the pipeline.
- Keystone shall maintain communication with the landowner and tenant throughout the operating life of the pipeline to allow expedient communication of issues and problems as they occur. Keystone shall provide the landowner with corporate contact information for these purposes. Keystone shall work with landowners to prevent excessive erosion on lands disturbed by construction. Reasonable methods shall be implemented to control erosion. These may not be implemented if the property across which the pipeline is constructed is bare cropland which the landowner intends to leave bare until the next crop is planted.
- If the landowner and Keystone cannot agree upon a reasonable method to control erosion on the landowner's property, the recommendations of the appropriate NRCS office shall be considered by Keystone and the landowner.

5.0 DRAIN TILE SYSTEMS

5.1 General

If underground drainage tile is damaged by the pipeline installation, it shall be repaired in a manner that ensures the tile line's proper operating condition at the point of repair. Keystone may elect to negotiate a fair settlement with the affected county or landowner for repair of the damaged drain tile. In the event the landowner chooses to have the damaged tile repaired by Keystone, the Contractor shall follow these guidelines and procedures to identify the location of drain tiles, to mitigate damages to drain tiles prior to and during construction, to repair drain tiles damaged during installation of the pipeline, to inspect the proper repair of drain tiles, and to provide post-construction monitoring to determine any impacts caused by repair of drain tiles. Since all public and private drain tile systems are unique, i.e., varying age, depth of cover, type of material, geometry on the land, etc., it is not possible to develop a standard procedure for resolving each county's or landowner's drain tile issues. These guidelines provide a basis on which to develop site specific methodology to mitigate damage and to repair drain tiles affected by construction of the Project. A typical right-of-way layout and typical orientation for crossing drain tiles is provided in Detail 25. Typical header and main

crossovers are provided in Details 26 and 27. Actual measures will be developed based on site-specific information unique to specific installations. However, all work will be conducted in accordance with applicable permits.

5.2 Identification and Classification of Drain Tile Systems

Personnel shall attempt to identify and classify existing drain tile systems by meeting with local public officials and county engineers, and individual private landowners and tenants.

5.2.1 Publicly Owned Drain Tiles

Personnel shall identify and meet with the responsible county or local authority responsible for publicly owned drain tiles. Publicly owned drain tiles shall be identified and documented on the Project's 1" = 2000' USGS quad strip maps and additional data collected for input into an electronic spreadsheet by county, township, range, and section; responsible agency; and size, type, and depth of cover (if known). This data shall be cross-referenced to the centerline survey to be completed by Keystone. Additionally, any public records including maps or easement instruments on the drain tiles shall be acquired as well as any requirements of the local authority for installation of the pipeline.

5.2.2 Privately Owned Drain Tiles

Right-of-way agents shall meet with landowners and tenants of privately owned land along the route. As a minimum, the right-of-way agents shall ascertain the data concerning drain tiles outlined in a landowner questionnaire. The questionnaire requests data concerning: type of drain tile system; size, type of material, and depth of cover; preference for repair of drain tiles; and identification of local drain tile contractors. These data shall be collected into an electronic spreadsheet for utilization by right-of-way personnel in negotiating payments for easements and damages and by engineering or construction personnel for inclusion in specifications for the construction Contractor.

5.3 Mitigation of Damage to Drain Tile Systems

Keystone shall undertake mitigation measures to reduce damage to publicly and privately owned drain tile systems prior to and during installation of the pipeline.

5.3.1 Non-interference with Drain Tile

The Project shall be installed at a depth of cover and elevation so as not to interfere with the elevation and grade of existing drain tiles where practicable. Where not practicable, Keystone shall pursue alternative mitigation measures mutually acceptable to the landowner and jurisdictional agencies. Typically, the pipeline shall be installed below the elevation of drain tiles with a minimum clearance of 12 inches. Detail 25, Typical Right-of-Way Layout/Soil Handling, represents a typical drain tile crossing by the

pipeline with additional temporary work space to facilitate handling of topsoil and trench spoil created by the additional depth of cover for the pipeline.

5.3.2 Non-disturbance of Drain Tile Mains

Publicly owned and privately owned drain tile mains shall be identified through the processes identified in Section 5.2. Drain tile mains are essential to the overall drainage system of a land area and if disturbed, may require excessive pumping/dewatering of the pipe trench unless temporarily repaired and maintained until permanently repaired.

Keystone shall review drain tile mains and consider their size, flow rate, type of material, depth of cover, and geographic location. If determined to be practicable and reasonable for construction, the drain tile main shall not be cut and repaired during mainline installation (a pipe section shall be left out and installed by a tie-in crew without damaging the drain tile main).

5.3.3 Relocation or Replacement of Existing Drain Tiles Prior to Construction

In many instances, drain tile systems that have been installed after the installation of adjacent existing pipelines were installed with “headers” parallel to the existing pipeline with periodic jump overs as depicted on Detail 26, Header/Main Crossovers of Keystone XL Pipeline. The distance of these headers from the existing pipeline may vary.

Some of these drain tile headers may be most effectively relocated and/or replaced to the east of the Project. The existing header will be capped and made into a single drain tile as depicted on Detail 27, Relocate/Replace Drainage Header/Main. This could reduce the number of drain tile crossings on a particular landowner’s property by a significant quantity, thereby reducing the risk that repairs will fail.

5.3.4 Future Drain Tiles/Systems

Keystone shall attempt to determine where public agencies and private landowners or tenants are proposing to install drain tile systems in the future. These locations shall be input into an electronic spreadsheet by county, township, range, and section; landowner or responsible public agency; and proposed size and depth of cover. Keystone shall endeavor to construct the pipeline at a depth and elevation to accommodate the future installation of the proposed drain tile systems.

5.3.5 Other Mitigation Measures

Other mitigation measures that may be implemented during installation of the pipeline are as follows:

- not removing topsoil from the working side of the construction right-of-way to prevent crushing of drain tile by heavy equipment;
- spreading ditch and spoil side topsoil (not subsoil) over the working side to provide additional soil depth to protect existing drain tiles;

- restricting the work of the pipe lower in crew if ground conditions are too wet to adequately support the heavy equipment;
- limiting travel of heavy equipment the working lane of the construction right-of-way where possible;
- limiting travel of heavy equipment to one pass over the drain tile per work crew where possible; and
- removing and replacing topsoil during drain tile replacement should tile be crushed on the working side of the right-of-way.

5.4 Responsibility for Repair of Drain Tile Systems

Temporary and permanent drain tile repairs shall be the responsibility of the Contractor. The physical repairs shall be made by qualified and experienced drain tile repair personnel.

5.4.1 Local Drain Tile Contractor Repair

Keystone shall identify and qualify local drain tile contractors in the geographical area of the pipeline route from interviews with local public officials, landowners, tenants, and drain tile contractors. The preferred responsibility for permanent repair of drain tiles shall be for the pipeline Contractor to subcontract the supervision and repair to local reputable drain tile contractors acceptable to the landowners and tenants.

5.4.2 Pipeline Contractor Repair

In the event local drain tile contractors are not available to subcontract the supervision and repair, permanent repair shall be made with the Contractor's supervision, equipment, and labor.

5.4.3 Landowner/Tenant Repair

The landowner or tenant may agree to take responsibility for the permanent repair of his drain tiles if not precluded by regulatory agency. The landowner or tenant shall be requested to ensure his ability to coordinate and complete the drain tile repair in a timely manner to allow the pipeline Contractor to completely backfill the damaged drain tile for repair by landowner/tenant in the immediate future. Keystone shall require that its representative be present to ensure the permanent drain tile repairs are made in accordance with the minimum requirements of this manual.

5.5 Drain Tile Repairs

The Contractor shall endeavour to locate all tile lines within the construction right-of-way prior to and during installation so repairs can be made if necessary.

5.5.1 Temporary Repairs During Construction

Drain tiles damaged or cut during the excavation of the trench shall be marked with a lath and ribbon in the spoil bank. Care shall be taken to

locate markers where the chance of disturbance shall be minimized and a written record maintained of each drain tile crossing. A work crew following the pipeline trench crew shall complete a temporary repair to allow continuing flow. Detail 28, Temporary Drain Tile Repair, depicts the materials and installation procedure to complete the temporary repair. If a drain tile line shall not be temporarily repaired, the open ends of the drain tile shall be screened to prevent entry of foreign materials and small animals.

5.5.2 Permanent Repairs

Permanent repairs shall be made for all drain tiles damaged by installation of the pipeline.

5.5.2.1 Ditch Line Only Repairs

If water is flowing through a damaged tile line, the tile line shall be immediately and temporarily repaired until such time that permanent repairs can be made. If tile lines are dry and water is not flowing, temporary repairs are not required if the permanent repair is made within 7 days of the time damage

occurred. The temporary repair shall be removed just prior to lowering in the pipeline.

Drain tiles must be permanently repaired before the pipeline trench is backfilled and within 14 days of construction completion, weather and soil conditions permitting. All tile lines shall be repaired with materials of the same or better quality as that which was damaged. The drain tile marker shall not be removed until the tile repairs have been inspected, approved, and accepted by Keystone's inspectors, the county inspectors, where applicable, and the landowner or tenant. Detail 29, Permanent Repair Method of Drain Tiles, depicts the minimum materials and installation procedure to complete a permanent repair.

5.5.2.2 Ditch Line and Temporary Work Space Repairs

Prior to making the permanent drain tile repair, the Contractor shall probe a segmented sewer rod with a plug that is not more than 15% smaller than the internal diameter of the drain tile to determine if additional damage has occurred to the drain tile. If the probe does not freely insert into the drain tile across the temporary workspace of pipeline construction, the Contractor shall excavate, expose, and repair the damaged drain tile to its original or better condition.

5.6 Inspection/Acceptance of Drain Tile Repairs

Drain tile repairs shall be inspected by Keystone construction inspectors, county inspectors, as applicable, and the landowner or tenant or his representative.

Keystone shall designate inspector(s) for the sole purpose and responsibility for inspection of all repairs of drain tiles. These inspectors shall be, if possible, employed from local drain tile installation contractors, local farmers with extensive drain tile experience, or previously employed or retired employees of local jurisdictions familiar with drain tile installation and repair. In the event that a sufficient quantity of inspectors from these sources is not available, Keystone shall conduct in-the-field training seminars on drain tile repair for additional inspection personnel.

Inspection personnel shall observe the permanent repair of all drain tiles to ensure the replacement drain tile is: (1) the proper size and type; (2) installed at the proper grade; (3) properly supported and backfill beneath the drain tile is properly placed and compacted; and (4) properly tied into the existing drain tile. The inspection shall be documented on the Drain Tile Inspection Report Form.

A drain tile repair shall not be accepted until Keystone's construction inspector and the landowner or tenant or designated representative approves the inspection form.

6.0 WETLAND CROSSINGS

6.1 General

Wetland boundaries shall be clearly marked in the field with signs and/or highly visible flagging during construction.

In the event a waterbody crossing is located within or adjacent to a wetland crossing, the measures of both Section 6 - Wetland Crossings and Section 7 - Waterbodies and Riparian Lands shall be implemented to the extent practicable.

A dry wetland is defined in Section 6.5.1. In these wetlands, equipment can traverse the wetland without the support of mats or timber riprap.

A standard wetland environment typically has soils that are saturated and non-cohesive. Difficult trenching conditions are likely resulting in excessively wide trenches. In these wetland environment types, supplemental support in the form of timber riprap or prefabricated equipment mats may be required for construction equipment to safely and efficiently operate.

A flooded wetland involves the presence of standing water over much of the wetland area. Equipment typically cannot traverse the wetland and must generally move around that portion of the area. Access is typically limited to marsh backhoes or equipment working from flexifloats or equivalents.

Keystone may allow modification of the following specifications as necessary to accommodate site-specific conditions or procedures. Any modifications must still comply with all applicable regulations and permits.

6.2 Easement and Workspace

The Contractor shall maintain wetland boundary markers during construction in all areas and until permanent seeding is complete in non-cultivated areas.

The width of the construction right-of-way shall be reduced to 85 feet or less in standard wetlands unless non-cohesive soil conditions require utilization of a greater width and unless the USACE or other regulatory authority authorizes a greater width.

The Contractor shall locate extra work areas (such as staging areas and additional spoil storage areas) shall be at least 10 feet away from wetland boundaries, where topographic conditions permit.

The Contractor shall limit clearing of vegetation between extra work areas and the edge of the wetland to the construction right-of-way and limit the size of extra work areas to the minimum needed to construct the wetland crossing.

6.3 Vehicle Access and Equipment Crossing

The only access roads, other than the construction right-of-way, that the Contractor shall use in wetlands are those existing public roads and private roads acquired by Keystone from the landowner shown on the construction drawings.

To the extent practicable, the Contractor's construction equipment operating in saturated wetlands or wetlands with standing water shall be limited to that needed to clear the construction right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction right-of-way.

If equipment must operate within a wetland containing standing water or saturated soils, the Contractor shall use the following methods for equipment access unless otherwise approved by Keystone based on site-specific conditions:

- wide-track or balloon-tire construction equipment; and
- conventional equipment operated from timber and slash (riprap) cleared from the right-of-way, timber mats, or prefabricated equipment mats.

6.4 Temporary Erosion and Sediment Control

The Contractor shall install sediment barriers across the entire construction right-of-way immediately upslope of the wetland boundary at all standard wetland crossings, as necessary, to prevent sediment flow into the wetland. Sediment barriers must be properly maintained by the Contractor throughout construction and reinstalled as necessary. In the travel lane, these may incorporate removable sediment barriers or drivable berms. Removable sediment barriers can be removed during the construction day, but shall be re-installed after construction has stopped for the day or when heavy precipitation is imminent. The Contractor shall maintain sediment barriers until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. The Contractor shall not install sediment barriers at wetlands designated as "dry" unless otherwise specified by Keystone.

Where standard wetlands are adjacent to the construction right-of-way, the Contractor shall install sediment barriers along the edge of the construction right-of-way as necessary to prevent a sediment flow into the wetland.

6.5 Wetland Crossing Procedures

The following general mitigative procedures shall be followed by the Contractor in all wetlands unless otherwise approved or directed by Keystone based on site-specific conditions. All work shall be conducted in accordance with applicable permits.

- limit the duration of construction-related disturbance within wetlands to the extent practicable;

- use no more than two layers of timber riprap to stabilize the construction right-of-way;
- cut vegetation off at ground level leaving existing root systems in place and remove it from the wetland for disposal;
- limit pulling of tree stumps and grading activities to directly over the trench line unless safety concerns require the removal of stumps from the working-side of the construction ROW;
- segregate a maximum of 12 inches of topsoil from the area disturbed by trenching in dry wetlands, where practicable;
- restore topsoil to its approximate original stratum, after backfilling is complete;
- dewater the trench in a manner to prevent erosion and heavily silt-laden flowing directly into any wetland or waterbody;
- remove all timber riprap and prefabricated equipment mats upon completion of construction;
- locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable;
- prohibit storing hazardous materials, chemicals, fuels, lubricating oils, or perform concrete coating activities in a wetland, or within 100 feet of any wetland boundary;
- perform all equipment maintenance and repairs upland locations at least 100 feet from waterbodies and wetlands;
- avoid parking equipment overnight within 100 feet of a watercourse or wetland;
- prohibit washing equipment in streams or wetlands;
- install trench breakers and/or seal the trench to maintain the original wetland hydrology, where the pipeline trench may drain a wetland;
- attempt to refuel all construction equipment in an upland area at least 100 feet from a wetland boundary (otherwise follow the procedures outlined in Section 3); and
- avoid sand blasting in wetlands to the extent practicable. If sandblasting is performed within a wetland, the Contractor shall place a tarp or suitable material in such a way as to collect as much waste shot as possible and dispose of the collected waste. The Contractor shall clean up all visible deposits of wastes and dispose of the waste at an approved disposal facility.

Specific procedures for each type of wetland crossing method are listed below and shall be designated on the construction drawings but may be modified depending on site conditions at the time of construction. All work shall be conducted in accordance with applicable permits.

6.5.1 Dry Wetland Crossing Method

Topsoil shall be segregated. Pipe stringing and fabrication may occur within the wetland adjacent to the trench line or adjacent to the wetland in a designated extra workspace.

The dry wetland crossing procedure depicted in Detail 8 shall be used where this type of wetland is identified on the construction drawings. The following are exceptions to standard wetland crossing methods:

- The width of the construction right-of-way for upland construction is maintained through the wetland.
- Where extra work areas (such as staging areas and additional spoil storage areas) are designated on the construction drawings, they may be placed no closer than 10 feet from the wetland's edge.
- Seeding requirements for agricultural lands shall be applied to farmed wetlands.

6.5.2 Standard Wetland Crossing Method

Topsoil stripping is impracticable due to the saturated nature of the soil. Pipe stringing and fabrication may occur within the wetland adjacent to the trench line or adjacent to the wetland in a designated extra workspace. Based upon the length of a standard wetland crossing and presence of sufficient water to float the pipe, the Contractor may elect to install a standard wetland crossing utilizing the “push/pull” method.

The standard wetland crossing procedure depicted in Detail 9 shall be used where this type of wetland is identified on the construction drawings.

Procedures unique to standard wetlands include:

- limiting construction right-of-way width to a maximum of 85 feet unless site conditions warrant a wider width;
- utilizing low-ground-pressure construction equipment or support equipment on timber riprap or timber mats; and
- installing sediment barriers across the entire right-of-way where the right-of-way enters and exits the wetland.

6.5.3 Flooded Push/Pull Wetland Crossing Method

Where standing surface water or high groundwater levels make trenching difficult, trench widths up to 35 feet are common. Topsoil stripping is impossible due to the flooded conditions. Pipe stringing and fabrication is required adjacent to the wetland in a designated extra workspace. Using floatation devices, the pipe string is pushed and pulled from the extra workspace to the trench.

The Push/Pull wetland crossing procedure as depicted in Detail 10 shall be used where water is sufficient to float the pipeline in the trench and other site conditions allow.

Clean metal barrels or Styrofoam floats may be used to assist in the flotation of the pipe. Metal banding shall be used to secure the barrels or floats to the pipe. All barrels, floats, and banding shall be recovered and removed upon completion of lower in. Backfill shall not be allowed before recovery of barrels, floats, and banding.

6.6 Restoration and Reclamation

All timber riprap, timber mats, and prefabricated equipment mats and other construction debris shall be removed upon completion of construction. As much as is feasible, the Contractor shall replace topsoil and restore original contours with no crown over the trench. Any excess spoil shall be removed from the wetland. The Contractor shall stabilize wetland edges and adjacent upland areas by establishing permanent erosion control measures and revegetation, as applicable, during final clean up.

For each standard wetland crossed, the Contractor shall install a permanent slope breaker and trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. The Contractor shall locate the trench breaker immediately upslope of the slope breaker.

The Contractor shall not use fertilizer, lime, or mulch in wetlands unless required in writing by the appropriate land management agency.

All wetland areas within conservation lands or easements will be restored to a level consistent with any additional criteria established by the relevant managing agency.

7.0 WATERBODIES AND RIPARIAN AREAS

7.1 General

The Contractor shall comply with requirements of all permits issued for the waterbody crossings by federal, state or local agencies.

Waterbody includes any areas delineated as jurisdictional natural or artificial stream, river, or drainage, and other permanent waterbodies such as ponds and lakes:

- Minor Waterbody includes all waterbodies less than or equal to 10 feet wide at the water's edge at the time of construction.
- Intermediate Waterbody includes all waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge at the time of construction.
- Major Waterbody includes all waterbodies greater than 100 feet wide at the water's edge at the time of construction.

In the event a waterbody crossing is located within or adjacent to a wetland crossing, the Contractor, to the extent practicable, shall implement the provisions of both Section 6 - Wetland Crossings and Section 7 - Waterbodies and Riparian Areas.

The Contractor shall supply and install advisory signs in a readily visible location along the construction right-of-way at a distance of approximately 100 feet on each side of the crossing and on all roads which provide direct construction access to waterbody crossing sites. Signs shall be supplied, installed, maintained, and then removed upon completion of the Project. Additionally, signs shall be supplied and installed by the Contractor on all intermediate and major waterbodies accessible to recreational boaters warning boaters of pipeline construction operations.

The Contractor shall not store hazardous materials, chemicals, fuels, lubricating oils, or perform concrete coating within 100 feet of any waterbody. The Contractor shall not refuel construction equipment within 100 feet of any waterbody. If the Contractor must refuel construction equipment within 100 feet of a waterbody, it must be done in accordance with the requirements outlined in Section 3. All equipment maintenance and repairs will be performed in upland locations at least 100 feet from waterbodies and wetlands. All equipment parked overnight shall be at least 100 feet from a watercourse or wetland, if possible. Equipment shall not be washed in streams or wetlands.

Throughout construction, the Contractor shall maintain adequate flow rates to protect aquatic life and to prevent the interruption of existing downstream uses.

Keystone may allow modification of the following specifications as necessary to accommodate specific situations or procedures. Any modifications must comply with all applicable regulations and permits. Keystone will complete site-specific

crossing plans for certain waterbody crossings if required by the applicable regulatory agencies during federal or state permitting processes.

7.2 Easement and Work Space

The permanent easement, temporary work space, additional temporary work space, and any special restrictions shall be depicted on the construction drawings. The work shall be contained within these areas and be limited in size to the minimum required to construct the waterbody crossing.

The Contractor shall locate all extra work areas (such as staging areas and additional spoil storage areas) at least 10 feet from the water's edge if practicable.

At all waterbody crossings, the Contractor shall install flagging across the construction right-of-way at least 10 feet from the water's edge prior to clearing and ensure that riparian cover is maintained where practicable during construction.

7.3 Vehicle Access and Equipment Crossings

The Contractor shall inspect equipment for fluid leaks prior to entering or crossing over waterbodies.

Equipment bridges shall be installed at all flowing waterbodies and as directed by the Keystone EI. Equipment crossings shall be constructed as described in Details 16, 17
and/or 18.

Equipment crossings shall be perpendicular to drainage bottoms wherever possible.

Erosion and sediment control barriers will be installed and maintained around vehicle access points as necessary to prevent sediment from reaching the waterway.

The Contractor shall be responsible for the installation, maintenance, and removal of all temporary access crossings including portable bridges, bridges made from timber or mats, flumes, culverts, sand bags, subsoil, coarse granular material, and riprap.

The Contractor shall ensure that culverts and flumes are sized and installed of sufficient diameter to accommodate the existing flow of water and those that may potentially be created by sudden runoffs. Flumes shall be installed with the inlet and outlet at natural grade if possible.

Where bridges, culverts or flumes are installed across the work area, the Contractor shall be responsible for maintaining them (e.g. preventing collapse, clogging or tilting). All flumes and culverts shall be removed as soon as possible upon completion of construction.

The width of the temporary access road across culverts and flumes and the design of the approaches and ramps shall be adequate for the size of vehicle and equipment access required. The ramps shall be of sufficient depth and constructed to prevent collapse of the flumes, and the approaches on both sides of the flume shall be feathered.

Where culverts are installed for access, the culvert shall be of sufficient length to convey the stream flow through the construction zone.

The Contractor shall maintain equipment bridges to prevent soil from entering the waterbody.

7.4 Waterbody Crossing Methods

Construction methods pertinent to waterbody crossings are presented below. Selection of the most appropriate method at each crossing shall be depicted on the construction drawings but may be amended or changed based on site-specific conditions (i.e., environmental sensitivity of the waterbody, depth, and rate of flow, subsurface soil conditions, and the expected time and duration of construction) at the time of crossing. Construction will involve dry-ditch techniques at crossings where the timing of construction does not adequately protect environmentally sensitive waterbodies, as determined by the appropriate regulatory authority. Where required, horizontal directional drilling (HDD) will be used at designated major and sensitive waterbodies crossings. Each waterbody crossing shall be accomplished using one of the following construction methods:

- Non-flowing Open Cut Crossing Method - (Detail 11)
- Flowing Open Cut Crossing Method – Minor, Intermediate or Major Waterbody - (Detail 12)
- Flowing Stream Crossing – Dry Flume Method - (Detail 13)
- Flowing Stream Crossing – Dry Dam-and-Pump Method - (Detail 14)
- Horizontal Directional Drill Crossing - (Detail 15)
- Horizontal Bore Crossing - (Detail 21)

In conjunction with the appropriate jurisdictional agency, Keystone will develop specific crossing plans for major water bodies that contain recreationally or commercially important fisheries, or are classified as special use. Keystone will consult with state fisheries agencies with respect to applicable construction windows for each crossing and develop specific construction and crossing methods for open cuts in conjunction with USACE permitting and USFWS consultation.

7.4.1 Non-flowing Open Cut Crossing Method

The Contractor shall utilize the Non-flowing Open Cut Crossing Method (Detail 11) for all waterbody crossings (ditches, gullies, drains, swales, etc.) with no perceptible flow at the time of construction. Should site conditions change and the waterbody is flowing at the time of

construction, the Contractor shall install the crossing utilizing the Flowing Open Cut Crossing Method (Detail 12) unless otherwise approved by Keystone.

7.4.2 Flowing Open Cut Crossing Method of Minor, Intermediate, and Major Waterbodies

For minor waterbody crossings, except where the flume method is used, the Contractor shall complete construction in the waterbody (not including blasting, if required) as shown on Detail 12 within 24 hours if practicable.

For intermediate waterbodies, the Contractor shall attempt to complete trenching and backfill work within the waterbody (not including blasting if required) within 48 hours if practicable as shown on Detail 12.

The Contractor shall construct each major waterbody crossing in accordance with a site-specific plan as shown in the construction drawings. The Contractor shall complete in-stream construction activities as expediently as practicable.

7.4.3 Flowing Stream Crossing – Dry Flume Method

Where required, the Contractor shall utilize the Flowing Open Cut Crossing – Dry Flume Method as shown on Detail 13 with the following "dry ditch" techniques:

- Flume pipe shall be installed after blasting (if necessary), but before any trenching.
- Sand bag, sand bag and plastic sheeting diversion structure, or equivalent shall be used to develop an effective seal and to divert stream flow through the flume pipe (some modifications to the stream bottom may be required in order to achieve an effective seal).
- Flume pipe(s) shall be aligned to prevent bank erosion and streambed scour.
- Flume pipe shall not be removed during trenching, pipe laying, or backfilling activities, or initial streambed restoration efforts.
- All flume pipes and dams that are not also part of the equipment bridge shall be removed as soon as final clean up of the stream bed and bank is complete.

7.4.4 Flowing Stream Crossing – Dry Dam-and-Pump Method

Where specified in the construction drawings, the Contractor shall utilize the Flowing Open Cut Crossing – Dry Dam-and-Pump Method as shown on Detail 14. The dam-and-pump crossing method shall meet the following performance criteria:

- sufficient pumps to maintain 1.5 times the flow present in the stream at the time of construction;

- at least one back up pump available on site;
- dams constructed with materials that prevent sediment and other pollutants from entering the waterbody (e.g., sandbags or clean gravel with plastic liner);
- screen pump intakes installed;
- streambed scour prevented at pump discharge; and
- dam and pumps shall be monitored to ensure proper operation throughout the waterbody crossing.

7.4.5 Horizontal Directional Drill Crossings

Where required, the horizontal directional drill method as shown on Detail 15 shall be utilized for designated major and sensitive waterbodies. The Contractor shall construct each directional drill waterbody crossing in accordance with a site specific plan as shown in the construction drawings.

Drilling fluids and additives utilized during implementation of a directional drill shall be non-toxic to the aquatic environment.

The Contractor shall develop a contingency plan to address a frac-out during a directional drill. The plan shall include instructions for monitoring during the directional drill and mitigation in the event that there is a release of drilling fluids. Additionally, the waterbody shall be monitored downstream by the Contractor for any signs of drilling fluid.

The Contractor shall dispose of all drill cuttings and drilling mud as permitted by the appropriate regulatory authority at a Keystone-approved location. Disposal options may include spreading over the construction right-of-way in an upland location approved by Keystone or hauling to an approved licensed landfill or other site approved by Keystone.

7.4.6 Horizontal Bore Crossings

Where required, the horizontal bore method as shown on Detail 21 shall be utilized for crossing waterbodies. The Contractor shall construct each horizontal bore waterbody crossing in accordance with a site specific plan as shown in the construction drawings.

7.5 Clearing

Except where rock is encountered and at non-flowing open cut crossings, all necessary equipment and materials for pipe installation must be on site and assembled prior to commencing trenching in a waterbody. All staging areas for materials and equipment shall be located at least 10 feet from the waterbody edge. The Contractor shall preserve as much vegetation as possible along the waterbody banks while allowing for safe equipment operation.

Clearing and grubbing for temporary vehicle access and equipment crossings shall be carefully controlled to minimize sediment entering the waterbody from the construction right-of-way.

Clearing and grading shall be performed on both sides of the waterbody prior to initiating any trenching work. All trees shall be felled away from watercourses.

Plant debris or soil inadvertently deposited within the high water mark of waterbodies shall be promptly removed in a manner that minimizes disturbance of the waterbody bed and bank. Excess floatable debris shall be removed above the high water mark from areas immediately above crossings.

Vegetation adjacent to waterbody crossings by horizontal directional drill or boring methods shall not be disturbed except by hand clearing as necessary for drilling operations.

7.6 Grading

The construction right-of-way adjacent to the waterbody shall be graded so that soil is pushed away from the waterbody rather than towards it whenever possible.

In order to minimize disturbance to woody riparian vegetation within extra workspaces adjacent to the construction right-of-way at waterbody crossings, the Contractor shall minimize grading and grubbing of waterbody banks. To the extent practicable, grubbing shall be limited to the ditch line plus an appropriate width to accommodate safe vehicle access and the crossing.

7.7 Temporary Erosion and Sediment Control

The Contractor shall install and maintain sediment barriers across the entire construction right-of-way at all flowing waterbody crossings.

The Contractor shall install sediment barriers immediately after initial disturbance of the waterbody or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete.

Where waterbodies are adjacent to the construction right-of-way, the Contractor shall install and maintain sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way.

7.8 Trenching

The following requirements apply to all waterbody crossings except those being installed by the non-flowing open cut crossing method.

All equipment and materials shall be on site before trenching in the active channel of all minor waterbodies containing state-designated fisheries, and in

intermediate and major waterbodies. All activities shall proceed in an orderly manner without delays until the trench is backfilled and the stream banks stabilized. The Contractor shall not begin in-stream activity until the in-stream pipe section is complete and ready to be installed in the waterbody.

The Contractor shall use trench plugs at the end of the excavated trench to prevent the diversion of water into upland portions of the pipeline trench and to keep any accumulated upland trench water out of the waterbody. Trench plugs must be of sufficient size to withstand upslope water pressure.

The Contractor shall conduct as many in-stream activities as possible from the banks of the waterbodies. The Contractor shall limit the use of equipment operating in waterbodies to that needed to construct each crossing.

The Contractor shall place all spoil from minor and intermediate waterbody crossings and upland spoil from major waterbody crossings in the construction right-of-way at least 10 feet from the water's edge or in additional extra work areas. No trench spoil, including spoil from the portion of the trench across the stream channel, shall be stored within a waterbody unless the crossing cannot be reasonably completed without doing so.

The Contractor shall install and maintain sediment barriers around spoil piles to prevent the flow of spoil into the waterbody.

Spoil removed during ditching shall be used to backfill the trench usually with a backhoe, clamshell, or a dragline working from the waterbody bank. Sand, gravel, rockshield, or fill padding shall be placed around the pipe where rock is present in the channel bottom.

7.9 Pipe Installation

The following requirements apply to all waterbody crossings except those being installed by the non-flowing open cut crossing method.

A "free stress" pipe profile shall be used at all minor, intermediate, and major waterbodies with gradually sloping stream banks. The "box bend" pipe profile may be used for intermittent and major waterbodies with steep stream banks.

The trench shall be closely inspected to confirm that the specified cover and adequate bottom support can be achieved, and shall require Keystone approval prior to the pipe being installed. Such inspections shall be performed by visual inspection and/or measurement by a Keystone representative. In rock trench, the ditch shall be adequately padded with clean granular material to provide continuous support for the pipe.

The pipe shall be pulled into position or lowered into the trench and shall, where necessary, be held down by suitable negative buoyancy control, as-built recorded and backfilled immediately to prevent the pipe from floating.

The Contractor shall provide sufficient approved lifting equipment to perform the pipe installation in a safe and efficient manner. As the coated pipe is lowered in,

it shall be prevented from swinging or rubbing against the sides of the trench. Only properly manufactured slings, belts, and cradles suitable for handling coated pipe shall be used. All pipes shall be inspected for coating flaws and/or damage as it is being lowered into the trench. Any damage to the pipe or coating shall be repaired.

7.10 Backfilling

The following requirements apply to all waterbody crossings except those being installed by the non-flowing open cut crossing method.

Trench spoil excavated from waterbodies shall be used to backfill the trench across waterbodies.

After lowering in is complete, but before backfilling, the line shall be re-inspected to ensure that no skids, brush, stumps, trees, boulders, or other debris is in the trench. If discovered, such materials or debris shall be removed from the trench prior to backfilling.

For each major waterbody crossed, the Contractor shall install a trench breaker at the base of slopes near the waterbody unless otherwise directed by Keystone based on site specific conditions. The base of slopes at intermittent waterbodies shall be assessed on site and trench breakers installed only where necessary.

Slurred muck or debris shall not be used for backfill. At locations where the excavated native material is not acceptable for backfill or must be supplemented, the Contractor shall provide granular material approved by Keystone.

If specified in the construction drawings, the top of the backfill in the stream shall be armored with rock riprap or bio-stabilization materials as appropriate.

7.11 Stabilization and Restoration of Stream Banks and Slopes

The Contractor will restore the contours of the bed and banks of all waterways immediately after pipe installation and backfill, except over the travel lane. Travel lanes and bridges may stay in place until hydrostatic testing and cleanup are complete. All materials used to support construction activities will be removed from waterbodies and wetlands, including, but not limited to, flumes, mats, plastic sheeting, and sandbags.

The stream bank contour shall be re-established. All debris shall be removed from the streambed and banks. Stream banks shall be stabilized and temporary sediment barriers shall be installed within 24 hours of completing the crossing if practicable.

Approach slopes shall be graded to an acceptable slope for the particular soil type and surface run off controlled by installation of permanent slope breakers. Where considered necessary, the integrity of the slope breakers shall be ensured by lining with erosion control blankets.

Immediately following reconstruction of the stream banks, the Contractor shall install seed and flexible channel liners on waterbody banks as shown in Detail 19.

If the original stream bank is excessively steep and unstable or flow conditions are severe, or if specified on the construction drawings, the banks shall be stabilized with rock riprap, gabions, stabilizing cribs, or bio-stabilization measures to protect backfill prior to reestablishing vegetation.

Stream bank riprap structures shall consist of a layer of stone, underlain with approved filter fabric or a gravel filter blanket in accordance with Detail 20. Riprap shall extend from the stabilized streambed to the top of the stream bank. Where practicable, native rock shall be utilized.

Bio-stabilization techniques which may be considered for specific crossings are shown in Details 23 and 24.

The Contractor shall remove equipment bridges as soon as possible after final clean up.

8.0 HYDROSTATIC TESTING

8.1 Testing Equipment Location

The Contractor shall provide for the safety of all pipeline construction personnel and the general public during hydrostatic test operations by placing warning signs in populated areas.

The Contractor shall locate hydrostatic test manifolds 100 feet outside wetlands and riparian areas to the maximum extent practicable.

8.2 Test Water Source and Discharge Locations

Keystone is responsible for acquiring all permits required by federal, state and local agencies for procurement of water and for the discharge of water used in the hydrostatic testing operation. Keystone shall provide the Contractor with a copy of the appropriate withdrawal/discharge permits for hydrostatic test water. The Contractor shall keep water withdrawal/discharge permits on site at all times during testing operations.

Any water obtained or discharged shall be in compliance with permit notice requirements and with sufficient notice for Keystone's Testing Inspector to make water sample arrangements prior to obtaining or discharging water. Keystone will obtain water samples for analysis from each source before filling the pipeline. In addition, water samples will be taken prior to discharge of the water, as required by state and federal permits.

In some instances sufficient quantities of water may not be available from the permitted water sources at the time of testing. Withdrawal rates may be limited as stated by the permit. Under no circumstances shall an alternate water source be used without prior authorization from Keystone.

The Contractor shall be responsible for obtaining any required water analyses from each source to be used in sufficient time to have a lab analysis performed prior to any filling operations. The sample bottle shall be sterilized prior to filling with the water sample. The analysis shall determine the pH value and total suspended solids. Each bottle shall be marked with:

- source of water with pipeline station number;
- date taken;
- laboratory order number; and
- name of person taking sample.

Staging/work areas for filling the pipeline with water will be located a minimum of 100 feet from the waterbody or wetland boundary if topographic conditions permit. The Contractor will install temporary sediment filter devices adjacent to all streams to prevent sediments from leaving the construction site.

The Contractor shall screen the intake hose to prevent the entrainment of fish or debris. The hose shall be kept at least 1 foot off the bottom of the waterbody. Refueling of construction equipment shall be conducted a minimum distance of 100 feet from the stream or a wetland. Pumps used for hydrostatic testing within 100 feet of any waterbody or wetland shall be operated and refueled in accordance with Section 3.

During hydrostatic test water withdrawals, the Contractor will maintain adequate flow rates in the waterbody to protect aquatic life and provide for downstream uses, in compliance with regulatory and permit requirements.

The Contractor shall not use chemicals in the test water. The Contractor shall not discharge any water containing oil or other substances that are in sufficient amounts as to create a visible color film or sheen on the surface of the receiving water.

Selected road, railroad, and river crossing pipe sections may be specified to be pre-tested for a minimum of 4 hours. The water for pre-testing of any road and railroad crossings shall be hauled by a tanker truck from an approved water source. Water for pre-testing of a river crossing may be hauled or taken from the respective river if it is an approved water source. Since the volume of water utilized in these pre-tests shall be relatively small, the water shall be discharged overland along the construction right-of-way and allowed to soak into the ground utilizing erosion and sediment control mitigative measures.

Selection of final test water sources will be determined based on site conditions at the time of construction and applicable permits.

8.3 Filling the Pipeline

After final positioning of the pipe, the Contractor shall fill the pipe with water. Pipe ends shall not be restrained during the fill. The fill pump shall be set on a metal catch pan of sufficient dimensions to contain all leaking lubricants or fuel and prevent them from entering the water source. The suction inlet must be placed in a screened enclosure located at a depth that shall not allow air to be drawn in with the water. The screened enclosure shall be such that the fill water is free of organic or particulate matter.

The Contractor shall provide a filter of the back flushing or cartridge type with a means of cleaning without disconnecting the piping. The filter shall have the specifications of 100 mesh screen. If the cartridge type is used, a sufficient quantity of cartridges shall be on hand at the filter location. The Contractor shall install the filter between the fill pump and the test header. The Contractor shall be responsible for keeping the back flush valve on the filter closed during the filling operation. The Contractor shall be responsible for the proper disposal of materials back flushed from the filter or filter cartridges. The Contractor shall not be allowed to back flush the filter into the stream or other water source.

During water-filling of the pipeline, the Contractor shall employ fill pumps capable of injecting water into the pipeline at a maximum rate of approximately 0.7 to 1.0 mile per hour, except as limited by permits or the maintenance of adequate flow rates in the waterbody, as follows:

Nominal OD	Max GPM
36”	3000

The Contractor shall maintain flow rates as necessary to protect aquatic life, provide for all waterbody uses, and provide for downstream withdrawals of water by existing users.

In areas where zebra mussels are known to occur, all equipment used during the hydrostatic test withdrawal and discharge will be thoroughly cleaned before being used at subsequent hydrostatic test locations to prevent the transfer of zebra mussels or their larvae (veligers) to new locations.

8.4 Dewatering the Pipeline

The Contractor shall comply with state-issued NPDES permits for discharging test water.

The Contractor shall not discharge any water containing oil or other substances that are in sufficient amounts as to create a visible color film on the surface of the receiving water.

The Contractor shall not discharge into state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and local permitting agencies grant written permission.

To avoid impacts from introduced species, no inter-basin transfers (discharge) of hydrostatic test water will occur.

The discharge operation will be monitored and water samples will be taken prior to the beginning of the discharge to ensure that it complies with the Project and permit requirements. If required by state permits, additional water quality testing will be conducted during discharge, in accordance with permit conditions.

The Contractor shall calculate, record, and provide to Keystone the day, date, time, location, total volume, maximum rate, and methods of all water discharged to the ground or to surface water in association with hydrostatic testing.

The Contractor shall regulate the pig velocity discharge rate (3000 gpm maximum), use energy dissipation devices, and install sediment barriers, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive stream flow. Water must be disposed of using good engineering judgment so that all federal, state, and local environmental standards are met. Dewatering lines shall be of sufficient strength and be securely supported and tied down at the discharge end to prevent whipping during this operation.

To reduce the velocity of the discharge, The Contractor shall utilize an energy-dissipating device described as follows:

8.4.1 Splash Pup

A splash pup consists of a piece of large diameter pipe (usually over 20" outside diameter) of variable length with both ends partially blocked that is welded perpendicularly to the discharge pipe. As the discharge hits against the inside wall of the pup, the velocity is rapidly reduced and the water is allowed to flow out either end. A variation of the splash pup concept, commonly called a diffuser, incorporates the same design, but with capped ends and numerous holes punched in the pup to diffuse the energy.

8.4.2 Splash Plate

The splash plate is a quarter section of 36-inch pipe welded to a flat plate and attached to the end of a 6-inch discharge pipe. The velocity is reduced by directing the discharge stream into the air as it exits the pipe. This device is also effective for most overland discharge.

8.4.3 Plastic Liner

In areas where highly erodible soils exist or in any low flow drainage channel, it is a common practice to use layers of Visqueen (or any of the new construction fabrics currently available) to line the receiving channel for a short distance. One anchoring method may consist of a small load of rocks to keep the fabric in place during the discharge. Additional best management practices, such as the use of plastic sheeting or other material to prevent scour, will be used as necessary to prevent excessive sedimentation during dewatering.

8.4.4 Straw Bale Dewatering Structure

Straw bale dewatering structures are designed to dissipate and remove sediment from the water being discharged. Straw bale structures are used for on land discharge of wash water and hydrostatic test water and in combination with other energy dissipating devices for high volume discharges. A straw bale dewatering structure is shown In Detail 6. A dewatering filter bags may be sued as an alternative to show bale dewatering structures. A dewatering filter bag is shown in Detail 5.

Typical Drawing Index

NOTE: **The following typical drawings are included for ease of reference.**

- Details 1 through 31 can be found in the Construction Mitigation and Reclamation Plan

REVISIONS
01 2008-11-05 REVISED TITLES, ADDED/DEL. DETAILS
02 2010-10-08 REVISED TITLES
03 2010-10-11 REVISED TITLE BLOCK

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DESIGNER: JMP (NAME) 2010-10-21 (DATE)
CHECKED BY: WSF
DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT
FIA # 4359 | CHAINAGE: | DISCIPLINE # 03
TITLE: DETAIL INDEX
SCALE N.T.S. | DWG No 4359-03-ML-00-700 | REV 03

TC_A4_BR.DWG 8.5X11

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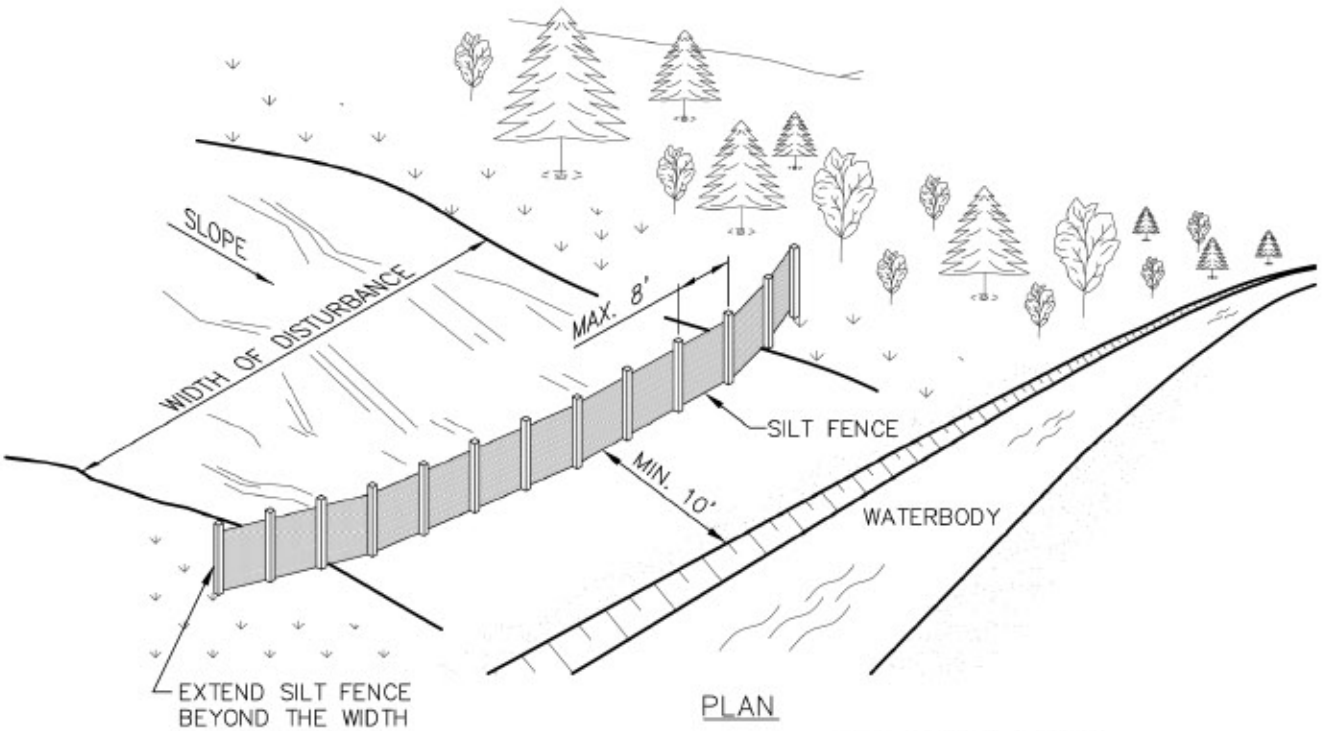
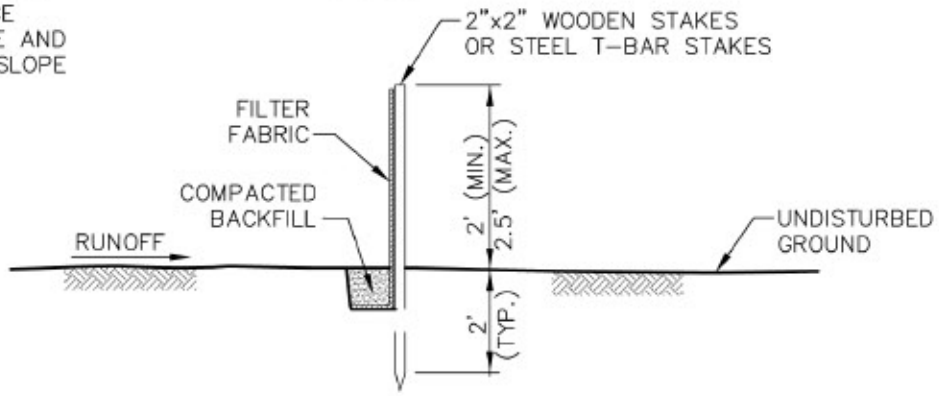
THESE ARE TYPICAL DRAWINGS; ACTUAL SITE CONDITIONS MAY VARY FROM THE SITE GRAPHICALLY REPRESENTED.



PLAN



SECTION "A-A"

NOTES:

1. MATERIAL SHOULD BE WOVEN GEOTEXTILE FABRIC SUCH AS EXXON GTF 180 OR MIRAFI 600X, OR AN APPROVED EQUIVALENT. SECONDARY REINFORCEMENT, SUCH AS A CONSTRUCTION BARRIER FENCE OR WIRE MESH CAN ALSO BE USED BEHIND THE FILTER FABRIC.
2. SILT FENCE TO BE REINFORCED WITH 2"x2" WOODEN STAKES OR STEEL T-BAR STAKES PLACED EVERY 8' OR CLOSER AS CONDITIONS REQUIRE.
3. ATTACH FILTER FABRIC AT EACH POST AT A MINIMUM OF 3 LOCATIONS.
4. THE FILTER FABRIC MINIMUM LENGTH OF 1' IS TO BE ANCHORED IN A TRENCH WITH WELL COMPACTED BACKFILL OVER THE FABRIC TO PREVENT UNDERMINING.
5. TO ELIMINATE POSSIBLE END FLOW, BOTH ENDS OF THE SILT FENCE SHALL BE TURNED AND EXTENDED UPSLOPE.
6. SILT FENCES ARE TO BE CHECKED AND MAINTAINED ON A REGULAR BASIS. REMOVE ANY BUILD-UP OF SEDIMENT. REPLACE DAMAGED OR INEFFECTIVE SILT FENCE AS SOON AS POSSIBLE.
7. WHERE ANCHORING CONDITIONS FOR THE SILT FENCE ARE POOR, PLACE STRAW BALES ON DOWNSTREAM SIDE OF THE SILT FENCE.
8. INSTALLATION TO BE MODIFIED BY THE PROJECT AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-08 UPDATED DRAWING NOTES
03 2010-10-11 REVISED TITLE BLOCK

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DESIGNER:		KEYSTONE XL PROJECT		
JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 1 TYPICAL SILT FENCE BARRIER		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-05-701	REV 03

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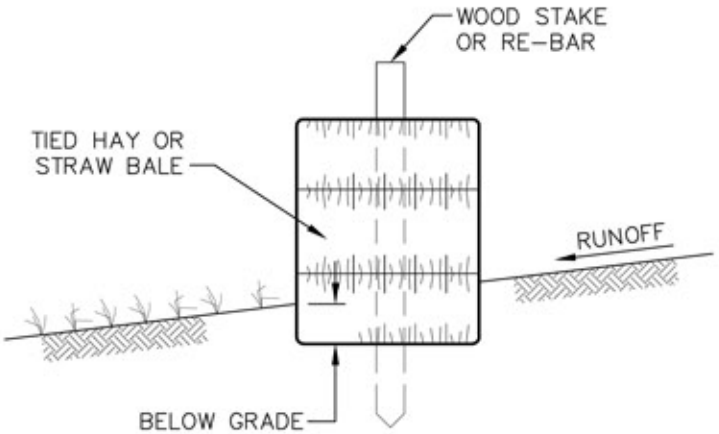
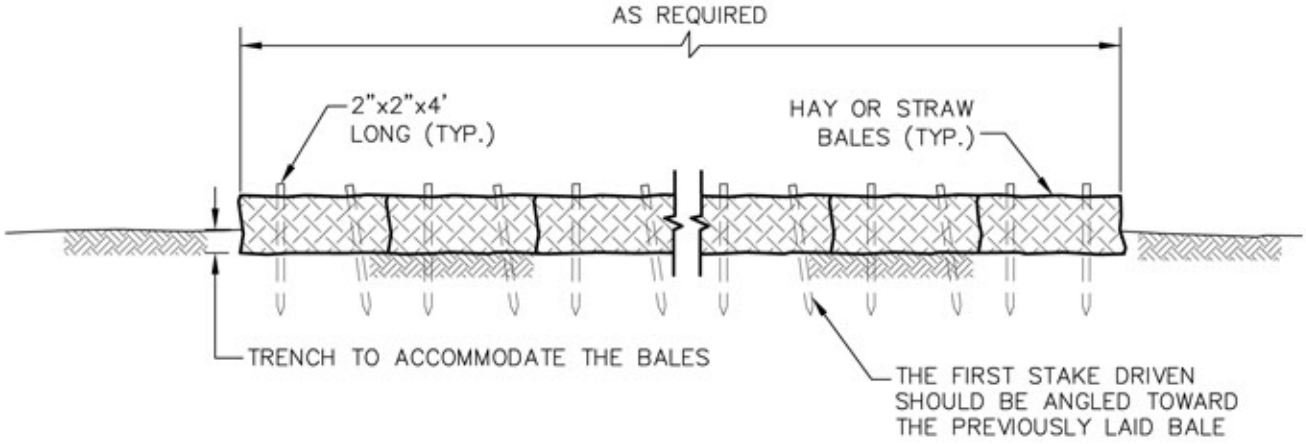


SECTION



SECTION

NOTES:

1. TO ELIMINATE POSSIBLE END FLOW, BOTH ENDS OF THE STRAW BALE BARRIER SHOULD BE TURNED AND EXTENDED UPSLOPE.
2. EACH BALE SHOULD BE SECURED BY AT LEAST 2 STAKES. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE TO FORCE THE BALES TOGETHER. ANY GAPS CAN BE FILLED IN BY WEDGING LOOSE STRAW BETWEEN THE BALES. STAKES SHOULD BE DRIVEN. REBAR OR STANDARD "T" OR "U" STEEL POSTS CAN BE USED AS STAKES, BUT IT SHOULD BE NOTED THAT THEY MAY POSE A HAZARD TO EQUIPMENT IF THE BALES DISINTEGRATE.
3. COMPACT THE EXCAVATED SOIL AGAINST THE UPHILL SIDE OF THE BARRIER TO PREVENT PIPING.
4. STRAW OR HAY BALE BARRIERS REQUIRE CONTINUAL MAINTENANCE TO REMOVE COLLECTED SEDIMENT AND REPLACE DAMAGED BALES AS SOON AS POSSIBLE. PAY CLOSE ATTENTION TO THE REPAIR OF DAMAGED BALES, END RUNS AND UNDERCUTTING BENEATH BALES.
5. INSTALLATION TO BE MODIFIED BY THE PROJECT AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-08 UPDATED DRAWING NOTES
03 2010-10-11 UPDATED DRAWING NOTES

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DESIGNER: JMP (NAME) 2010-10-21 (DATE)
CHECKED BY: WSF
DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359	CHAINAGE:	DISCIPLINE # 03

TITLE
DETAIL 2
TYPICAL STRAW OR HAY BALE BARRIER

SCALE N.T.S.	DWG No 4359-03-ML-05-702	REV 03

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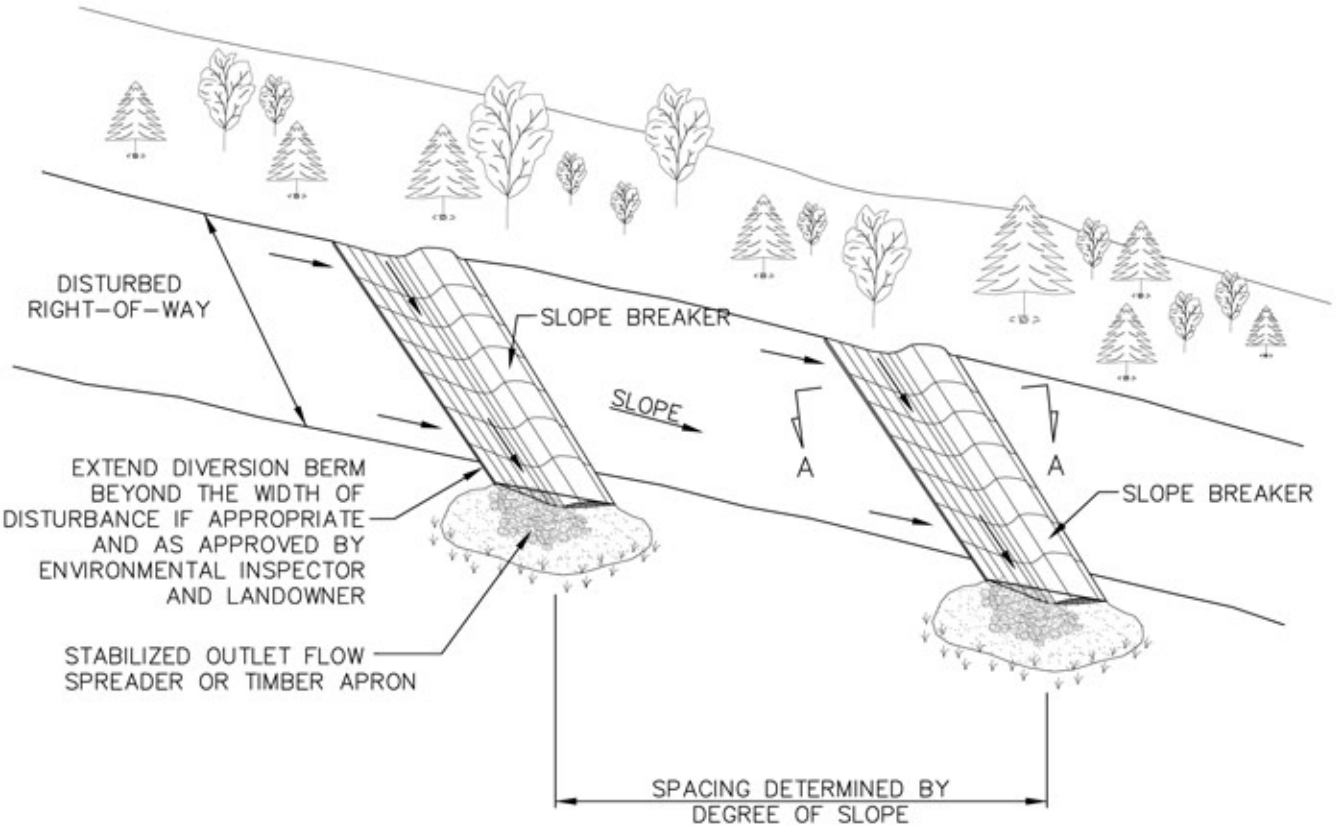

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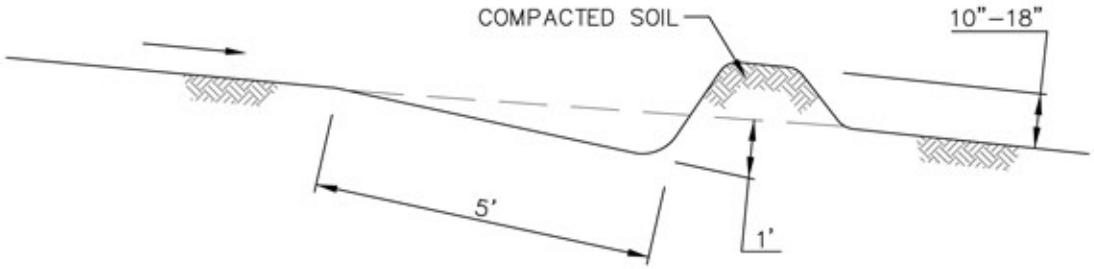

NOTES:

1. PERMANENT SLOPE BREAKERS TO PROVIDE POSITIVE DRAINAGE TO A STABILIZED OUTLET.
2. INSTALLATION SPECIFICATIONS TO BE MODIFIED BY THE PROJECT AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.
3. THE CONTRACTOR SHALL INSTALL TEMPORARY AND PERMANENT SLOPE BREAKERS ON SLOPES GREATER THAN APPROXIMATELY 5% ON ALL DISTURBED LANDS AT THE FOLLOWING RECOMMENDED SPACING:

SLOPE (%)	SPACING (FEET)
5-15	300
>15-30	200
>30	100

REVISIONS
01 2008-11-04 MODIFIED DRAWING NOTES
02 2010-10-08 UPDATED DRAWING NOTES
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DESIGNER: JMP (NAME) 2010-10-21 (DATE)
CHECKED BY: WSF
DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 3
TEMPORARY/PERMANENT SLOPE BREAKER DETAIL
(WATER BARS)

SCALE N.T.S. | DWG No 4359-03-ML-05-703 | REV 03

TC_A4_BR.DWG 8.5X11

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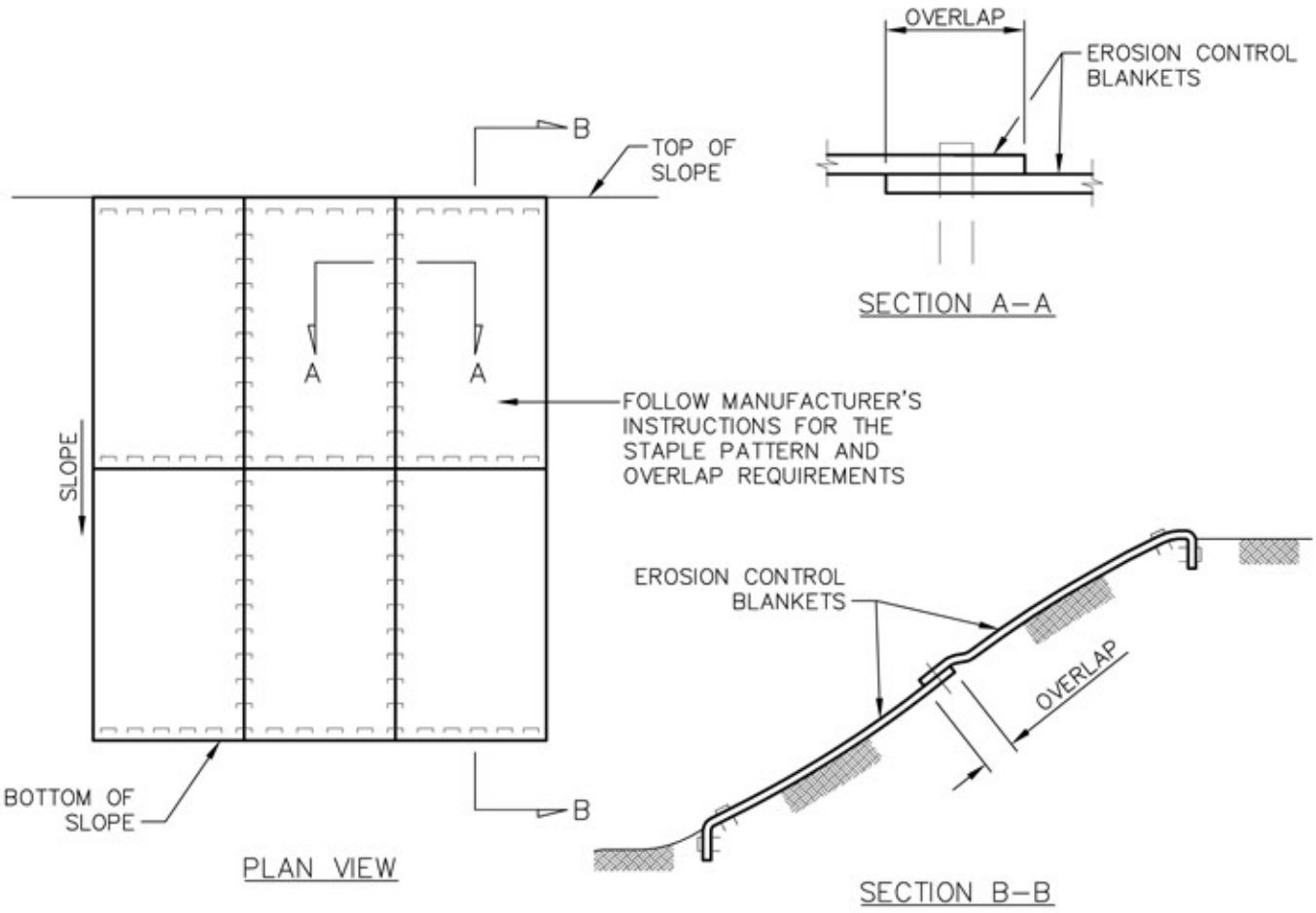

SECTION A–A

PLAN VIEW

SECTION B–B

NOTES:

1. INSTALL MATTING IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. PREPARE SOIL BEFORE INSTALLING MATTING, INCLUDING GRADING, REMOVAL OF LARGE ROCKS AND DEBRIS, AND THE APPLICATION OF SEED AND FERTILIZER IF NOT USING PRE–SEEDED MATTING.
3. EROSION CONTROL MATTING SHALL EXTEND COMPLETELY ACROSS DISTURBED AREAS TO PROTECT ERODIBLE SURFACES.
4. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE MATTING IN A TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
5. ROLL THE MATTING DOWN THE SLOPE IN THE DIRECTION OF THE WATER FLOW.
6. AS AN ALTERNATIVE TO STAPLES, WOODEN STAKES OR BIO–DEGRADEABLE PINS CAN BE USED WHERE SPECIFIED BY THE COMPANY.
7. ENSURE COMPLETE CONTACT BETWEEN THE MATTING AND THE SLOPE FACE. ADDITIONAL STAPLES CAN BE USE TO ELIMINATE GAPS.
8. INSTALLATION SPECIFICATIONS TO BE MODIFIED BY THE PROJECT AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008–11–04 MODIFIED DRAWING NOTES
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JMP (NAME)	2010–10–21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	TITLE: DETAIL 4 EROSION CONTROL MATTING INSTALLATION		
		SCALE N.T.S.	DWG No 4359–03–ML–05–704	REV 03

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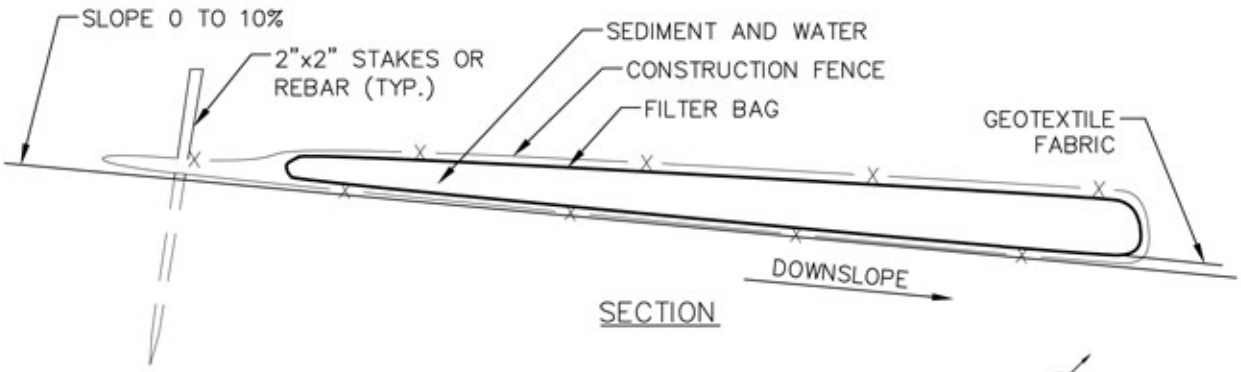
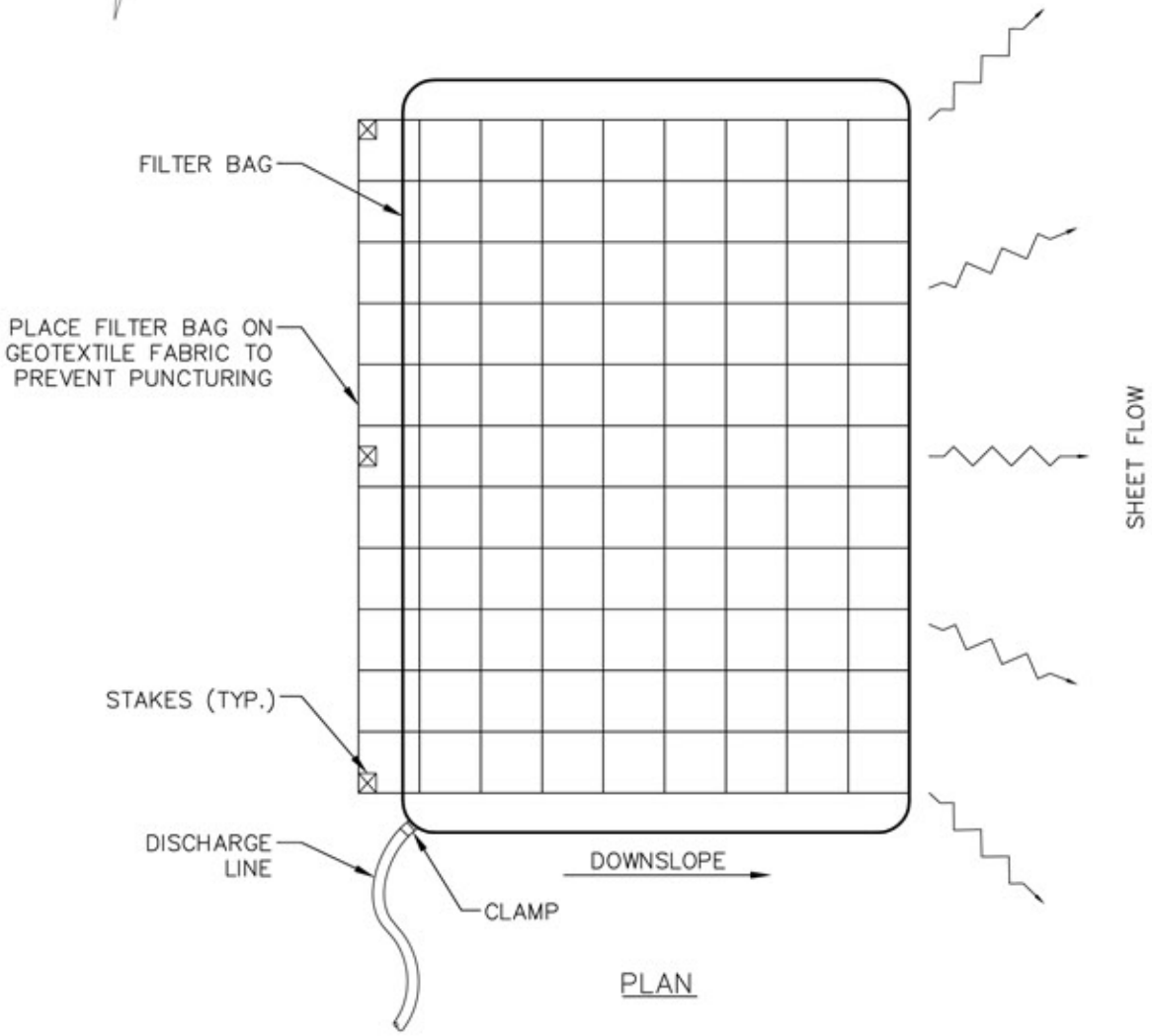


SECTION



PLAN

NOTES:

1. MANUFACTURED NONWOVEN (FELT) FILTER BAGS ARE A SUITABLE ALTERNATIVE TO STRAW BALE STRUCTURES FOR TRENCH DEWATERING. FILTER BAGS SHALL BE INSTALLED AS SPECIFIED BY THE MANUFACTURER.
2. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 MODIFIED DRAWING NOTES
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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 5 TYPICAL DEWATERING FILTER BAG		
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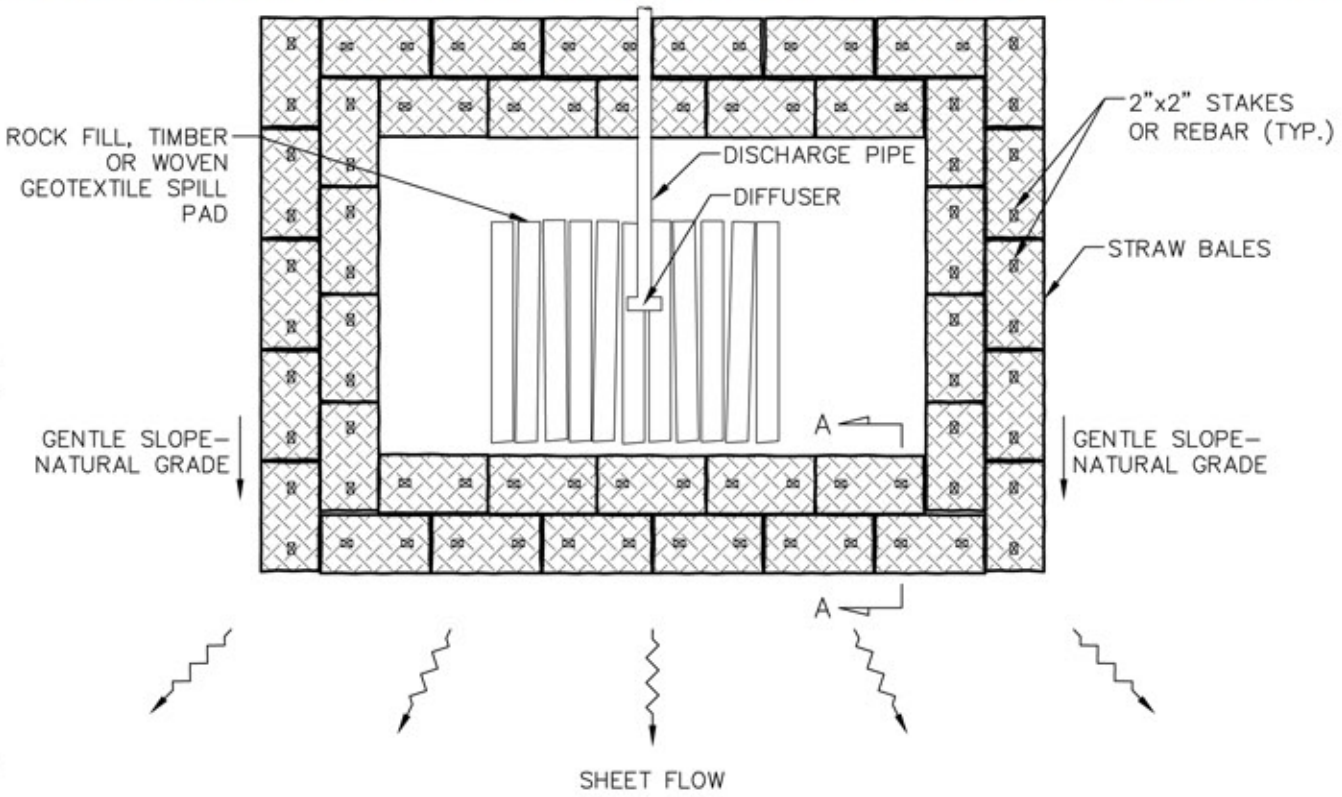
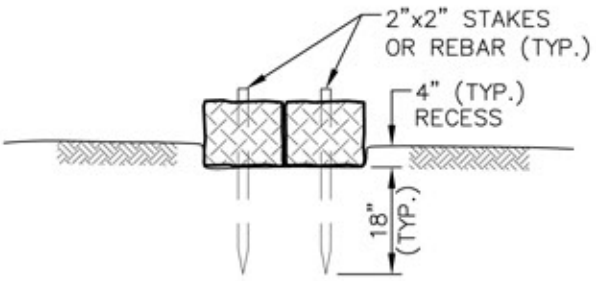


PLAN



SECTION A–A

NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATERBODIES OR WETLANDS.
2. DISCHARGE SITE SHOULD BE WELL VEGETATED AND LOCATED AT LEAST 50 FEET FROM ANY WATERBODY. THE TOPOGRAPHY OF THE SITE SHOULD BE SUCH THAT WATER WILL FLOW INTO THE DEWATERING STRUCTURE AND AWAY FROM ANY WORK AREAS. THE AREA DOWNSLOPE FROM THE DEWATERING SITE MUST BE REASONABLY FLAT OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. DIRECT THE PUMPED WATER ONTO A STABLE SPILL PAD CONSTRUCTED OF ROCKFILL, WEIGHTED TIMBERS, OR A WOVEN GEOTEXTILE STAKED TO THE GROUND SURFACE, SUCH AS MIRAFI 600X, TERRAFIX 400W, OR A COMPANY APPROVED EQUIVALENT. BEYOND THE SPILL PAD FORCE THE DISCHARGE WATER INTO SHEET FLOW USING STRAW BALES AND THE NATURAL TOPOGRAPHY.
4. DISCHARGE RATES SHOULD BE SUCH THAT THE CAPACITY OF THE STRUCTURE WILL NOT BE EXCEEDED.
5. DISCHARGE WATER SHALL BE FORCED INTO SHEET FLOW IMMEDIATELY BEYOND THE SPILL PAD USING A COMBINATION OF STRAW BALES AND THE NATURAL TOPOGRAPHY. RECESS STRAW BALES. DRIVE TWO (2) STAKES OR REBAR INTO EACH BALE TO ANCHOR THEM IN PLACE.
6. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 MODIFIED DRAWING NOTES
02 2010-10-08 UPDATED DRAWING NOTES
03 2010-10-11 UPDATED DRAWING NOTES

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CHECKED BY: WSF
DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA #	CHAINAGE:	DISCIPLINE #
4359		03

TITLE
DETAIL 6
TYPICAL STRAW BALE DEWATERING STRUCTURE

SCALE	DWG No	REV
N.T.S.	4359-03-ML-05-706	03

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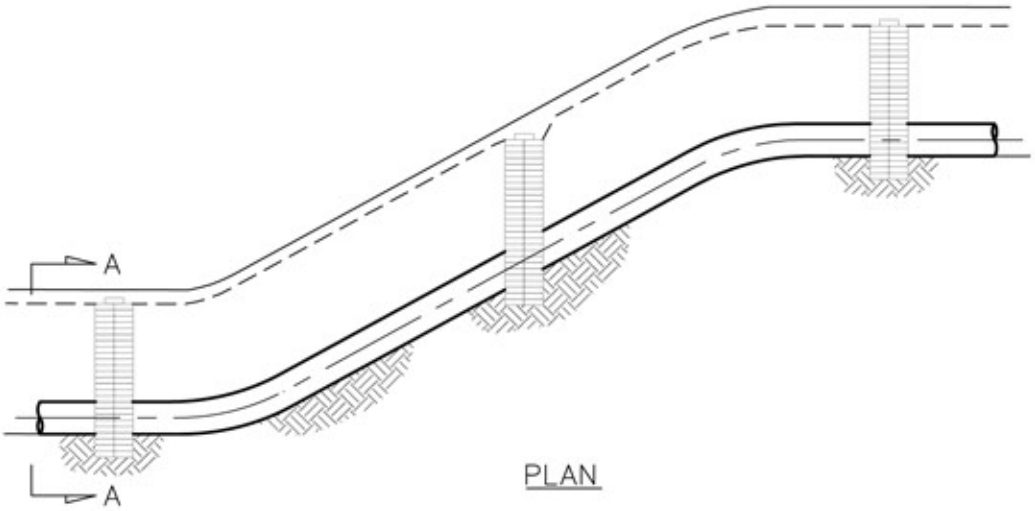
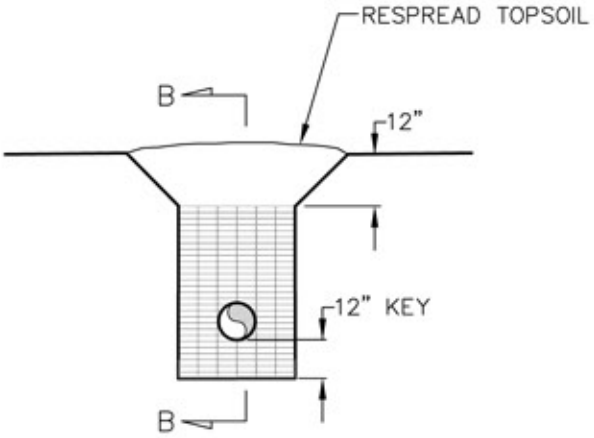
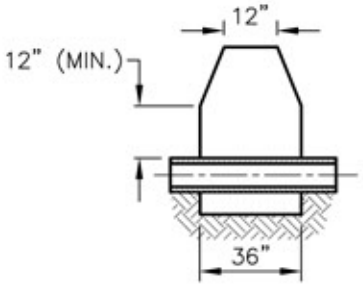


PLAN



SECTION A–A



SECTION B–B

NOTES:

1. TRENCH BREAKERS TO BE INSTALLED AS SHOWN ON THE CONSTRUCTION DRAWINGS, WHERE DESCRIBED IN THE PLAN, AND AS DIRECTED.
2. OPEN WEAVE HEMP OR JUTE SACKS SHALL BE FILLED WITH AN AVERAGE 55 LBS. MIXTURE OF:
   1) ONE (1) PART CEMENT AND SIX (6) PARTS SAND OR SUBSOIL, OR
   2) ONE (1) PART CEMENT, THREE (3) PARTS FLYASH, AND FIVE (5) PARTS SAND OR SUBSOIL
   3) SAND WITH JUST SUFFICIENT WATER TO PERMIT MIXTURE TO EXUDE AND BOND SACKS TOGETHER. TOPSOIL IS NOT TO BE USED IN SACKS.
3. KEY EACH TRENCH BREAKER A MINIMUM OF ONE (1) FT. INTO BOTTOMS AND SIDES OF TRENCH.
4. FOAM TRENCH BREAKERS MAY BE USED IN LIEU OF SAND SACK TRENCH BREAKERS.
5. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.
6. TRENCH BREAKERS SHALL BE INSTALLED SUCH THAT THE TOP OF EACH DOWNSLOPE BREAKER IS ABOVE THE BOTTOM OF THE NEXT UPSLOPE BREAKER.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-11 UPDATED PLAN DETAIL

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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 7 TYPICAL PERMANENT TRENCH BREAKER		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-05-707	REV 02

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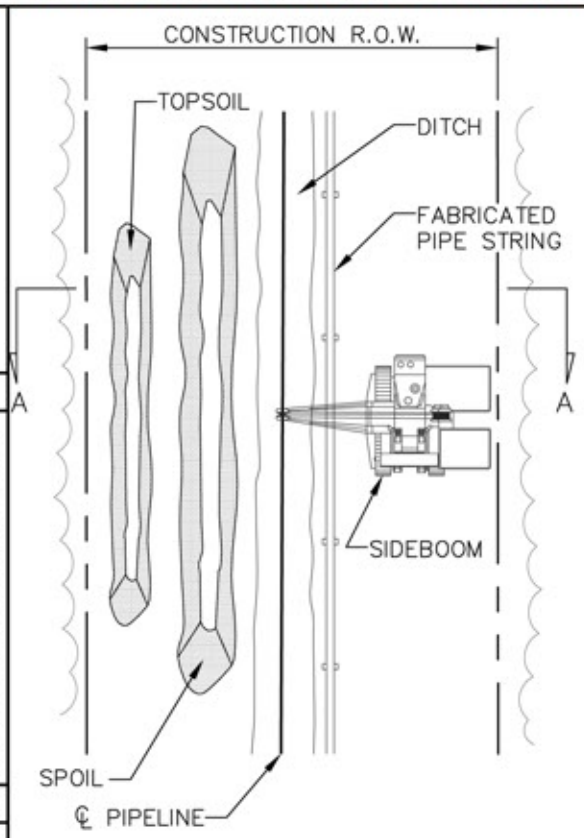
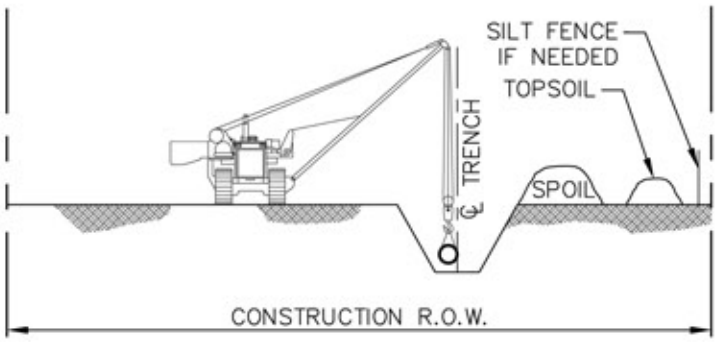


PLAN VIEW



SECTION "A–A"

CONSTRUCTION PROCEDURES:

1. IF THE WETLAND IS BEING CULTIVATED AND FARMED, NO WETLAND CONSTRUCTION PROCEDURES ARE REQUIRED.
2. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
3. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS APPROXIMATELY 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER THE PROJECT'S SPILL PREVENTION PROCEDURES.
4. INSTALL TEMPORARY SLOPE BREAKER UPSLOPE WITHIN 100 FEET OF WETLAND BOUNDARY IF DIRECTED BY THE PROJECT.
5. DO NOT TRENCH WETLAND UNTIL PIPE IS READY TO INSTALL.
6. CONSTRUCT WHEN DRY, IF POSSIBLE. IF SITE BECOMES WET AT TIME OF TRENCHING, AVOID SOIL COMPACTION BY UTILIZING TIMBER RIP–RAP OR PREFABRICATED EQUIPMENT MATS.
7. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) AT DOWN SLOPE EDGE OF RIGHT–OF–WAY ALONG WETLAND EDGE IF NEEDED TO CONTAIN SPOIL WITHIN RIGHT–OF–WAY.
8. RESTRICT ROOT GRUBBING TO ONLY THAT AREA OVER THE DITCHLINE AND REMOVE STUMPS FROM WETLAND FOR DISPOSAL.
9. CONDUCT TRENCH LINE TOPSOIL STRIPPING (IF TOPSOIL IS NOT SATURATED). SALVAGE TOPSOIL TO ACTUAL DEPTH OR A MAXIMUM DEPTH OF 12 INCHES.
10. TRENCH THROUGH WETLANDS.
11. PIPE SECTION TO BE FABRICATED WITHIN THE WETLAND AND ADJACENT TO ALIGNMENT, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN.
12. LOWER–IN PIPE. PRIOR TO BACKFILLING TRENCH, IF REQUIRED, TRENCH PLUGS SHALL BE INSTALLED AS REQUIRED. BACKFILL TRENCH.
13. RESTORE GRADE TO NEAR PRE–CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL AND INSTALL PERMANENT EROSION CONTROL.
14. IF UTILIZED, REMOVE TIMBER MATS OR PRE–FABRICATED MATS FROM WETLANDS UPON COMPLETION.
15. IN THE ABSENCE OF A DETAILED REVEGETATION PLANS, APPLY A TEMPORARY COVER CROP AS DIRECTED BY KEYSTONE.

REVISIONS
01 REVISED NOTES 3 & 4
02 2010–10–08 UPDATED DRAWING NOTES
03 2010–10–11 UPDATED DRAWING NOTES

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	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 8 "DRY" WETLAND CROSSING METHOD		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359–03–ML–03–701 REV 03

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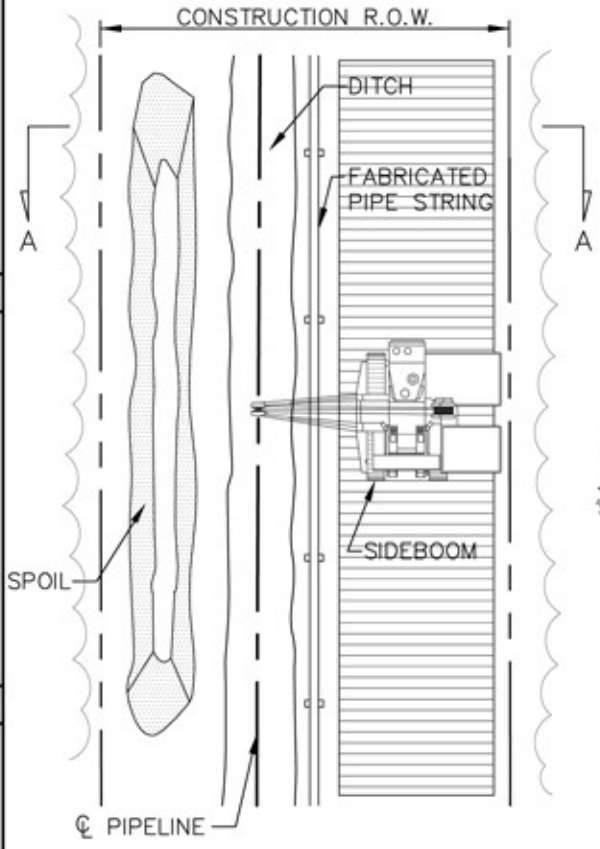
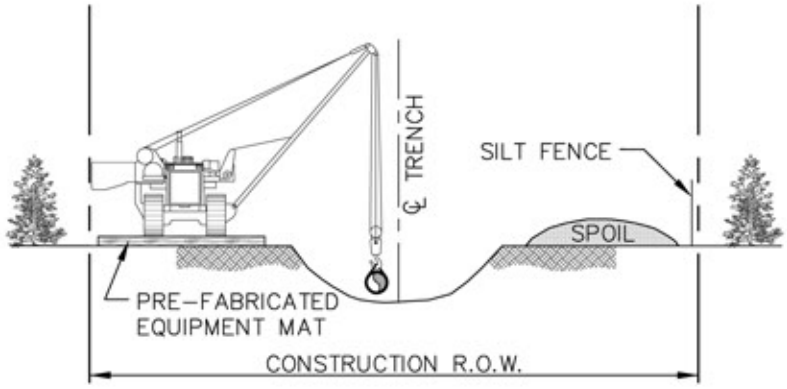


PLAN VIEW



SECTION A-A

CONSTRUCTION PROCEDURES:

1. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
2. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER THE PROJECT'S SPILL PREVENTION PROCEDURES.
3. INSTALL TEMPORARY SLOPE BREAKER UPSLOPE WITHIN 100 FEET OF WETLAND BOUNDARY IF DIRECTED BY THE PROJECT.
4. INSTALL TIMBER MATS/RIPRAP THROUGH ENTIRE WETLAND AREA. EQUIPMENT NECESSARY FOR RIGHT-OF-WAY CLEARING MAY MAKE ONE (1) PASS THROUGH THE WETLAND BEFORE MATS ARE INSTALLED.
5. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) AT DOWNSLOPE EDGE OF RIGHT-OF-WAY AND ALONG WETLAND EDGE AS REQUIRED.
6. RESTRICT ROOT GRUBBING TO ONLY THAT AREA OVER THE DITCHLINE AND DITCH SPOIL AREAS AND REMOVED FROM WETLAND FOR DISPOSAL.
7. DO NOT TRENCH WETLAND UNTIL PIPE IS READY TO INSTALL.
8. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
9. LEAVE HARD PLUGS AT EDGE OF WETLAND UNTIL JUST PRIOR TO TRENCHING.
10. PIPE SECTION MAY BE FABRICATED WITHIN THE WETLAND AND ADJACENT TO ALIGNMENT, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN.
11. TRENCH THROUGH WETLANDS.
12. LOWER-IN PIPE, INSTALL TRENCH PLUGS AT WETLAND EDGES AS REQUIRED AND BACKFILL IMMEDIATELY.
13. REMOVE TIMBER MATS OR PRE-FABRICATED MATS FROM WETLAND UPON COMPLETION.
14. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL IF SALVAGED AND INSTALL PERMANENT EROSION CONTROL.

REVISIONS
01 REVISED NOTES 2 & 3
02 2010-10-11 UPDATED DRAWING NOTES

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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 9 STANDARD WETLAND CROSSING METHOD		
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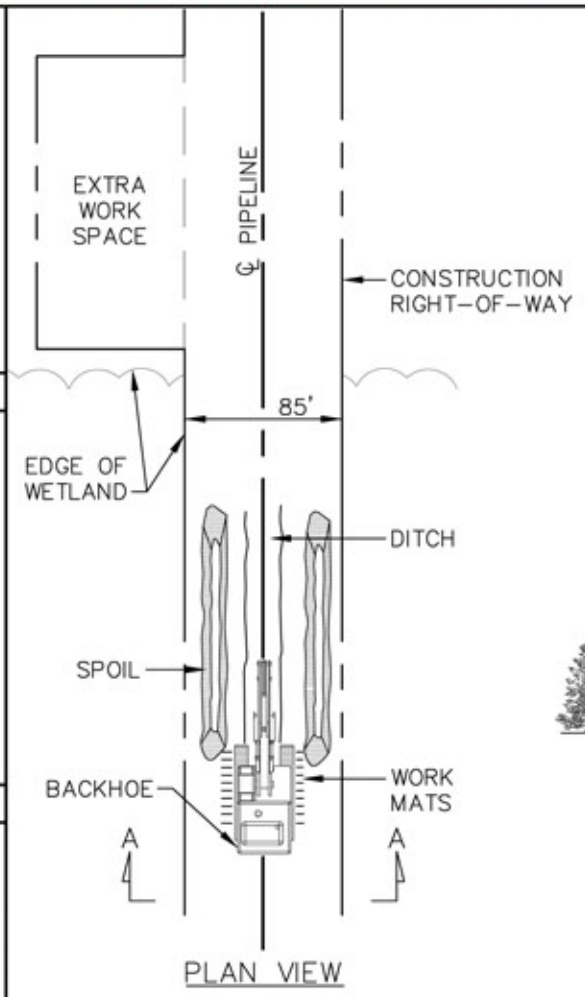
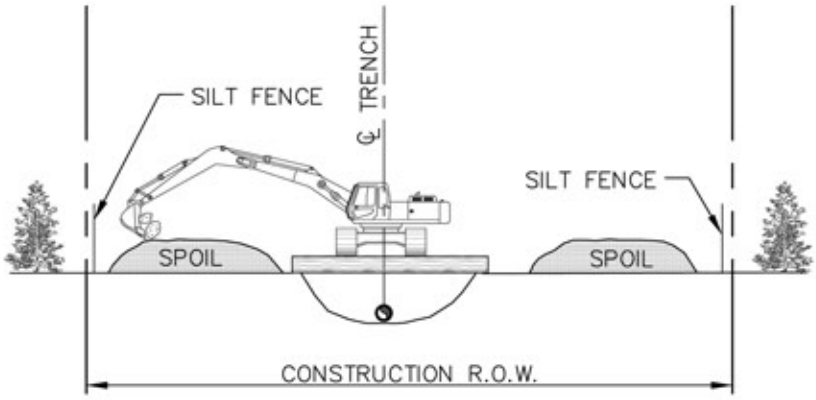


PLAN VIEW



SECTION A-A

CONSTRUCTION PROCEDURES:

1. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
2. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER THE PROJECT'S SPILL PREVENTION PROCEDURES.
3. INSTALL TEMPORARY SLOPE BREAKER UPSLOPE WITHIN 100 FEET OF WETLAND BOUNDARY AS DIRECTED BY THE PROJECT.
4. RESTRICT ROOT GRUBBING TO ONLY THE AREA OVER THE DITCHLINE.
5. DO NOT TRENCH WETLAND UNTIL PIPE IS READY TO INSTALL.
6. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
7. UTILIZE AMPHIBIOUS EXCAVATORS (PONTOON MOUNTED BACKHOES) OR TRACKED BACKHOES SUPPORTED BY FABRICATED TIMBER MATS OR FLOATS TO EXCAVATE TRENCH. IF FABRICATED TIMBER MATS ARE USED FOR STABILIZATION, THE BACKHOE SHALL GRADUALLY MOVE ACROSS THE WETLAND BY MOVING THE MAT FROM IMMEDIATELY BEHIND TO IMMEDIATELY IN FRONT OF THE BACKHOE'S PATH.
8. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) AT EDGE OF RIGHT-OF-WAY AND ALONG WETLAND EDGE IF PRACTICAL.
9. FABRICATE PIPE IN STAGING AREA OUTSIDE THE WETLAND IN THE EXTRA WORK SPACE AS INDICATED ON THE CONSTRUCTION DRAWINGS.
10. LEAVE HARD PLUGS AT THE EDGE OF THE WETLAND UNTIL JUST PRIOR TO PIPE PLACEMENT.
11. FLOAT PIPE IN PLACE, LOWER-IN, INSTALL TRENCH PLUGS AT WETLAND EDGES WHERE REQUIRED AND BACKFILL IMMEDIATELY.
12. REMOVE TIMBER MATS OR PRE-FABRICATED MATS OF NON-NATIVE MATERIAL FROM WETLANDS UPON COMPLETION.
13. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY AND INSTALL PERMANENT EROSION CONTROL.
14. THE CONSTRUCTION RIGHT-OF-WAY FOR THIS TYPE OF CONSTRUCTION SHALL BE 85 FEET.

REVISIONS
01 REVISED NOTES 2, 3 & 13
02 2010-10-11 UPDATED DRAWING NOTES

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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 10 PUSH/PULL WETLAND CROSSING METHOD		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-703	REV 02

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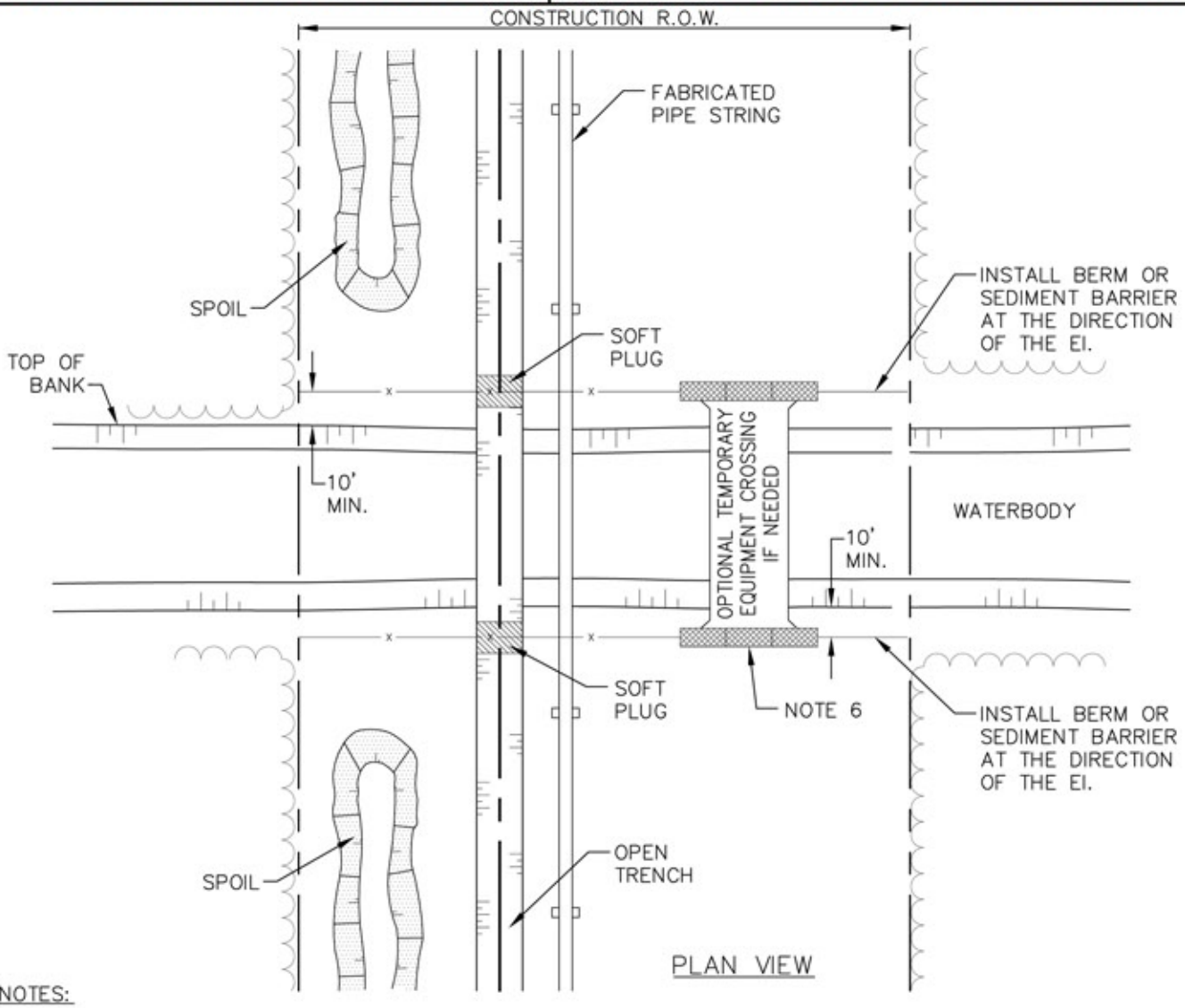

NOTES:

1. THIS METHOD APPLIES TO DRY WASHES, SWALES, INCISED DRAINAGES AND DITCHES WITH NO PERCEPTIBLE FLOW AT TIME OF CROSSING. IF FLOWS ARE PRESENT DURING CONSTRUCTION REFER TO DETAIL 12. CLEARING AND GRADING, TOPSOIL SALVAGE AND TOPSOIL STRIPPING DEPTHS SHALL BE THE SAME AS INDICATED FOR ADJACENT UPLAND UNLESS OTHERWISE DIRECTED BY KEYSTONE.
2. EI TO FLAG THE ORDINARY HIGH WATER MARK (OHWM) PRIOR TO CLEARING.
3. INSTALL SILT FENCE OR A BERM AT DIRECTION OF KEYSTONE EI TO PREVENT RUNOFF FROM ROW TO ADJACENT, UNDISTURBED DRAINAGE.
4. STOCKPILE TOPSOIL AND SPOIL SEPARATELY. TOPSOIL SHALL NOT BE STOCKPILED ACROSS THE DRAINAGE CHANNEL AND SHALL BE PLACED A MINIMUM OF 15 FEET FROM THE OHWM OR TO SUIT CONDITIONS AND PROTECT THE DRAINAGE AS DETERMINED BY KEYSTONE.
5. INSTALL TEMPORARY SLOPE BREAKERS WHERE IDENTIFIED BY THE EI.
6. TRENCH, STRING PIPE, AND BACKFILL USING STANDARD UPLAND CONSTRUCTION PROCEDURES UNLESS OTHERWISE DIRECTED BY KEYSTONE.
7. RESTORE WATERCOURSE CHANNEL AND BANKS (EXCEPT TRAVEL LANE IF USED) TO APPROXIMATE PRE-CONSTRUCTION PROFILE IMMEDIATELY AFTER PIPE IS LOWERED IN AND BACKFILLED. INSTALL PERMANENT EROSION CONTROLS WHERE DIRECTED BY KEYSTONE.
8. REMOVE ANY TEMPORARY CROSSING STRUCTURES AND/OR GRAVEL.

REVISIONS
01 UPDATED DRAWING NOTES
02 2010-10-08 UPDATED DRAWING NOTES
03 2010-10-11 UPDATED DRAWING NOTES

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DESIGNER: JMP (NAME) 2010-10-21 (DATE)
CHECKED BY: WSF
DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359	CHAINAGE:	DISCIPLINE # 03

TITLE
DETAIL 11
TYPICAL OPEN CUT WET CROSSING METHOD
NON-FLOWING WATERBODY

SCALE N.T.S.	DWG No 4359-03-ML-03-704	REV 03

TC_A4_BR.DWG 8.5X11

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017060

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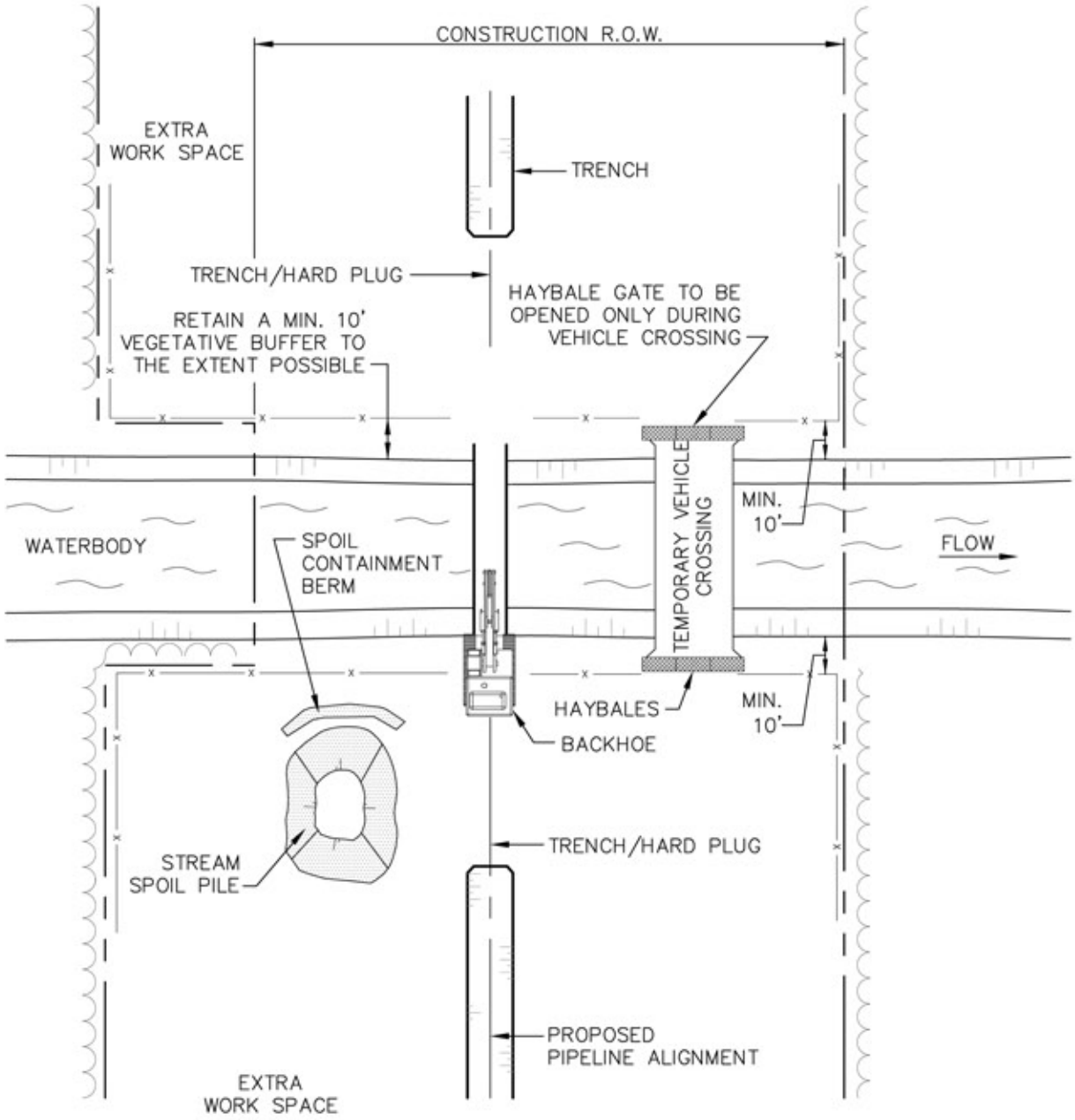

PLAN VIEW

REVISIONS
01 UPDATED DRAWING NOTES
02 2010-10-11 REVISED TITLE BLOCK

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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	TITLE: DETAIL 12 TYPICAL OPEN CUT WET CROSSING METHOD FLOWING WATERBODY		
		SCALE N.T.S.	DWG No 4359-03-ML-03-705	REV 02

TC_A4_BR.DWG 8.5X11

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CONSTRUCTION PROCEDURES:

1. RIGHT-OF-WAY BOUNDARIES AND WORK SPACE LIMITS SHALL BE CLEARLY DELINEATED. STAGING FOR MAKEUP SHALL BE LOCATED A MINIMUM OF 10 FEET FROM WATERBODY.

2. CLEARING LIMITS WILL BE CLEARLY DELINEATED AND 10 FOOT VEGETATIVE BUFFER STRIP BETWEEN DISTURBED AREA AND THE WATERBODY SHALL BE MAINTAINED TO THE EXTENT POSSIBLE. ALL CLEARING SHALL BE MINIMIZED TO THE EXTENT POSSIBLE AND TO ONLY THAT NECESSARY FOR CONSTRUCTION. WOODY VEGETATION SHALL BE CUT AT GROUND LEVEL AND THE STUMPS/ROOTS LEFT IN PLACE TO THE EXTENT POSSIBLE.

3. TOPSOIL SHALL BE STRIPPED FROM THE DITCH LINE IN ALL WETLANDS RIPARIAN.

4. CONTRACTOR SHALL INSTALL SIGNS APPROXIMATELY 100 FEET MINIMUM FROM EACH WATERBODY AND WETLAND TO IDENTIFY THE HAZARDOUS MATERIALS EXCLUSION AREA.

5. EROSION AND SEDIMENT CONTROL
   a. CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES, AS DEPICTED OR ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS WATERBODY OR WETLAND.

   b. NO HEAVILY SILT LADEN WATER SHALL BE DISCHARGED DIRECTLY OR INDIRECTLY INTO THE WATERBODY. ALL EROSION AND SEDIMENT CONTROL STRUCTURE LOCATIONS AS DEPICTED ARE APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED BY THE COMPANY INSPECTOR TO SUIT ACTUAL SITE CONDITIONS. SILT FENCE OR STRAW BALE INSTALLATIONS SHALL INCLUDE REMOVABLE SECTIONS TO FACILITATE ACCESS DURING CONSTRUCTION.

   c. SEDIMENT LADEN WATER FROM TRENCH DEWATERING SHALL BE DISCHARGED TO A WELL VEGETATED UPLAND AREA INTO A STRAW BALE DEWATERING STRUCTURE OR GEOTEXTILE FILTER BAG. SEDIMENT CONTROL STRUCTURES MUST BE IN PLACE AT ALL TIMES ACROSS THE DISTURBED CONSTRUCTION RIGHT-OF-WAY EXCEPT DURING EXCAVATION/INSTALLATION OF THE CROSSING PIPE.

   d. SOFT DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE WATERBODY CROSSING UNTIL THE WATER CROSSING IS INSTALLED AND BACKFILLED.

   e. TRENCH BREAKERS ARE TO BE INSTALLED AT THE SAME SPACING AND IMMEDIATELY UPSLOPE OF PERMANENT SLOPE BREAKERS, OR AS DIRECTED BY THE COMPANY.

6. CONTRACTOR SHALL MAINTAIN HARD PLUGS IN THE DITCH AT THE WATERBODY UNTIL JUST PRIOR TO PIPE INSTALLATION. CONTRACTOR SHALL EXCAVATE TRENCH AND INSTALL PIPE AS EXPEDIENTLY AS PRACTICAL TO REDUCE THE DURATION OF WORK ACTIVITIES IN THE WATERBODY BED.

7. CONTRACTOR SHALL PLACE TRENCH SPOIL ONLY IN CERTIFICATED WORK SPACE AND A MINIMUM OF 10 FEET FROM THE WATERBODY BANKS TO PREVENT ENTRY OF SPOIL INTO THE WATERBODY. SPOIL SHALL BE CONTAINED AS NECESSARY USING EITHER A STRAW BALE BARRIER OR AN EARTH/ROCK BERM.

8. CONTRACTOR SHALL RESTORE THE WATERBODY AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONTOURS, UNLESS OTHERWISE APPROVED BY THE COMPANY. CONTRACTOR SHALL INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES AS INDICATED. ANY MATERIALS PLACED IN THE WATERBODY TO FACILITATE CONSTRUCTION SHALL BE REMOVED DURING RESTORATION. BANKS SHALL BE STABILIZED AND TEMPORARY SEDIMENT BARRIERS INSTALLED AS SOON AS POSSIBLE AFTER CROSSING, BUT WITHIN 24 HOURS OF COMPLETING THE CROSSING. MAINTAIN A SILT FENCE OR STRAW BALE BARRIER ALONG THE WATERBODY AND WETLAND BOUNDARIES UNTIL VEGETATION IS ESTABLISHED IN ADJACENT DISTURBED AREAS.

9. VEHICLE CROSSING CAN BE CONSTRUCTED USING EITHER A FLUME CROSSING OR A TEMPORARY BRIDGE. VEHICLE CROSSING ONLY REQUIRED IF STREAM SUPPORTS A STATE DESIGNATED FISHERY.

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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 12A
TYPICAL OPEN CUT WET CROSSING METHOD
FLOWING WATERBODY – CONSTRUCTION PROCEDURES

SCALE N.T.S. | DWG No 4359-03-ML-03-706 | REV 01

TC_A4_BR.DWG 8.5X11

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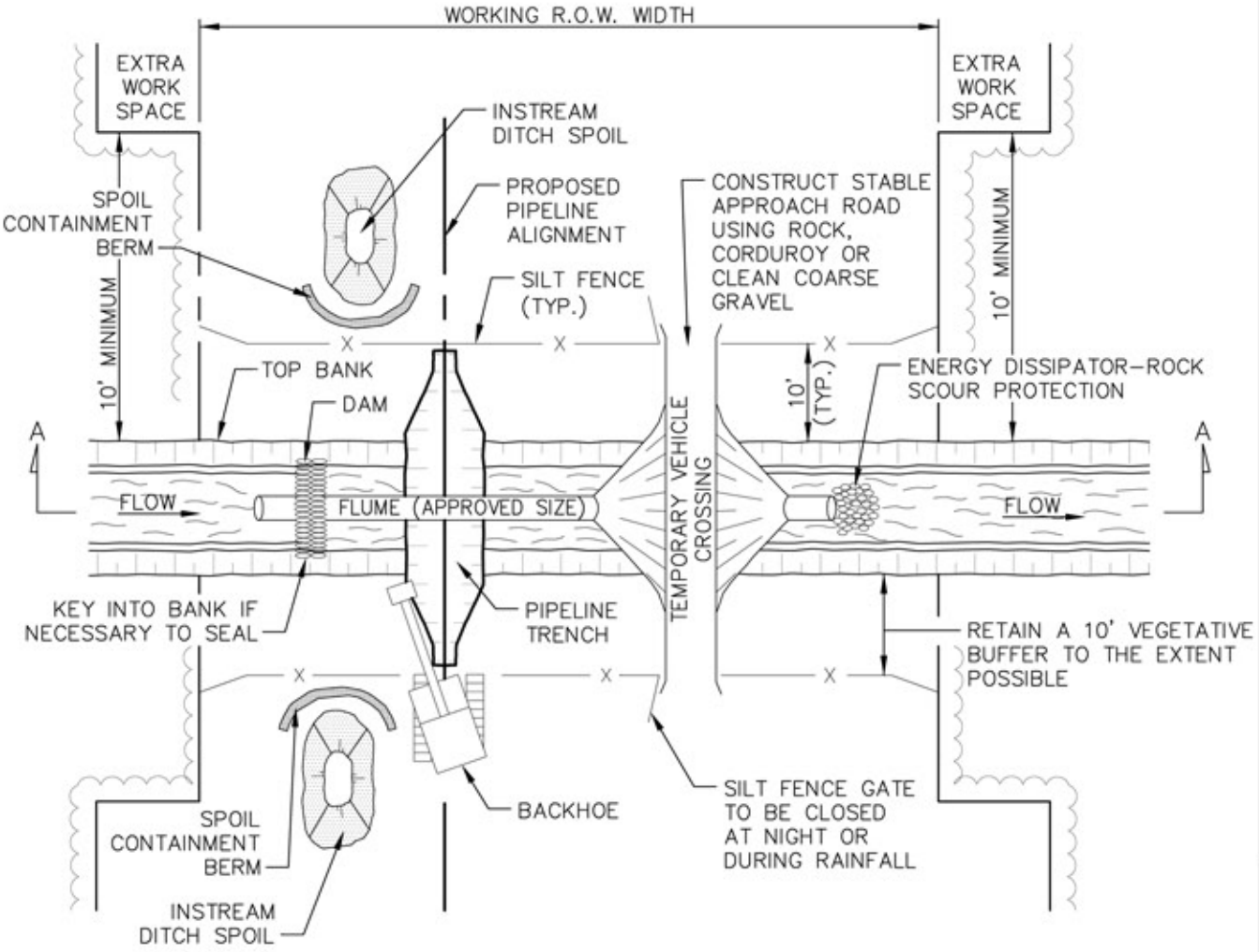
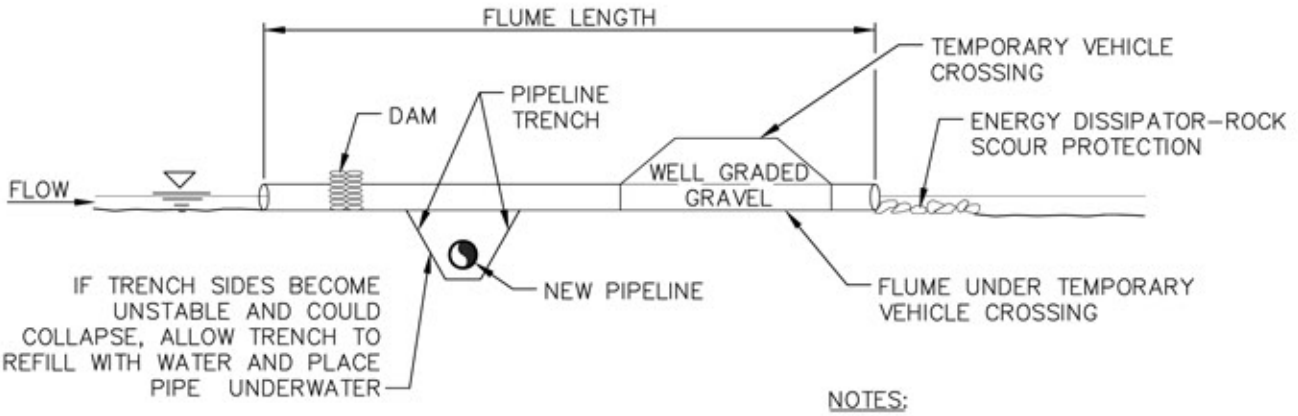


PLAN VIEW



SECTION A–A

NOTES:

1. PIPELINE PLACEMENT WITHIN RIGHT-OF-WAY CONCEPTUAL ONLY.
2. SEE DETAIL 13A FOR CONSTRUCTION PROCEDURES.

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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 13
TYPICAL DRY FLUME CROSSING METHOD

SCALE N.T.S. | DWG No 4359-03-ML-03-707 | REV 01

TC_A4_BR.DWG 8.5X11

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

CONSTRUCTION PROCEDURES:

1. MARK OUT AND MAINTAIN LIMITS OF AUTHORIZED WORK AREAS WITH FENCING OR FLAGGING TAPE TO AVOID UNNECESSARY DISTURBANCE OF VEGETATION. ENSURE EQUIPMENT OPERATORS WORKING ON THE CROSSING HAVE BEEN BRIEFED ABOUT THIS PLAN AND THE MEASURE NEEDED TO PROTECT WATER QUALITY.
2. ALL NECESSARY EQUIPMENT AND MATERIALS TO BUILD THE FLUME MUST BE ON-SITE OR READILY AVAILABLE PRIOR TO COMMENCING IN-WATER WORK.
3. TO THE EXTENT POSSIBLE, MAINTAIN A MINIMUM 10 FT. VEGETATIVE BUFFER STRIP BETWEEN DISTURBED AREAS AND THE WATERCOURSE. INSTALL AND MAINTAIN A SILT FENCE OR STRAW BALE BARRIER UPSLOPE OF THE BUFFER STRIP ON EACH SIDE OF THE WATERCOURSE.
4. CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES, AS DEPICTED OR ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS STREAM.
   a. NO HEAVILY SILT LADEN WATER SHALL BE DISCHARGED DIRECTLY INTO THE STREAM.
   b. EROSION AND SEDIMENT CONTROL STRUCTURE LOCATIONS AS DEPICTED ARE APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED BY THE COMPANY INSPECTOR TO ACTUAL SITE CONDITIONS.
   c. SILT FENCE OR STRAW BALE INSTALLATIONS SHALL INCLUDE REMOVABLE SECTIONS TO FACILITATE ACCESS DURING CONSTRUCTION. UTILIZE STRAW BALE BARRIERS ONLY IN LIEU OF A SILT FENCE WHERE FREQUENT ACCESS IS REQUIRED.
   d. SEDIMENT LADEN WATER FROM TRENCH DEWATERING SHALL BE DISCHARGED TO A WELL VEGETATED UPLAND AREA INTO A STRAW BALE DEWATERING STRUCTURE OR GEOTEXTILE FILTER BAG.
   e. SEDIMENT CONTROL STRUCTURES MUST BE IN PLACE AT ALL TIMES ACROSS THE DISTURBED PORTIONS OF THE RIGHT-OF-WAY EXCEPT DURING EXCAVATION/INSTALLATION OF THE CROSSING PIPE.
   f. SOFT DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE RIVER CROSSING UNTIL THE RIVER CROSSING IS INSTALLED AND BACKFILLED.
5. PIPE SHALL BE STRUNG AND WELDED FOR READY INSTALLATION PRIOR TO WATERCOURSE TRENCHING.
6. FLUME CAPACITY DURING DRY CROSSING SHALL BE SUFFICIENT TO ACCOMMODATE 1.5 TIMES THE FLOW MEASURED AT THE TIME OF CONSTRUCTION PROVIDED THAT THE FLUMES WILL BE IN PLACE NOT MORE THAN 96 HOURS AND NO PRECIPITATION IS FORECAST. FLUME CAPACITY FOR VEHICLE ACCESS SHALL BE SUFFICIENT TO PASS THE 2 YEAR DESIGN FLOW OR THE FLOW REASONABLY EXPECTED TO OCCUR DURING THE INSTALLATION. EXCESS FLUMES REQUIRED FOR LONGER TERM ACCESS SHALL BE CAPPED DURING DRY CROSSING PROCEDURES.
7. ENSURE THAT THE DAMS AND VEHICLE CROSSING ARE LOCATED FAR ENOUGH APART TO ALLOW FOR A WIDE EXCAVATION.
8. FLUMES ARE TO BE SET WITH 10 PERCENT OF THEIR DIAMETER BELOW STREAMBED LEVEL WHERE SOIL CONDITIONS PERMIT (OTHERWISE INSTALLED AT STREAM GRADE AND SLOPE.)
9. PLACE IMPERVIOUS DAMS AT EACH END OF THE FLUME, UPSTREAM FIRST, THEN DOWNSTREAM. ACCEPTABLE ALTERNATIVES INCLUDE GRAVEL WITH RIP-RAP PROTECTION, SAND BAGS, STEEL PLATE AND ROCKFILL. DURING INSTALLATION, INSTALL AN IMPERVIOUS MEMBRANE, IF NECESSARY, TO LIMIT LEAKAGE. DAMS MAY NEED KEYING INTO THE BANK AND STREAMBED.
   EXCAVATE TRENCH THROUGH PLUGS AND UNDER FLUME FROM BOTH SIDES. WORK IS TO BE COMPLETED AS QUICKLY AS POSSIBLE.
   a. LOWER IN PIPE BY PASSING UNDER FLUME AND BACKFILL IMMEDIATELY WITH SPOIL MATERIAL.
   b. IT IS NOT NECESSARY TO DEWATER THE IN-STREAM TRENCH, HOWEVER, DISPLACED WATER SHALL BE PUMPED TO A STABLE UPLAND AREA TO AVOID OVERTOPPING OF DAMS DURING PIPE PLACEMENT.
   c. IF THE SPOIL MATERIAL IS NOT SUITABLE, USE IMPORTED CLEAN GRANULAR MATERIAL.
   d. IF BLASTING IS REQUIRED, USE CONTROLLED BLASTING TECHNIQUES TO PREVENT DAMAGE TO THE FLOW CONVEYANCE SYSTEM. ALTERNATIVELY, BLASTING MAY BE ACCOMPLISHED PRIOR TO THE FLUME INSTALLATION BY DRILLING THROUGH THE OVERBURDEN.
10. EXCAVATED MATERIAL MUST NOT BE STOCKPILED WITHIN 10 FT. OF THE WATERCOURSE. THIS MATERIAL SHALL BE CONTAINED TO PREVENT SATURATED SOIL FROM FLOWING BACK INTO THE WATERCOURSE.
11. DEWATERING OF THE ONLAND TRENCH SHOULD OCCUR IN A STABLE VEGETATED AREA A MINIMUM OF 50 FT. FROM ANY WATERBODY. THE PUMP DISCHARGE SHOULD BE DIRECTED ONTO A STABLE SPILL PAD CONSTRUCTED OF ROCKFILL OR TIMBERS TO PREVENT LOCALIZED EROSION. THE DISCHARGE WATER SHOULD ALSO BE FORCED INTO SHEET FLOW IMMEDIATELY BEYOND THE SPILL PAD BY USING STRAW BALES AND THE NATURAL TOPOGRAPHY.
12. FLUMES SHOULD BE REMOVED AS SOON AS POSSIBLE, WHEN NO LONGER REQUIRED FOR PIPE LAYING OR FOR ROAD ACCESS, IN THE FOLLOWING MANNER:
   a. REMOVE THE VEHICLE CROSSING RAMP. BANKS ARE TO BE RESTORED TO A STABLE ANGLE AND PROTECTED WITH EROSION RESISTANT MATERIAL COMPATIBLE WITH THE FLOW CONDITIONS (E.G., EROSION CONTROL BLANKETS, CRIBBING, ROCK RIP-RAP, ETC.) TO THE MAXIMUM EXTENT POSSIBLE BEFORE REMOVING THE DAMS.
   b. REMOVE DOWNSTREAM DAM.
   c. REMOVE UPSTREAM DAM.
   d. REMOVE FLUME.
   e. COMPLETE BANK TRIMMING AND EROSION PROTECTION. IF SANDBAGS ARE USED FOR THE DAMS, PLACE AND REMOVE BY HAND TO AVOID EQUIPMENT BREAKING BAGS.
13. RESTORE THE STREAMBED AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONTOURS, BUT NOT TO EXCEED 2 HORIZONTAL TO 1 VERTICAL.
   a. INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES AS INDICATED ON A SITE SPECIFIC BASIS. IN THE ABSENCE OF SITE SPECIFIC INFORMATION, A FLEXIBLE CHANNEL LINER SUCH AS NAG C125 OR C350 WHICH IS CAPABLE OF WITHSTANDING ANTICIPATED FLOW SHALL BE INSTALLED. ALTERNATIVELY, ROCK RIP-RAP SHALL BE INSTALLED.
   b. ANY MATERIALS PLACED IN THE STREAM TO FACILITATE CONSTRUCTION SHALL BE REMOVED DURING RESTORATION. BANKS SHALL BE STABILIZED AND TEMPORARY SEDIMENT BARRIERS INSTALLED AS SOON AS POSSIBLE AFTER CROSSING, BUT WITHIN 24 HOURS OF COMPLETING THE CROSSING.
   c. MAINTAIN A SILT FENCE OR STRAW BALE BARRIER ALONG THE WATER COURSE UNTIL VEGETATION IS ESTABLISHED IN ADJACENT DISTURBED AREAS.

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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 13A
TYPICAL DRY FLUME CROSSING METHOD - CONSTRUCTION PROCEDURES

SCALE N.T.S. | DWG No 4359-03-ML-03-708 | REV 02

TC_A4_BR.DWG 8.5X11

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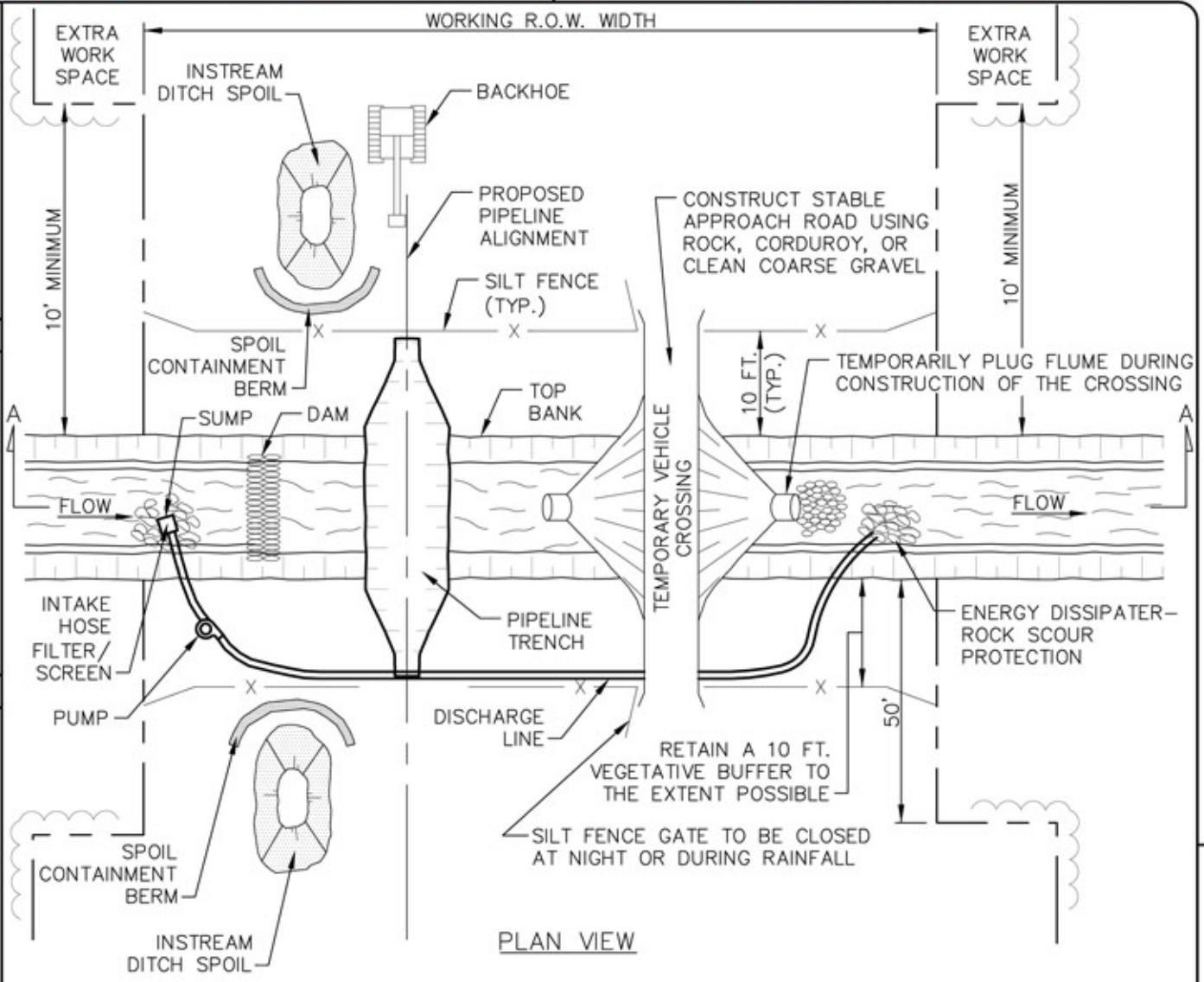

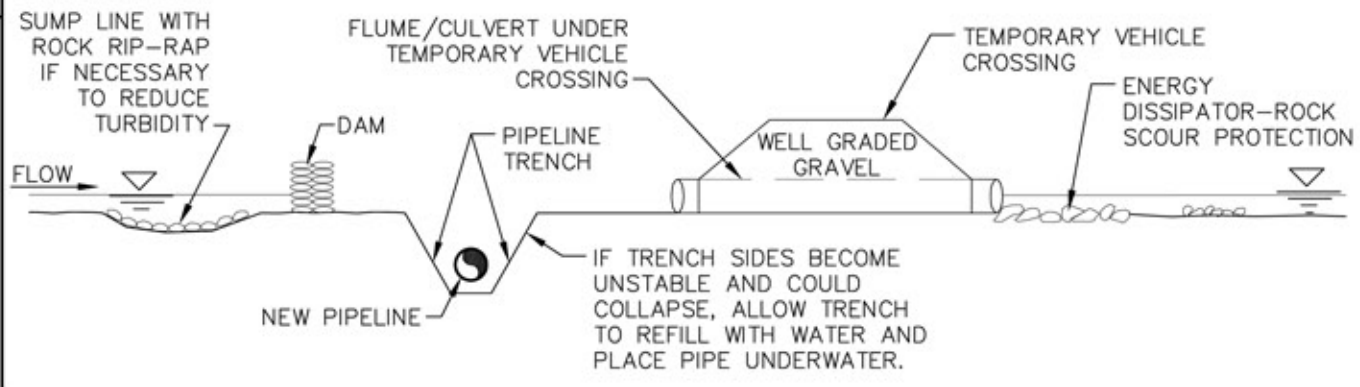

NOTES:

1. PIPELINE PLACEMENT WITHIN RIGHT-OF-WAY CONCEPTUAL ONLY.
2. SEE DETAIL 14A FOR CONSTRUCTION PROCEDURES.

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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	TITLE: DETAIL 14 TYPICAL DAM AND PUMP CROSSING		
		SCALE N.T.S.	DWG No 4359-03-ML-03-709	REV 01

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CONSTRUCTION PROCEDURES:

1. WHERE NECESSARY, OBTAIN PRIOR APPROVAL BEFORE USING THE DAM AND PUMP METHOD.
2. IF THERE IS ANY FLOW IN THE WATERCOURSE, INSTALL PUMPS TO MAINTAIN STREAMFLOW AROUND THE BLOCKED OFF SECTIONS OF CHANNEL. THE PUMP IS TO HAVE 1.5 TIMES THE PUMPING CAPACITY OF ANTICIPATED FLOW. A SECOND STANDBY PUMP OF EQUAL CAPACITY IS TO BE READILY AVAILABLE AT ALL TIMES. AN ENERGY DISSIPATER IS TO BE BUILT TO ACCEPT PUMP DISCHARGE WITHOUT STREAMBED OR STREAMBANK EROSION. IF THE CROSSING IS PROLONGED BEYOND ONE DAY THE OPERATION NEEDS TO BE MONITORED OVERNIGHT.
3. SCHEDULE INSTREAM ACTIVITY FOR LOW FLOW PERIODS IF POSSIBLE.
4. MARK OUT AND MAINTAIN LIMITS OF AUTHORIZED WORK AREAS WITH FENCING OR FLAGGING TAPE TO AVOID UNNECESSARY DISTURBANCE OF VEGETATION. ENSURE EQUIPMENT OPERATORS WORKING ON THE CROSSING HAVE BEEN BRIEFED ABOUT THIS PLAN AND THE MEASURES NEEDED TO PROTECT WATER QUALITY. INSTALL PRE-WORK SEDIMENT CONTROL MEASURES AS SPECIFIED IN THE PLAN. ALL NECESSARY EQUIPMENT AND MATERIALS TO BUILD THE DAMS AND TO PUMP WATER MUST BE ON SITE OR READILY AVAILABLE PRIOR TO COMMENCING IN-WATER CONSTRUCTION. PIPE SHOULD BE STRUNG, WELDED AND COATED AND READY FOR INSTALLATION PRIOR TO WATERCOURSE TRENCHING.
5. CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES, AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS STREAM.
   a. NO HEAVILY SILT LADEN WATER SHALL BE DISCHARGED DIRECTLY INTO THE STREAM.
   b. EROSION AND SEDIMENT CONTROL STRUCTURE LOCATIONS AS DEPICTED ARE APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED BY THE COMPANY INSPECTOR TO ACTUAL SITE CONDITIONS.
   c. SILT FENCE OR STRAW BALE INSTALLATIONS SHALL INCLUDE REMOVABLE SECTIONS TO FACILITATE ACCESS DURING CONSTRUCTION. UTILIZE STRAW BALE BARRIERS ONLY IN LIEU OF A SILT FENCE WHERE FREQUENT ACCESS IS REQUIRED.
   d. SEDIMENT LADEN WATER FROM TRENCH DEWATERING SHALL BE DISCHARGED TO A WELL VEGETATED UPLAND AREA INTO A STRAW BALE DEWATERING STRUCTURE OR GEOTEXTILE FILTER BAG.
   e. SEDIMENT CONTROL STRUCTURES MUST BE IN PLACE AT ALL TIMES ACROSS THE DISTURBED PORTIONS OF THE RIGHT-OF-WAY EXCEPT DURING EXCAVATION/INSTALLATION OF THE CROSSING PIPE.
   f. SOFT DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE RIVER CROSSING UNTIL THE RIVER CROSSING IS INSTALLED AND BACKFILLED.
6. TO THE EXTENT POSSIBLE, MAINTAIN A MINIMUM 10 FEET VEGETATIVE BUFFER STRIP BETWEEN DISTURBED AREAS AND THE WATERCOURSE. INSTALL AND MAINTAIN A SILT FENCE UPSLOPE OF THE BUFFER STRIP ON EACH SIDE OF THE WATERCOURSE. THE SILT FENCE SHOULD INCORPORATE REMOVABLE "GATES" AS REQUIRED TO ALLOW ACCESS WHILE MAINTAINING EASE OF REPLACEMENT FOR OVERNIGHT OR DURING PERIODS OF RAINFALL.
7. CONSTRUCT A TEMPORARY SUMP UPSTREAM OF THE DAM AND LINE WITH ROCKFILL IF A NATURAL POOL DOES NOT EXIST. INSTALL THE PUMP OR PUMP INTAKE IN THE POOL OR SUMP. DISCHARGE WATER ONTO AN ENERGY DISSIPATER DOWNSTREAM OF THE WORK AREA.
8. EXCAVATED MATERIAL MUST NOT BE STOCKPILED WITHIN 10 FT. OF THE WATERCOURSE. THIS MATERIAL MUST BE CONTAINED WITHIN BERM CONTAINMENT, WITH SECONDARY SILT FENCE PROTECTION TO PREVENT SATURATED SOIL FROM FLOWING BACK INTO THE WATERCOURSE.
9. CHEMICALS, FUELS, LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT REFUELED WITHIN 100 FT. OF THE WATERBODY. PUMPS ARE TO BE REFUELED AS PER THE SPCC PLANS.
10. STAGING AREAS ARE TO BE LOCATED AT LEAST 10 FT. FROM THE WATER'S EDGE (WHERE TOPOGRAPHIC CONDITIONS PERMIT) AND SHALL BE THE MINIMUM SIZE NEEDED.
11. DAMS ARE TO BE MADE OF STEEL PLATE, INFLATABLE PLASTIC DAM, SAND BAGS, COBBLES, WELL GRADED COARSE GRAVEL FILL, OR ROCK FILL. DAMS MAY NEED KEYING INTO THE BANKS AND STREAMBED. ENSURE THAT THE DAM AND VEHICLE CROSSING ARE LOCATED FAR ENOUGH APART TO ALLOW FOR A WIDE EXCAVATION. CAP FLUMES USED UNDER VEHICLE CROSSING DURING DRY CROSSING.
12. DEWATER AREA BETWEEN DAMS IF POSSIBLE. DEWATERING SHOULD OCCUR IN A STABLE VEGETATIVE AREA A MINIMUM OF 50 FT. FROM ANY WATERBODY. THE PUMP DISCHARGE SHOULD BE DISCHARGED ONTO A STABLE SPILL PAD CONSTRUCTED OF ROCKFILL SANDBAGS, OR TIMBERS TO PREVENT LOCALIZED EROSION. THE DISCHARGE WATER SHOULD ALSO BE FORCED INTO SHEET FLOW IMMEDIATELY BEYOND THE SPILL PAD BY USING STRAW BALES AND THE NATURAL TOPOGRAPHY DISCHARGED WATER SHALL NOT BE ALLOWED TO FLOW INTO ANY WATERCOURSE OR WETLAND. IF IT IS NOT POSSIBLE TO DEWATER THE EXCAVATION DUE TO SOILS WITH A HIGH HYDRAULIC CONDUCTIVITY, THE EXCAVATION AND PIPE PLACEMENT IS TO BE CARRIED OUT IN THE STANDING WATER. PUMP ANY DISPLACED WATER AS DESCRIBED ABOVE TO PREVENT OVERTOPPING OF DAMS.
13. EXCAVATE TRENCH THROUGH PLUGS AND STREAMBED FROM BOTH SIDES, RE-POSITIONING DISCHARGE HOSE AS NECESSARY. LOWER THE PIPE IN THE TRENCH AND BACKFILL IMMEDIATELY. DURING THIS OPERATION WORK IS TO BE COMPLETED AS QUICKLY AS POSSIBLE.
14. CONTRACTOR SHALL RESTORE THE STREAM BED AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONTOURS, BUT NOT TO EXCEED 2 HORIZONTAL TO 1 VERTICAL.
   a. CONTRACTOR SHALL INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES AS INDICATED ON A SITE SPECIFIC BASIS. IN THE ABSENCE OF SITE SPECIFIC INFORMATION, A FLEXIBLE CHANNEL LINER SUCH AS NAG C125 OR C350 WHICH IS CAPABLE OF WITHSTANDING ANTICIPATED FLOW SHALL BE INSTALLED. ALTERNATIVELY, ROCK RIP-RAP SHALL BE INSTALLED.
   b. ANY MATERIALS PLACED IN THE STREAM TO FACILITATE CONSTRUCTION SHALL BE REMOVED DURING RESTORATION. BANKS SHALL BE STABILIZED AND TEMPORARY SEDIMENT BARRIERS INSTALLED AS SOON AS POSSIBLE AFTER CROSSING, BUT WITHIN 24 HOURS OF COMPLETING THE CROSSING.
   c. MAINTAIN A SILT FENCE OR STRAW BALE BARRIER ALONG THE WATER COURSE UNTIL VEGETATION IS ESTABLISHED IN ADJACENT DISTURBED AREAS.
15. WHEN THE STREAMBED HAS BEEN RESTORED, THE CREEK BANKS ARE TO BE CONTOURED TO A STABLE ANGLE AND PROTECTED WITH EROSION RESISTANT MATERIAL COMPATIBLE WITH FLOW VELOCITY BETWEEN DAMS (E.G., EROSION CONTROL BLANKETS, CRIBBING, ROCK RIP-RAP, ETC.). THE DAMS ARE TO BE REMOVED DOWNSTREAM FIRST. KEEP PUMP RUNNING UNTIL NORMAL FLOW IS RESUMED. COMPLETE BANK TRIMMING AND EROSION PROTECTION. IF SANDBAGS ARE USED FOR THE DAMS, PLACE AND REMOVE BY HAND TO AVOID EQUIPMENT BREAKING BAGS.

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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 14A
TYPICAL DAM AND PUMP CROSSING – CONSTRUCTION PROCEDURES

SCALE N.T.S. | DWG No 4359-03-ML-03-710 | REV 02

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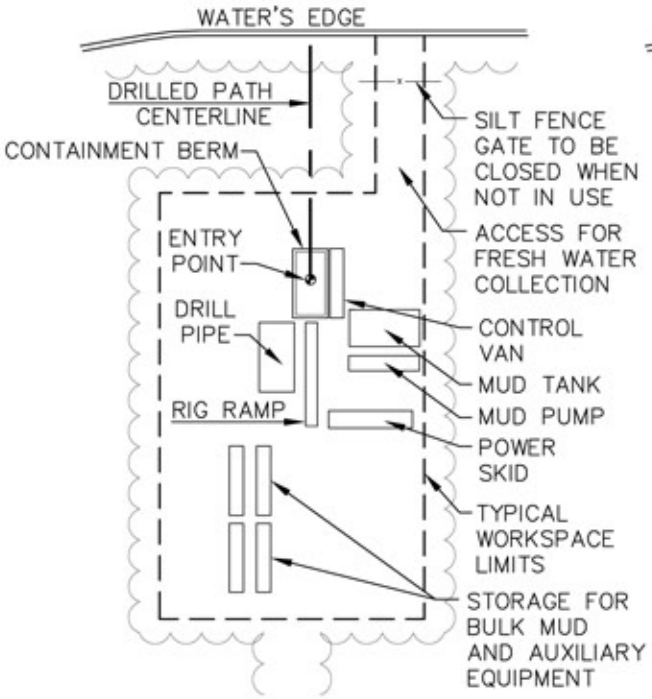
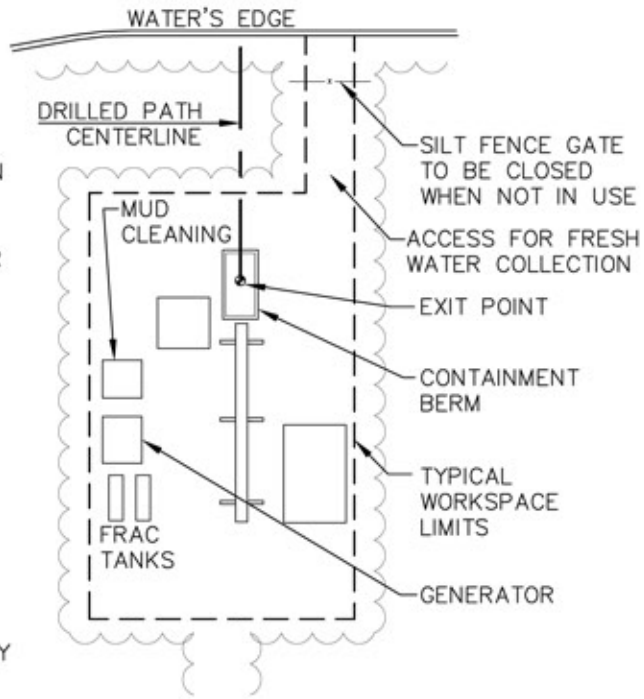
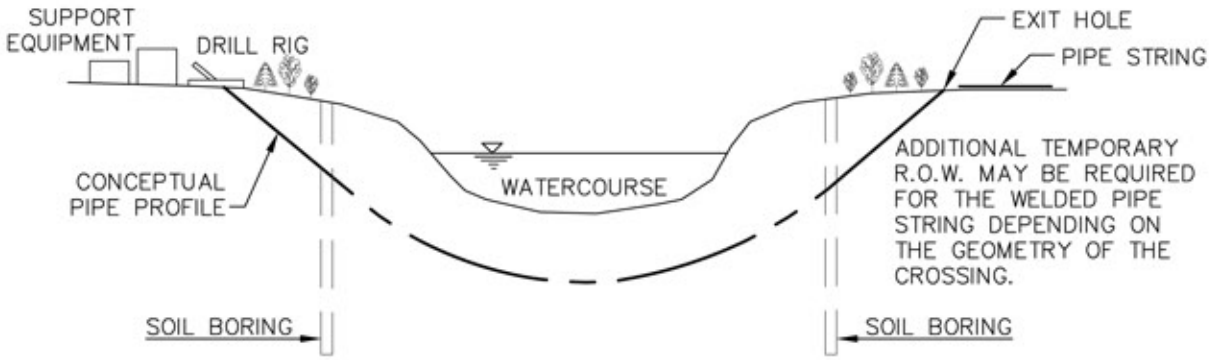


SITE PLAN
ENTRY SIDE



SITE PLAN
EXIT SIDE



PROFILE

NOTES:

1. SET UP DRILLING EQUIPMENT A MINIMUM OF 100 FEET FROM THE EDGE OF THE WATERCOURSE. LIMIT CLEARING BETWEEN DRILL ENTRY AND EXIT POINT TO HAND CUTTING BRUSH FOR TRACKING WIRES.
2. ENSURE THAT ONLY BENTONITE-BASED DRILLING MUD IS USED.
3. INSTALL SUITABLE DRILLING MUD TANKS OR SUMPS TO PREVENT CONTAMINATION OF WATERCOURSE.
4. INSTALL BERMS DOWNSLOPE FROM THE DRILL ENTRY AND ANTICIPATED EXIT POINTS TO CONTAIN ANY RELEASE OF DRILLING MUD.
5. DISPOSE OF DRILLING MUD IN ACCORDANCE WITH THE APPROPRIATE REGULATORY AUTHORITY REQUIREMENTS.

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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	TITLE: DETAIL 15 TYPICAL HORIZONTAL DRILL (HDD) SITE PLAN & PROFILE		
		SCALE N.T.S.	DWG No 4359-03-ML-03-711	REV 02

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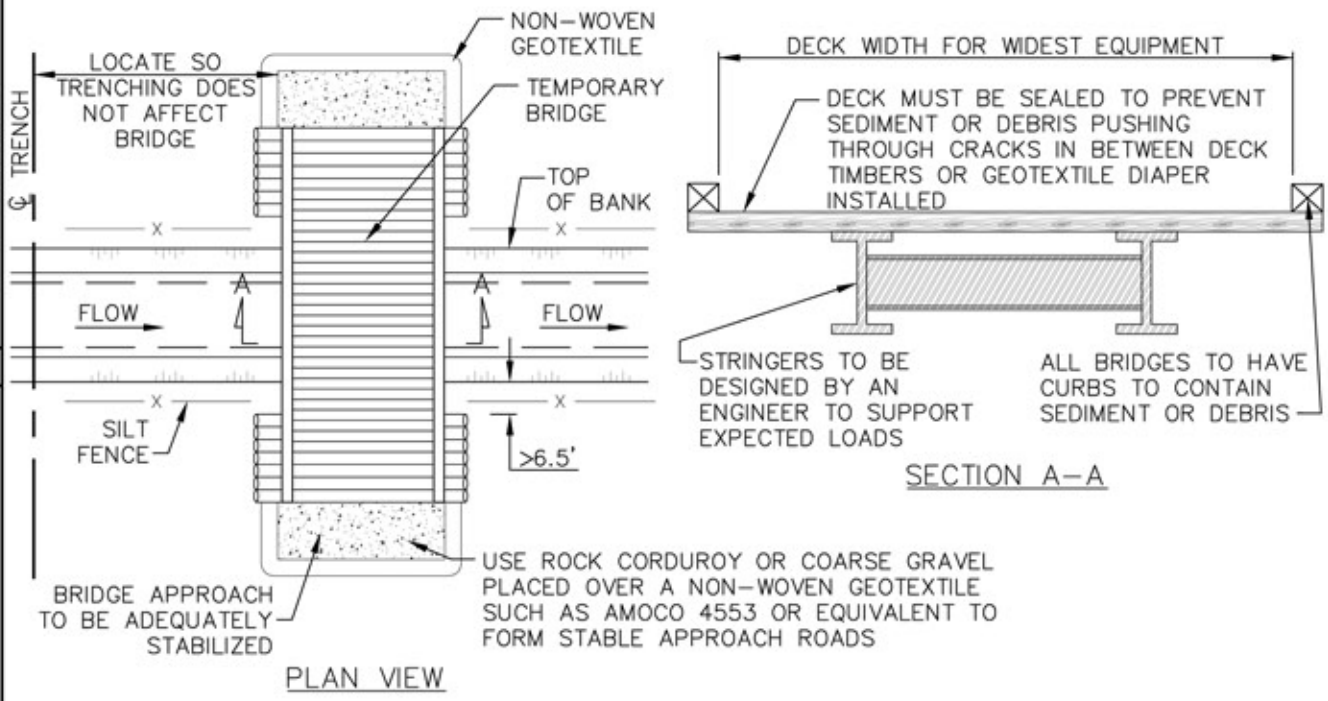
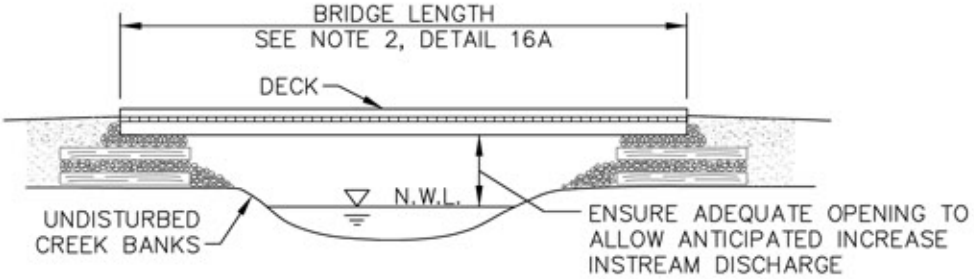
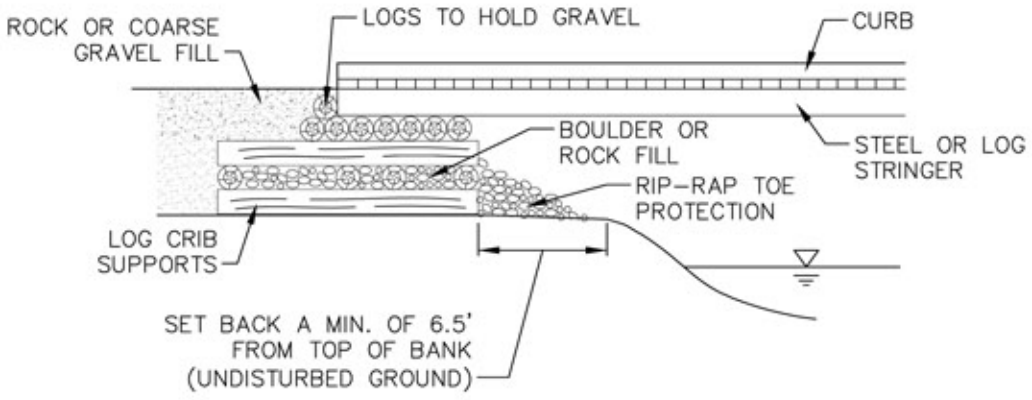




BRIDGE PROFILE



TYPICAL TEMPORARY CRIB ABUTMENT

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DESIGNER:		KEYSTONE XL PROJECT		
JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 16 TYPICAL TEMPORARY BRIDGE CROSSING		
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CONSTRUCTION PROCEDURES:

IN GENERAL TERMS, THE FOLLOWING IS A SEQUENCE OF CONSTRUCTION PROCEDURES THAT ARE RECOMMENDED TO BE FOLLOWED FOR TEMPORARY BRIDGE CROSSINGS:

1. A PORTABLE BRIDGE, FLEXI-FLOAT OR FLUMED VEHICLE CROSSING MAY BE SUBSTITUTED FOR THE TEMPORARY BRIDGE. IT IS IMPORTANT THAT THE SIZE OF THE TOTAL OPENING BE SELECTED SO THE STRUCTURE CAN SAFELY PASS FLOOD FLOWS THAT CAN REASONABLY BE EXPECTED TO OCCUR DURING THE LIFE OF THE CROSSING.

2. DETERMINE BRIDGE LENGTH REQUIRED AND FOLLOW EITHER METHOD A) OR B) FOR DETERMINING THE OPENING SIZE. IF A) IS FOLLOWED, A MINIMUM 6.5 FT. SETBACK FROM TOP OF BANK MUST BE PRESERVED AS A "NO DISTURBANCE AREA". IF ABUTMENTS OR PIERS IN THE STREAMBED ARE REQUIRED, METHOD B) IS TO BE FOLLOWED.

3. INSTALL THE BRIDGE IN A MANNER THAT WILL MINIMIZE SEDIMENT ENTERING THE WATER. STRINGERS MUST BE DESIGNED TO SUPPORT THE LOADS EXPECTED ON THE BRIDGE. CURBS MUST BE INSTALLED ALONG THE EDGE OF THE DECK TO CONTAIN SEDIMENT AND DEBRIS ON THE BRIDGE. FASTENERS CONNECTING COMPONENTS MUST BE STRONG ENOUGH TO HOLD THEM IN POSITION DURING THE LIFE OF THE BRIDGE. CRIBS ARE TO BE FILLED WITH ROCK OR COBBLE. RIP-RAP EROSION PROTECTION IS TO BE PLACED AROUND THE CRIBS AND ON ANY FILL SLOPES PROJECTING INTO THE WATERBODY.

4. ROAD APPROACHES LEADING TO THE BRIDGE MUST BE RAISED AND STABLE SO EQUIPMENT LOADS ARE SUPPORTED A SUFFICIENT DISTANCE BACK FROM THE WATER TO REDUCE SEDIMENT AND DEBRIS ENTERING THE WATERBODY FROM EQUIPMENT TRACKS. THIS MAY REQUIRE USING MATERIALS SUCH AS GRAVEL, ROCK OR CORDUROY. DO NOT USE SOIL TO CONSTRUCT OR STABILIZE EQUIPMENT BRIDGES. IF CUTS ARE NEEDED TO OBTAIN A SATISFACTORY GRADE, THEY ARE TO BE DUG WITH SIDE DITCHES AND STABLE SLOPES. EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED TO KEEP SEDIMENT ON LAND (E.G., SILT FENCING, FILTER CLOTH, RIP-RAP, SEED AND MULCH, ETC.)

5. MAINTAIN A SILT FENCE ON EACH SIDE OF THE WATERBODY EXTENDING A MINIMUM OF 10 FEET BEYOND THE WIDTH OF DISTURBANCE UNTIL VEGETATION HAS BEEN ESTABLISHED IN UPSLOPE AREAS.

6. PERIODICALLY CHECK BRIDGE INSTALLATION AND REMOVE ANY BUILD-UP OF SEDIMENT OR DEBRIS ON THE BRIDGE. DISPOSE OF THIS MATERIAL IN A LOW LYING AREA AT LEAST 100 FEET FROM THE WATERBODY.

7. REMOVE TEMPORARY CROSSINGS AS SOON AS POSSIBLE AFTER FINAL CLEAN-UP. MATERIALS PLACED ALONG THE WATERBODY SHOULD BE COMPLETELY REMOVED DURING FINAL CLEAN-UP. REMOVAL SHOULD NOT OCCUR OUTSIDE THE CONSTRUCTION WINDOWS. SURPLUS GRAVEL IS TO BE SPREAD ON THE RIGHT-OF-WAY AS GRAVEL SHEETING, IF GRADATION IS SUITABLE, OR MOVED AT LEAST 100 FEET FROM TOP OF BANK FOR DISPOSAL. BRIDGE MATERIALS ARE TO BE REMOVED FROM THE CROSSING AREA. THE WATERBODY BED AND BANKS ARE TO BE RESTORED TO A STABLE ANGLE AND PROTECTED WITH EROSION RESISTANT MATERIAL COMPATIBLE WITH THE EXPECTED FLOW CONDITIONS.

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		SCALE N.T.S.	DWG No 4359-03-ML-03-713	REV 01

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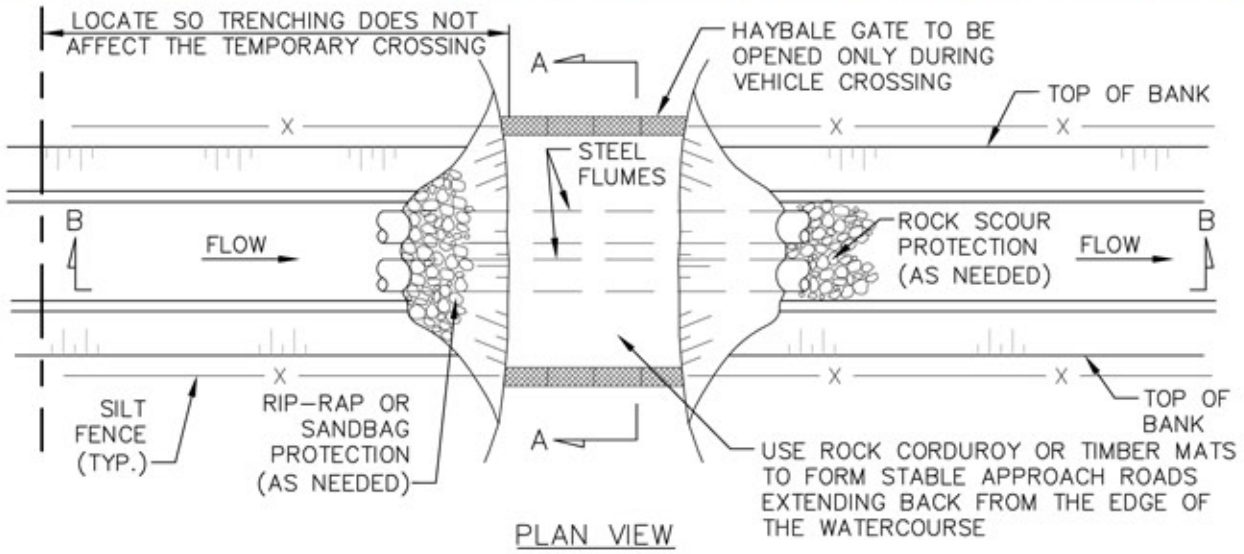
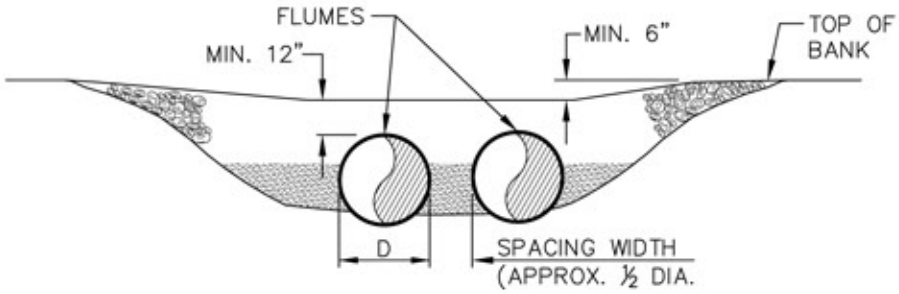
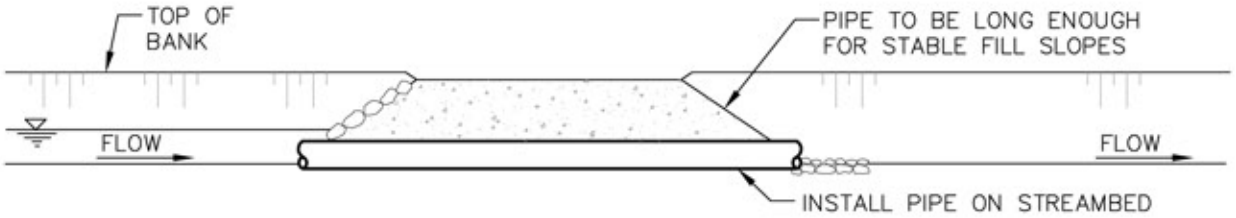


PLAN VIEW



SECTION A–A



SECTION B–B

CONSTRUCTION PROCEDURES:

THE FOLLOWING IS A SEQUENCE OF CONSTRUCTION AND PROCEDURES MEASURES TO BE FOLLOWED AT ALL TEMPORARY FLUME VEHICLE CROSSINGS.

1. A PORTABLE FLEXI–FLOAT, OR TEMPORARY BRIDGE MAY BE SUBSTITUTED FOR THE TEMPORARY FLUME CROSSING.
2. THE LENGTH OF THE FLUME SHALL BE SUFFICIENT TO SPAN THE ENTIRE AREA REQUIRED FOR VEHICULAR ACCESS, EXTENDING 4 FEET BEYOND TOE OF FILL MATERIAL, SO TRENCHING WILL NOT AFFECT THE ROAD CROSSING. A LONGER PIPE IS TO BE USED, IF NEEDED, TO MAINTAIN STABLE SIDE SLOPES. FLUME CAPACITY TO BE BASED ON THE 2–YEAR DESIGN FLOW OR MAXIMUM FLOW ANTICIPATED TO OCCUR DURING INSTALLATION, AS SPECIFIED IN CONSTRUCTION DOCUMENTS.
3. WHERE PRACTICAL, BACKFILL AROUND THE PIPES AT THE ROAD WITH CLEAN, COARSE ROCK FILL MATERIAL. IF SCOUR IS POSSIBLE, RIP–RAP IS TO BE PLACED ON THE WATERBODY BED DOWNSTREAM OF THE PIPE OUTLET EXTENDING A MINIMUM OF TWO PIPE DIAMETERS. ALTERNATIVELY, TIMBER EQUIPMENT MATS, SAND BAGS OR TIMBER CORDUROY MAY BE USED TO FORM THE TRAVEL SURFACE.
4. TO REDUCE DEBRIS ENTERING THE WATERBODY FROM EQUIPMENT TRACKS, THE APPROACH ROAD LEADING TO THE CULVERT CROSSING MUST BE RAISED AND STABLE SO EQUIPMENT LOADS ARE SUPPORTED A SUFFICIENT DISTANCE BACK FROM THE WATER. IF CUTS ARE NEEDED TO OBTAIN A SATISFACTORY GRADE, THEY ARE TO BE DUG WITH SIDE DITCHES AND STABLE SLOPES. EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED TO LIMIT THE POTENTIAL FOR SEDIMENT TO ENTER THE WATERBODY (E.G., CHECK DAMS, SILT FENCE, RIP–RAP, SEED AND MULCH, SEDIMENT TRAPS, ETC.).
5. PERIODICALLY CHECK THE TEMPORARY CROSSING INSTALLATION AND REMOVE ANY BUILD–UP OF SEDIMENT OR DEBRIS ON THE BRIDGE. DISPOSE OF THIS MATERIAL AT LEAST 100 FEET FROM THE WATERBODY AND ABOVE THE HIGH WATER LEVEL.
6. FOLLOWING COMPLETION OF THE CROSSING, REMOVE ROCKFILL IN/OR AROUND FLUME PIPES FROM THE WATERBODY OR WETLAND.
7. RESTORE STREAM BANKS AND WATERBODY BOTTOM.

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TITLE: DETAIL 17 TYPICAL FLUME BRIDGE CROSSING

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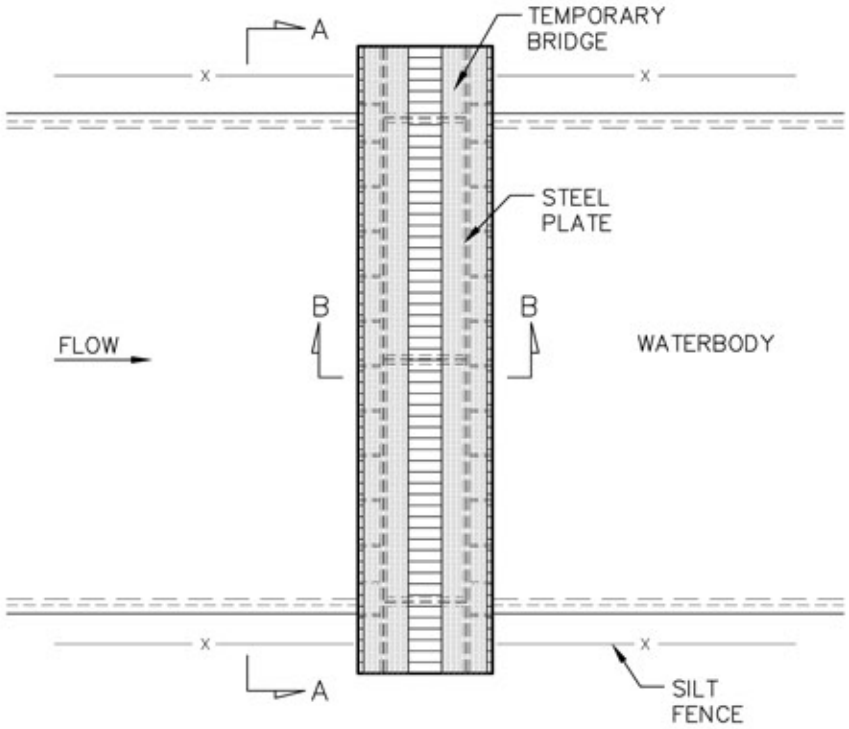
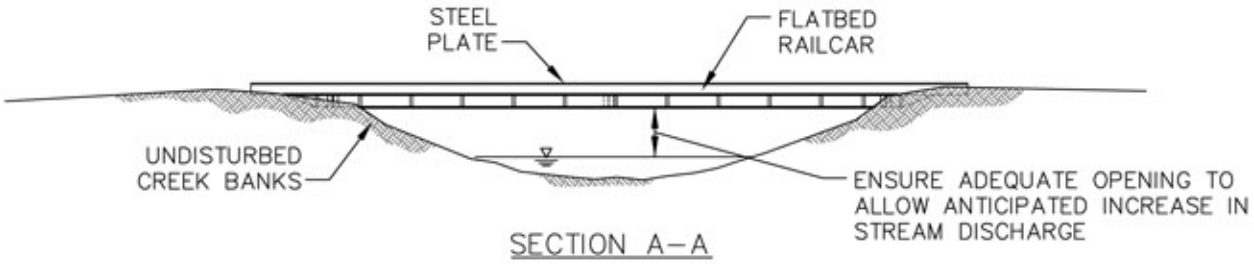
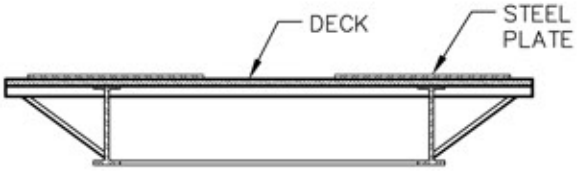


PLAN VIEW



SECTION A–A



SECTION B–B

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CONSTRUCTION PROCEDURES:

1. THIS TYPICAL DRAWING PROVIDES FOR A RAILCAR BRIDGE EQUIPMENT CROSSING.

2. BRIDGE SHOULD BE A MINIMUM OF 12 FEET LONGER THAN BANK TO BANK WIDTH.

3. BEST MANAGEMENT PRACTICES UTILIZING EROSION CONTROL DEVICES, SUCH AS HAY BALES AND SILT FENCE ARE REQUIRED TO PREVENT SEDIMENTATION OF THE STREAM. EROSION PROTECTION SHALL BE PLACED ON THE STREAM BANKS.

4. DURING FINAL CLEAN-UP, REMOVE TEMPORARY EQUIPMENT CROSSINGS AS SOON AS POSSIBLE. INSTALLED MATERIALS, SUCH AS HAY BALES AND SILT FENCE MUST BE REMOVED AND DISPOSED IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS AND REQUIREMENTS. THE STREAMBED, BANKS AND AREAS AFFECTED BY CONSTRUCTION OF THE TEMPORARY EQUIPMENT CROSSING SHOULD BE RESTORED TO A STABLE CONDITION. IF REQUIRED TO PREVENT TRANSPORT OF SEDIMENTATION TO THE STREAM, SILT FENCE SHOULD BE INSTALLED AT THE TOP OF THE BANKS.

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TYPICAL RAILCAR BRIDGE CROSSING -
CONSTRUCTION PROCEDURES

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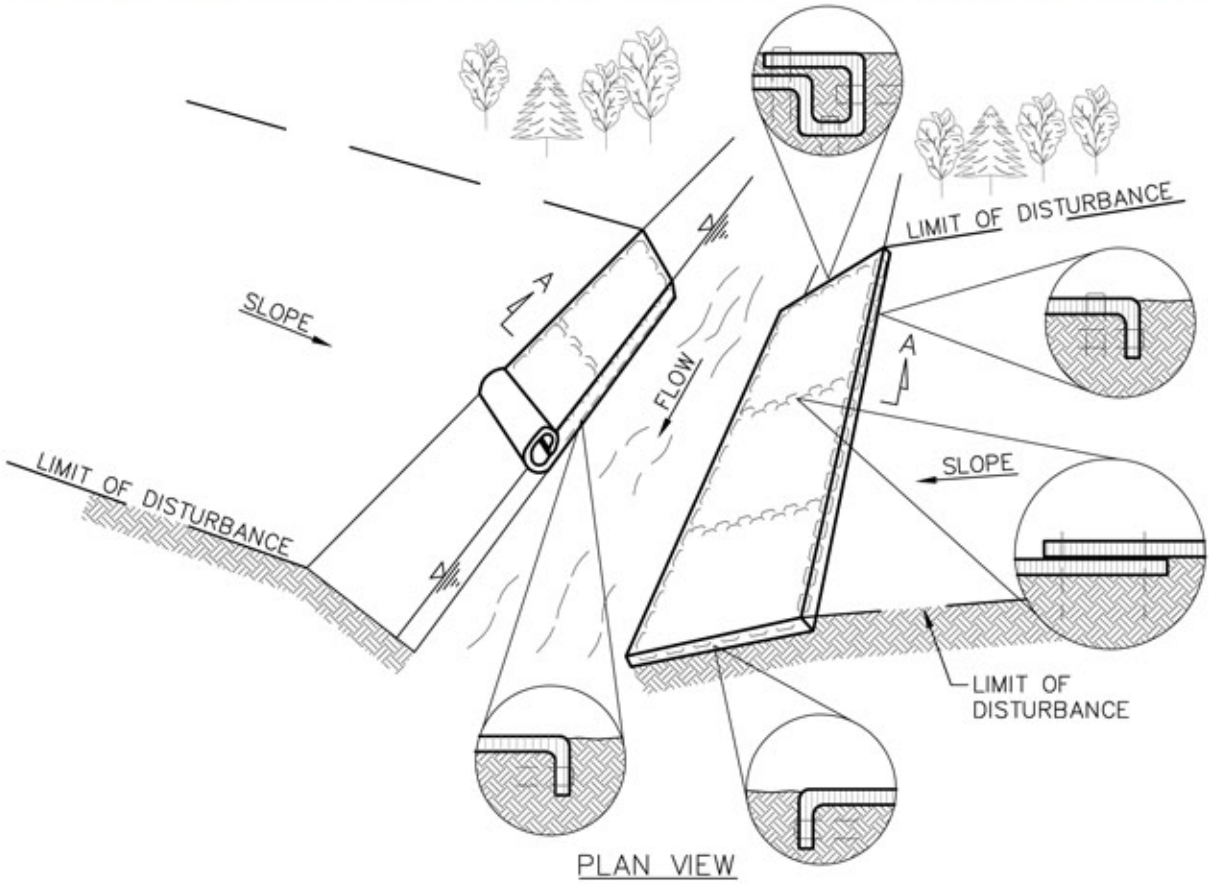

PLAN VIEW

SECTION A–A

NOTES:

1. INSTALL AND ANCHOR LINERS FOLLOWING MANUFACTURER'S INSTRUCTIONS.
2. PREPARE SOIL BEFORE INSTALLING CHANNEL LINER, INCLUDING THE APPLICATION OF
3. SEED. CHANNEL LINERS SHOULD EXTEND COMPLETELY ACROSS DISTURBED BANK AREAS TO PROTECT ERODIBLE SURFACES.
4. BEGIN AT THE END OF THE CHANNEL BY ANCHORING THE LINER IN A TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
5. ROLL LINER IN DIRECTION OF WATER FLOW.
6. INSTALL LINERS END–OVER–END (SHINGLE STYLE) WITH OVERLAP USING A DOUBLE ROW OF STAGGERED STAPLES 4 INCHES BELOW THE FIRST ROW IN A STAGGERED PATTERN.
7. IN HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FEET INTERVALS. USE A ROW OF STAPLES 4 INCHES BELOW THE FIRST ROW IN A STAGGERED PATTERN.
8. INSTALL CHANNEL LINER TO THE TOP OF THE DEFINED CHANNEL SECTION. TWO OR MORE ROWS OF BLANKETS MAY BE NECESSARY, THESE LINERS MUST BE OVERLAPPED 4 INCHES AND STAPLED.
9. THE CHANNEL LINER SHOULD EXTEND TO THE BASE OF THE CHANNEL AND STAPLED. FOR CHANNELS WITH VERY LITTLE OR NO FLOW, EXTEND A MINIMUM OF 1 FOOT BELOW THE LOW WATER LEVEL AND STAPLE IN PLACE.
10. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

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		TITLE: DETAIL 19 FLEXIBLE CHANNEL LINER INSTALLATION		
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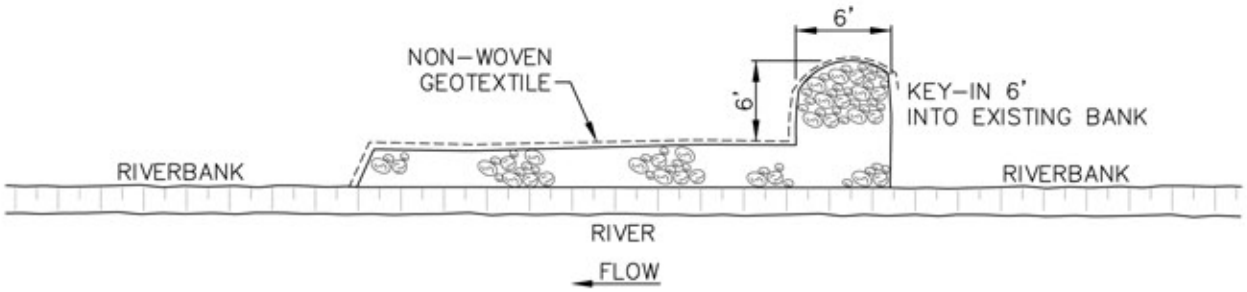
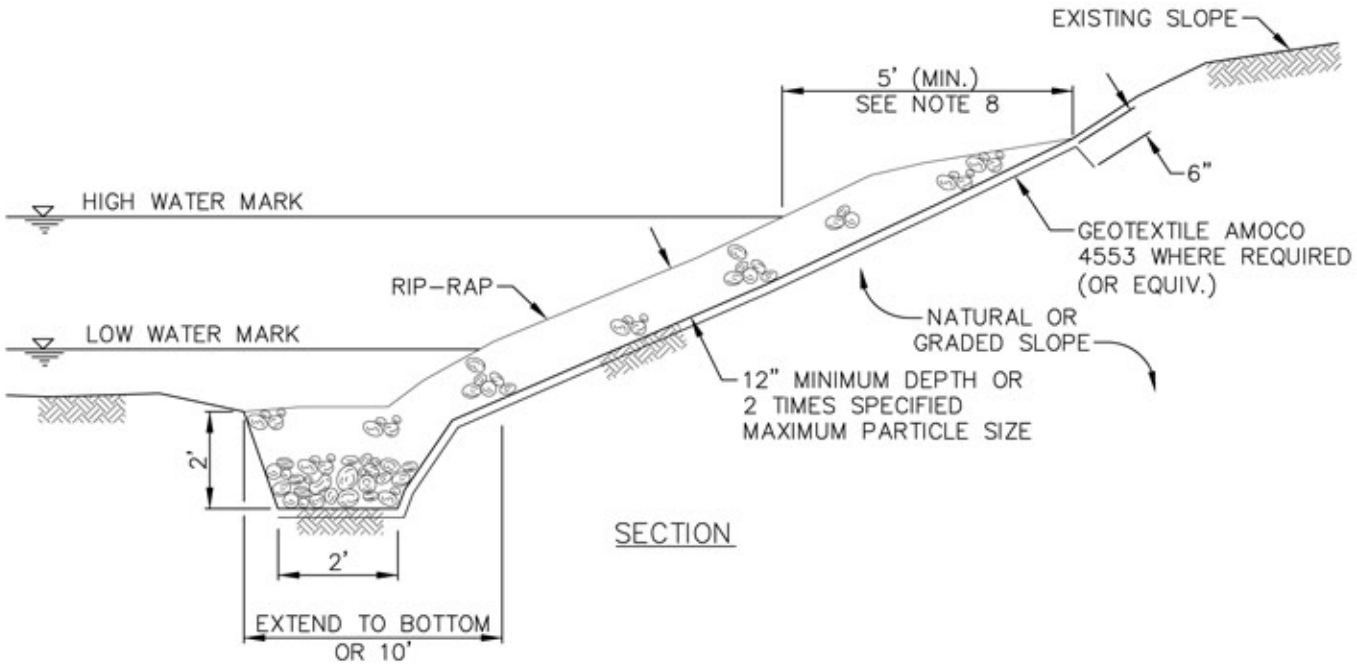


PLAN



SECTION

NOTES:

1. REMOVE ALL STUMPS, ORGANIC MATERIAL AND PREPARE BANKS TO A STABLE CONFIGURATION TO A MAXIMUM SLOPE OF 2 HORIZONTAL TO 1 VERTICAL.
2. CONSTRUCT TOE TRENCH TO KEY IN BOTTOM OF RIP-RAP PROTECTION.
3. INSTALL FILTER CLOTH (GEOTEXTILE), SUCH AS AMOCO 4553 OR EQUIVALENT, UNDER ROCK WHERE SPECIFIED OR AS DIRECTED BY THE COMPANY. ADJOINING EDGES OF CLOTH SHALL OVERLAP A MINIMUM OF 12".
4. ROCK UTILIZED FOR RIP-RAP SHALL CONSIST OF SOUND, DURABLE ROCK, AND RESISTANT TO WEATHERING. INDIVIDUAL PIECES SHOULD BE ANGULAR, BLOCK SHAPED AND HAVE A MINIMUM SPECIFIC GRAVITY OF 2.2.
5. INSTALL RIP-RAP TO A THICKNESS OF APPROXIMATELY 2 TIMES THE MAXIMUM EQUIVALENT DIAMETER OF THE RIP-RAP. EACH LOAD SHOULD BE WELL GRADED. A WELL GRADED MIXTURE IS COMPOSED 60% (MINIMUM) OF LARGER SIZES WITH 40% OF SMALLER SIZES TO FILL THE VOIDS.
6. SIZE OF RIP-RAP IS DEPENDENT UPON THE PREDICTED FLOW CONDITIONS.
7. KEY IN THE EDGES OF THE RIP-RAP AND FILTER CLOTH TO NATURAL GROUND CONTOURS SO THAT UNDERMINING DOES NOT OCCUR.
8. RIP-RAP IS TO BE INSTALLED TO 2 FEET. ABOVE THE NORMAL HIGH WATER MARK OR 5 FEET ALONG THE SLOPE, WHICHEVER IS LESS.
9. INSTALLATION SPECIFICATIONS TO BE MODIFIED TO SUIT ACTUAL SITE CONDITIONS.

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		TITLE: DETAIL 20 TYPICAL ROCK RIP-RAP		
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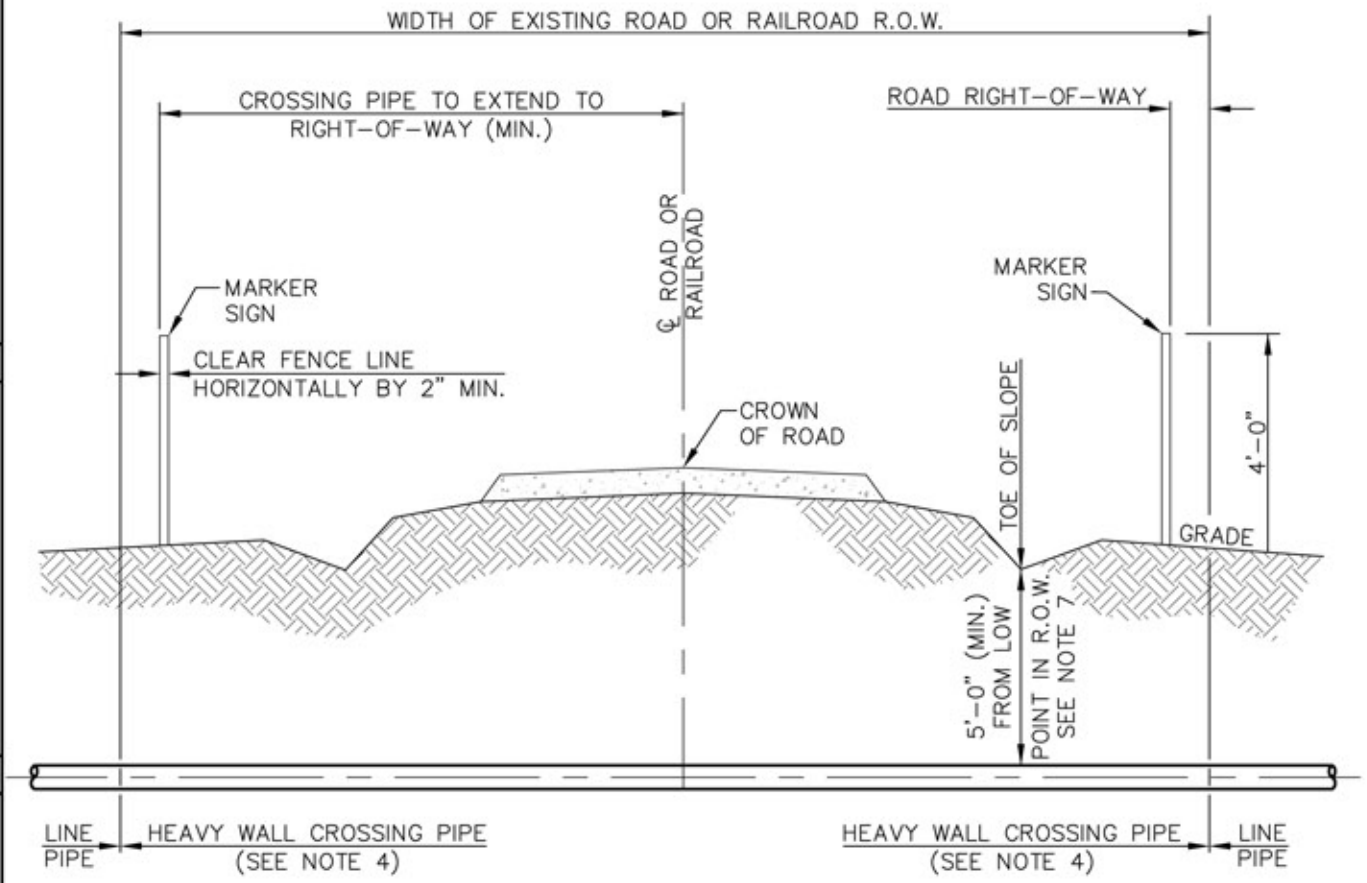

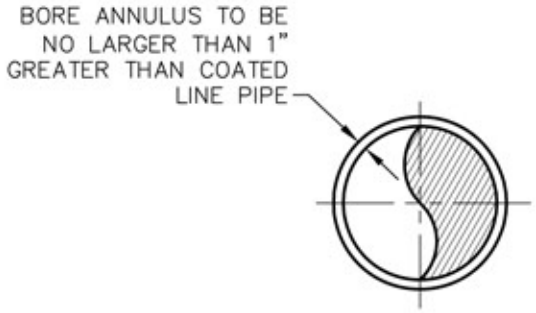

NOTES:

1. CROSSINGS SHALL BE IN ACCORDANCE WITH APPLICABLE PERMIT.
2. ROAD CROSSING PIPE SHALL EXTEND AT MINIMUM TO RIGHT-OF-WAY LINE UNLESS OTHERWISE SPECIFIED.
3. THE TYPE AND MINIMUM REQUIRED LENGTH OF PIPE FOR CROSSINGS OF ROADS SHALL BE AS SPECIFIED ON ALIGNMENT SHEETS.
4. PIPE FOR BORED CROSSINGS TO INCLUDE ABRASION-RESISTANT (ARB) COATING.
5. PIPELINE MARKER AND TEST STATIONS TO BE INSTALLED ON RIGHT-OF-WAY LINE NEXT TO FENCE IF POSSIBLE.
6. THE CROSSING PIPE SHALL BE STRAIGHT WITH NO VERTICAL OR HORIZONTAL BENDS WITHIN ROAD RIGHT-OF-WAY.
7. MINIMUM PIPELINE COVER IN DRAINAGE DITCHES AT PUBLIC ROADS IS 60 INCHES; 36 INCHES IN CONSOLIDATED ROCK.

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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	TITLE: DETAIL 21 TYPICAL UNCASED ROAD/RAILROAD CROSSING BORE DETAIL		
		SCALE N.T.S.	DWG No 4359-03-ML-03-717	REV 02

TC_A4_BR.DWG 8.5X11

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

017075

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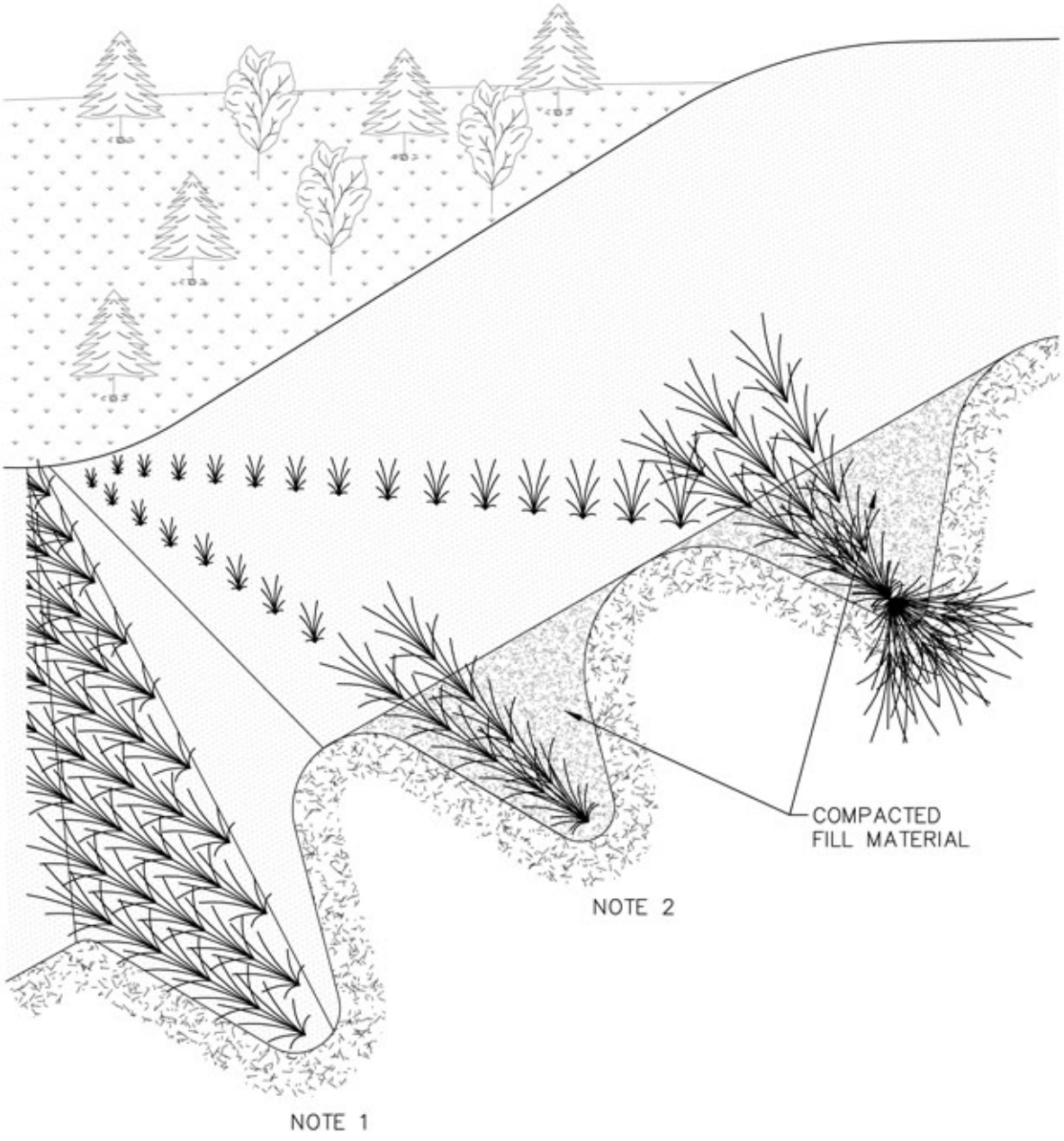

NOTES:

1. CUT TRENCH ACROSS SLOPE. FILL WITH DORMANT WOODY PLANT MATERIAL.
2. FILL IS PLACED ON TOP OF BRANCH LAYER AND COMPACTED.
3. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT SITE CONDITIONS.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-11 REVISED TITLE BLOCK

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DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359	CHAINAGE:	DISCIPLINE # 03

TITLE
DETAIL 22
STREAMBANK RECLAMATION –
BRUSH LAYER IN CROSS CUT SLOPE

SCALE N.T.S.	DWG No 4359-03-ML-05-710	REV 02

TC_A4_BR.DWG 8.5X11

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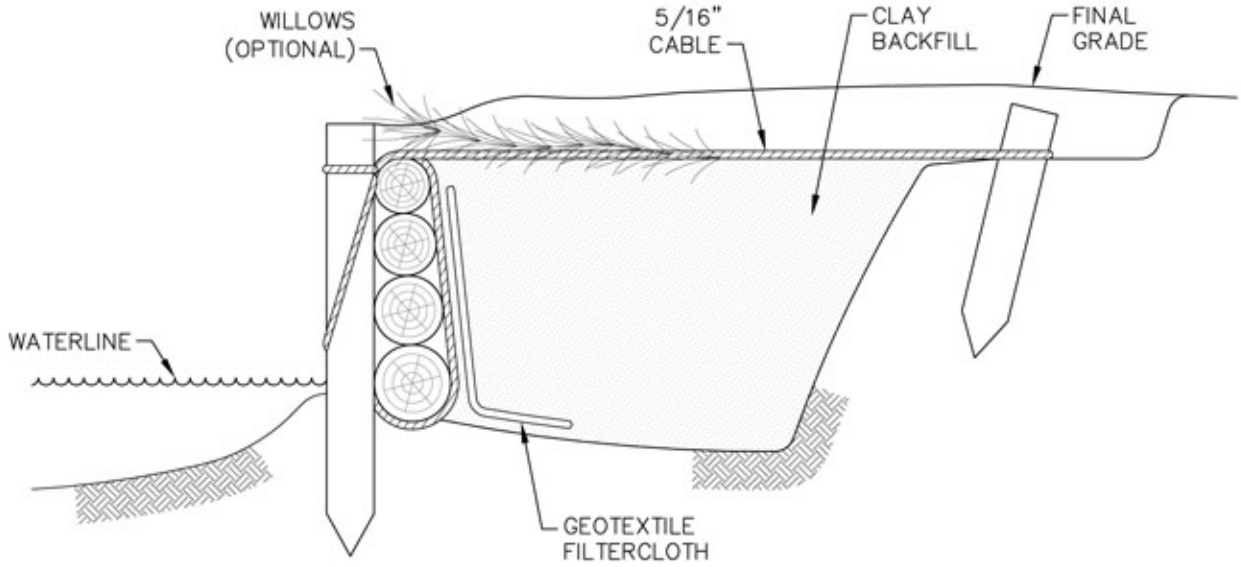

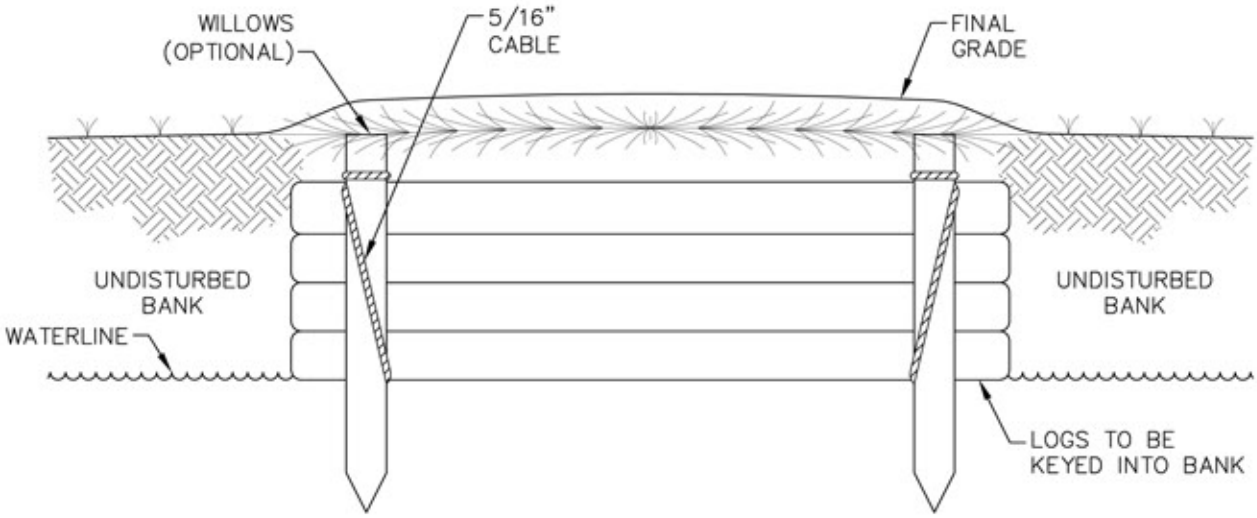

NOTES:

1. LOG WALLS TO BE CONSTRUCTED USING CONIFEROUS MATERIAL.
2. NATURE BACKFILL OR LOOSE GRADE MATERIAL SHOULD BE USED AS FILL MATERIAL.
3. ANCHOR PILINGS OR DEADMAN ANCHORS TO BE USED TO SECURE CABLE IN BANK.
4. NON-WOVEN FILTER CLOTH (NYLEX C34 OR EQUIVALENT) TO BE USED TO LINE LOG WALL.
5. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-11 REVISED TITLE BLOCK

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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 23
STREAMBANK RECLAMATION – LOGWALL

SCALE N.T.S. | DWG No 4359-03-ML-05-711 | REV 02

TC_A4_BR.DWG 8.5X11

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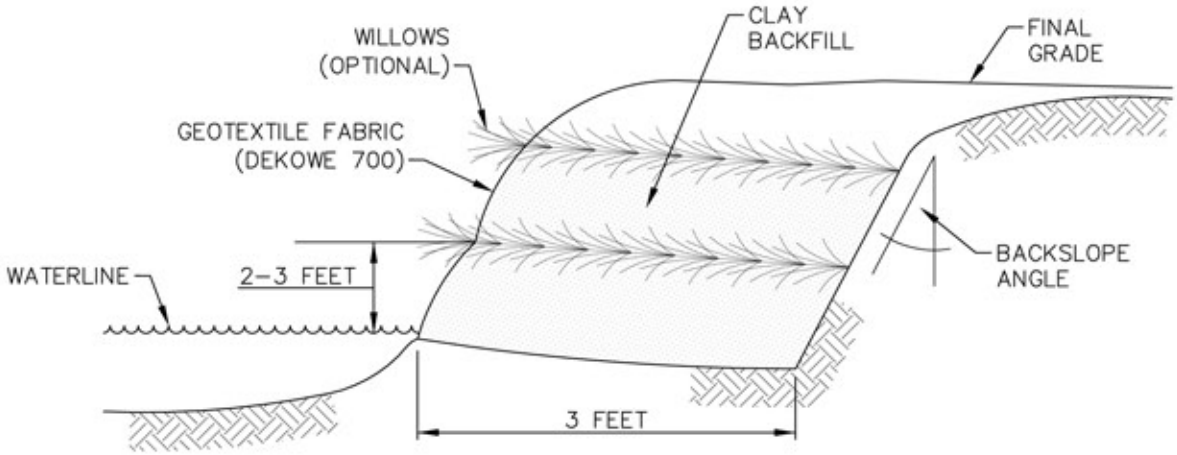

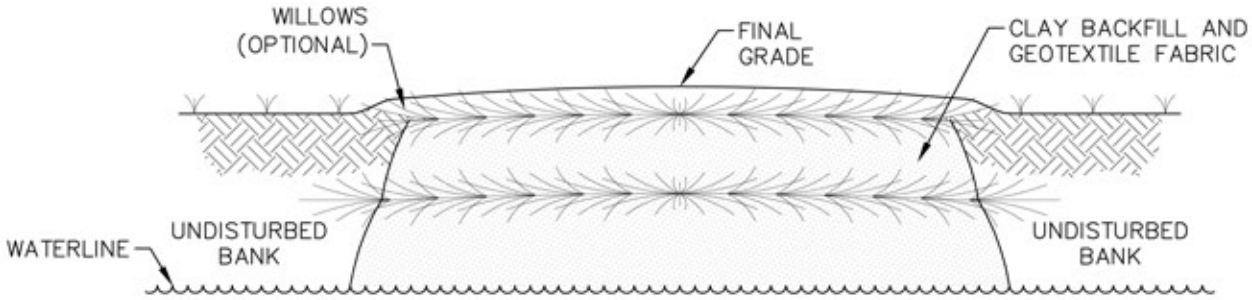

NOTES:

1. NATURE BACKFILL OR LOOSE GRADE MATERIAL SHOULD BE USED TO MINIMIZE AIR SPACES. THIS ALLOWS PROPER SOIL FABRIC CONTACT, WHICH MINIMIZES STEELING AND SCOURING DURING RUNOFF AND ENSURES SURVIVAL OF THE WILLOW CUTTINGS.
2. PLYWOOD FORMS (8'x2') MAY BE REQUIRED TO HELP RECONSTRUCT STEEP OR VERTICAL BANKS.
3. GRID LAYERS SHOULD NOT EXCEED 3 FEET IN HEIGHT WITH A MINIMUM OF 3 FEET SET IN BANK.
4. WILLOWS SHOULD BE HARVESTED AS CLOSE TO INSTALLATION AS POSSIBLE, PREFERABLY THE PREVIOUS DAY BUT NO MORE THAN 2 DAYS EARLY.
5. WILLOWS SHOULD BE 0.5 TO 1 INCH IN DIAMETER AND 2 TO 3 FEET LONG WITH NO MORE THAN 10 INCHES LEFT EXPOSED.
6. PLANTING RATE SHOULD BE APPROXIMATELY 1 STEM PER 6 INCHES.
7. INSTALLATION TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-11 REVISED TITLE BLOCK

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JMP (NAME) 2010-10-21 (DATE)		FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 24 STREAMBANK RECLAMATION – VEGETATED GEOTEXTILE INSTALLATION		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-05-712	REV 02

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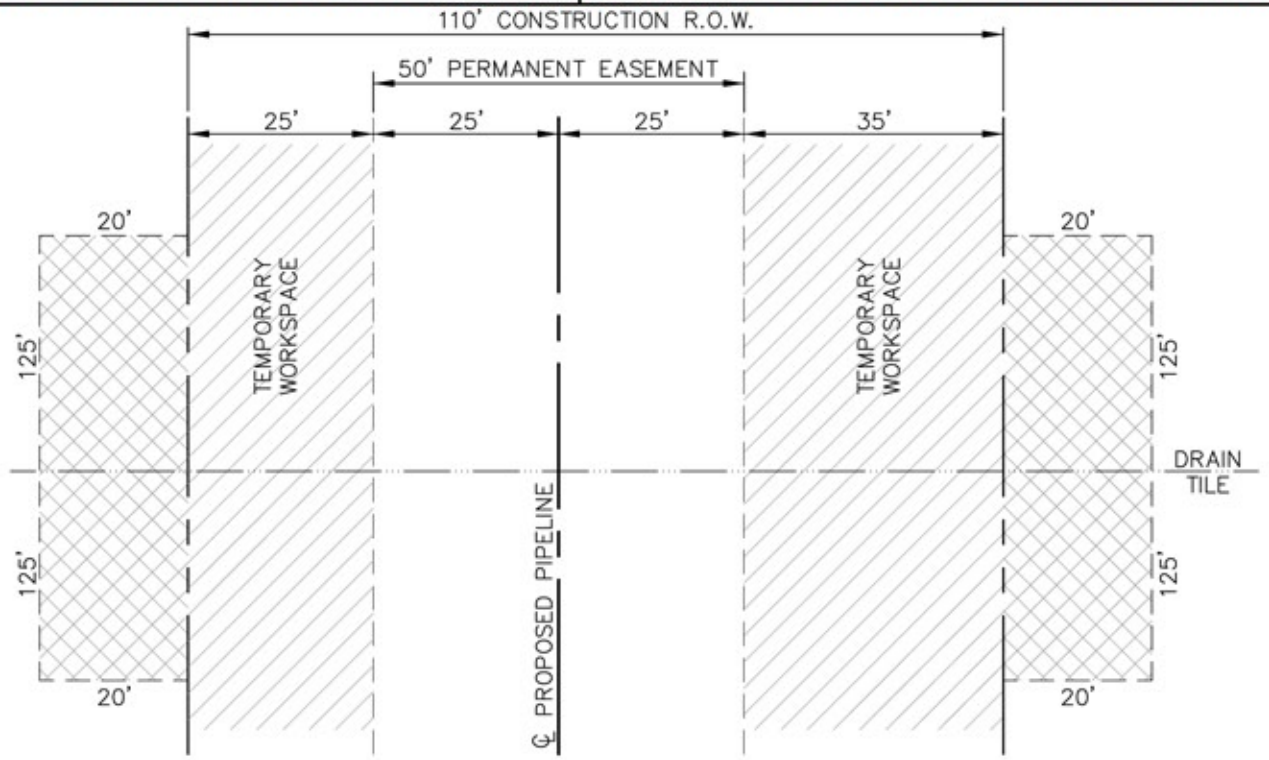
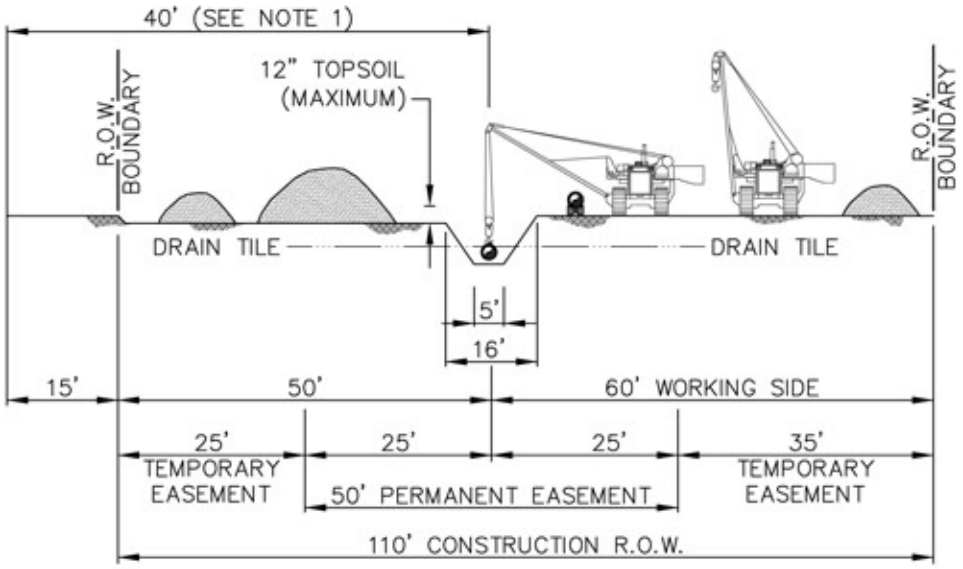


PLAN VIEW



ELEVATION

NOTES:

1. THE OFFSET FROM A FOREIGN PIPELINE, WHERE APPLICABLE, WILL BE 40' FOR MOST LOCATIONS, BUT MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS.
2. THE MINIMUM CLEARANCE BETWEEN THE TOP OF PIPE AND THE BOTTOM OF DRAIN TILE WILL BE 12 INCHES.
3. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 REVISED NOTE 3; DELETED DIMENSION
02 2010-10-11 REVISED TITLE BLOCK

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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	TITLE: DETAIL 25 TYPICAL R.O.W. LAYOUT/SOIL HANDLING 110' CONSTRUCTION R.O.W. 50' EASEMENT DRAIN TILE CROSSING		
		SCALE N.T.S.	DWG No 4359-03-ML-03-718	REV 02

TC_A4_BR.DWG 8.5X11

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

017079

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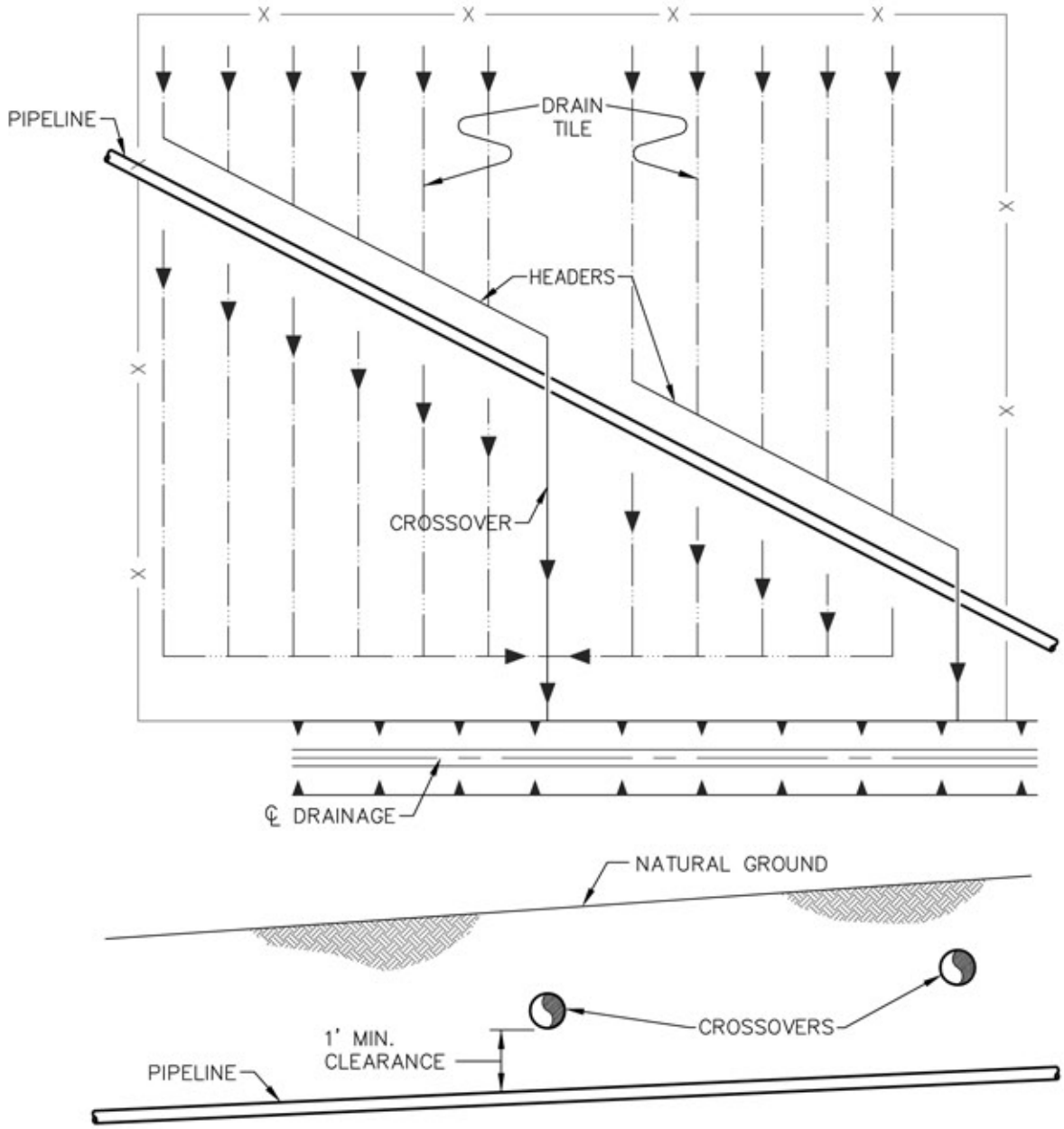

PROFILE

REVISIONS
01 ADDED DIMENSION
02 2010-10-11 REVISED TITLE BLOCK

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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 26 HEADER/MAIN CROSSOVERS OF PIPELINE		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-719	REV 02

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CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

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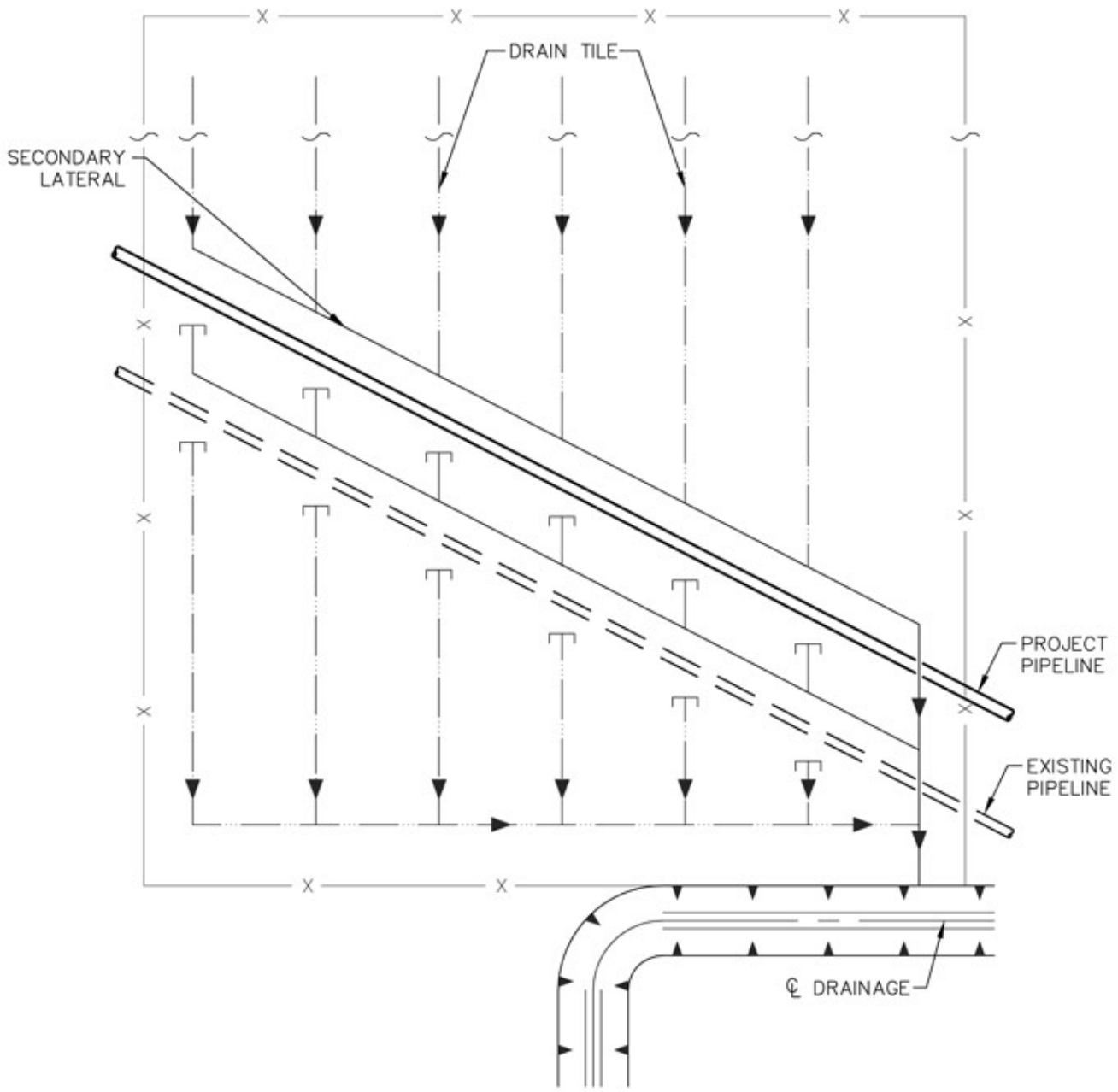
RELOCATE/REPLACE DRAINAGE HEADER/MAIN



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JMP (NAME) 2010-10-21 (DATE)		FIA # 4359	CHAINAGE:	DISCIPLINE # 03
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	TITLE: DETAIL 27 HEADER/MAIN CROSSOVERS OF PIPELINE		
		SCALE N.T.S.	DWG No 4359-03-ML-03-720	REV 02

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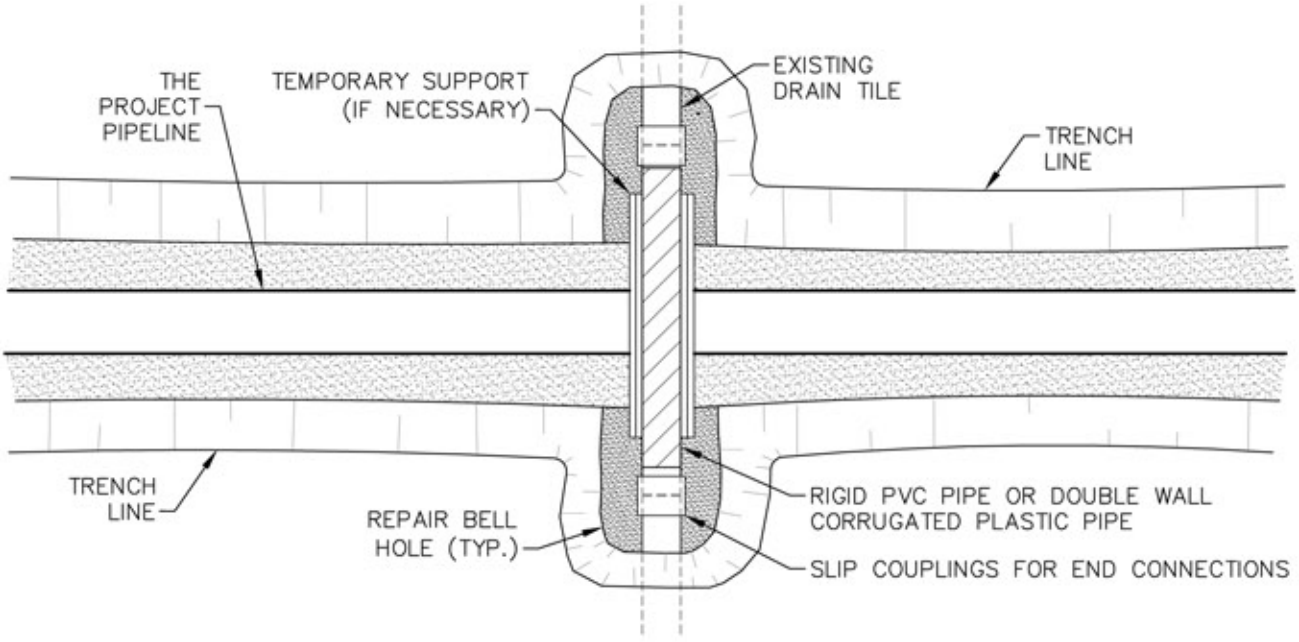
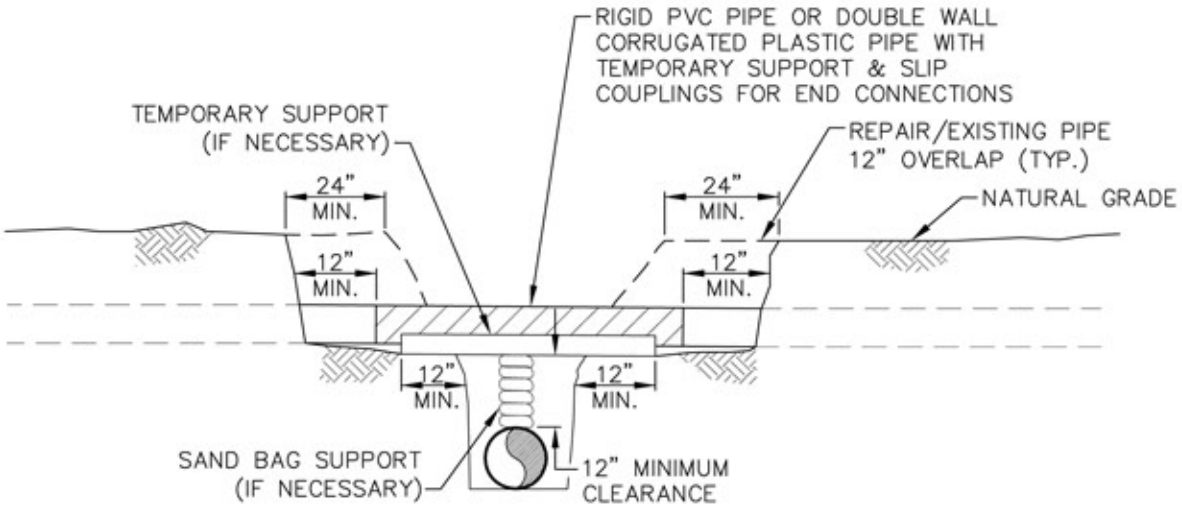


PLAN



PROFILE

NOTES:

1. IMMEDIATELY REPAIR TILE IF WATER IS FLOWING THROUGH TILE AT TIME OF TRENCHING.
2. SCREEN ALL EXPOSED ENDS OF TILE LINES.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-11 REVISED TITLE BLOCK

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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 28 DRAINAGE AND IRRIGATION TEMPORARY DRAIN TILE REPAIR		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-721	REV 02

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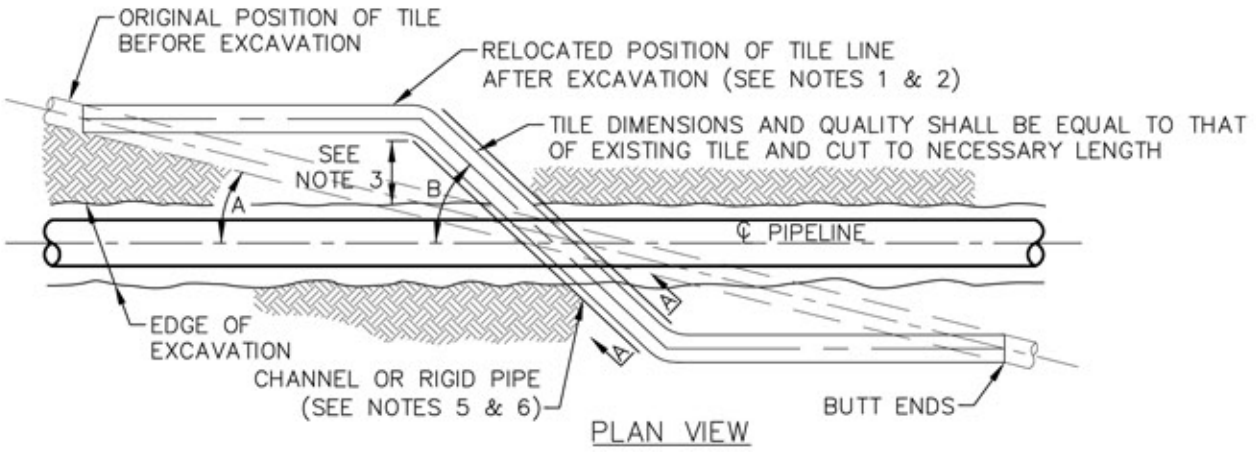
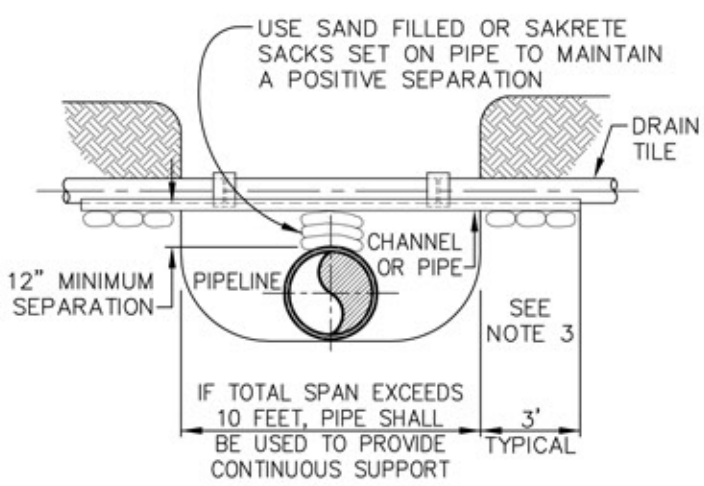
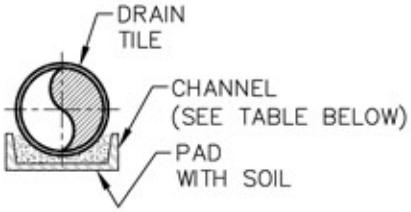
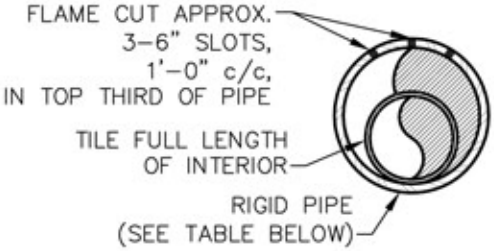


PLAN VIEW





SECTION "A–A" CHANNEL (SPANS < 10 FEET)



SECTION "A–A" RIGID PIPE (SPANS > 10 FEET)

END VIEWS

NOTES:

1. TILE REPAIR SHALL MAINTAIN ORIGINAL ALIGNMENT AND GRADIENT WHEN ANGLE "A", BETWEEN PIPELINE AND ORIGINAL TILE, IS MORE THAN 20 FEET UNLESS OTHERWISE DIRECTED BY THE PROJECT REPRESENTATIVE.
2. WHEN ANGLE "A" IS LESS THAN 20 FEET, UNLESS OTHERWISE DIRECTED BY COMPANY, ANGLE "B" SHALL BE 45° FOR USUAL WIDTHS OF TRENCH. FOR EXTRA WIDTHS, IT MAY BE GREATER AS DIRECTED BY THE PROJECT REPRESENTATIVE.
3. 3 FOOT MINIMUM LENGTH OF CHANNEL OR RIGID PIPE SHALL BE SUPPORTED BY UNDISTURBED SOIL, OR IF CROSSING IS NOT AT RIGHT ANGLES TO GAS PIPELINE, EQUIVALENT LENGTH PERPENDICULAR TO TRENCH. SHIM WITH SAKRETE, SAND BAGS OR CONCRETE BLOCKS TO UNDISTURBED SOIL FOR SUPPORT AND DRAINAGE GRADIENT MAINTENANCE (TYPICAL BOTH SIDES).
4. DRAINAGE TILE SHALL BE REPLACED SO THAT ITS FORMER GRADIENT AND ALIGNMENT ARE RESTORED.
5. DIAMETER OF RIGID PIPE SHALL BE OF ADEQUATE SIZE TO ALLOW FOR THE INSTALLATION OF THE TILE FOR THE FULL LENGTH OF THE RIGID PIPE.
6. OTHER METHODS OF SUPPORTING DRAIN TILE MAY BE USED IF THE ALTERNATE PROPOSED IS EQUIVALENT IN STRENGTH TO THE CHANNEL/PIPE SECTIONS SHOWN AND IF APPROVED BY THE PROJECT REPRESENTATIVE IN ADVANCE. SITE SPECIFIC ALTERNATE SUPPORT SYSTEM TO BE DEVELOPED BY THE PROJECT REPRESENTATIVE AND FURNISHED TO CONTRACTOR FOR SPANS IN EXCESS OF 20 FEET, TILE GREATER THAN 10 INCHES DIAMETER, AND FOR HEADER SYSTEMS.
7. ALL MATERIAL TO BE FURNISHED BY CONTRACTOR.
8. PRIOR TO REPAIRING TILE, CONTRACTOR SHALL PROBE INTO THE EXISTING TILE TO THE FULL WIDTH OF THE RIGHT-OF-WAY TO DETERMINE IF ADDITIONAL DAMAGE HAS OCCURRED. ALL DAMAGED/DISTURBED TILE SHALL BE REPAIRED AS NEAR AS PRACTICABLE TO ITS ORIGINAL OR BETTER CONDITION.
9. "NIGHT CAP" OPEN ENDS OF PIPE AND/OR DRAIN TILES IF REPAIRS ARE NOT COMPLETED BY END OF WORK DAY.

MINIMUM SUPPORT TABLE		
TILE SIZE	CHANNEL SIZE	PIPE SIZE
3"	4" @ 5.4 #/FT.	4" STD. WT
4"–5"	5" @ 6.7 #/FT.	6" STD. WT
6"–9"	7" @ 9.8 #/FT.	8"–10" STD. WT
10"	10" @ 15.3 #/FT.	12" STD. WT

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-11 REVISED TITLE BLOCK

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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 29
DRAINAGE AND IRRIGATION
PERMANENT DRAIN TILE REPAIR

SCALE N.T.S. | DWG No 4359-03-ML-03-722 | REV 02

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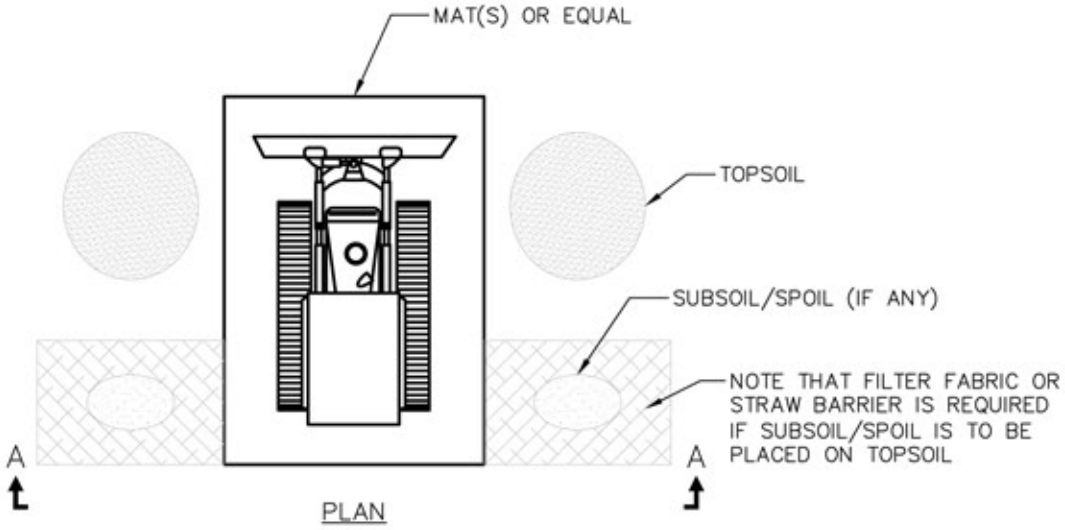
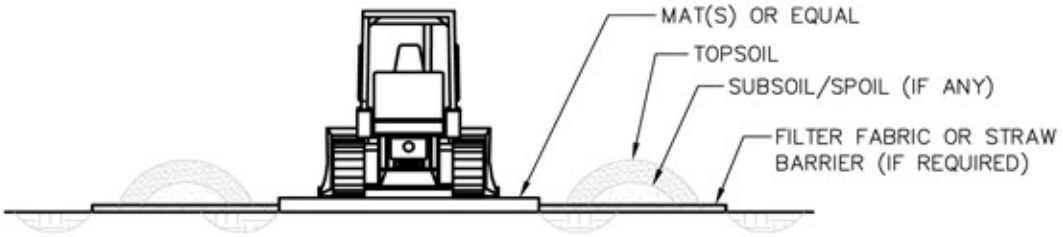


PLAN



SECTION A–A

CLEANING STATION NOTES:

1. ALL EQUIPMENT WILL BE REQUIRED TO BE CLEANED AT EQUIPMENT CLEANING STATIONS LOCATED AS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
2. STOCKPILE TOPSOIL/SUBSOIL AS SHOWN OR IN ANY CONFIGURATION APPROVED BY THE ENVIRONMENTAL INSPECTOR.
3. SHOVELS OR OTHER HAND TOOLS AND/OR COMPRESSED AIR WILL BE USED TO REMOVE AS MUCH AS MUCH SOIL AS PRACTICAL FROM TRACKED EQUIPMENT. EFFORT WILL BE FOCUSED ON TRACKS AND BLADES.
4. IF CONDITIONS ARE MUDDY, WHEELED EQUIPMENT WILL ALSO BE CLEANED USING HAND TOOLS TO REMOVE EXCESS SOIL FROM TIRES AND WHEEL WELLS.
5. CLEANING WILL BE CONDUCTED ON CONSTRUCTION MATS OR OTHER RAISED SURFACE TO MINIMIZE REATTACHMENT OF SOIL THAT HAS BEEN PREVIOUSLY REMOVED.
6. MATS WILL BE CLEANED BETWEEN EACH PIECE OF EQUIPMENT.
7. SOIL COLLECTED DURING THE CLEANING PROCESS WILL BE STOCKPILED AT A CONVENIENT LOCATION NEAR THE CLEANING STATION AND DISPOSED OF IN AN ACCEPTABLE LAND FILL.
8. IF THE SOIL HAS A SIGNIFICANT COMPONENT OF SUBSOIL, IT WILL BE PLACED OVER THE BACKFILLED TRENCH OR IN THE ADJACENT SPOIL STORAGE AREA, AND SUBSEQUENTLY COVERED WITH TOPSOIL. IF THE LAND OWNER DIES NOT APPROVE OF ON–SITE DISPOSAL, THE SOIL WILL BE TAKEN TO AN APPROVED DISPOSAL SITE.
9. SOILS CONTAMINATED WITH OIL OR GREASE WILL BE REMOVED AND DISPOSED OF IN ACCORDANCE PROJECT SPCCC PLAN.

REVISIONS
01 REVISED LABELS
02 2010–10–11 REVISED TITLE BLOCK

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CHECKED BY: WSF

DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 30 EQUIPMENT CLEANING STATION DETAIL

SCALE N.T.S. | DWG No 4359–03–ML–05–713 | REV 02

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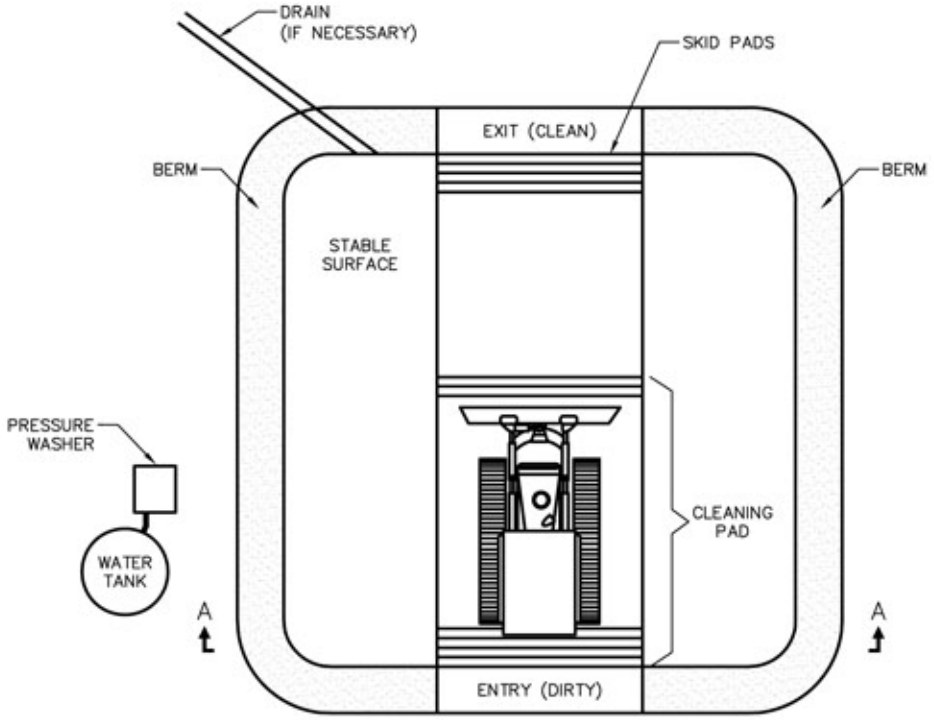
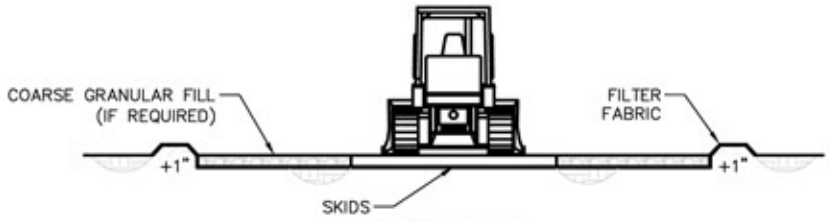


PLAN



SECTION A–A

WASH STATION NOTES:

1. ALL EQUIPMENT AND VEHICLES ARE REQUIRED TO BE CLEANED AT WASH STATION LOCATIONS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR. WASH STATIONS WILL BE CONSTRUCTED BY THE CONTRACTOR. WASHINGS WILL BE CARRIED OUT UNDER THE SUPERVISION AND TO SATISFACTION OF THE ENVIRONMENTAL INSPECTOR.
2. WASH WATER USED FOR CLEANING WILL NOT BE ALLOWED TO ENTER ANY WATERBODY, WETLAND, OR IRRIGATION CANAL/DITCH. ANY SOILS CONTAMINATED BY PETROLEUM–BASED, OR OTHER UNDESIRABLE MATERIALS FROM WASH STATIONS WILL BE REMOVED.
3. THE SIZE OF STATION WILL BE ADEQUATE TO ACCOMMODATE THE MAXIMUM SIZE OF EQUIPMENT EXPECTED.
4. EQUIPMENT WILL CONSISTENTLY ENTER THE "DIRTY END" AND EXIT THE "CLEAN END."
5. STABLE DRAINAGE FROM THE SITE WILL BE PROVIDED (IF NECESSARY). NO DISCHARGE TO STREAMS OR WETLANDS WILL BE ALLOWED.
6. WASH STATIONS WILL BE EQUIPPED WITH SKID PADS OR WASH RACKS TO PREVENT SOIL FROM BEING CARRIED ON TRACKS OR TIRES AS EQUIPMENT AND VEHICLES EXIT THE WASH STATION. SKIDS ARE TO BE CLEANED EACH TIME A PIECE OF EQUIPMENT IS CLEANED.
7. GRAVEL FILL (IF REQUIRED) AND FILTER FABRIC WILL BE REMOVED AND DISPOSED OF IN AN ACCEPTABLE LAND FILL.
8. THE DEPRESSION WILL BE BACKFILLED WITH BERMED MATERIAL.
9. CLEANING SITES WILL BE MONITORED DURING THE POST CONSTRUCTION MONITORING PROGRAM AND WEEDS WILL BE CONTROLLED PER THE NOXIOUS WEED MANAGEMENT PLAN.

REVISIONS
01 REVISED LABELS
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DESIGNER:		KEYSTONE XL PROJECT		
JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 31 EQUIPMENT WASH STATION DETAIL		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-05-714	REV 02

TC_A4_BR.DWG 8.5X11

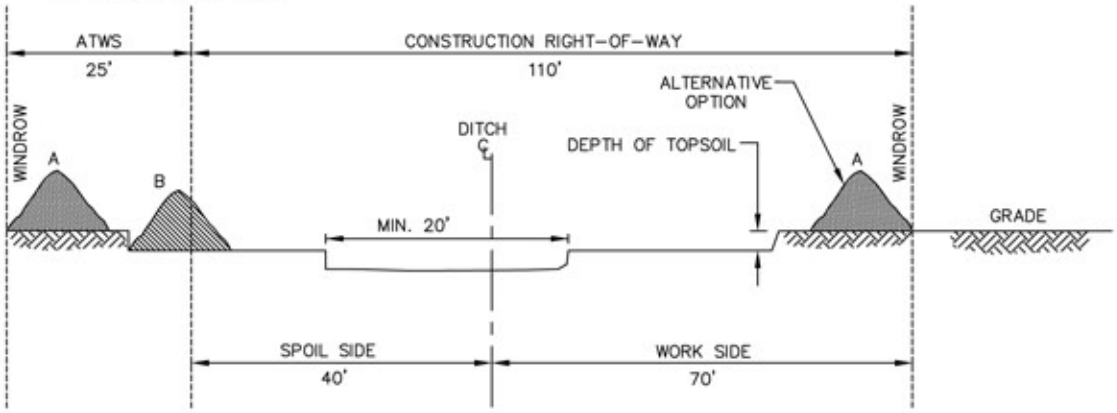
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

017085

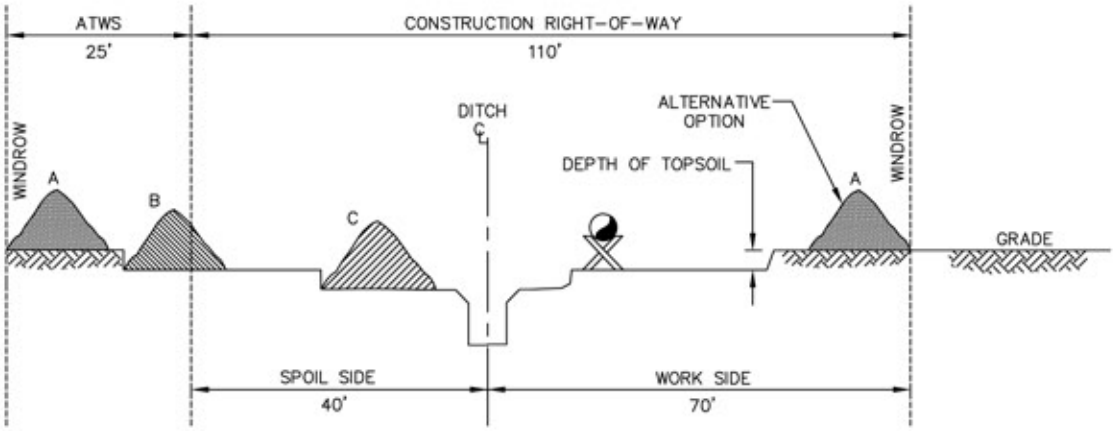
THESE ARE TYPICAL DRAWINGS; ACTUAL SITE CONDITIONS MAY VARY FROM THE SITE GRAPHICALLY REPRESENTED.

1. POTENTIAL LOCATIONS WHERE TRIPLE DITCH TOPSOIL CONSERVATION MAY BE COMPLETED ARE SHOWN ON THE ALIGNMENT SHEETS. KEYSTONE WILL DIRECT THE ACTUAL LOCATIONS WHERE TRIPLE DITCH WILL BE COMPLETED DURING, OR IMMEDIATELY PRIOR TO, TOPSOILING THE ROW. KEYSTONE MAY MODIFY TRIPLE DITCH PROCEDURES FROM THOSE DESCRIBED HERE TO ADDRESS SITE-SPECIFIC, OR SOIL-SPECIFIC, CONDITIONS.

2. STRIP TOPSOIL ("A" HORIZON) ACCORDING TO THE "A" HORIZON DEPTHS AND CONSTRUCTION DETAILS SHOWN ON CONSTRUCTION ALIGNMENT SHEETS. PLACE "A" HORIZON IN THE ADDITIONAL TEMPORARY WORKSPACE OR THE WINDROW WITHIN THE WORKING SIDE OF THE CONSTRUCTION RIGHT-OF-WAY. IN AREAS OF THICKER "A" HORIZON'S, "A" HORIZON MAY BE SPLIT TO BOTH SIDES OF THE RIGHT-OF-WAY.
REMOVE "B" HORIZON (2ND DITCH) TO DEPTHS SPECIFIED BY KEYSTONE AND STOCKPILE ON SPOIL SIDE. THE "B" HORIZON SHOULD BE REMOVED IN A STRIP AT LEAST 20 FEET WIDE OVER THE TRENCH TO ALLOW FOR STORAGE OF THE TRENCH SPOIL MATERIALS. MAINTAIN A MINIMUM OF 2 FEET BETWEEN "A" HORIZON AND "B" HORIZON STOCKPILES.



3. EXCAVATE TRENCH. ENSURE THE DIFFERENT SOIL HORIZONS ("B" HORIZON AND "C" HORIZON) ARE IN SEPARATE STOCKPILES. THE VISUAL DISTINCTION OF EACH PILE MUST BE POSSIBLE AT ALL TIMES. THE STOCKPILING SHALL ALLOW FOR RE-PLACEMENT OF THE SOIL HORIZONS BACK TO THEIR ORIGINAL SEQUENCE WITHOUT LOSS OF SOIL. MAINTAIN A MINIMUM OF 2 FEET BETWEEN "B" HORIZON AND "C" HORIZON STOCKPILES.



REVISIONS
01 REVISED LABELS
02 2010-10-08 REVISED DETAIL
03 2010-10-11 REVISED TITLE BLOCK

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DESIGNER:		KEYSTONE XL PROJECT		
JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 67 TOPSOIL CONSERVATION DITCH & SPOIL STRIPPING TRIPLE DITCH		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-05-724	REV 03

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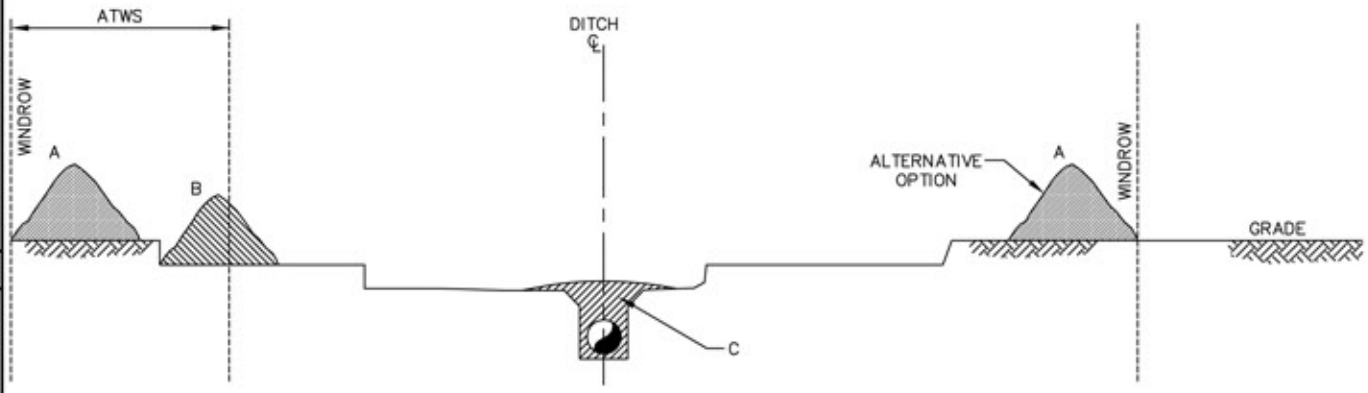
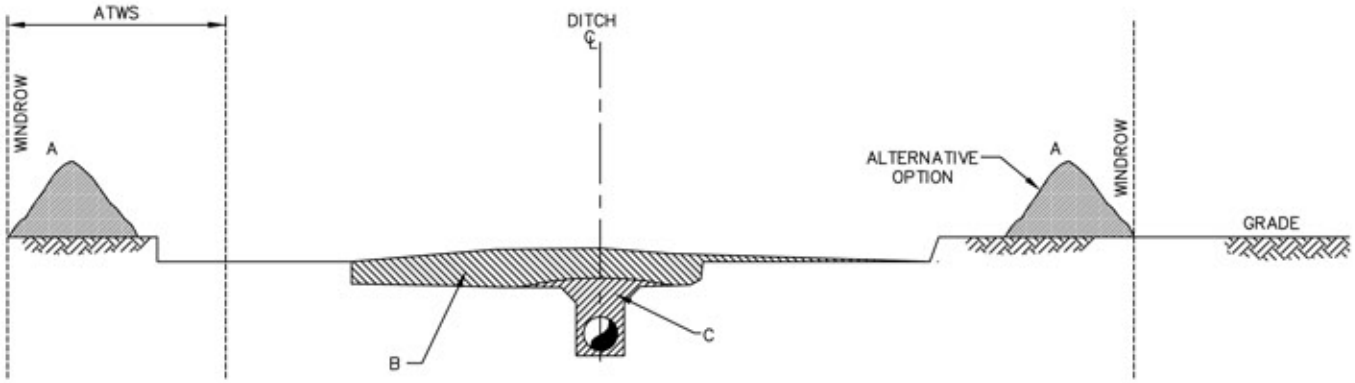
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

THESE ARE TYPICAL DRAWINGS; ACTUAL SITE CONDITIONS MAY VARY FROM THE SITE GRAPHICALLY REPRESENTED.

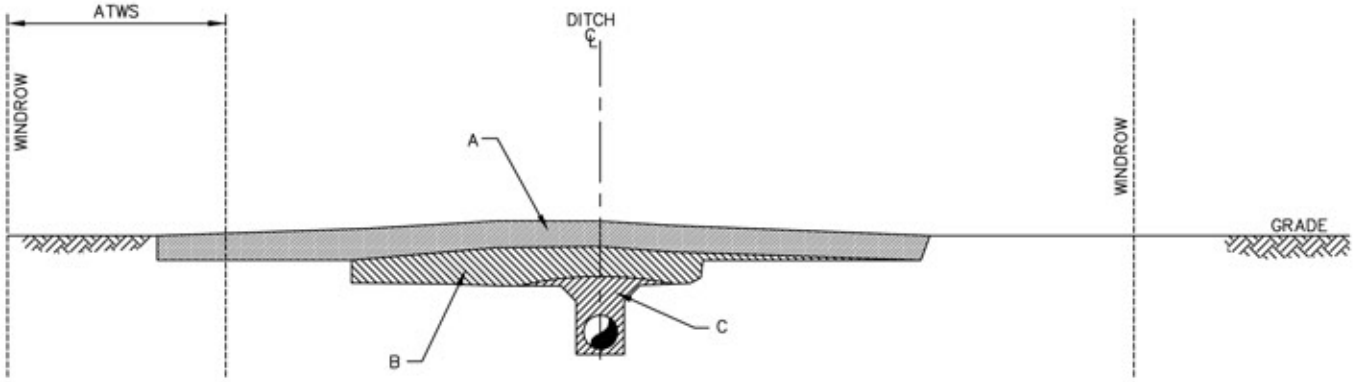
4. BACKFILL TRENCH AND COMPACT AS PER APPROVED PROCEDURE.. PLACE THE SOIL HORIZONS BACK IN THEIR ORIGINAL SEQUENCE IN THE TRENCH.



5. RELIEVE AREAS OF COMPACTION AND FEATHER (B) MATERIAL EVENLY OVER STRIPPED AREA.



6. REPLACE "A" HORIZON PILE EVENLY OVER STRIPPED AREA.



REVISIONS
01 REVISED LABELS
02 2010-10-08 REVISED DETAIL
03 2010-10-11 REVISED TITLE BLOCK

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DESIGNER: JMP (NAME) 2010-10-21 (DATE)

CHECKED BY: WSF | DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 67A
TOPSOIL CONSERVATION DITCH & SPOIL STRIPPING TRIPLE DITCH

SCALE N.T.S. | DWG No 4359-03-ML-05-725 | REV 03

TC_A4_BR.DWG 8.5X11

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Keystone XL Pipeline Project

HORIZIONTAL DIRECTIONAL DRILL
FRAC-OUT CONTINGENCY PLAN

Prepared for:

TransCanada PipeLines Limited
450-1st Street, S.W.
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Project No:

Revision No:
Issue Date: August 31, 2011

Table of Contents

1. Introduction

This horizontal directional drilling mud contingency plan provides specific procedures and steps to contain the inadvertent releases of drilling mud (frac-outs) during pipeline installations using horizontal direction drilling (HDD) techniques. Keystone will designate a representative that will coordinate the implementation of this plan and perform any environmental agency communications in the event of a frac-out during the project.

2. Drilling Fluid and Drilling Fluid System

The HDD process involves the use of a drilling fluid (also referred to as drilling mud) made up primarily of water. Bentonite clay is added to the water to enhance lubricating, spoil transport and caking properties of the drilling fluid. Bentonite is a naturally occurring, non-toxic, inert substance that meets NSF/ANSI 60 NSF Drinking Water Additives Standards and is frequently used for drilling potable water wells.

The primary purpose of drilling fluid is to power the downhole cutting tools, remove cuttings from the drill hole, stabilize the hole, and act as a coolant and lubricant during the drilling process.

The drilling fluid is prepared in a mixing tank containing both new and clean recycled drilling fluid. The fluid is pumped at rate of 100 to 1,000 gallons per minute (gpm) through the center of the drill pipe to the cutters. Return flow is through the annulus created between the wall of the boring and the drill pipe. The cuttings are then carried back to either the entry or the exit pit, depending on a combination of elevation difference and drilling/hole opening direction.

Once in the entry pit, the fluid moves to the pickup pit to be pumped to the fluid processing equipment. Typically, shaker screens, desanders and desilters remove increasingly finer cuttings from the drilling fluid. The cleaned and recycled fluid is returned to the mixing tank and pumps for reuse in the borehole. Following completion of the drill, cuttings and clay will be disposed of in accordance with all applicable federal, state and local environmental regulations. Accordingly, this material may be made available to landowners for use, mixed with native soil and buried on site with landowner permission, or disposed of in a landfill.

The HDD method has the potential for loss or seepage of drilling fluid into the native material through which the drill passes. In some cases, the drilling fluid may be forced to the surface resulting in what is commonly referred to as an inadvertent release or a frac-out. While one of the positive aspects of the HDD method is the avoidance surface disturbance, surface disturbances may occur when there is an inadvertent release of drilling fluid. Drilling fluid release is typically caused by pressurization of the drill hole beyond the containment capability of the overburden soil material or due to inherent weaknesses within the overlying soils such as a fissure or other pathway. In some cases, the pathway can be associated with boreholes advanced for geotechnical investigations or by bridge or building pilings.

The HDD operation is a closed system to minimize the discharge of drilling mud, fluids, and cuttings outside of the work area. To minimize the possibility of fluid escape, mud pits shall be used to contain the drilling fluids. The drilling fluids are cleaned and recycled to the extent possible. Tanks or dumpsters will be installed in lined pits. Care will be taken to prevent the fluids from getting into the soil and to prevent groundwater from entering the pits.

3. HDD Contractor Responsibilities and Requirements

The HDD contractor is responsible for execution of the HDD operation, including actions for detecting and controlling the inadvertent release of drilling fluid. Keystone will closely supervise the progress and actions of the HDD contractor through the use of onsite inspection teams.

The HDD contractor will be required to conduct the HDD operation in compliance with the project specific Spill Prevention Control and Countermeasure Plan (SPCC) which includes specifies the types and quantities of equipment to be provided, which would typically consist of a tracked hydraulic excavator, straw or hay bales, stakes to secure bails, silt fence, sand bags, shovels, pumps, and any other materials or equipment deemed necessary and adequate to contain and clean up inadvertent releases. The contractor will also provide for a vacuum truck and operator to be on call during drilling operations, such that the vacuum truck can respond and be on-site within three hours of notification.

The Contractor will provide a site-specific plan for each HDD crossing, identifying any site-specific requirements and provisions to be made to meet special site conditions.

Ancillary items must be readily available during drilling operations including a light tower in case cleanup operations are needed after dark, a boat with relevant safety equipment during the crossing of large water bodies, and leak free hose to allow pumping spilled drilling mud for mitigation where small creeks or drainages are involved.

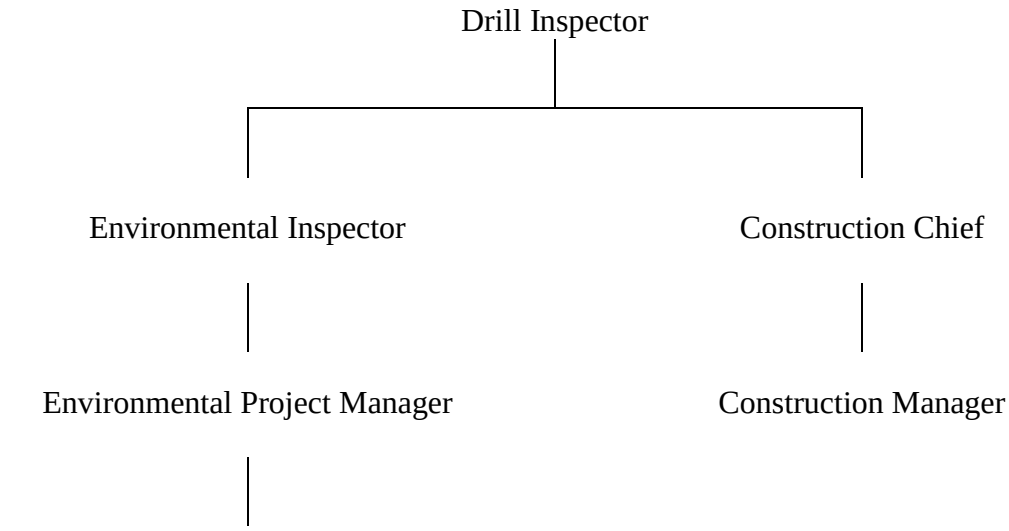
4. Fluid Migration Detection

Drilling crews and the Keystone inspection personnel will be responsible for monitoring and detection of frac-outs. The most obvious signs of a frac-out are the visible pooling of drilling mud on the surface or a sudden decease in mud volume during drilling operations or loss in drilling mud pressure. The annular pressure will be specified in the HDD contract. Drilling and mud system personnel will observe alterations in drilling pressure or the volume of drilling fluid return and immediately report reductions or anomolies to the foreman and Keystone personnel. The contract will specify the use of an Electronic Data Recorder (EDR) to monitor volumes, pressures and other HDD operations.

5. Corrective Action for an Inadvertent Release

In the event of inadvertent release to the surface at locations other than the borehole location, the following actions will be taken:

- Notify the Keystone Drill Inspector, who will contact the appropriate Keystone representatives per the following communication outline:



- Suspend active drilling operations
- Search for surface fractures
- Determine the volume of lost fluid to surface
- Contain any drilling fluid that has surfaced
- Evaluate the circumstances leading to circulation loss to determine if the fracture can be sealed. This shall include a review of the annular pressure history during the drill
- In the event of partial circulation loss, pumping of drilling fluid may be reduced to reduce pressure applied to native formation materials or LCM's may be added. Use of pressure reduction or addition of LCM's will be identified in the contract specification.
- Additional berms will be constructed around the bore pit as directed by the Keystone Representative to prevent release of materials into the adjacent water body

- The contractor will pump the spill in an attempt to recover all of the spilled fluid for disposal

- Measures will be implemented (berm, silt fence, and/or hay bale installation) to prevent silt laden water from flowing into the water body.

- If hand tools cannot contain a small on-land release, small collection sumps may be constructed to pump the released material into the mud processing system.

- Sump pumps or vacuum trucks will be used to remove and dispose of any drilling fluids.

6. Containment of Drilling Fluid Release

Immediately following the detection of the inadvertent drilling fluid release, containment and clean-up operations shall commence and Keystone will notify all appropriate authorities. For releases on land, Contractor shall use straw bales, silt fences, sand bags and earth berms to prevent fluid from migrating or flowing from the immediate area of the discharge. If the volume released is too small for containment measures or if the release occurs in an environmentally sensitive area where release of containments can cause additional damage, the receiving area will be allowed to dry naturally. If there is a threat to a sensitive resource or a threat to public safety, HDD activities will cease immediately.

In cases of inadvertent releases to open water or flooded wetlands, it may impractical or impossible to contain the release. For releases in shallow water, the HDD contractor shall install staked sediment barriers as described in the Keystone XL Construction Mitigation and Reclamation Plan (CMRP). Removal by vacuum truck may be attempted if deemed appropriate. The decision to proceed with the drilling operation will be at the sole discretion of the Keystone representative after all methods to seal off the location of the discharge identified in the SPCC Plan have been attempted. Underwater releases may be allowed to dissipate where cleanup would cause more damage than leaving the material in place. Where cleanup can be accomplished without causing additional damage, the cleanup of the spill will be conducted. The regulating agency with jurisdiction over the operation will be advised of planned actions in response to spills, when those actions do not include complete removal of the spilled material.

7. Clean-up of Releases

The clean-up shall commence after the release is contained. Clean-up shall include removal of all visible drilling fluid located in accessible areas. Removal methods will vary based on the volume of the release and the site specific conditions. Removal equipment may include vacuum trucks, loader and track hoe buckets, small pumps, shovels, buckets, brooms and squeegees. If the release occurs in a sensitive area, it may be necessary to pump the fluid into an upland area for additional containment and disposal. After removal of the released drilling fluid, the release area will be returned as close to the original condition as feasible. It may be necessary to store the drilling fluid residue on-site prior to disposal. On-site storage will include secondary containment with the capacity of 110 percent of the volume of drilling fluid residue to be stored.

Any water discharged from the HDD operation will be discharged through filter bags, or other approved dewatering structure, to contain suspended solids.

8. Agency Notification Procedures

If an inadvertent release is discovered, steps will be taken to contain the release as described in Section 4. It will be reported in accordance with the Keystone communication outline. The appropriate agency(s) will be consulted regarding the nature of the release the corrective actions to be applied and any additional measures necessary to minimize potentially adverse environmental impacts.

In the event an HDD crossing cannot be successfully completed, an alternative crossing plan will be developed and its implementation will be coordinated with the appropriate agencies.

2012 NATIONWIDE PERMITS
REGIONAL CONDITIONS
OMAHA DISTRICT
STATE OF SOUTH DAKOTA

The following Nationwide Permit (NWP) regional conditions will be used in the State of South Dakota. Regional conditions are placed on NWPs to ensure projects result in less than minimal adverse impacts to the aquatic environment and to address local resources concerns.

Wetlands Classified as Peatlands – Revoked for Use

All NWPs, with the exception of 3, 5, 20, 27, 30, 32, 38, and 45, are revoked for use in peatlands in South Dakota.

"Peatlands" are saturated and inundated wetlands where conditions inhibit organic matter decomposition and allow for the accumulation of peat. Under cool, anaerobic, and acidic conditions, the rate of organic matter accumulation exceeds organic decay. Peatlands can be primarily classified into ombrotrophic bogs and minerotrophic fens; the latter subdivided into poor, moderate-rich, and extreme-rich fens, each with distinctive indicator species, community physiognomy, acidity, alkalinity, and base cation content.

Wetlands Classified as Peatlands – Pre-construction Notification Requirement

For NWPs 3, 5, 20, 27, 30, 32, 38, and 45 permittees must notify the Corps in accordance with General Condition No. 31 (Notification) prior to initiating any regulated activity impacting peatlands in South Dakota.

Waters Adjacent to Natural Springs – Pre-construction Notification Requirement – All Nationwide Permits

For all NWPs, permittees must notify the Corps in accordance with General Condition No. 31 (Notification) for regulated activities located within 100 feet of the water source in natural spring areas in South Dakota. For purposes of this condition, a spring source is defined as any location where there is artesian flow emanating from a distinct point at any time during the growing season. Springs do not include seeps and other groundwater discharge areas where there is no distinct point source.

Borrow Site Identification – All Nationwide Permits

The permittee is responsible for ensuring that the Corps is notified of the location of any borrow site that will be used in conjunction with the construction of the authorized activity so that the Corps may evaluate the site for potential impacts to aquatic resources, historic properties, and endangered species. For projects where there is another lead Federal agency, the permittee shall provide the Corps documentation indicating that the lead Federal agency has complied with the National Historic Preservation Act and Endangered Species Act for the borrow site. The permittee shall not initiate work at the borrow site in conjunction with the authorized activity until approval is received from the Corps.

Minimum Culvert Width – All Nationwide Permits

The permittee shall size culvert stream crossings based on the estimated two-year storm event or the width of the bankfull stream channel. Culverts placed in streams with a discernable bed and bank shall have a maximum width that is at least as wide as the bankfull channel width in the section of stream where the culvert will be placed. In lieu of bankfull width as a reference for minimum culvert size, the permittee may install a culvert that can pass the two-year storm event without causing rise of flood flows upstream of the culvert. Bankfull width shall be defined as the width of the stream at where over-bank flow begins during a flood event. In incised stream channels that do not or infrequently access their floodplains bankfull indicators may include slope changes, vegetation changes, the maximum elevation of deposited bedload, or the top of undercut banks.

Culvert Countersink Depth for Aquatic Organism Depth – All Nationwide Permits

The permittee shall install culverts as so that the culvert invert is set below the natural flowline of the water body according to the below table.

Culvert Type	Drainage Area	Culvert Invert Depression Below Stream Grade Line
All culvert types	$\leq$ 100 acres	Not required
Pipe diameter < 8.0 ft	100 to 640 acres	0.5 ft
Pipe diameter < 8.0 ft	> 640 acres	1.0 ft
Pipe diameter $\geq$ 8.0 ft	All drainage sizes	20 % of pipe diameter
Box culvert	All drainage sizes	1.0 ft

- **The stream grade line shall be defined as the longitudinal average of the low-flow stream channel.**
- **The slope of the culvert should be parallel to the slope of the stream grade line.**
- **The culvert invert depression depth shall be measured at the culvert inlet for culverts installed at a slope less than the slope of the stream grade line.**
- **Riprap inlet and outlet protection shall be placed to match the height of the culvert invert.**

GENERAL CONDITIONS (REGIONAL ADDITIONS)

General Condition 3 - Spawning Areas

In order to further minimize adverse impacts in certain waters of the United States and to comply with General Condition No. 3, projects authorized under all available Section 404 NWPs that would occur in South Dakota's cold water streams must comply with the following regional condition:

In all South Dakota streams classified as cold water streams, when water flow is present, the discharge of dredged or fill material shall not take place without the permittee notifying the Corps in accordance with General Condition No. 31 (Notification) prior to initiating any regulated activity between October 15 and April 1. The Corps of Engineers, the South Dakota Department of Game, Fish and Parks, or the South Dakota Department of Environment and Natural Resources can be contacted for the location of State classified cold water streams. The cold water fisheries rivers and streams in South Dakota may be found at http://legis.state.sd.us/rules/DisplayRule.aspx?Rule=74:51:03.

General Condition 6 - Suitable Material

Permittees are reminded that General Condition No. 6 prohibits the use of unsuitable material. In addition, the following materials are not suitable for discharge into waters of the United States in the State of South Dakota:

1. Vehicle bodies, farm machinery and metal junk, including appliances and metal containers, are prohibited.

2. The use of old or used asphalt paving material as a fill material and the use of new or used asphalt for bank stabilization or erosion control is prohibited.

3. The use of organic debris as fill material is prohibited. (Properly anchored trees, treetops, root wads, logs, and hay bales may be allowed on a case-by-case basis.)

4. Any material subject to leaching when in an aquatic environment is prohibited (for example, but not limited to, chemically-treated building material, roofing material, and wood debris).

5. Individual or unanchored tires are prohibited. (Tires may be allowed on a case-by-case basis when placed in the form of a mat or grid with multiple anchoring points to reduce the risk of design failure.)

6. Small aggregate (i.e. less than 6 inches in diameter) may not be placed below the ordinary high water mark (OHWM) of a water body for the purpose of bank stabilization or erosion control when such aggregate will be unstable or subject to frequent failure. Small aggregate may, however, be placed below the OHWM if its purpose is to fill the interstices of a well-graded rock riprap revetment or channel lining.

7. Slab material, regardless of source, must be broken before placement so that the dimension of the largest slab will not be more than 3.5 times the dimension of the smallest slab (unless justified by a qualified engineer) and must be free of exposed rebar, wire and wire mesh.

8. The use of clean brick, broken concrete and cinder block for erosion control or bank stabilization will be considered on a case-by-case basis. If allowed, the broken concrete must be free of exposed rebar, wire, wire mesh, asphalt paving material, paint, and other erodible materials. Broken concrete must range in size from 6 to 36 inches (unless justified by a qualified engineer).

All mapping produced by TransCanada in response to DRA Request for Production of Documents #31 appended to the Pre-Construction Notice to US Army Corps of Engineers.

All mapping produced by TransCanada in response to DRA Request for Production of Documents #31 appended to the Pre-Construction Notice to US Army Corps of Engineers.

SOUTH DAKOTA ROUTE VARIATIONS

ROUTE VARIATION NUMBER	STATE	COUNTY	REASON
0166-01	SD	Harding	Route variation to minimize constructability and safety concerns with current County Road 988 crossing.
0167-01	SD	Jones	Route variation to minimize constructability and safety concerns with current Interstate 90, Hwy 16 and State Railroad crossings.
0172-01	SD	Tripp	Route variation to minimize landowner impacts and reduce crossing of varying terrain features.
0178-01	SD	Tripp	Route variation to minimize constructability and safety concerns with current Interstate 90, Hwy 16 and State Railroad crossings.
0179-01	SD	Harding	Route variation to avoid endangered species.
0181-01	SD	Haakon	Route variation to remove unnecessary points of inflection in the route and reduce the route length.
0187-01	SD	Haakon	Route variation per landowner request and to avoid crossing a pond.
0188-01	SD	Haakon	Route variation per landowner request to minimize construction impacts to a pond.
0190-01	SD	Harding	Route variation to avoid paleontological features.
0192-01	SD	Harding	Route variation to minimize multiple crossing of a waterline.
0195-01	SD	Tripp	Route variation per landowner requests to avoid a row of trees and minimize landowner impacts.
0196-01	SD	Haakon	Route variation to minimize crossing length of Hwy 73 and constructability concerns.
0199-01	SD	Perkins	Route variation to minimize multiple creek crossings.
0199-02	SD	Meade	Route variation to minimize multiple creek crossings and avoid paralleling drainage feature.
0199-03	SD	Haakon	Route variation to avoid paralleling drainage feature.
0199-05	SD	Haakon	Route variation to minimize creek crossings and adjust for better constructability of creek crossing.
0199-06	SD	Haakon	Route variation to avoid drainage feature and eliminate construction impacts to the levee.
0199-08	SD	Lyman	Route variation to avoid drainage features.
0199-09	SD	Tripp	Route variation to minimize multiple creek crossings.
0200-01	SD	Haakon	Route variation to minimize creek crossings, adjust for better constructability of creek crossing and minimize construction impacts to a pond.
0212-01	SD	Harding	Route variation to accommodate HDD design for the Little Missouri River.
0214-01	SD	Meade	Route variation to avoid a well and levee.
0214-02	SD	Tripp	Route variation to avoid a well and impacts to a fence.
0215-01	SD	Harding	Route variation to avoid varying terrain features.
0215-02	SD	Meade	Route variation to avoid paralleling a creek.
0215-03	SD	Haakon	Route variation to avoid sudden terrain change.
0215-04	SD	Tripp	Route variation to avoid road crossing within a wetland area.
0216-01	SD	Lyman	Route variation to minimize side slope construction.
0216-02	SD	Tripp	Route variation to minimize side slope construction.
0220-01	SD	Haakon	Route variation to accommodate HDD design for the Bad River.
0224-01	SD	Meade	Route variation to minimize multiple creek crossings.
0239-01	SD	Haakon	Route variation to avoid sudden terrain change.
0252-01	SD	Meade	Route variation to avoid ridge lines, varying terrain and sudden terrain changes.
0252-02	SD	Meade	Route variation to avoid ridge lines, varying terrain and sudden terrain changes.
0252-03	SD	Haakon	Route variation to accommodate HDD design for the Cheyenne River.
0256-01	SD	Haakon	Route variation to remove unnecessary points of inflection in the route and reduce the route length.
0256-02	SD	Haakon	Route variation to accommodate a road crossing.
0256-03	SD	Jones	Route variation to minimize the route length.
0257-01	SD	Perkins	Route variation to avoid construction foot print impacts paralleling a road.
0257-02	SD	Meade	Route variation to avoid route and construction foot print impacts paralleling a road.
0258-01	SD	Harding	Route variation to avoid crossing a pond.
0260-01	SD	Haakon	Route variation to accommodate waterline crossings.
0260-02	SD	Haakon	Route variation to accommodate waterline crossings.
0260-03	SD	Haakon	Route variation to avoid construction foot print on waterline.
0260-04	SD	Haakon	Route variation to avoid crossing waterlines.
0262-01	SD	Haakon	Route variation to increase separation of route and pond spillway due to constructability and avoid potential future concerns.
0269-01	SD	Harding	Route variation to avoid cultural site.
0270-01	SD	Meade	Route variation to avoid construction foot print impacts to cattle guard and fence.
0272-01	SD	Haakon	Route variation to minimize side slope construction and varying terrain.
0279-01	SD	Jones	Route variation to remove unnecessary points of inflection in the route and reduce the route length.
0280-01	SD	Harding	Route variation to avoid varying terrain and sudden terrain changes.
0281-01	SD	Harding	Route variation to avoid side slope construction.
0282-01	SD	Harding	Route variation to minimize drainage crossings and avoid paralleling a drainage.

SOUTH DAKOTA ROUTE VARIATIONS

ROUTE VARIATION NUMBER	STATE	COUNTY	REASON
0285-01	SD	Haakon	Route variation to accommodate road and creek crossings.
0286-01	SD	Haakon	Route variation to remove unnecessary points of inflection in the route, reduce the route length and better valve location.
0287-01	SD	Lyman	Route variation to accommodate road crossing and better valve location.
0289-01	SD	Haakon	Route variation to accommodate pump station design.
0289-02	SD	Jones	Route variation to accommodate pump station design.
0291-01	SD	Harding	Route variation to avoid paralleling and minimize multiple creek crossings.
0292-01	SD	Harding	Route variation to avoid paralleling a creek.
0293-01	SD	Jones	Route variation to avoid construction impacts to a pond and levee. Also, minimize varying terrain features.
0294-01	SD	Tripp	Route variation to avoid a well and construction foot print impacts to a fence surrounding a historical site.
0295-01	SD	Tripp	Route variation to avoid a drainage crossing and accommodate a road crossing.
0296-01	SD	Butte / Perkins	Route variation to avoid terrain feature.
0310-01	SD	Jones	Route variation to avoid paralleling a drainage and increase separation at a washout at a creek crossing.
0311-01	SD	Perkins	Route variation to avoid a cultural site and accommodate a creek crossing.
0314-01	SD	Tripp	Route variation to avoid side slope construction and sudden terrain changes.
0372-01	SD	Haakon	Route variation to accommodate valve placement.
0381-01	SD	Harding	Route variation to avoid crossing a pond.
0382-01	SD	Harding	Route variation to minimize construction foot print on adjacent landowner property.
0384-01	SD	Meade	Route variation to avoid impacts to adjacent property.
0383-01	SD	Jones	Route variation to accommodate waterline crossing.
0385-01	SD	Haakon	Route variation to minimize multiple crossing of a waterline.
0395-01	SD	Harding	Route variation to accommodate pump station design.
0395-02	SD	Harding	Route variation to accommodate pump station design.
0395-03	SD	Meade	Route variation to accommodate pump station design.
0395-04	SD	Haakon	Route variation to accommodate pump station design.
0395-05	SD	Jones	Route variation to accommodate pump station design.
0395-06	SD	Tripp	Route variation to accommodate pump station design.
0395-07	SD	Tripp	Route variation to accommodate pump station design.
0413-01	SD	Harding	Route variation to avoid washouts and sudden terrain changes.
0442-01	SD	Jones	Route variation to accommodate waterline crossing.
0443-01	SD	Lyman	Route variation to avoid paralleling a creek.
0443-02	SD	Jones	Route variation to avoid paralleling a creek.
0443-04	SD	Haakon	Route variation to avoid waterbody crossing.
0443-05	SD	Jones	Route variation to avoid paralleling a creek.
0455-01	SD	Haakon	Route variation to increase parallel separation of route and waterline.
0455-02	SD	Haakon	Route variation to increase parallel separation of route and waterline.
0456-01	SD	Harding	Route variation to avoid an oil well.
0465-01	SD	Harding	Route variation to avoid pond/wetland features.
0470-01	SD	Harding	Route variation to avoid creek crossing.
0470-02	SD	Haakon	Route variation to minimize multiple creek crossings.
0470-03	SD	Jones	Route variation to minimize multiple creek crossings.
0470-04	SD	Perkins	Route variation to avoid paralleling a creek.
0470-05	SD	Perkins	Route variation to avoid paralleling a creek.
0470-06	SD	Meade	Route variation to accommodate creek crossing.
0470-07	SD	Meade	Route variation to avoid a pond.
0470-09	SD	Perkins	Route variation to avoid ravine.
0470-10	SD	Perkins	Route variation to avoid paralleling a creek
0478-01	SD	Meade	Route variation to accommodate road crossing.
0491-01	SD	Meade	Route variation to avoid drainage.
0497-01	SD	Haakon	Route variation to accommodate road crossing.
0512-01	SD	Meade	Route variation to avoid any well impacts.
0512-02	SD	Meade	Route variation to avoid any well impacts.
0512-03	SD	Tripp	Route variation to avoid any well impacts.
0512-04	SD	Tripp	Route variation to avoid any well impacts.
0514-01	SD	Butte	Route variation to avoid cultural site.
0515-01	SD	Harding	Route variation to avoid cultural site.
0527-01	SD	Harding	Route variation to avoid cultural site.
0527-02	SD	Perkins	Route variation to avoid cultural site.
0528-01	SD	Tripp	Route variation to avoid swampy low lying area near a pond.
0543-01	SD	various	Route variation to accommodate HDD designs.

TransCanada-Keystone XL Steele City

Contact Record

Date/Time: **06.07.2010**	Meeting Phone Conversation E-Mail (attach) *(highlight)*

Agency/Organization(s):	Natural Resources Conservation Service (NRCS), South Dakota State Office

Person(s) Involved:	NRCS: Kent Cooley (Soil scientist), Stan Boltz (State Range Scientist) WESTECH: Lisa Larsen, Corey Baker

Notes: WESTECH requested a meeting with the SD NRCS State Office to solicit comments on the Keystone XL CON/REC Units and revegetation mixes. The meeting was held in Rapid City, SD at the NRCS Office. CON/REC Units were previously sent to SB and KC electronically for their review. LL and CB described the project, explained how CON/REC Units were created and provided background on formulation of seed mixes. SB and KC repeatedly expressed surprise over the level of thoroughness and scope of reclamation planning.

Both SB and KC agreed that forbs are not needed in the mixes based on the fact that they tend to reestablish well on their own. Seed rates were satisfactory for a Critical Area planting. SB suggested a few changes to species composition and varieties (see attached CON/REC Units with track changes).

CB and LL questioned SB and KC about landowner communications, regarding reclamation issues per the SD PUC conditions. They recommended the following ideas to disseminate information to landowners:

- County Conservation Districts (meetings, printed materials)
- FSA Newsletter
- Town meetings
- Internet
- TransCanada letter/Land Agents

KC wondered if it would be possible to utilize the pipeline trench to characterize soils for NRCS soils surveys.

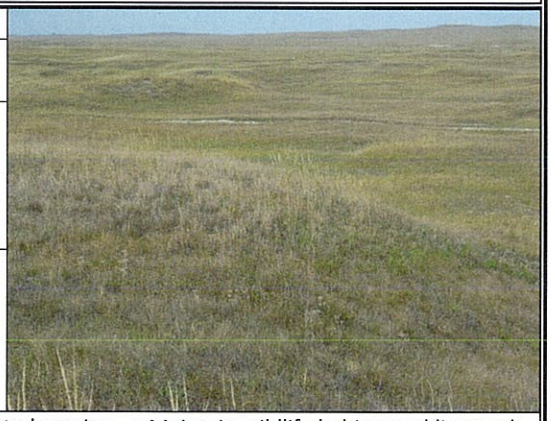
Is follow up required?	Yes - send revisions using track changes (attached). Clarify if trench can be utilized to characterize soils. Contact during reclamation to be on-site to observe.

Commitments made:	See attached CON/REC Units changes

Recorded by:	Lisa Larsen and Corey Baker, WESTECH

CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: MG
KEYSTONE XL STEELE CITY

UNIT NAME:	**MIXED GRASSLANDS**
UNIT CODE:	**MG**
UNIT DESCRIPTION:	Mixed grasslands are dominated by native perennial grasses such as western wheatgrass, needle-and-thread, blue grama, Sandberg bluegrass, prairie junegrass, little bluestem, prairie sandreed, green needlegrass and bluebunch wheatgrass.
UNIT LOCATION:	Mixed grasslands are the most extensive native vegetation type on the Keystone XL Project and occur primarily south of the Missouri River in Montana and throughout South Dakota on Spreads 2 through 8.



UNIT GOALS:	• Re-establish native vegetation and prevent accelerated erosion. • Maintain wildlife habitat and livestock grazing production. • Complete all work to standards specified in the CMR Plan, contract documents and Details, applicable permits, easement descriptions, and Keystone's satisfaction.
SPECIAL CONSIDERATIONS:	None unless otherwise directed by Keystone.

CONSTRUCTION

ROW WIDTH:	Typically 110 feet.
CLEARING:	As specified in the CMR Plan. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.
TOPSOIL SALVAGE:	As specified in the CMR Plan to maintain the topsoil resource and reclamation potential. ADDITIONAL REQUIREMENTS: **A.** Salvage topsoil horizon at depths shown on Alignment Sheets or as directed by Keystone.
TRENCHING:	As specified in the CMR Plan. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.
BACKFILL, DECOMPACTION AND REGRADING:	As specified in the CMR Plan to avoid slumping over the trench, relieve compaction, and match adjacent topography. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.
TEMPORARY EROSION CONTROL:	As specified in the CMR Plan and authorized by Keystone to limit dust, prevent off-site sedimentation or erosion, and accelerated erosion on the ROW.

RECLAMATION

SEEDBED PREPARATION:	As specified in the CMR Plan. ADDITIONAL REQUIREMENTS: **A.** Dirt clods should typically be smaller than 4 inches diameter. **B.** Topsoil should be as firm as practicable prior to seeding. **C.** The seedbed should be firm enough so that the boot heel of an average adult penetrates the soil to a depth of approximately one-half inch.

CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: MG
KEYSTONE XL STEELE CITY

SEEDING METHOD, SEED MIX AND RATE:

As specified in the CMR Plan. See Detail 70 for a description of seeding procedures and approved equipment.

ADDITIONAL REQUIREMENTS:

A. Seed will be provided by Keystone and managed by the Contractor. The Contractor will store seed a dry, secure location.

B. The Contractor will store any unused seed in a dry, secure location and notify Keystone as to the seed's disposition. Keystone may elect to change the storage location.

C. The MG seed mix will be applied at locations shown on the Alignment Sheets or as directed by Keystone. The MG seed mix will be drill seeded unless slopes are too steep or soils are too rocky to safely operate seeding equipment, in which case, broadcast seeding will be conducted.

D. Cover crop: If permanent seeding is delayed to the following growing season, QuickGuard will be seeded at a rate of 80 pounds per acre per Keystone direction.

Mixed Grassland Seed Mixture MG-1
(Spreads 2, 3)

SCIENTIFIC NAME	COMMON NAME	VARIETY[2]	DRILL SEEDING RATE[1] Pounds PLS/ Acre		PLS/ sq.ft.
GRASSES:					
Agropyron smithii	Western wheatgrass	Rosana, Rodan	3.00	-	8
Agropyron spicatum	Bluebunch wheatgrass	Goldar	1.50	-	5
Agropyron trachycaulum	Slender wheatgrass	Pryor	1.00	-	3
Bouteloua gracilis	Blue grama	Bad River	0.30	-	6
Calamovilfa longifolia	Prairie sandreed	Goshen, Bowman	0.75	-	5
Koeleria cristata	Prairie junegrass	VNS	0.10	-	5
Poa sandbergii	Sandberg bluegrass	VNS, High Plains	0.25	-	5
Schizachyrium scoparium	Little bluestem	Badlands, Itasca	0.50	-	3
Stipa comata	Needle-and-thread	VNS	2.00	-	5
Triticum aestivum x Secale cereale	QuickGuard Sterile Triticale	-	20.00	-	5
	TOTAL		**29.40**	-	**50**

VNS: Variety not specified
[1]Based on a drill seeding rate of 50 Pure Live Seed (PLS) per square foot. Where broadcast seeding is used, the rate will be doubled.
[2]This may not be a complete list; other named varieties listed by USDA-NRCS in Montana are acceptable.
NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.

Mixed Grassland Seed Mixture MG-2
(Spreads 4, 5)

SCIENTIFIC NAME	COMMON NAME	VARIETY[2]	DRILL SEEDING RATE[1] Pounds PLS/ Acre		PLS/ sq.ft.
GRASSES:					
Agropyron smithii[3]	Western wheatgrass	Rosana, Rodan, Walsh	2.50	-	6
Agropyron trachycaulum	Slender wheatgrass	Pryor	1.00	-	3
Bouteloua gracilis	Blue grama	Bad River	0.30		6
Buchloe dactyloides	Buffalograss	~~Texoka, Plains~~Tatanka, Bismarck ecotype	3.00	-	4
Calamovilfa longifolia	Prairie sandreed	Goshen, Pronghorn	0.50	-	3
Distichlis spicata	Inland saltgrass	VNS	0.25	-	3
Koeleria cristata	Prairie junegrass	VNS	0.10	-	5
Poa sandbergii	Sandberg bluegrass	VNS, High Plains	0.20	-	4
Schizachyrium scoparium	Little bluestem	Badlands, Itasca	0.50	-	3
Stipa comata	Needle-and-thread	VNS	2.00	-	5
Stipa viridula	Green needlegrass	Lodorm, AC Mallard Ecovar	0.75	-	3
Triticum aestivum x Secale cereale	QuickGuard Sterile Triticale	-	20.00	-	5
	TOTAL		**31.10**	-	**50**

VNS: Variety not specified
[1]Based on a drill seeding rate of 50 Pure Live Seed (PLS) per square foot. Where broadcast seeding is used, the rate will be doubled.
[2]This may not be a complete list; other named varieties listed by USDA-NRCS in Montana and South Dakota are acceptable.
[3]If western wheatgrass is unavailable, thickspike wheatgrass (*Agropyron dasystachyum* var. Critana, Bannock, or Elbee) may be substituted at a rate of 2.0 PLS pounds per acre.
NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.

CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: MG
KEYSTONE XL STEELE CITY

Mixed Grassland Seed Mixture MG-3
(Spreads 6,7, 8)

SCIENTIFIC NAME	COMMON NAME	VARIETY[2]	DRILL SEEDING RATE[1] Pounds PLS/ Acre		PLS/ sq.ft.
GRASSES:					
Agropyron smithii[3]	Western wheatgrass	Rosana, Rodan, Walsh	3.00	-	6
Agropyron trachycaulum	Slender wheatgrass	Pryor	1.00	-	3
Bouteloua curtipendula	Sideoats grama	Butte, Pierre, Trailway	1.25	-	6
Bouteloua gracilis	Blue grama	Bad River	0.20	-	4
Calamovilfa longifolia	Prairie sandreed	Goshen, ~~Bowman~~Pronghorn	1.00	-	6
Koeleria cristata	Prairie junegrass	VNS	0.10	-	5
Poa sandbergii	Sandberg bluegrass	VNS~~, High Plains~~	0.25	-	5
Schizachyrium scoparium	Little bluestem	Blaze, Camper~~, Cimmaron~~Badlands, Itasca	1.00	-	6
Stipa viridula	Green needlegrass	Lodorm, AC Malard Ecovar	1.00	-	4
Triticum aestivum x Secale cereale	QuickGuard Sterile Triticale	-	20.00	-	5
	TOTAL		**28.80**	-	**50**

VNS: Variety not specified
[1]Based on a drill seeding rate of 50 Pure Live Seed (PLS) per square foot. Where broadcast seeding is used, the rate will be doubled.
[2]This may not be a complete list; other named varieties listed by USDA-NRCS in South Dakota and Nebraska are acceptable.
[3]If western wheatgrass is unavailable, thickspike wheatgrass (*Agropyron dasystachyum* var. Critana, Bannock, or Elbee) may be substituted at a rate of 2.0 PLS pounds per acre
NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.

SEEDING DATE:	August 1 to May 15, depending on climatic conditions.
MULCHING AND MATTING:	As specified in the CMR Plan at locations shown on Alignment Sheets or as directed by Keystone. Refer to Detail 4 for erosion control matting, Detail 52 for straw mulch, and Detail 64 for wood mulch. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.
SLOPE AND TRENCH BREAKERS:	As specified in the CMR Plan at locations shown on Alignment Sheets or as directed by Keystone. Refer to Detail 3 for slope breakers and Detail 7 for trench breakers. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.

MANAGEMENT PRACTICES

1. Provide for livestock and wildlife access across the trench at locations convenient to livestock and the landowner as practicable per the CMR Plan.
2. Construction and reclamation practices may be modified from those presented to suit site conditions or permit requirements with Keystone approval.
3. Monitor revegetation and soil stability post construction.
4. Monitor and control noxious weeds as specified in the Montana and South Dakota Noxious Weed Management Plans.

CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: RIP
KEYSTONE XL STEELE CITY

UNIT NAME:	**RIPARIAN**
UNIT CODE:	**RIP**
UNIT DESCRIPTION:	Riparian woodlands include forested and shrub dominated areas around streams and rivers. Common trees and shrubs include plains cottonwood, green ash, box elder, Russian olive, sandbar willow, Wood's rose, snowberry, and silver sagebrush. Herbaceous understories are often dominated by Kentucky bluegrass, western wheatgrass, and redtop.
UNIT LOCATION:	Primarily located on floodplains and terraces along streams and rivers in Spreads 1 to 6. This Con/Rec Unit is relatively limited on the Keystone XL Steele City Project.

UNIT GOALS:	• Prevent damage to vegetation adjacent to the ROW when removing trees. • Restore native grass understory. • Stabilize slopes to prevent erosion. • Adequately decompact soil. • Complete all work to standards specified in the CMR Plan, contract documents and details, applicable permits, and Keystone's satisfaction.
SPECIAL CONSIDERATIONS:	**1.** Note that this type may be adjacent to or associated with wetlands and stream crossings. **2.** Implement wetland and stream crossing procedures as shown on Alignment Sheets or directed by Keystone. **3.** Wetland or stream crossing procedures will take precedent over this Con/Rec Unit should discrepancies occur.

CONSTRUCTION

ROW WIDTH:	Typically 110 feet.
CLEARING:	As specified in the CMR Plan. ADDITIONAL REQUIREMENTS: **A.** Salvage timber if directed by landowner. **B.** Fell and clear trees to avoid injuring adjacent trees. **C.** Tree stumps shall be removed for 5 feet either side of the trench line and where necessary for safe and level construction. **D.** Where necessary on living trees with overhanging branches, cut broken branches at the fork; preserve the branch collar on the standing tree. **E.** Dispose of woody debris according to landowner direction as approved by Keystone; otherwise chip and incorporate with subsoil (amount not to inhibit revegetation) or remove to designated site approved by Keystone. **F.** Mow shrubby vegetation to ground level and leave rootstock intact unless grading is necessary.
TOPSOIL SALVAGE:	As specified in the CMR Plan to maintain the topsoil resource and reclamation potential. ADDITIONAL REQUIREMENTS: **A.** Salvage topsoil horizon at depths shown on Alignment Sheets or as directed by Keystone.
TRENCHING:	As specified in the CMR Plan. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.
BACKFILL, DECOMPACTION AND REGRADING:	As specified in the CMR Plan to avoid slumping over the trench, relieve compaction, and match adjacent topography. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.
TEMPORARY EROSION CONTROL:	As specified in the CMR Plan and authorized by Keystone to limit dust, prevent off-site sedimentation or erosion, and accelerated erosion on the ROW. ADDITIONAL REQUIREMENTS: A. Insure adequate erosion control is in place during construction to prevent sediment from reaching any associated streams or rivers.

CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: RIP
KEYSTONE XL STEELE CITY

RECLAMATION

SEEDBED PREPARATION:

As specified in the CMR Plan.

ADDITIONAL REQUIREMENTS:

A. Dirt clods should typically be smaller than 4 inches diameter.

B. Topsoil should be as firm as practicable prior to seeding.

SEEDING METHOD, SEED MIX AND RATE:

As specified in the CMR Plan. See Detail 70 for a description of seeding procedures and approved equipment.

ADDITIONAL REQUIREMENTS:

A. Seed will be provided by Keystone and managed by the Contractor. The Contractor will store seed a dry, secure location.

B. The Contractor will store any unused seed in a dry, secure location and notify Keystone as to the seed's disposition. Keystone may elect to change the storage location.

C. The RIP seed mix will be applied at locations shown on the Alignment Sheets or as directed by Keystone. The RIP seed mix will be drill seeded unless slopes are too steep or soils are too rocky to safely operate seeding equipment, in which case, broadcast seeding will be conducted.

Riparian Seed Mixture (RIP)

SCIENTIFIC NAME	COMMON NAME	VARIETY[2]	DRILL SEEDING RATE[1] Pounds PLS/ Acre		PLS/ sq.ft.
GRASSES:					
Agropyron smithii	Western wheatgrass	Rosanna, Rodan, Walsh	~~4.00~~ 5.00	-	~~10~~ 13
Agropyron trachycaulum	Slender wheatgrass	Pryor	1.00	-	3
Bouteloua gracilis	Blue grama	Bad River	~~0.40~~ 0.20		~~8~~ 4
Elymus canadensis	Canada wildrye	VNS	~~2.00~~ 3.00	-	~~5~~ 8
~~*Poa sandbergii*~~	~~Sandberg bluegrass~~	~~VNS, High Plains~~	~~0.40~~	~~-~~	~~8~~
Stipa viridula	Green needlegrass	Lodorm	2.50	-	10
Triticum aestivum x secale cereal	QuickGuard Sterile Triticale	-	20.00	-	5
		TOTAL	~~10.30~~ **31.30**	-	~~44~~ **35**

VNS: Variety not specified

[1]Based on a drill seeding rate of 44 Pure Live Seed (PLS) per square foot. Where broadcast seeding is used, the rate will be doubled.

[2]This may not be a complete list; other named varieties listed by USDA-NRCS in Montana and South Dakota are acceptable.

[3]In Spreads 4-6, big bluestem and switchgrass will be added to the mix at the rates shown below:
Panicum virgatum, Switchgrass, (Varieties Forestburg, Nebraksa 28, Pathfinder, Summer, Trailblazer), at 2.00 pounds PLS/acre
Andropogon gerardii, Big bluestem, (Varieties Sunnyview, Bison, Bonilla, Champ, Rountree, Bonanza), 15 3.00 pounds PLS/acre

NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.

SEEDING DATE:

As appropriate for the specified seed mix.

MULCHING AND MATTING:

As specified in the CMR Plan at locations shown on Alignment Sheets or as directed by Keystone. Refer to Detail 4 for erosion control matting, Detail 52 for straw mulch, and Detail 64 for wood mulch.

ADDITIONAL REQUIREMENTS:

A. Respread wood debris may negate the need for straw mulch per Keystone direction.

SLOPE AND TRENCH BREAKERS:

As specified in the CMR Plan at locations shown on Alignment Sheets or as directed by Keystone. Refer to Detail 3 for slope breakers and Detail 7 for trench breakers.

ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.

MANAGEMENT PRACTICES

1. Provide for livestock and wildlife access across the trench at locations convenient to livestock and the landowner as practicable per the CMR Plan.
2. Construction and reclamation practices may be modified from those presented to suit site conditions or permit requirements with Keystone approval.
3. Monitor revegetation and soil stability post construction.
4. Monitor and control noxious weeds as specified in state Noxious Weed Management Plans.

CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: SAGE
KEYSTONE XL STEELE CITY

UNIT NAME:	**SAGEBRUSH**
UNIT CODE:	**SAGE**
UNIT DESCRIPTION:	Sagebrush vegetation types on the Keystone XL Project are dominated by Wyoming big sagebrush (*Artemisia tridentata ssp.wyomingensis*) and/or silver sagebrush (*Artemisia cana*). Big sagebrush and/or silver sagebrush communities provide habitat for greater sage grouse and several other important wildlife species.
UNIT LOCATION:	Sagebrush occurs in limited areas north of the Missouri River and is scattered south of the Missouri River throughout Montana and northwest South Dakota to the Moreau River in Spreads 1 to 5.

UNIT GOALS:	• Re-establish vegetation with a substantial component of big or silver sagebrush, and native perennial grasses and forbs. • Maintain wildlife habitat, especially sage-grouse and livestock grazing production. • Complete all work to standards specified in the CMR Plan, contract documents and Details, applicable permits, easement descriptions, and Keystone's satisfaction.
SPECIAL CONSIDERATIONS:	**1.** Note that timing restrictions to avoid impacts to greater sage grouse occur throughout this Con/Rec Unit. See Alignment Sheets for timing restriction locations. **2.** Mow vegetation rather than grade the soil where sagebrush occurs as practicable. Maintaining sagebrush root structures promotes sagebrush reestablishment. **3.** Utilize trench and working side topsoil salvage to maintain sagebrush root structures on the spoil side where shown on Alignment Sheets or directed by Keystone. **4.** Apply seed mix in two applications. Drill seed perennial grasses where slopes allow. Broadcast seed sagebrush and forbs.

CONSTRUCTION

ROW WIDTH:	Typically 110 feet.
CLEARING:	As specified in the CMR Plan. ADDITIONAL REQUIREMENTS: **A.** Mow or otherwise remove (e.g. hydroaxe) woody vegetation to ground level as directed by Keystone. **B.** Leave root crowns and root structures in place to the maximum extent practicable. **C.** Minimize clearing equipment on the ROW.
TOPSOIL SALVAGE:	As specified in the CMR Plan to maintain the topsoil resource and reclamation potential. ADDITIONAL REQUIREMENTS: **A.** Utilize trench and working salvage (Detail 54) on slopes less than 5% where shown on Alignment Sheets or as directed by Keystone. **B.** Where grading is necessary, salvage topsoil from entire area to be graded (Detail 53). **C.** Salvage topsoil horizon at depths as shown on Alignment Sheets or as directed by Keystone.
TRENCHING:	As specified in the CMR Plan. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.
BACKFILL, DECOMPACTION AND REGRADING:	As specified in the CMR Plan to avoid slumping over the trench, relieve compaction, and match adjacent topography. ADDITIONAL REQUIREMENTS: **A.** Do not decompact areas where topsoil was not salvaged and sagebrush root structures remain in place unless directed by Keystone. **B.** Avoid scalping more than one inch of undisturbed topsoil on the spoil side when backfilling spoil and redistributing stockpiled topsoil.
TEMPORARY EROSION CONTROL:	As specified in the CMR Plan and authorized by Keystone to limit dust, prevent off-site sedimentation or erosion, and accelerated erosion on the ROW.

CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: SAGE
KEYSTONE XL STEELE CITY

RECLAMATION

SEEDBED PREPARATION:

As specified in the CMR Plan.

ADDITIONAL REQUIREMENTS:

A. Dirt clods should typically be smaller than 4 inches diameter.

B. Cultipack or roll ROW to firm topsoil prior to reseeding as authorized by Keystone.

C. The seedbed should be firm enough so that the boot heel of an average adult penetrates the soil to a depth of approximately one-half inch.

SEEDING METHOD, SEED MIX AND RATE:

As specified in the CMR Plan. See Detail 70 for a description of seeding procedures and approved equipment.

ADDITIONAL REQUIREMENTS:

A. Seed will be provided by Keystone and managed by the Contractor. The Contractor will store seed a dry, secure location.

B. The Contractor will store any unused seed in a dry, secure location and notify Keystone as to the seed's disposition. Keystone may elect to change the storage location.

C. The seed mix will be broadcast-seeded in one application. Seeded areas will be dragged with a chain to lightly cover seed.

D. Cover crop: If permanent seeding is delayed to the following growing season, QuickGuard will be seeded at a rate of 80 pounds per acre per Keystone direction.

Sagebrush-1 Seed Mixture SAGE-1 (Spread 1)

SCIENTIFIC NAME	COMMON NAME	VARIETY[2]	BROADCAST SEEDING RATE[1] Pounds PLS/ Acre		PLS/ sq.ft.
GRASSES:					
*Agropyron smithii**	Western wheatgrass	Rosana	5.00	-	12
Agropyron trachycaulum	Slender wheatgrass	Pryor	1.50		5
*Koeleria cristata**	Prairie junegrass	VNS	0.10	-	5
*Poa sandbergii**	Sandberg bluegrass	VNS, High Plains	0.40	-	8
Stipa comata	Needle-and-thread	VNS	2.50	-	6
		Subtotal	**9.50**	-	**36**
FORBS:					
*Achillea millefolium**	Yarrow	VNS, Great Northern	0.05	-	3
*Artemisia frigida**	Fringed sagewort	VNS	0.05	-	5
Dalea candida	White prairie clover	Antelope	0.25	-	2
Dalea purpurea	Purple prairie clover	Kaneb, ~~Bismark~~Bismarck	0.25	-	1
		Subtotal	**0.10**	-	**8**
SHRUBS:					
*Artemisia cana**	Silver sagebrush	VNS	5.00	-	98
*Ceratoides lanata**	Winterfat	Open Range	0.50	-	1
		Subtotal	**5.00**	-	**98**
		TOTAL	**15.60**	-	**146**

VNS: Variety not specified

[1]Based on a broadcast seeding rate of 150 Pure Live Seed (PLS) per square foot.

[2]This may not be a complete list; other named varieties listed by USDA-NRCS in Montana and South Dakota are acceptable.

NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.

*Identified as species associated with sage-grouse habitat in Bird and Schenk (2005).

Sagebrush-2 Seed Mixture SAGE-2
(Spreads 2, 3)

SCIENTIFIC NAME	COMMON NAME	VARIETY[2]	BROADCAST SEEDING RATE[1] Pounds PLS/ Acre		PLS/ sq.ft.
GRASSES:					
*Agropyron smithii**	Western wheatgrass	Rosana, Rodan	3.00	-	8
Agropyron spicatum	Bluebunch wheatgrass	Goldar	1.50	-	5
Agropyron trachycaulum	Slender wheatgrass	Pryor	1.00	-	3
Calamovilfa longifolia	Prairie sandreed	Goshen, Bowman	0.75	-	5
*Koeleria cristata**	Prairie junegrass	VNS	0.10	-	5
*Poa sandbergii**	Sandberg bluegrass	VNS, High Plains	0.25	-	5
Schizachyrium scoparium	Little bluestem	Badlands, Itasca	0.50	-	3
Stipa comata	Needle-and-thread	VNS	2.00	-	5
		Subtotal	**9.40**	-	**39**
FORBS:					
*Achillea millefolium**	Yarrow	VNS, Great Northern	0.05	-	3
*Artemisia frigida**	Fringed sagewort	VNS	0.05	-	5
Dalea candida	White prairie clover	Antelope	0.25	-	2
Dalea purpurea	Purple prairie clover	Kaneb, ~~Bismark~~Bismarck	0.25	-	1
		Subtotal	**0.10**	-	**8**
SHRUBS:					
*Artemisia cana**	Silver sagebrush	VNS	2.00	-	39
Artemisia tridentata var. *wyomingensis **	Wyoming big ~~Big~~-sagebrush	VNS	1.00	-	57
*Ceratoides lanata**	Winterfat	Open Range	0.50	-	1
		Subtotal	**3.00**	-	**96**
		TOTAL	**14.90**	-	**147**

VNS: Variety not specified
[1]Based on a broadcast seeding rate of 149 Pure Live Seed (PLS) per square foot.
[2]This may not be a complete list; other named varieties listed by USDA-NRCS in Montana and South Dakota are acceptable.
NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.
*Identified as species associated with sage-grouse habitat in Bird and Schenk (2005).

CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: SAGE
KEYSTONE XL STEELE CITY

Sagebrush-3 Seed Mixture SAGE-3 (Spreads 4, 5)

SCIENTIFIC NAME	COMMON NAME	VARIETY[2]	BROADCAST SEEDING RATE[1] Pounds PLS/ Acre		PLS/ sq.ft.
GRASSES:					
*Agropyron smithii**	Western wheatgrass	Rosana, Rodan, Walsh	2.50	-	6
Agropyron trachycaulum	Slender wheatgrass	Pryor	1.00	-	3
*Buchloe dactyloides**	Buffalograss	~~Texoka, Plains~~Tatanka, Bismarck ecotype	3.00	-	4
Calamovilfa longifolia	Prairie sandreed	Goshen, Pronghorn	0.50	-	3
Distichlis spicata	Inland saltgrass	VNS	0.25	-	3
*Koeleria cristata**	Prairie junegrass	VNS	0.10	-	5
*Poa sandbergii**	Sandberg bluegrass	VNS~~, High Plains~~	0.20	-	4
Schizachyrium scoparium	Little bluestem	Badlands, Itasca	0.50	-	3
Stipa comata	Needle-and-thread	VNS	2.00	-	5
Stipa viridula	Green needlegrass	Lodorm, AC Mallard ~~Escovar~~Ecovar	0.75	-	3
		Subtotal	**10.80**	-	**39**
FORBS:					
~~*Achillea millefolium**~~	~~Yarrow~~	~~VNS, Great Northern~~	~~0.05~~	~~-~~	~~3~~
~~*Artemisia frigida**~~	~~Fringed sagewort~~	~~VNS~~	~~0.05~~	~~-~~	~~5~~
~~*Dalea candida*~~	~~White prairie clover~~	~~Antelope~~	~~0.25~~	~~-~~	~~2~~
~~*Dalea purpurea*~~	~~Purple prairie clover~~	~~Kaneb, Bismark~~	~~0.25~~	~~-~~	~~1~~
~~-~~		~~Subtotal~~	~~0.10~~	~~-~~	~~8~~
SHRUBS:					
*Artemisia cana**	Silver sagebrush	VNS	2.00	-	39
Artemisia tridentata var. vaseyana	Mountain big sagebrush	VNS, Hobble Creek	0.50	-	29
Artemisia tridentata var. *wyomingensis **	Wyoming ~~Big~~ big sagebrush	VNS, Gordon Creek	~~1.00~~ 0.50	-	~~57~~ 29
~~*Ceratoides lanata**~~	~~Winterfat~~	~~Open Range~~	~~0.50~~	~~-~~	~~1~~
		Subtotal	**3.00**	-	~~96~~ 125
		TOTAL	~~15.00~~ **13.80**	-	~~147~~ 166

VNS: Variety not specified
[1]Based on a broadcast seeding rate of 149 Pure Live Seed (PLS) per square foot.
[2]This may not be a complete list; other named varieties listed by USDA-NRCS in Montana and South Dakota are acceptable.
NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.
*Identified as species associated with Sage-grouse habitat in Bird and Schenk (2005).

SEEDING DATE:	September 15 to May 15, depending on climatic conditions.
MULCHING AND MATTING:	As specified in the CMR Plan at locations shown on Alignment Sheets or as directed by Keystone. Refer to Detail 4 for erosion control matting, Detail 52 for straw mulch, and Detail 64 for wood mulch. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.
SLOPE AND TRENCH BREAKERS:	As specified in the CMR Plan at locations shown on Alignment Sheets or as directed by Keystone. Refer to Detail 3 for slope breakers and Detail 7 for trench breakers. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.

MANAGEMENT PRACTICES

1. Provide for livestock and wildlife access across the trench at locations convenient to livestock and the landowner as practicable per the CMR Plan.
2. Construction and reclamation practices may be modified from those presented to suit site conditions or permit requirements with KXL approval.
3. Monitor revegetation and soil stability post construction. Areas of failed reclamation will be repaired. Sagebrush establishment in this Con/Rec Unit will be monitored on lands administered by the Bureau of Land Management (BLM).
4. Monitor and control noxious weeds as specified in the Montana and South Dakota Noxious Weed Management Plans.

CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: PAN
KEYSTONE XL STEELE CITY

UNIT NAME:	**SALT PANS**
UNIT CODE:	**PAN**
UNIT DESCRIPTION:	Salt pans are relatively flat, isolated features with highly saline, sodic, or alkaline soils. Topsoil is very thin or non-existent. Surface rock or salt crusts may be present in some areas. Vegetation is usually sparse, although inland saltgrass may form relatively dense stands in some areas. Other common species include thickspike wheatgrass, blue grama, foxtail barley, and Sandberg bluegrass. Big sagebrush is frequently present.
UNIT LOCATION:	Salt pans occur in relatively limited areas on the Keystone XL Steele City Project in Spreads 1 to 5. A few small, isolated areas occur in northern Montana, with more extensive areas in northwestern South Dakota north of the Cheyenne River.

UNIT GOALS:	• Re-establish native vegetation. • Maintain wildlife habitat and livestock grazing production. • Complete all work to standards specified in the CMR Plan, contract documents and Details, applicable permits, easement descriptions, and Keystone's satisfaction.
SPECIAL CONSIDERATIONS:	**1.** Topsoil is typically very thin within Salt Pans. It is often necessary to salvage portions of the B soil horizon to have sufficient material to respread a suitable growth medium across the ROW. **2.** Trench-only topsoil salvage is specified in some areas of flat topography. **3.** Triple-lift soil handling procedures may be necessary in some areas to avoid mixing inert subsoils with the limited amounts of topsoil. **4.** Salt Pans may be impassable when wet. **5.** Excess rock may be brought to the surface during construction.

CONSTRUCTION

ROW WIDTH:	Typically 110 feet.
CLEARING:	As specified in the CMR Plan. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.
TOPSOIL SALVAGE:	As specified in the CMR Plan to maintain the topsoil resource and reclamation potential. ADDITIONAL REQUIREMENTS: **A.** Salvage topsoil horizon at depths shown on Alignment Sheets or as directed by Keystone. **B.** Salvage depths are typically 4-6 inches. A minimum of 4 inches will be salvaged to insure that sufficient material is salvaged to respread a suitable growth medium across the ROW. **C.** Trench-only topsoil salvage (Detail 56) is specified in some areas of flat topography to limit grading and maintain intact root structures to the extent practicable. Trench-only topsoil salvage will be completed at locations shown on the Alignment Sheets or where directed by Keystone. **D.** Note that triple-lift soil handling procedures may be required in portions of this type to avoid mixing inert subsoils with the limited amounts of topsoil. Triple-lift soil handling will be completed where directed by Keystone.
TRENCHING:	As specified in the CMR Plan. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.
BACKFILL, DECOMPACTION AND REGRADING:	As specified in the CMR Plan to avoid slumping over the trench, relieve compaction, and match adjacent topography. ADDITIONAL REQUIREMENTS: **A.** Subsoil and topsoil decompaction will be completed as directed by Keystone to avoid exposing excessive amounts of rock or mixing inert subsoils with more productive soil horizons.
TEMPORARY EROSION CONTROL:	As specified in the CMR Plan and authorized by Keystone to limit dust, prevent off-site sedimentation or erosion, and accelerated erosion on the ROW. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.

CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: PAN
KEYSTONE XL STEELE CITY

RECLAMATION

SEEDBED PREPARATION:

As specified in the CMR Plan.

ADDITIONAL REQUIREMENTS:

A. Dirt clods should typically be smaller than 4 inches diameter.

B. Shallow (i.e. less than 6 inches) harrowing or discing will be completed in areas where topsoil was not salvaged to loosen the upper soil horizons as directed by Keystone.

C. The seedbed should be firm enough so that the boot heel of an average adult penetrates the soil to a depth of approximately one-half inch.

SEEDING METHOD, SEED MIX AND RATE:

As specified in the CMR Plan. See Detail 70 for a description of seeding procedures and approved equipment.

ADDITIONAL REQUIREMENTS:

A. Seed will be provided by Keystone and managed by the Contractor. The Contractor will store seed in a dry, secure location during construction.

B. The Contractor will store any unused seed in a dry, secure location and notify Keystone as to the seed's disposition. Keystone may elect to change the storage location.

C. The PAN seed mix will be broadcast-seeded at locations shown on the Alignment Sheets or as directed by Keystone. Seeded areas will be dragged with a chain to lightly cover seed.

D. Cover crop: If permanent seeding is delayed to the following growing season, QuickGuard will be seeded at a rate of 80 pounds per acre per Keystone direction.

Salt Pans Seed Mixture (PAN)

SCIENTIFIC NAME	COMMON NAME	VARIETY[2]	BROADCAST SEEDING RATE[1] Pounds PLS/ Acre		PLS/ sq.ft.
GRASSES:					
Agropyron dasystachyum	Thickspike wheatgrass	Bannock, Critana	9.00	-	31
Bouteloua gracilis	Blue grama	Bad River	~~0.80~~ 0.40	-	~~16~~ 8
Buchloe dactyloides	Buffalograss	Tatanka, Bismarck ecotype	3.00	-	4
Distichlis spicata	Inland saltgrass	VNS	2.00	-	24
Poa sandbergii	Sandberg bluegrass	VNS	0.80	-	16
Triticum aestivum x Secale cereale	QuickGuard Sterile Triticale	-	20.00	-	5
SHRUB:			0		0
Artemisia tridentata var. *wyomingensis*	Big sagebrush	-	1.00		57
Atriplex canescens	Four-wing saltbush	-	1.00	-	1
	TOTAL		~~33.60~~ 37.20	-	~~149~~ 146

VNS: Variety not specified

[1]Based on a broadcast seeding rate of 149 Pure Live Seed (PLS) per square foot.

[2]This may not be a complete list; other named varieties listed by USDA-NRCS in Montana and South Dakota are acceptable.

NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.

SEEDING DATE:

August 1 to May 15, depending on climatic conditions.

MULCHING AND MATTING:

As specified in the CMR Plan at locations shown on Alignment Sheets or as directed by Keystone. Refer to Detail 4 for erosion control matting, Detail 52 for straw mulch, and Detail 64 for wood mulch.

ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.

SLOPE AND TRENCH BREAKERS:

As specified in the CMR Plan at locations shown on Alignment Sheets or as directed by Keystone. Refer to Detail 3 for slope breakers and Detail 7 for trench breakers.

ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.

MANAGEMENT PRACTICES

1. Provide for livestock and wildlife access across the trench at locations convenient to livestock and the landowner as practicable per the CMR Plan.
2. Construction and reclamation practices may be modified from those presented to suit site conditions or permit requirements with Keystone approval.
3. Monitor revegetation and soil stability post construction. Note that revegetation is anticipated to be very sparse due to native soil productivity.
4. Monitor and control noxious weeds as specified in the Montana and South Dakota Noxious Weed Management Plans.

TransCanada-Keystone XL Steele City
Contact Record

Date/Time: **06.08.2010**	Meeting Phone Conversation E-Mail (attach) *(highlight)*

Agency/Organization(s):	Natural Resources Conservation Service (NRCS), South Dakota State Office

Person(s) Involved:	NRCS: Kent Cooley (Area Resource Soil Scientist) WESTECH: Corey Baker

Notes: This meeting incorporated NRCS input from the CON/REC meeting on June 7 to determine specific criteria for identifying soils with low reclamation potential or triple lift soil salvage. Also discussed were the preliminary data results, including identification of specific soil series to be added or deleted from future consideration based on NRCS knowledge of soil characteristics and distribution.

General comments:

1) Shallow soils are typically over-estimated in western South Dakota soil surveys
2) Often beneficial for plant growth to mix natric(sodic) soil horizons with deeper non-sodic horizons

Suggested changes to soil data analysis:

TripleLift

1) Consider triple lift on soils with paralithic contact between 15" and 32" instead of strictly using shallow soils (i.e. <20" deep).
2) Triple lifting of saline/sodic soils should be minimal since most saline or sodic horizons are found at shallow depths. Only soils with 12 inches or more of suitable material above saline/sodic horizons should be considered for triple lift.
3) Update gravelly soils criteria for triple lift analysis to include horizons with 15% or more coarse fragments by volume, instead of the proposed 35% minimum volume.

Low Rec Potential

1) Paralithic contact within 24-inches of surface not much of a concern for reclamation given existing reclamation plans that mitigate for erosion control and poor soil conditions
2) Bentonite is not much of a concern since it is widely scattered across project area – more of a problem for transportation and handling in wet weather during construction
3) Consider including soils with Wind Erodibility Group rating of 3 or less (instead of 2 or less)
4) Consider surface stabilization of fine-textured soils with slopes less than 8% if slope length exceeds 200 feet

Is follow up required?	Yes-send updated soil criteria for triple lift and low reclamation soils for written approval. KC requested to be provided with results of soil analysis report.

Commitments made:	Soil analysis will be adjusted to include changes listed above

Recorded by:	Corey Baker, WESTECH

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November 15, 2012

Tom Kirschenmann
Chief of Terrestrial Resources
South Dakota Dept. Game, Fish and Parks

Foss Building
523 E. Capitol
Pierre, South Dakota 57501

Re: Revised Proposal for Mitigation Funding to Offset Potential Impacts from the Keystone XL Pipeline Project On Sage Grouse in South Dakota.

Dear Mr. Kirschenmann:

The Keystone XL project team (Keystone) would like to take this opportunity to thank your staff for meeting with us and the U.S. Fish and Wildlife Service (Service) on October 23, 2012 regarding the greater sage-grouse (sage-grouse) mitigation opportunities available to the Keystone XL pipeline project (Project) . During that meeting it was agreed that Keystone would revise the previous South Dakota sage-grouse habitat mitigation proposal that had been submitted to you on November 7, 2011. The intent of this letter is to provide a revised proposal for mitigation funding as an additional measure to offset impacts to sage-grouse in South Dakota.

The attached mitigation proposal, *Proposal for Mitigation Funding to Offset Potential Impacts from the Keystone XL Pipeline Project On Sage Grouse in South Dakota*, summarizes affected sage-grouse habitats along the project. Habitat quality assessments relative to potential sage-grouse use were derived from habitat mapped along the right-of-way during pedestrian surveys, and classified according to dominant plant species. The financial value of these types of habitats was then determined based on land values in northwestern South Dakota as well as mitigation ratios and land values that have been utilized in other project-related mitigation efforts.

Keystone proposes to enter into an agreement to establish a mitigation fund with a mutually acceptable conservation entity for use in habitat mitigation opportunities as discussed in previous meetings.

We look forward to further discussion of this proposal with your staff. Should you have further questions please contact Jon Schmidt at 850-385-5441 (jon.schmidt@exp.com) or Stephen Craycroft at 713-693-6467 (stephen_craycroft@transcanada.com). Thank you for your attention to this matter.

Sincerely,

Stephen N. Marr,
Manager – Keystone XL
Keystone Pipeline

Proposal for Mitigation Funding to Offset Potential Impacts from the Keystone XL Pipeline Project On Sage-grouse in South Dakota

1.0 Introduction

TransCanada Keystone Pipeline, L.P. (Keystone) is proposing to construct and operate the Keystone XL pipeline (Project), which is a crude oil pipeline and related facilities that would extend from Hardisty, Alberta, Canada, to the existing Keystone pipeline near Steele City, Nebraska in the United States (US).

The proposed route of the Project crosses the habitat utilized by the greater sage-grouse (*Centrocercusurophasianus*) in portions of Montana and South Dakota. Due to declines in numbers and distribution throughout much of its historical range, the greater sage-grouse (sage-grouse) is a South Dakota Department of Game, Fish and Parks (SDGFP) "species of greatest conservation need", a Bureau of Land Management (BLM) "sensitive species", and in early 2010 the U.S. Fish and Wildlife Service (USFWS) identified the sage-grouse as a "candidate species" under the Endangered Species Act of 1973, as amended (ESA).

Keystone developed and presented a strategy to minimize impacts of the project to sage-grouse to SDGFP on June 2, 2011 entitled *"An Approach for Implementing Mitigation Measures to Minimize the Effects of Construction and Operation of the Keystone XL Pipeline Project on Greater Sage-Grouse in South Dakota*." This strategy was supplemented with compensatory mitigation that was outlined in a proposal submitted on SDGFP on November 7, 2011. This current mitigation proposal revises the previous South Dakota strategy and provides additional mitigation for potential habitat loss and disturbance as a result of project activities.

2.0 Sage-grouse Habitat Analysis and Mitigation Calculations

Sage-grouse habitat was mapped along the Project during field surveys in 2009, 2010, and 2011. Habitat types were classified according to dominant plant species and then combined into primary cover types based on dominant plant morphology. For example, field surveyors mapped native grassland types by communities such as western wheatgrass/needle-and-thread (*Pascopyrumsmithii/Hesperostipacomata*) or western wheatgrass/blue grama (*Pascopyrumsmithii/Boutelouagracilis)* and then consolidated these types into more general cover types such as Mixed Grassland to facilitate habitat analysis and reclamation planning. Sagebrush communities were mapped according to the dominant sagebrush species and dominant understory grass species. The average canopy cover and height of sagebrush within each overall stand was also visually estimated. In South Dakota, the majority of sagebrush stands were dominated by Wyoming big sagebrush (*Artemisia tridentata ssp. wyomingensis*), although silver sagebrush (*Artemisia cana*) was occasionally intermixed with Wyoming big sagebrush or occurred as a separate community, primarily near drainages or on low terraces. Canopy cover of both species of sagebrush was typically between 10 and 20 percent; typical sagebrush height was between 10 and 24 inches. Although Wyoming big sagebrush is typically preferred over silver sagebrush by sage-grouse, both types of sagebrush were considered potential sage-grouse habitat. Further, several small alkali

flats occur within native grassland and sagebrush communities in northwestern South Dakota. These areas, termed salt pans, typically support one or both species of sagebrush and provide suitable habitat for sage-grouse.

Keystone defined sage-grouse habitat based on seasonal forage and cover components and did not consider only areas dominated by sagebrush to be potential habitat for sage-grouse. For example, sage-grouse forage varies by season. Seasonal forage requirements are generally described in terms of higher amounts of grasses, forbs, and insects in spring and summer, and higher amounts of sagebrush in fall and winter, although sagebrush is consumed in the spring and summer also (Wallestad 1975). Juvenile sage-grouse in Montana consume primarily forbs (76 percent of diet) and insects (24 percent of diet) until approximately 12 weeks of age (Peterson 1970). Adult sage-grouse in Montana consume primarily sagebrush and forbs (97 percent of diet by volume) and insects (3 percent of diet) (Wallestad*et al.* 1975). Sagebrush is usually the only food consumed by adult birds between December and February, but can vary between 1 percent and 19 percent of their diet (by volume) between June and September when forbs are primarily consumed (Wallestad*et al.* 1975). Primary forbs consumed by juvenile and adult sage-grouse include fringed sagewort (*Artemisia frigida*), salsify (*Tragopogondubius*), dandelion (*Taraxacumofficinale*), prickly lettuce (*Lactucaserriola*), and alfalfa (*Medicago sativa*) (Peterson 1970, Wallestad*et al.* 1975). Forbs are known to contain high amounts of protein and nutrients such as calcium and phosphorus that improve the nutritional status of hen sage-grouse and reproductive success (Barnett and Crawford 1994, Hess and Beck 2010).

Similar to forage, sage-grouse have different seasonal cover requirements for breeding display, nesting, brood-rearing, and wintering. Primary elements of sage-grouse seasonal habitat include the following (based on Braun *et al.* 2005, Southwest Wyoming Sage-Grouse Working Group 2007, Atamian*et al.* 2010, Doherty *et al.* 2010):

- Spring – Lek habitat includes areas with low amounts of sagebrush but extensive cover of low grasses and forbs. Nesting habitat includes areas with abundant sagebrush and substantial grasses and forbs. Sagebrush cover in spring habitats varies from 15 to 25 percent.
- Summer – Summer habitats provide adequate forage, especially succulent forbs, and escape cover. These habitats include pastures and grasslands, mesic drainages, and the edges of agricultural fields. Habitat adjacent to these open areas includes shrub stands that provide escape and resting areas. Sagebrush cover in these escape and resting areas varies from 10 to 25 percent.
- Fall – Similar to summer habitat, fall habitat includes areas where succulent forbs are present, but also includes areas with higher amounts of sagebrush. North-facing slopes are often preferred since green forage persists later in the year at these sites. Extensive sagebrush stands, with canopy cover greater than 20 percent begin to be used with greater frequency than in the summer.
- Winter – Winter habitat includes areas with extensive sagebrush as well as windswept ridges with more limited sagebrush cover. Sage-grouse tend to prefer south to southwest aspects

where snow accumulation is less. Sagebrush canopy cover varies from 10 to 30 percent (Braun *et al.* 2005, Southwest Wyoming Sage-Grouse Working Group 2007).

In summary several types of habitats are important to sage-grouse at different times of year. However, sagebrush habitat is clearly a primary component of all seasonal habitats. Native grassland communities, particularly those where sagebrush or other shrubs may be widely scattered, also provide occasional habitat for sage-grouse. Finally, non-native pasture or hayland (termed Improved Pasture/Hayland on the Keystone project) may be rarely used by sage-grouse for foraging at certain times of year. Based on the typical amount of use each type of habitat receives by sage-grouse, Keystone assigned a habitat quality rating to each major habitat type. Sagebrush was considered high quality sage-grouse habitat, native mixed grassland was considered medium quality sage-grouse habitat, and improved pasture/hayland was considered low quality sage-grouse habitat.

Sage-grouse habitat will be affected by the proposed Project. Revegetation within these habitats will require different lengths of time to resemble adjacent, undisturbed conditions. Improved Pasture/Hayland typically resembles adjacent conditions within 2 to 3 growing seasons as non-native agronomic species establish quickly. Native perennial herbaceous revegetation is expected to require 3 to 5 years to appear similar to adjacent herbaceous habitat. For example, approximately 60 percent of the Express Pipeline right-of-way through Montana had native perennial grasses and forbs equal to 90 percent of that in adjacent habitats within 3 years, and 94 percent of the Express pipeline right-of-way met the 90 percent performance criteria within 5 years (WESTECH 1999, 2001). Keystone will use revegetation mixtures and methods similar to that used on the Express Pipeline; revegetation results should be similar to that on the Express Pipeline.

Shrub habitats require longer time periods to reestablish. Wyoming big sagebrush and silver sagebrush, either individually or in combination, are the primary shrub habitats on the Project. Wyoming big sagebrush, can require several decades (e.g., more than 70 years) to recover to pre-disturbance shrub densities following fire (Cooper et al. 2007) although other studies show recovery to pre-disturbance conditions in approximately 40 years following fire, and approximately 20 years to recover to pre-disturbance conditions after spraying or plowing (Watts and Wambolt 1996). Silver sagebrush can recover to pre-disturbance shrub densities in less than 10 years (Wright and Bailey 1982). In contrast to natural re-establishment of sagebrush, seeding sagebrush following disturbance can reduce the amount of time required for sagebrush density to recover to pre-disturbance levels. Seeding high rates of Wyoming big sagebrush can result in sagebrush density equal to 1 shrub per meter^2 in less than 5 years (Hild et al. 2006).Keystone intends to seed high rates of Wyoming big sagebrush and silver sagebrush on the Project in areas where it occurs using similar methods to those described by Hild et al. (2006). Using these methods sagebrush density on the Project should provide suitable habitat for sage-grouse within 5 to 10 years.

Keystone analyzed the various habitats near sage-grouse leks to determine potential impacts to sage-grouse from construction of the Project. Permanent and temporary impacts were based on definitions in the Keystone XL Final Environmental Impact Statement (FEIS). Temporary impacts included construction activities that are associated with construction of the pipeline ROW, since the ROW will be

revegetated and provide habitat for sage-grouse and other species. Permanent impacts included permanent footprints where habitat has been replaced by facilities. Potential impacts to sage-grouse from temporary construction activities were analyzed within three miles of the following active sage-grouse leks: Gallup Creek (lek7) KXL 310, KXL 335, Squaw Creek (lek 8), KXL 196, Little Cowboy Creek (lek 10), and KXL 195 (Hoover). The locations of affected sagebrush, mixed grassland, salt pan, and improved pasture/hayland habitat within three miles of these leks are shown in Table 1.

Table 1. Habitat Type and Quality on the Keystone XL Project within 3 Miles of Active Sage-grouseLeks in South Dakota.

State	County	Milepost Start	Milepost End	Length (mi)	Habitat Type	Sage-Grouse Habitat Quality
South Dakota	Harding	305.80	306.39	0.59	Sagebrush	High
South Dakota	Harding	306.39	307.00	0.61	Mixed Grassland	Medium
South Dakota	Harding	307.00	307.56	0.56	Sagebrush	High
South Dakota	Harding	307.56	307.96	0.40	Improved Pasture/Hayland	Low
South Dakota	Harding	307.96	309.02	1.05	Mixed Grassland	Medium
South Dakota	Harding	309.02	309.69	0.67	Sagebrush	High
South Dakota	Harding	309.69	310.40	0.71	Mixed Grassland	Medium
South Dakota	Harding	310.40	310.57	0.17	Sagebrush	High
South Dakota	Harding	310.57	310.62	0.05	Salt Pan	Salt Pan
South Dakota	Harding	310.62	311.23	0.61	Sagebrush	High
South Dakota	Harding	311.23	311.37	0.14	Mixed Grassland	Medium
South Dakota	Harding	311.37	311.55	0.18	Sagebrush	High
South Dakota	Harding	311.55	311.96	0.40	Mixed Grassland	Medium
South Dakota	Harding	311.96	312.13	0.18	Salt Pan	High

Table 1. Habitat Type and Quality on the Keystone XL Project within 3 Miles of Active Sage-grouseLeks in South Dakota.

State	County	Milepost Start	Milepost End	Length (mi)	Habitat Type	Sage-Grouse Habitat Quality
South Dakota	Harding	312.13	313.35	1.22	Mixed Grassland	Medium
South Dakota	Harding	331.30	331.51	0.21	Sagebrush	High
South Dakota	Harding	331.51	332.10	0.59	Mixed Grassland	Medium
South Dakota	Harding	332.10	332.62	0.52	Mixed Grassland	Medium
South Dakota	Harding	332.62	332.70	0.08	Mixed Grassland	Medium
South Dakota	Harding	332.70	332.86	0.17	Mixed Grassland	Medium
South Dakota	Harding	332.86	340.54	7.68	Mixed Grassland	Medium
South Dakota	Harding	342.47	347.25	4.78	Sagebrush	High
South Dakota	Harding	347.25	348.47	1.22	Mixed Grassland	Medium
South Dakota	Harding	348.47	348.59	0.12	Salt Pan	High
South Dakota	Harding	348.59	349.38	0.78	Mixed Grassland	Medium
South Dakota	Harding	349.38	349.41	0.03	Salt Pan	High
South Dakota	Harding	349.41	350.71	1.30	Mixed Grassland	Medium
South Dakota	Harding	350.71	350.75	0.04	Sagebrush	High
South Dakota	Butte	PY-12	PY-12	--	Mixed Grassland	Medium

The amount of acreage contained within the areas noted in Table 1 is presented in Table 2 by habitat type.

Table 2. Acreage of Sage-Grouse Habitat Affected within 3 Miles of Active Sage-grouse Leks in South Dakota.[1]	
Habitat Type	**Acreage**
Improved Pasture/Hayland	6.1
Mixed Grassland	332.5
Salt Pan	6.2
Sagebrush	50.9
TOTAL	**395.7**

[1] Note that this acreage includes 30 acres of temporary impact to Mixed Grassland at pipe yard (PY) 12.

In order to determine compensatory mitigation values to offset temporary impacts to sage-grouse habitat, Keystone applied mitigation ratios to habitat acreages based on the importance of the habitat to sage-grouse and the length of time typically required for habitat restoration to occur. These ratios were also used in Keystone's Special Purpose Permit Application to the Service for impacts to migratory bird habitat and provide a common basis for habitat mitigation. Non-native pastures that receive relatively little use by sage-grouse and that recover quickly from disturbance were assigned a mitigation value of 0.50. Mixed grasslands that require relatively short time frames to resemble adjacent conditions, and that are subject to widely ranging management, were assigned a mitigation value of 0.75. Sagebrush was assigned a mitigation value of 1.00 due to its higher use by sage-grouse and the longer periods of time that are required to re-establish this type of habitat.

Permanent impacts to sage-grouse habitat would occur at PS-16 which is within 3 miles of the Squaw Creek lek. Habitat at PS-16 is comprised of sagebrush interspersed with native grasslands but was classified as sagebrush habitat for this exercise. Mitigation ratios for temporary impacts in sagebrush are 2:1; to account for permanent impacts as a result of the pump stations.

Impacted acreage was multiplied by the mitigation ratios noted above to derive the amount of mitigated acreage by habitat type. This acreage was then multiplied by the average cost of rangeland in South Dakota. The average cost of rangeland was obtained from South Dakota State University (SDSU 2012). Table 3 presents the amount of affected and mitigated acreage as well as the resulting compensatory mitigation value.

In addition to mitigation for affected acreage, Keystone has agreed to fund research to determine if pipeline construction negatively affects sage-grouse. Keystone recommends that a conceptual research study plan be developed and approved by SDGFP and Keystone to evaluate the effects of construction at different locations along the Project. Keystone recommends that a Before-After Control-Impact (BACI) study design be used. Keystone believes that the goal of a post-construction study should be to determine what level of pipeline construction activities, if any, during the breeding season result in longer-term measurable negative impacts to sage-grouse. Keystone would contribute $75,000 in support of this study. Total mitigation funding, including compensatory mitigation for affected habitat and research dollars is presented in Table 3.

Table 3. South Dakota Sage-grouse Mitigation Acreage and Compensatory Value. Keystone XL					
HabitatType	**Affected Acreage**	**Mitiation Ratio**	**Mitigated Acreage**	**Land Value (ac)**	**Habitat Compensation Value**
Improved Pasture/Hayland	6.1	0.50	3.1	$611	$1,864
Mixed Grassland	332.5	0.75	249.4	$611	$152,368
Salt Pan	6.2	1.00	6.2	$611	$3,788
Sagebrush	50.9	1.00	50.9	$611	$31,100
Subtotal Compensatory Mitigation for Temporary Impacts in Sage-grouse Habitat					**$189,120**
Habitat Quality for Sage-grouse	**Affected Acreage**	**Mitiation Ratio**	**Mitigated Acreage**	**Land Value (ac)**	**Habitat Compensation Value**
Sagebrush	11.3	2.00	22.6	$611	$13,809
Subtotal Compensatory Mitigation for Permanent Impacts in Sage-grouse Habitat					**$13,809**
Funding to Research the Effect of Pipeline Cosntruciton on Sage-Grouse					**$75,000**
Total Compensatory Mitigation for Impacts in Sage-grouse Habitat					**$277,928**

3.0 Distribution of Compensatory Mitigation Funds

On August 26, 2011, SDGFP and Keystone participated in discussions on potential sage-grouse habitat mitigation. On August 29, 2011, SDGFP provided Keystone with a summary of proposed sagebrush mitigation options. On October 23, 2012 Keystone, SDGFP, and the Service met to review mitigation options. These options included providing funds to support opportunities for SDGFP to cooperatively enhance sagebrush on private and public lands through habitat enhancement programs, providing funds for establishment of sagebrush conservations easements, providing funds for fee-title lands acquisition by SDGFP, and for research projects.

SDGFP indicated during discussions on August 26, 2011 and October 23, 2012 that mitigation funds might best be managed by a third party conservation group. To that end, Keystone will enter into an agreement to establish a mitigation fund in the amount of $202,928, as determined above, with a mutually acceptable conservation entity the Intermountain West Joint Venture, or Pheasants Forever for use in habitat mitigation opportunities as described by SDGFP. The mitigation fund will be established in addition to implementing the measures described in "*An Approach for Implementing Mitigation Measures to Minimize the Effects of Construction and Operation of the Keystone XL Pipeline Project on Greater Sage-Grouse in South Dakota*". The mitigation fund will be used to enhance and preserve sagebrush communities within the sagebrush ecosystem in South Dakota, which is found within the following counties: Butte, Custer, Fall River, and Harding counties and to a lesser degree, Perkins and

Meade counties. An emphasis will be put towards locating sagebrush mitigation activities within the primary range of sage-grouse in South Dakota (Harding and Butte counties) with a particular focus on Harding County where the majority of the Project impacts will occur. Annual reports prepared by the fourth quarter of each year, summarizing accomplishments and providing the status of on-going projects funded through this initiative will be and provided to interested parties.

Keystone will also provide $75,000 to fund research that is designed, with input from SDGFP and Keystone, to evaluate the effects of pipeline construction on sage-grouse. It is Keystone's preference that these funds be utilized through a third-party research facility such as a state university. In total Keystone will provide $277,928 in compensatory mitigation funding to offset impacts to sage-grouse habitat and provide research funding to determine the effect of pipeline construction on sage-grouse.

4.0 References

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Rec'd Mar 14/13

DEPARTMENT OF GAME, FISH, AND PARKS
Foss Building
523 East Capitol
Pierre, South Dakota 57501-3182

March 4, 2013

TransCanada Pipelines Limited
Stephen Marr, Manager – Keystone XL
2700 Post Oak Blvd Suite 400
Houston, TX 77056

Dear Stephen,

The Department of Game, Fish, and Parks (GFP) appreciates the time the Keystone XL project team has dedicated with our staff to discuss the pipeline route, identified concerns, and alternative approaches to minimize impacts to the greater sage-grouse. We also appreciate the development of a mitigation proposal to monitor the impacts of constructing the pipeline and to obligate resources for habitat enhancements to benefit sage-grouse.

As you know, there is a west-wide effort to ameliorate sage-grouse threats to avoid an ESA listing in 2015. While the sage-grouse range in SD is primarily two northwestern counties, we recognize the implications would be far reaching if this species were to be listed. As such, we are engaged on several fronts to avoid that action. None is more notable than assisting with the implementation of one of the most proactive programs, the USDA Natural Resource Conservation Service (NRCS) Sage Grouse Initiative.

Through this NRCS initiative, we partner a biologist position with Pheasants Forever and NRCS in western SD that works directly with landowners to enroll in incentive-based programs covering a variety of range management practices specifically to address sage-grouse threats. The mitigation dollars allocated by TransCanada would be a great addition to the already dedicated resources and will complement this initiative and other efforts designed to benefit sage-grouse and sagebrush habitats. Because we currently partner with Pheasants Forever on sage-grouse conservation and they administer other sage-grouse conservation funds, we would suggest your consideration of Pheasants Forever to administer the SD mitigation funds.

It will be important to evaluate if any impacts occur as a result of the construction and associated infrastructure of the pipeline. Currently, GFP staff is coordinating ideas with Montana Game and Fish staff on evaluation/research approaches and the possibility of pooling research funds provided by TransCanada. This coordination will assure a consistent and scientifically sound approach is used while maximizing resources and efficiency.

Again, thank you for coordinating with GFP staff on this project. Please continue to work through Tom Kirschenmann, Chief of Wildlife (tom.kirschenmann@state.sd.us, 605.773.4192, on this project and the mitigation proposal.

Sincerely,

Jeffrey R. Vonk,
Department Secretary

JV:da

cc: Tony Leif, Wildlife Division Director
Tom Kirschenmann, Chief of Wildlife
USFWS, Noreen Walsh – Regional Director, Region 6
Dept. of State, K. Nicole Gibson – ESA Lead, Keystone XL Project

TransCanada – Keystone XL Phase II Pipeline Meeting Summary E-Mail Posting Form

Meeting Location: SDGFP, Pierre, SD

Date & Time: January 27, 2009 / 9:00 a.m. – 10:45 a.m.

Keystone Team Members: Patti Lorenz

Agency Contact Information:

Name	Organization	Title	Phone / E-mail address
Charlene Besskin	U.S. Fish and Wildlife Service	Fish and Wildlife Biologist / TWS Certified Wildlife Biologist	(605) 224-8693 Ext. 231 Charlene_Bessken@fws.gov
Doug Backlund	South Dakota Department of Game, Fish and Parks S.D. Natural Heritage Program	Wildlife Biologist	(605) 773-4345 Doug.Backlund@state.sd.us
Leslie Peterson	South Dakota Department of Game, Fish and Parks	Aquatic Resource Coordinator	(605) 773-6208 Leslie.Petersen@state.sd.us
John Lott	South Dakota Department of Game, Fish and Parks	Chief Aquatic Resources	(605) 773-4508 John.lott@state.sd.us

Meeting Purpose:

AECOM met with the SD USFWS and SDGFP to discuss survey requirements, surveys protocols, mitigation measures, and best management practices for wildlife and special status species that have been identified for the Project. The goals of this meeting were to obtain agency concurrence on the proposed survey protocols, survey locations, and other mitigation measures.

Meeting Notes

Species Discussion:
Black-footed Ferret:
SD block cleared. No further surveys or mitigation requirements. Prairie dog towns were identified during the 2008 biological field surveys. SDGFP notes good information for associated burrowing owls. They are not a listed species but will fall under the MBTA.

American Burying Beetle:
No further survey work will be accepted. Off-site mitigation banking will be required for impacts to suitable ABB habitat at a 1:2 reclamation ratio. Both USFWS and SDGFP will required off-site mitigation to enhance ABB habitat in southern Tripp County.

Recommendations include purchasing land for SDGFP management (e.g. waterfowl protection areas, areas for hunting), setting up conservation easements with the Nature Conservancy, or USFWS easements (e.g. grassland easement). Suggested properties include Dogear Lake, Rahn Lake, and Turtle Butte. Concerns regarding light pollution also exist for areas of the sandhills that remain undeveloped. ABB are impacted to light by being attracted to it instead of meeting their daily needs for survival. SDGFP provided some BMP's including installing shading on light fixtures that focus the light towards the ground and types of bulbs that are not as bright.

Whooping Crane:
Keystone will not be permitting the transmission lines but will add recommendations to bury and or mark appropriately overhead lines. Regarding centerline construction, the USFWS recommends surveying for cranes if construction will cross wetland/waterbody habitat that provides suitable stopover habitat during the migration period. USFWS would accept clearance from an Environmental Inspector (EI). It would be beneficial to provide a habitat assessment to quantify suitable stopover habitat.

Interior Least Tern.
Data was presented from the 2008 surveys at the Cheyenne River. No further surveys are needed if construction occurs outside the nesting period at the Cheyenne River. HDD methods will eliminate impacts to nesting habitat. The SDGFP will be conducting annual surveys at the Cheyenne and will provide AECOM with the results. If construction occurs during the nesting period, additional nesting surveys would be required.

Western Prairie Fringed Orchid:
Surveys are scheduled for 2009. USFWS recommends additional surveys in 2010 as well because the flowers do not always bloom each year. In addition, these plants are root based so an approach to protect seeds (e.g. topsoil segregation) is not applicable. The surveyor also needs to be capable of locating the plant without the flowers present and at young stages. There has not been a record in South Dakota in 100 years but this part of the state has never been surveyed. Don Hazlette was mentioned as a qualified surveyor.

Swift Fox:
Data was presented regarding potential swift fox dens located during the 2008 biological field surveys. Activity status was not determined at that time. SDGFP recommends verifying the use by canids and conducting more intensive surveys prior to construction. If an EI notices a potential den site prior to construction, it is recommended that the activity be verified prior to disturbing the den. SDGFP is only concerned about impacts directly disturbed by construction and during the denning period. It was also noted that no den sites were identified in the initial area described at the first meeting in 2008.

River Otter:
Surveys are planned prior to construction at the Cheyenne, White, and Bad rivers. SDGFP recommends surveys only if suitable habitat (e.g. beaver lodges) is found at the crossing.

Sensitive Fish:
Concern for these species within crossings of tributaries of the Keya Paha River. AECOM presented data from the 2008 biological surveys. Only two intermittent crossings were identified. SDGFP will look at the crossings with more detail to determine the need for presence/absence surveys. SDGFP would like more data because these streams have never been surveyed. Buffalo Creek was delineated but Lute Creek was not and it was recommended that a delineation be completed. SDGFP will provide more information on spawning periods.

Bald Eagle:
AECOM presented the results of the 2008 aerial raptor surveys. Additionally, winter roost surveys are scheduled for February 2009 and nesting surveys are planned for April 2009. SDGFP does not believe any communal roost sites exist along the route. SDGFP will provide the agreement between USFWS/SDGFP/ACOE on bald eagle guidelines.

Raptors:
Ferruginous hawk nests mostly in trees in SD. Ground crews did not identify and ground nests. AECOM asked if it would be possible to remove nest trees outside the nesting period. SD law prohibits these activities without a permit. SDGFP will provide more information on the permit.

Prairie Grouse:
SDGFP recommends aerial lek surveys along the ROW within line of sight (~0.25 miles). SDGFP will provide locations and surveys frequency.

Follow-up Required / Requested

SDGFP Needs:

- More information on sage grouse habitat and survey protocol – AECOM will follow up with Chad Switzer.

AECOM needs:

- Information of South Dakota law regarding removing nest trees;
- MOU with ACOE, USFWS, and SDGFP regarding bald eagle management;
- ABB off-site mitigation options;
- Aerial grouse lek survey locations;
- Annual survey results for least tern at the Cheyenne River;
- Survey period for sensitive fish species.

Additional Comments

- Sprague's Pipit is up for federal listing. The USFWS will send the 90 day finding. This species may warrant native prairie surveys.
- MBTA discussions are ongoing and KXL will most likely follow suite with the developing Keystone Conservation Agreement. This will involve mitigating for the loss of trees and grassland habitat.
- Verify that the pipeline will not heat wetlands/waterbodies crossed, keeping them open and attracting waterfowl to stay in an area when they should be migrating through.
- AECOM will finalize a document with the results of this meeting to be sent out for final concurrence to TransCanada and USFWS/SDGFP.
- Dave Ottie is a good contact for reclamation seed mix recommendations.

MEETING SUMMARY

PLACE OF MEETING:	Joe Foss Building; South Dakota Department of Environment and Natural Resources; Pierre, SD
DATE OF MEETING:	May 7, 2013
TIME:	1:00 PM
ATTENDEES:	Steve Craycroft - Keystone Jason Zoller - Keystone Leslie Murphy - SDGFP Gene Galinat - SDGFP Genny McMath - SD DENR Mark Rash - SD DENR John Lott - SDGFP
PURPOSE:	Discuss the feasibility of Keystone using Lake Gardner as a withdrawal source for hydrostatic test water and dust control test water.

SUBJECT OF CONVERSATION

The purpose of this meeting was to discuss the feasibility of the Keystone utilizing Lake Gardner as a source for hydrostatic test water and dust control water. Lake Gardner was identified as potential water source on the South Dakota water allocation permit applications submitted in mid-April. The primary issue is that Lake Gardner is a State owned water managed by South Dakota Games, Fish and Park (SDGFP) as a Game Protection Area. The meeting was held to formally introduce the Keystone XL Project to the representatives of the SDGFP (Ms. Leslie Murphy, Mr. Gene Galinat, Mr. John Lott) who manage the aquatic resources within Lake Gardner so that both parties could identify the options for water withdrawal from the Lake. Ms. Genny McMat and Mr. Mark Rush of South Dakota Department of Environment and Natural Resources (SD DENR) attended the meeting as the permitting leads for the water allocation (withdrawal/discharge) permits.

The meeting started with Mr. Steve Craycroft providing a detailed description of the Project construction process and specifically how the water from Lake Gardner would be utilized during construction. The following are the questions and comments that were discussed following Mr. Craycroft's description of the Project:

- Mr. Rush enquired what was the decision process in determining how/when test water is transferred from test section to test section
    - Mr. Craycroft responded that the degree of the elevation change along the pipeline route is the most significant determining factor in determining the length of test sections and how effectively water could be transferred between test sections.
- There was a general question enquiring when the water withdrawal would occur for Lake Gardner.

    - Mr. Craycroft responded that the exact construction schedule has not been determined and is dependent on timing of the Presidential Permit. Mr. Craycroft did state that hydrostatic testing could potentially occur during the winter 2013 (though unlikely), but would more likely occur from September through December 2014. Mr. Craycroft emphasized that there could be a degree of flexibility in the scheduling of the water use from Lake Garner and that Keystone was interested in working with the agencies during the process.
- Mr. Galinat stated that his primary concern would be ensuring that water levels were maintained in Lake Gardner to support the fish populations. Mr. Galinat stated that lake levels can be low in the winter and that winter kills have been recorded due to low water levels. Because of the potential for winter fish kills and also the popularity of ice fishing, Mr. Galinat stated that SDGFP would prefer Keystone avoid water withdrawal from Lake Gardner during the winter.
- Water levels in Lake Gardner are primary driven by winter snow pack, and Rush Creek has a marginal/seasonal flow into the lake.
- The overall sentiment of SDGFP was that Lake Gardner is an important recreational area for Harding County and for the northwest region of the State, and that SDGFP would prefer that any water withdrawal or related actions avoid major impacts on recreational activities.
- Mr. Galinat advised that withdrawal would be preferred during the spring and fall and use of the lake to be avoided during the summer and winter due to the increased potential for fish kills associated with low water levels during these times. This recommendation was also prefaced by saying the withdrawal could only be conducted when adequate water was present within Lake Gardner regardless of the season.
- Mr. Galinat also had concerns regarding the use of the existing access road to the proposed withdrawal location for dust control. The SDGFP would require that the road be maintained in its current condition, that rigorous dust control be applied and that access to the boat ramp via the road would not be blocked or impacted by Keystone activities. SDGFP would require that any road damage be repair to pre-use conditions.
- Mr. Craycroft communicated that Keystone's contractor would maintain the access road and would apply water or a dust palliative (e.g., MgCl or Lignin sulfonate)
- Ms. Leslie Murphy inquired how much water was lost during the hydrostatic test process.
    - Mr. Craycroft responded that water loss in minimal – likely less than 1% of the total volume withdrawn.
- Mr. Galinat estimated the size of Lake Gardner at 200 to 203 acres.
- Mr. Craycroft enquired if there was a mechanism for purchasing the water from SDGFP since the agency owned the water rights for Lake Gardner. Mr. Craycroft also enquired if there were any opportunities for conservation or restoration projects at Lake Gardner.
    - SDGFP responded that they would have to look into the option of selling the water, as well as the potential for restoration projects/funding.

The overall consensus was that the feasibility of water use from Lake Gardner was significantly dependent on the level of the water at the time when Keystone needed to withdraw the larger volumes for hydrostatic testing. As long as there was sufficient water in the lake to support the aquatic resources, than SDGFP did not anticipate that the request for water would be denied. SDGFP emphasized that the agency would prefer if the water was withdrawn during either the spring or fall, to reduce the potential for fish kills due to low water levels in

the winter and summer. SDGFP also stressed that public access to the lake was a primary concern and that any permitted activities should not limit access to the boat ramp located on the southwest side of the lake. SDGFP stated that the proposed discharge location in close proximity to the western shore of the lake was preferred over the discharge location near the ROW.

Mr. Craycroft requested that it would be beneficial if SDGFP could develop a list of conditions by which SDGFP would allow the proposed withdrawal from Lake Gardner. SDGFP agreed to work on developing a list of conditions for Lake Gardner water use by the Project.

On a separate note from the discussions centered on Lake Gardner, Mr. Rush provide a short assessment of some of the other proposed withdrawal locations identified in Keystone's withdrawal permit applications;

- Bad River – only potentially useable in the spring, dry most of the year
- Little Missouri – potential to be used, but very seasonal in flow (fall is the optimal time for use, since it avoids the irrigation season). Mr. Rush recommended using the Monmouth Gauge for the most accurate history on water levels near Keystone's water withdrawal point on the Little Missouri River.
- North Moreau – Not a reliable source
- Cheyenne River – most consistent of the proposed sources
- White River – likely to contain enough water for the proposed withdrawal amount.

Action Items

- Follow-up with SDGFP on their progress developing a list of conditions that would permit the use of water from Lake Gardner for the proposed use.
- An electronic copy of the proposed withdrawal/discharge locations at Gardner Lake was provided to SDGFP. *[email sent 5/9/2013 to Leslie Murphy]*

SIGNATURE: Jason Zoller

DISTRIBUTION:
Sandra Barnett
Steve Craycroft
Jason Zoller
James Odom
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FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
203 West Second Street
Grand Island, Nebraska 68801

May 15, 2013

FWS-NE: 2013-164

K. Nicole Gibson, Ph.D.
Endangered Species Act Lead,
U.S. Department of State
OES/FO Room 3880
Washington, D.C. 20520

Subject: Transmittal of the U.S. Fish and Wildlife Service's Biological Opinion on the Effects to Threatened and Endangered Species from the Issuance of a Presidential Permit to TransCanada Keystone XL Pipeline (Keystone) by the U.S. Department of State for the proposed construction, operation, and maintenance of the Keystone XL pipeline and associated facilities at the border and interrelated and interdependent actions.

Dear Dr. Gibson:

This document transmits the United States Fish and Wildlife Service's (USFWS) Biological Opinion (BO) regarding potential impacts of the proposed Keystone XL pipeline (Project) to the federally endangered black-footed ferret *(Mustela nigripes)*, interior least tern *(Sternula antillarum)*, whooping crane *(Grus americana)*, pallid sturgeon *(Scaphirhynchus albus)*, and American burying beetle *(Nicrophorus americanus)*(ABB); and threatened piping plover *(Charadrius melodus)* and western prairie fringed orchid *(Platanthera praeclara)*. Additionally, this BO also provides measures that would contribute to the conservation of two federal candidate bird species, the greater sage-grouse *(Centrocercus urophasianus)* and Sprague's pipit *(Anthus spragueii)*, that would likely be impacted by the Project. This consultation document has been prepared pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended (Act) (16 United States Code [U.S.C.] § 1531 et seq.) and 50 Code of Federal Regulations [C.F.R] § 402 of our interagency regulations governing section 7 of the Act.

Section 7(a) (2) of the Act requires Federal agencies to consult with the USFWS to ensure that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of any federally listed species nor destroy or adversely modify critical habitat. The proposed Project is the construction and operation of a 36-inch diameter oil pipeline with associated facilities from Hardisty, Alberta, Canada to Steele City, Nebraska with two pumping stations proposed for construction in Butler and Clay counties in Kansas. The direct and indirect effects, as well as the effects from any interrelated and interdependent actions, and cumulative effects, are considered in this BO to determine if the proposed Project is likely to jeopardize the aforementioned federally listed species.

Keystone has applied to the U.S. Department of State (Department) for a Presidential Permit for the construction, connection, operation, and maintenance of the proposed Project pipeline and associated facilities at the border of the United States for importation of crude oil from Canada. The Department receives and considers such applications for Presidential Permits for facilities to transport petroleum, petroleum products, coal, and other fuels transmission projects pursuant to the President's constitutional authority, which authority the President has delegated to the Department in Executive Order (Exec. Order No.) 13337, as amended (69 Federal Register [Fed. Reg.] 25299). Under EO 13337, the Secretary of State may issue a Presidential Permit for a border crossing facility if he finds that issuing such a permit would be in the "national interest." EO 13337 also specifies a process for the Department to seek the views from certain other agencies on whether issuing a permit would be in the national interest. It was determined in consultation with other agencies (including Bureau of Land Management (BLM) and the United States Army Corps of Engineers (USACE)) that the Department would act as the lead federal agency for the environmental review of the proposed Project consistent with National Environmental Policy Act (NEPA). Consequently, the Department is also the lead agency consulting with the USFWS consistent with Section 7 of the ESA. Other federal actions associated with the proposed Project may require separate section 7 consultation with the USFWS.

Several federal agencies are cooperating agencies with the Department, and involved in some capacity with the proposed Project. The proposed Project would affect numerous rivers and wetlands, thus the USACE would issue Section 404 permits as necessary. Because the proposed Project would cross both Federal and private lands, the BLM would evaluate the proposed Project and decide whether to grant Keystone a right-of-way (ROW) authorization for a crude oil pipeline and appurtenant facilities including access roads across those federal lands pursuant to the Mineral Leasing Act (43 C.F.R Part 2880). These federal lands principally include 43 miles of pipeline ROW in Montana, and the proposed pipeline would also cross or go under Bureau of Reclamation facilities on private lands in Montana and South Dakota. The Western Area Power Administration (Western) would own a small section of a 230-kV transmission line in southern South Dakota. This line would supply upgraded load capacity and support voltage requirements for pump stations 20 and 21 (in Tripp County, South Dakota) if the proposed pipeline were to operate at full capacity sometime in the future. Finally, the Rural Utilities Service of the U.S. Department of Agriculture would provide grants to help fund construction of some of the power distribution lines that may be built to provide power to the proposed pipeline pump stations.

Project Changes since the Previous Application

Several changes have been made to the proposed Project since the Final Environmental Impact Statement (Final EIS August 2011) was released and the 2011 BO was withdrawn at the request of the Department by the USFWS on December 21, 2011. In general, there have been 64 route modifications made in Montana, 51 route modifications in South Dakota, and 16 route changes in Nebraska to accommodate landowner concerns and the results of engineering and environmental surveys, and to comply with state permitting requirements. Of these route changes, 2 in Montana, 29 in South Dakota, and 11 route changes in Nebraska are outside the previous project survey corridor. The route changes in Nebraska result from Keystone's agreement to reroute the pipeline around the Nebraska Department of Environmental Quality (NDEQ)-identified Sandhills Region. No changes have been made to the two pump station locations in Kansas. The proposed Project

now includes an ancillary facility that will be used as a rail siding and pipe storage location in North Dakota. This 60-acre pipe yard was used previously as part of TransCanada Pipeline's Bison Pipeline Project.

This BO is based on the best available scientific and commercial data, including E-mail and telephone correspondence, USFWS files, pertinent scientific literature, discussions with recognized species authorities, and other scientific sources. Further, this BO uses information from the December 21, 2012, Biological Assessment (BA) that was submitted to the USFWS by the Department (DOS 2012).

Consultation History

The USFWS's Nebraska Field Office in Grand Island, Nebraska, is delegated the lead office to conduct the consultation with the Department. However, other USFWS Ecological Services Field Offices in Montana, North Dakota, South Dakota, and Kansas were actively involved in the review of the Project during informal consultation beginning in 2008, and provided input on draft consultation documents throughout the consultation.

In September 2011, the USFWS released a BO with an incidental take statement for the American burying beetle (ABB) in South Dakota, Nebraska, and Oklahoma. Subsequently, the USFWS withdrew the BO at the Department's request based on Keystone's agreement with Nebraska to reroute the pipeline in Nebraska to avoid the NDEQ-identified Sandhills Region. Keystone has since filed a new Presidential Permit application with the Department (May 2012). In June 2012, the Department initiated section 7 consultation for the May 2012 Keystone XL Pipeline Presidential Permit application. The Department submitted to the USFWS, a draft BA for the proposed Project in September 2012. For the new application, the Department did not designate Keystone as the non-federal representative. Keystone did not include the Gulf Coast portion of the previous Keystone XL project in its May 2012 application. Keystone decided to pursue the Gulf Coast Project as a stand-alone project with independent utility. That project received the necessary permits from relevant federal and state agencies and is under construction. The proposed Project encompasses a slightly revised "Steele City" segment of the previous proposed Project and is the subject of this BO. Construction and operation of the proposed Project may affect habitats and populations of species protected under Act and by individual state legislation in the aforementioned states. This BO addresses these federally protected species and updated proposed Project information.

The following bulleted items provide a summary of correspondence, species-specific survey information, and continued informal consultation with the USFWS regarding coordination of biological surveys and determination of biological impacts from the previously proposed Project and the new proposed Project. The previously proposed Project had a different geographic scope that included Texas and Oklahoma. Meeting summaries below include Texas and Oklahoma, which were part of the previously proposed Project. They are included here to provide a sense of the extensive agency coordination that has occurred on this Project from 2008 to 2013. Supporting meeting summaries, consultation letters, and other communications are included in the 2012 BA (DOS 2012), in files at the USFWS's Nebraska Ecological Services Field Office located in Grand Island, Nebraska and other USFWS Ecological Services Field Offices in Montana, North Dakota, South Dakota, and Kansas.

- April 2008: Keystone sent initial consultation letters for the Steele City Segment (Montana, South Dakota, and Nebraska) to the USFWS, BLM, state wildlife agencies, and state natural heritage programs to request their input in identifying prominent terrestrial and aquatic resource issues or concerns that may occur within or adjacent to the ROW, focusing on species that are either sensitive (e.g., federal or state listed), have high economic value (e.g., big game, waterfowl), or are considered important resources (e.g., raptors, fish). The consultation letters included state-specific special status species tables compiled from data received from each state, USFWS, and BLM with brief descriptions of species habitat, miles of potential habitat crossed by the Project, and approximate mileposts where potential habitat was identified along the ROW.

- May 5, 2008: Keystone met with the Nebraska Game and Parks Commission (NGPC) and the USFWS at the NGPC office in Lincoln, Nebraska, to discuss issues pertaining to wildlife, special status species, and sensitive habitat that could potentially occur in the Project area. The goal of the meeting was to gather input on agency recommendations based on the information sent to them in April 2008 for species occurrence, habitat assessments, and future field surveys. Keystone incorporated comments from the meeting into survey protocols and best management practices (BMPs) documents for future agency verification.

- May 8, 2008: Keystone met with the USFWS and the Montana Fish, Wildlife, and Parks (MFWP) at the MFWP office in Helena, Montana, to discuss issues pertaining to wildlife, special status species, and sensitive habitat that could potentially occur in the Project area. The goal of the meeting was to gather input on agency recommendations based on the information sent to them in April 2008 for species occurrence, habitat assessments, and future field surveys. Keystone incorporated comments from the meeting into survey protocols and BMPs documents for future agency verification. The MFWP requested a follow-up meeting with additional technical staff from MFWP (Regions 6 and 7).

- June 10, 2008: Keystone met with staff from USFWS and South Dakota Department of Game, Fish, and Parks (SDGFP), at the SDGFP office in Pierre, South Dakota, to discuss issues pertaining to wildlife, special status species, and sensitive habitat that could potentially occur in the Project area. The goal of the meeting was to gather input on agency recommendations based on the information sent to them in April 2008 for species occurrence, habitat assessments, and future field surveys. Keystone incorporated comments from the meeting into survey protocols and BMPs for future agency verification.

- July 29, 2008: Keystone met with staff from the BLM Glasgow Field Office and MFWP Region 6 and 7 at the MFWP office in Glasgow, Montana, to discuss issues pertaining to wildlife, special status species, and sensitive habitat that could potentially occur in the Project area. The goal of the meeting was to discuss agency recommendations based on the information sent to them in April 2008 for species occurrence, habitat assessments, and future field surveys. Keystone incorporated input from the meeting into survey protocols and BMPs for future agency verification.

- December 3, 2008: Keystone received a consultation letter from the USFWS's Ecological Services Field Office in Tulsa, Oklahoma, regarding recommendations for the proposed list of threatened and endangered species about species-specific surveys, habitats of special concern, and BMPs for projects affecting rivers, streams, and tributaries. The USFWS requested formal consultation with the Department to address take of ABB.

- January/February 2009: Keystone initiated section 7 consultation with the USFWS. Keystone continued discussions with BLM, and state wildlife agency offices for Montana, South Dakota, and Nebraska that included state-specific special status species survey protocols and BMPs for the species identified as potentially occurring during the 2008 meetings. A summary of the findings from the 2008 biological field surveys was included in the discussions.

- January 27, 2009: Keystone met with staff from the USFWS and SDGFP at the SDGFP office in Pierre, South Dakota, to discuss issues pertaining to special status species surveys. The goals of the meeting were to verify Keystone's survey approach, BMPs, discuss required field surveys, and review the information that was sent to the USFWS in the January/February 2009, informal consultation package. The USFWS and SDGFP provided additional recommendations to Keystone's sensitive species mitigation approach to be updated prior to final agency concurrence.

- February 3, 2009: Keystone met with staff from the BLM Glasgow Field Office and MFWP Regions 6 and 7 at the MFWP office in Glasgow, Montana, to discuss issues pertaining to special status species surveys. The goals of the meeting were to verify Keystone's survey approach, BMPs, discuss required field surveys, and review the information that was sent to the USFWS in the January/February 2009, consultation package. The BLM and MFWP provided additional recommendations to Keystone's sensitive species mitigation approach to be updated prior to final agency concurrence.

- February 5, 2009: Keystone held a conference call with staff from the BLM Glasgow, Malta, and Miles City field offices to discuss issues pertaining to special status species surveys. The goals of the meeting were to verify Keystone's survey approach, BMPs, discuss required field surveys, and review the information that was sent to the USFWS in the January/February 2009 informal consultation package. The BLM provided additional recommendations to Keystone's sensitive species mitigation approach to be updated prior to final agency concurrence.

- February 19, 2009: Keystone met with staff from the USFWS's Nebraska Ecological Services Field Office and NGPC at the NGPC office in Lincoln, Nebraska, to discuss issues pertaining to special status species surveys. The goals of the meeting were to verify Keystone's survey approach, BMPs, discuss required field surveys, and review the information that was sent to the USFWS in the January/February 2009 informal consultation package. The USFWS and NGPC provided additional recommendations to Keystone's sensitive species mitigation approach to be updated prior to final agency concurrence.

- May 19, 2009: Keystone sent E-mail correspondence to the USFWS's Oklahoma Ecological Services Field Office regarding survey protocols for the interior least tern. Comments and

concurrence were received on the survey locations and methodology on June 17, 2009, and surveys were initiated following receipt of approval.

- June 16, 2009: Keystone held a conference call with staff from the USFWS's Oklahoma Ecological Services Field Office to discuss issues pertaining to the ABB. The goals of the meeting were to determine the next steps in the consultation process for the ABB and verify that the USFWS was receiving the information they required.

- June 25, 2009: Keystone called C. Bessken of the South Dakota Ecological Services Field Office regarding a geotech activity clearance. The USFWS discussed the need for formal section 7 consultation with the Department to address take of the ABB in South Dakota.

- March 2, 2010: Project personnel held a conference call with USFWS about endangered species and migratory bird surveys. The goal of the call was to discuss helicopter survey timing windows for raptors/rookeries and bald eagles in 2010. The need for conducting additional pedestrian surveys for piping plovers was also discussed.

- June 1, 2010: The USFWS provided the Department with comments on the Draft BA of impacts of the proposed Project to threatened and endangered species. Comments from USFWS Ecological Services Field Offices in Nebraska, South Dakota, Oklahoma, and Texas were included.

- June 3, 2010: The USFWS provided the Director of the Office of Environmental Compliance, Department of the Interior combined comments from Region 6 (Denver) and Region 2 (Albuquerque) on the Draft Environmental Impact Statement for the proposed Project.

- September 3, 2010: Keystone met with the USFWS, Keystone, the Department, and Cardno ENTRIX (a consultant), regarding the requirements for formal consultation on the effects of the Keystone XL Pipeline Project.

- September 9, 2010: A meeting was held between USFWS, BLM, and Keystone regarding mitigation and construction stipulations for greater sage-grouse.

- October 12, 2010: Meetings continued between USFWS, Keystone, NGPC, and Cardno ENTRIX regarding the Keystone XL Pipeline Project's section 7 formal consultation on federally listed species.

- December 30, 2010: The USFWS provided comments to Keystone and Cardno ENTRIX on the November 2010 draft BA of impacts to threatened and endangered species from the proposed Keystone XL pipeline.

- December 30, 2010: The USFWS provided comments on the November 29, 2010, revision of the ABB Survey Report to Keystone and Cardno ENTRIX.

- January 7, 2011: A meeting was held between the USFWS, Keystone, and Cardno ENTRIX to discuss USFWS comments on the preliminary 2011 BA.

- January 12, 2011: Meetings continued between USFWS, Keystone, NGPC, and Cardno ENTRIX regarding the Keystone XL Pipeline Project's section 7 formal consultation on federally listed species.

- February 2, 2011: Personnel from the USFWS, Keystone, the Department, and Cardno ENTRIX (for DOS) met to continue discussions about the BA needed for section 7 formal consultation on effects of the Keystone XL Pipeline Project on federally listed species.

- February 17, 2011: Personnel from the USFWS, Department, and Cardno ENTRIX met to continue discussions about the BA needed for section 7 formal consultation on effects of the Keystone XL Pipeline Project on federally listed species.

- March 24, 2011: Personnel from the USFWS, Department, Keystone, NGPC, and Cardno ENTRIX met to continue discussions about the BA needed for section 7 formal consultation on effects of the Keystone XL Pipeline Project on federally listed species.

- April 21, 2011: Personnel from the USFWS, Keystone, Department, and Cardno ENTRIX (for DOS) met to continue discussions about the BA needed for section 7 formal consultation on effects of the Keystone XL Pipeline Project to the ABB. The discussion included potential impacts to wooded areas in Oklahoma.

- April 21, 2011: Personnel from Keystone and the Department met to continue discussions about the BA needed for section 7 formal consultation on the effects of the Keystone XL Pipeline Project on federally listed species. Discussions included monitoring and habitat restoration bonding.

- April 27, 2011: Personnel from the USFWS and Department met to continue discussions about the BA needed for section 7 formal consultation on effects of the Keystone XL Pipeline Project to the ABB. The discussion included monitoring and habitat restoration bonding.

- May 19, 2011: The Department submitted the 2011 BA to the USFWS with a letter requesting initiation of formal consultation. The BA analyzed the potential effects from the proposed Project to species protected under the Act (DOS 2011).

- August 26, 2011: The Department issued the Final Environmental Impact Statement (2011 Final EIS) to cooperating agencies and the public.

- September 6, 2011: The USFWS issued their 2011 BO on the Effects to Threatened and Endangered Species from the Construction and Operation of the previously Proposed Keystone XL Pipeline.

- December 20, 2011: The Department requested that the USFWS withdraw their 2011 BO for the previously proposed Keystone XL Project.

- December 21, 2011: The USFWS withdrew their 2011 BO for the previously proposed Keystone XL Project.

- May 2012: Keystone filed a new Presidential Permit Application with the Department.

- June 27, 2012: The USFWS, Department, BLM, Montana Department of Environmental Quality (MDEQ), MFWP discussed project status and schedule of the proposed Keystone XL Project. This meeting initiated section 7 consultation with the USFWS on the proposed Project.

- July 6, 2012: Meetings between the USFWS, Department, and BLM continued regarding the section 7 consultation under the Act for the proposed Project.

- August 28, 2012: The Department submitted a species list of federally protected and candidate species and federally designated critical habitat to the USFWS for the proposed Project and requested that USFWS verify that list and information pertaining to federally protected and candidate species and federally designated critical habitat.

- September 7, 2012: Keystone submitted the TransCanada Keystone XL Pipeline Project Environmental Report to the Department with an applicant-prepared Draft BA.

- September 28, 2012: The USFWS submitted a Technical Assistance letter for the proposed Project to the Department with a list of species and potential project effects that may occur in the proposed Project area.

- October 9-10, 2012: A meeting was held between the USFWS, Department, Keystone, BLM, NGPC, NDEQ, and MFWP regarding the proposed Project's section 7 consultation under the Act. Discussion included the ABB and other federally listed species, and state-protected species, the draft BA, species surveys, avoidance, minimization, and compensation measures.

- October 19, 2012: The USFWS provided extensive comments on the draft BA for the Project.

- October 23, 2012: A meeting was held between the USFWS, Department, SDGFP, BLM, and Keystone regarding the greater sage–grouse and a compensatory mitigation plan for the species in South Dakota. Discussions included a management plan and avoidance, minimization, and mitigation strategies.

- December 14, 2012: The USFWS provided extensive comments on the draft BA for the Project.

- December 21, 2012: The Department submitted a Final 2012 BA to the USFWS with a letter requesting initiation of formal consultation. The BA analyzed the anticipated effects of the proposed Project to numerous species protected under the Act and included

avoidance, minimization, and compensation strategies. Table 1 lists the species and the effect determinations reached in the BA by the Department (DOS 2012).

- March 1, 2013: The Department issued the 2013 Draft Supplemental EIS to cooperating agencies and the public.

Species Determinations

In its BA, the Department has considered the effects of the proposed Project on federally listed species and designated critical habitat and has made several determinations of effect as shown in Table 1. Further, the Department also considered the effects of the proposed Project on candidate species. The USFWS concurs with the determinations made by the Department that the proposed Project may affect but is not likely to adversely affect the endangered black-footed ferret, interior least tern, whooping crane, and pallid sturgeon; and the threatened piping plover and western prairie fringed orchid. A detailed discussion of factors contributing to our concurrence with the above not likely to adversely affect (NLAA) determinations is included in the Conservation Measures Section of this BO with supporting information on file at the USFWS's Nebraska Ecological Services Field Office.

The USFWS acknowledges the "no effect" determinations made by the Department including the gray wolf, Eskimo curlew, Topeka shiner, and blowout penstemon. Finally, we concur with the determination that the proposed Project may affect and is likely to adversely affect the ABB. Therefore, this BO analyzes the effects of the proposed Project along with the effects of interrelated and interdependent actions on the ABB, because the Keystone XL pipeline may affect and is likely to adversely affect this species. No critical habitat has been designated for the ABB.

The BA also addressed two candidate species: the greater sage-grouse and Sprague's pipit. In its BA, the Department determined that the proposed Project may effect, but is not likely to adversely affect these species (DOS 2012). Please note that our section 7 consultation would not apply to candidate species for this Project. As such, we would defer our concurrence/nonconcurrence on this determination should either species be listed in the future. In the meantime, we commend the Department for including the greater sage-grouse and Sprague's pipit in this BA even though they are not listed. We have concluded that implementation of several measures by Keystone for the greater sage-grouse and Sprague's pipit would certainly contribute to their conservation.

Table 1. Species considered in the 2012 BA analyses for the proposed action and effect determinations.

Common Name	**Scientific Name**	**Federal Status**	**Conclusion**[1]	**Rationale**
Mammals				
Black-footed ferret	*Mustela nigripes*	Endangered Experimental Populations	NLAA/ NLAA	No potential reintroduction sites present in MT, SD, or NE; no habitat present in Project area.
Gray Wolf	*Canis lupus*	Endangered/ Experimental Populations	No Effect/ No Effect	Not Present in SD, NE, or KS; delisted in MT
Birds				
Eskimo curlew	*Numenius borealis*	Endangered	No Effect	Not present
Interior least tern	*Sternula antillarum*	Endangered	NLAA	Conservation measures adequate
Piping plover	*Charadrius melodus*	Threatened	NLAA	Conservation measures adequate
Whooping crane	*Grus americana*	Endangered	NLAA	Conservation measures adequate
Fish				
Pallid sturgeon	*Scaphirhynchus albus*	Endangered	NLAA	Conservation measures adequate
Topeka shiner	*Notropis topeka*	Endangered	No Effect	Habitat not affected
Invertebrates				
American burying beetle	*Nicrophorus americanus*	Endangered	MALAA	Habitat and individuals adversely affected
Plants				
Blowout penstemon	*Penstemon haydenii*	Endangered	NLAA	Habitat will be avoided
Western prairie fringed orchid	*Platanthera praeclara*	Threatened	NLAA	Conservation measures adequate

[1] NLAA – May affect, not likely to adversely affect
MALAA – May affect, likely to adversely affect.

BIOLOGICAL OPINION

Description of the Proposed Action

The Federal Action under consideration is the potential issuance by the Department of a Presidential Permit to authorize the crossing of the United States-Canada border by a crude oil transmission system that extends from an oil supply hub near Hardisty, Alberta, Canada, and crosses the states of Montana, South Dakota, and Nebraska before it ends at Steele City, Nebraska (Figure 1). From Steele City, crude oil is then transported via existing pipelines to destinations in the United States. The project also includes an ancillary facility (rail siding and pipe storage location) in North Dakota and the construction of two pumping stations in Clay and Butler counties in Kansas along the existing Keystone Cushing Pipeline Extension. The scope of the proposed Presidential Permit would be for construction, connection, operation, and maintenance of the proposed Keystone XL pipeline and its associated facilities.

Keystone has applied to the Department for a Presidential Permit for the construction, connection, operation, and maintenance of the proposed Project pipeline and associated facilities at the border of the United States for importation of crude oil from Canada. The Department receives and considers such applications for Presidential Permits for facilities to transport petroleum, petroleum products, coal, and other fuels transmission projects pursuant to the President's constitutional authority, which authority the President has delegated to the Department in Exec. Order No. 13337, as amended (69 Fed. Reg. 25299). Under Exec. Order No. 13337, the Secretary of State may issue a Presidential Permit for a border crossing facility if he finds that issuing such a permit would be in the "national interest." Exec. Order No. 13337 also specifies a process for the Department to seek the views from certain other agencies on whether issuing a permit would be in the national interest. It was determined in consultation with other agencies (including BLM and the United States Army Corps of Engineers [USACE]) that the Department would act as the lead federal agency for the environmental review of the proposed Project consistent with National Environmental Policy Act (NEPA). Consequently, the Department is also the lead agency consulting with the USFWS consistent with Section 7 of the ESA.

Several federal agencies are cooperating agencies with the Department, and involved in some capacity with the proposed Project. The proposed Project would affect numerous rivers and wetlands, thus the USACE would issue Section 404 permits as necessary. Because the proposed Project would cross both public and private lands, the BLM would evaluate the proposed Project and decide whether to grant Keystone an ROW across those federal lands pursuant to ROWs under the Mineral Leasing Act (43 C.F.R. Part 2880). These federal lands principally include 43 miles of pipeline ROW in Montana, but the proposed pipeline would also cross or go under Bureau of Reclamation facilities on federal land in Montana and on private land in South Dakota. Western would own a small section of a 230-kV transmission line in southern South Dakota. This line would supply upgraded load capacity and support voltage requirements for pump stations 20 and 21 (in Tripp County, South Dakota) in the future if the proposed pipeline were to operate at full capacity sometime in the future. Finally, the Rural Utilities Service of the Department of Agriculture would provide grants to help fund construction of some of the power distribution lines that may be built to provide power to the proposed pipeline pump stations.

Project Description, Location, and Overview

From north to south, the proposed Project consists of approximately 1,204 miles of new, 36-inch diameter pipeline, with 329 miles in Canada and 875 miles in the United States from Morgan, Montana to Steele City, Nebraska. In the United States, the proposed Project would be constructed in 10 parts or 10 mainline spreads, varying in length between approximately 80 and 94 miles each, in 2014 and 2015 (Table 1) (DOS 2012). The proposed Project would involve the construction of facilities ancillary to the pipeline including pumping stations, main line valves, access roads, rail siding and pipe storage yards (Table 2) (DOS 2012).

Land Requirements

Surface disturbance associated with the construction and operation of the proposed Project by state is summarized on Table 3. Approximately 16,277 acres of land would be disturbed during construction of the proposed facilities in Montana, North Dakota, South Dakota, Nebraska, and Kansas. After construction, the temporary ROW (approximately 10,693 acres) would be restored and returned to its previous land use. After construction is complete, approximately 5,584 acres would be retained as permanent ROW and for permanent ancillary facilities. All disturbed acreage would be restored and returned to its previous aboveground land use after construction, except for approximately 286 acres of permanent ROW, which would not be restored but would serve to provide adequate space for aboveground facilities including pump stations and valves, for the life of the proposed pipeline, which is 50 years.

Pipeline Right-of-Way

The installation of the proposed 36-inch diameter pipeline would occur within a 110-foot-wide construction ROW, consisting of a 60-foot temporary construction ROW and a 50-foot permanent ROW. The construction ROW would be reduced to 85 feet in certain areas to avoid and minimize impacts on habitat for threatened and endangered species, wetlands, cultural sites, shelterbelts, residential areas, and commercial/industrial areas.

Additional Temporary Workspace Areas

In addition to the typical construction ROW, Keystone has identified typical types of additional temporary workspace areas (TWAs) that would be required. These include areas requiring special construction techniques (e.g., river, wetland, and road/rail crossings, horizontal directional drilling (HDD), entry and exit points, steep slopes, and rocky soils) and construction staging areas. These preliminary areas have been used to quantify impacts covering about 1,206 acres for the proposed Project.

Pipe Stockpile Sites, Railroad Sidings, and Contractor Yards

Extra workspace areas outside of the temporary construction ROW covering approximately 1,805 acres would be required during the construction of the proposed Project to serve as pipe storage sites, railroad sidings, and contractor yards (Table 4) (DOS 2012). Pipe stockpile sites along the pipeline route have typically been identified in proximity to railroad sidings. To the extent practical, Keystone would use existing commercial/industrial sites or sites that previously were used for construction. Existing public or private roads would be used to access each yard. Both

pipe stockpile sites and contractor yards would be used on a temporary basis and would be restored, as appropriate, upon completion of construction.

Construction Camps

Some areas within Montana, South Dakota, and Nebraska do not have sufficient temporary housing in the proposed route vicinity for all construction personnel working in those areas. Temporary work camps would be constructed to meet the workforce housing needs in these remote locations. A total of eight temporary construction camps would be established (Table 5) (DOS 2012).

Table 1. Pipeline construction spreads associated with the proposed Project

State	Miles by State	County	Spread Number	Location (Mile Post)	Approximate Length of Construction Spread (Miles)
Montana	285.65	Phillips, Valley	Spread 1	0-90	90
		Valley, McCone	Spread 2	90-151.48	61.48
		McCone, Dawson	Spread 3	151.48-197.68	46.2
		Dawson, Prairie, Fallon	Spread 4	197.68-288.63	90.95
South Dakota	315.29	Harding			
		Harding, Butte, Perkins, Meade	Spread 5	288.63-410.75	122.12
		Meade, Pennington	Spread 6	410.75-500.44	89.69
		Haakon, Jones			
		Jones, Lyman, Tripp	Spread 7	500.44-598.86	98.42
		Tripp	Spread 8	598.86-691.78	92.92
Nebraska	274.44	Tripp, Keya Paha, Boyd, Hold, Antelope			
		Antelope, Boone, Nance, Merrick, Polk	Spread 9	691.78-775.67	83.89
		Polk, York, Fillmore, Saline, Jefferson	Spread 10	775.67-875.38	99.71

Source: exp Energy Services Inc. 2012

Table 2. Description of proposed Project facilities by State.

Segment/State	Ancillary Facilities
Montana	6 pump stations, 25 main line valves (MLVs), 84 access roads
North Dakota	Rail siding, pipe storage yard
South Dakota	7 pump stations, 13 MLVs, 59 access roads
Nebraska[a]	5 pump stations, 4 MLVs, 48 access roads
Kansas	2 pump stations

[a] There were four MLVs proposed in the Final EIS for the proposed route. Other Nebraska valve locations are being determined at this time. The total number of pump stations and access roads has been preliminarily identified based on the proposed route.

Table 3. Summary of Lands Affected for the Proposed Project

		Lands Affected (Acres)	
State	**Facility**	**Construction**	**Operation**
Montana	Pipeline ROW	3,784.42	1,727.75
	Additional Temporary Workspace Areas	518.64	0.00
	Pipe Stockpile Sites, and Contractor Yards	517.28	0.00
	Construction Camp	242.88	0.00
	Pump Stations and Delivery Facilities	65.79	65.79
	Access Roads	337.03	47.41
	Rail Sidings[a] (3 Sites)	60.00	0.00
	Montana Subtotal	5,526.05	1,840.95
South Dakota	Pipeline ROW	4,153.37	1,906.83
	Additional Temporary Workspace Areas	460.37	0.00
	Pipe Stockpile Sites, and Contractor Yards	605.07	0.00
	Construction Camp	250.04	0.00
	Pump Stations and Delivery Facilities[b]	65.63	65.63
	Access Roads	222.96	24.34
	Rail Sidings[a] (3 Sites)	60.00	0.00
	South Dakota Subtotal	5,817.44	1,996.80
North Dakota	Pipeline ROW	0.00	0.00
	Additional Temporary Workspace Areas	0.00	0.00

				Lands Affected (Acres)	
State	**Facility**			**Construction**	**Operation**
	Pipe Stockpile Sites, and Contractor Yards			56.05	0.00
	Construction Camp			0.00	0.00
	Pump Stations and Delivery Facilities[b]			0.00	0.00
	Access Roads			0.00	0.00
	North Dakota Subtotal			56.05	0.00
Nebraska	Pipeline ROW			3,637.41	1,663.68
	Additional Temporary Workspace Areas			226.88	0.00
	Pipe Stockpile Sites, and Contractor Yards[c]			680.00	0.00
	Construction Camp[c]			80.00	0.00
	Pump Stations and Delivery Facilities[b]			67.12	67.12
	Access Roads			70.50	0.00
	Rail Sidings[a]			100.00	0.00
	Nebraska Subtotal			4,001.91	1,730.80
Kansas	Pipeline ROW			0.00	0.00
	Additional Temporary Workspace Areas			0.00	0.00
	Pipe Stockpile Sites, and Contractor Yards			0.00	0.00
	Construction Camp			0.00	0.00
	Pump Stations and Delivery Facilities[b]			15.15	15.15
	Access Roads			0.00	0.00
	Rail Sidings[a]			0.00	0.00
	Kansas Subtotal			15.15	15.15
Total =				**16,277.60**	**5,583.78**

[a] Rail siding acreage represents 20 acres for each site. Total acreage for rail sidings = 140 acres.

[b] Pump station acreages are a nominal number set at 15 acres. Except PS-26, actual acreage was used (7.12 acres).

[c] These are estimated acreages; locations have not been finalized at this time.

Table 4. Locations and acreages of pipe storage sites, railroad sidings, and proposed contractor yards.

State	County	Type(s) of Yards	Number of Yards	Combined Acreage
Montana	Dawson, McCone, Valley, Fallon	Contractor Yards	5	161
	Roosevelt, Sheridan, Prairie	Rail Sidings[a]	3	60
	Phillips, Dawson, McCone, Valley, Fallon	Pipe Yard Stockpile Sites	9	283
South Dakota	Tripp, Haakon, Jones	Contractor Yards	7	258

State	County	Type(s) of Yards	Number of Yards	Combined Acreage
	Hughes, Lyman, Pennington	Rail Sidings[a]	3	60
	Tripp, Haakon, Jones	Pipe Yard Stockpile Sites	11	347
North Dakota	Bowman	Pipe Yard Stockpile Sites	1	56
Nebraska	Fillmore, Greeley, Holt, Jefferson, Merrick, York	Contractor Yards	8	233
	Butler, Hamilton, Holt, Jefferson, Valley	Rail Sidings	5	100
	Antelope, Boone, Fillmore, Hamilton, Holt, Jefferson, Keya Paha, Nance	Pipe Yard Stockpile Sites	11	447
Kansas	NA	NA	NA	NA
		TOTAL		1,805

[a] Nominal Acreage of 20 acres each assigned to rail sidings.

The total acreage for the seven camps planned in Montana and South Dakota for which acreage is known equals 493 acres. Keystone is also proposing and investigating the possibility of building a temporary construction camp at a suitable location in Holt County in northern Nebraska, which would be an additional 80 acres raising the total amount to 573 acres. Camp decommissioning would be accomplished in two stages. First, all infrastructure systems would be removed and either hauled away for reuse, recycled, or disposed of in accordance with regulatory requirements. Each site would then be restored and reclaimed in accordance with permit requirements and the applicable procedures described in Keystone's Construction, Mitigation, and Reclamation Plan (CMRP) (Appendix B, DOS 2012).

Table 5. Locations and acreages of proposed construction camps.

State	County	Type(s) of Yards	Number of Yards	Combined Acreage
Montana	McCone, Valley (2), Fallon	Contractor Camps	4	243[1]
South Dakota	Tripp, Harding, Meade	Contractor Camps	3	250
North Dakota	NA	NA	NA	NA
Nebraska	Holt	Contractor Camp	1	80
Kansas	NA	NA	NA	NA
		TOTAL		573

[a] Additional camp in Valley County has not yet been sited, acreage TBD.

Access Roads

The proposed Project would use public and existing private roads to provide access to most of the construction ROW (DOS 2012). Approximately 191 temporary access roads would be needed to provide adequate access to the construction sites. Private roads and any new temporary access roads would be used and maintained only with permission of the landowner or the appropriate land management agency. Temporary and permanent disturbance estimates for access roads are based on the 30-foot roadway width required to accommodate oversized vehicles. In developing the disturbance acreages, all non-public roads were conservatively estimated to require upgrades and maintenance during construction.

Aboveground Facilities

The proposed Project would require approximately 286 acres of land, other than permanent ROW, along the proposed Project segments for aboveground facilities, including pump stations, densitometer sites, intermediate MLVs, and delivery facilities (see Table 3) (DOS 2012).

Pump Stations

New pump stations, each situated on approximately 15-acre sites, would be constructed for the proposed Project. Each new pump station would consist of up to six pumps driven by electric motors, an electrical equipment shelter, a variable frequency drive equipment shelter, an electrical substation, one sump tank, a remotely operated MLV, a communication tower (approximately 33 feet in height), a small maintenance building, and a parking area for station maintenance personnel. Stations would operate on locally purchased electric power and would be fully automated for unmanned operation. Power lines would need to be constructed by local power providers to provide electrical service to pumping stations (Table 6)

Table 6. Summary of power supply requirements for the Keystone XL Pump Stations

Pump Station Number	Approximate Milepost	Transformer Size (MVA)	Utility Supply (kV)	Length (miles)	Power Provider
Montana					
PS-09	1.2	20/27/33	115	61.8	Big Flat Electric Cooperative
PS-10	49.3	20/27/33	115	49.1	NorVal Electric Cooperative
PS-11	99	20/27/33	230	0.2	NorVal Electric Cooperative
PS-12	151.5	20/27/33	115	3.2	McCone Electric Cooperative
PS-13	203.1	20/27/33	115	15.2	Tongue River Electric Cooperative
PS-14	239.5	20/27/33	115	6.3	Montana-Dakota Utilities Company
South Dakota					
PS-15	288.6	20/27/33	115	24.5	Grand Electric Cooperative
PS-16	337.3	20/27/33	115	40.1	Grand Electric Cooperative
PS-17	391.5	20/27/33	115	10.9	Grand Electric Cooperative

Pump Station Number	Approximate Milepost	Transformer Size (MVA)	Utility Supply (kV)	Length (miles)	Power Provider
PS-18	444.6	20/27/33	115	25.9	West Central Electric Cooperative
PS-19	500.4	20/27/33	115	20.4	West Central Electric Cooperative
PS-20	550.9	20/27/33	115	17.2	Rosebud Electric Cooperative
PS-21	598.9	20/27/33	115	20.1	Rosebud Electric Cooperative
Nebraska					
PS-22	653.6	20/27/33	115	24	Nebraska Public Power District (NPPD) & Niobrara Valley Electric
PS-23	708.2	20/27/33	115	36	NPPD & Loup Valleys Rural PPD
PS-24	765	20/27/33	115	9	NPPD & Southern Power District
PS-25	818.4	20/27/33	69	1.0	Perennial PPD
PS-26	875.3	20/27/33	115	0.5	NPPD & Norris PPD
Kansas					
PS-27	49	20/27/33	115	4.6	Clay Center Public Utility
PS-29	144.5	20/27/33	115	8.9	Westar Energy

MVA = megavolt-amperes (million volt-amperes), kV = kilovolt.

Note: Mile posting for each segment of the proposed Project starts at 0.0 at the northernmost point of each segment and increases in the direction of oil flow.

Mainline Valves

Keystone proposes to construct 44 intermediate MLV sites along the new pipeline ROW. Intermediate MLVs would be sectionalizing block valves generally constructed within a fenced, 50 by 50-foot site located on the permanent easement. Remotely operated intermediate MLVs would be located at major river crossings and upstream of sensitive waterbodies and at intermediate locations. Additional remotely operated MLVs would be located at pump stations. These remotely operated valves can be activated to shut down the pipeline in the event of an emergency to minimize environmental impacts in the event of a spill.

Restoration

Construction debris on the ROW would be disposed of and work areas would be final-graded. Preconstruction contours would be restored as closely as possible. Topsoil would be spread over the ROW surface and permanent erosion controls would be installed. After backfilling, final cleanup would begin as soon as weather and site conditions permit. Preliminary cleanup would be completed within approximately 20 days after the completion of backfilling assuming appropriate weather conditions prevail (approximately 10 days in residential areas). Construction debris would be cleaned-up and taken to an appropriate disposal facility.

After permanent erosion control devices are installed and final grading complete, all disturbed work areas except annually cultivated fields would be seeded as soon as possible. Timing of the reseeding efforts would depend on weather and soil conditions and would be subject to the

prescribed rates and seed mixes specified by the landowner, land management agency, or NRCS recommendations. On agricultural lands, seeding would be conducted only as agreed upon with the landowner. In addition, landowners would be asked to report on areas where seeds may have not germinated or erosion has appeared. Keystone would then dispatch crews to repair and address the issues. Once operation begins, Keystone is required to monitor the pipeline at least 26 times per year at intervals not to exceed three weeks for revegetation following construction disturbance, erosion, other human activities occurring near the pipeline, and potential leaks. The ROW would be inspected after the first growing season to determine revegetation success and noxious weed control. Eroded areas would be repaired and areas that were unsuccessfully re-established would be revegetated by Keystone or Keystone would compensate the landowner for reseeding.

Waterbody Crossings

Perennial waterbodies would be crossed using one of four techniques: the open-cut wet method (the preferred method), dry flume method, dry dam-and-pump method, or hydraulic directional drilling (HDD). Each method is described below. In the final design phase of the proposed Project, qualified personnel would assess waterbody crossings with respect to the potential for channel aggradation or degradation and lateral channel migration. The level of assessment for each crossing would vary based on the professional judgment of the qualified design personnel.

The pipeline would be installed as necessary to address any hazards the assessment identifies. The pipeline would be installed at the design crossing depth for at least 15 feet beyond the design lateral migration zone, as determined by qualified personnel. The crossing design also would include the specification of appropriate stabilization and restoration measures. The actual crossing method employed at a perennial stream would depend on permit conditions from USACE and other relevant regulatory agencies, as well as additional conditions that may be imposed by landowners or land managers at the crossing location.

Sediment barriers such as silt fence and staked straw bales would be installed and maintained on drainages across the ROW adjacent to waterbodies and within additional TWAs to minimize the potential for sediment runoff. Silt fence and straw bales located across the working side of the ROW would be removed during the day when vehicle traffic is present and would be replaced each night. Alternatively, drivable berms could be installed and maintained across the ROW in lieu of a silt fence.

In general, equipment refueling and lubricating at waterbodies would take place in upland areas that are 100 feet or more from the water. When circumstances dictate that equipment refueling and lubricating would be necessary in or near waterbodies, Keystone would follow its Spill Prevention Control and Countermeasures Plan (SPCCP) to address the handling of fuel and other hazardous materials (DOS 2012, Appendix D). The purpose of the SPCCP is to establish procedures to prevent the discharge of hazardous or regulated materials during construction of the proposed Project. The SPCCP is designed to reduce the likelihood of a spill, provide for prompt identification and proper removal of contaminated materials if a spill does occur, comply with applicable State and Federal laws and Project permits, and to protect human health and the environment (DOS 2012, Appendix D).

After the pipeline is installed beneath the waterbody, restoration would begin. Waterbody banks would be restored to preconstruction contours or to a stable configuration. Appropriate erosion control measures such as rock riprap, gabion baskets (rock enclosed in wire bins); log walls, vegetated geogrids, or willow cuttings would be installed as necessary on steep banks in

accordance with permit requirements. More stable banks would be seeded with native grasses and mulched or covered with erosion control fabric. Waterbody banks would be temporarily stabilized within 24 hours of completing in-stream construction. Sediment barriers, such as silt fences, straw bales, or drivable berms would be maintained across the ROW at all waterbody approaches until permanent vegetation is established. Temporary equipment bridges would be removed following construction.

Wetland Crossings

Data from wetland delineation field surveys, aerial photography, and National Wetland Inventory maps were used by Keystone to identify wetlands crossed by the proposed pipeline. Pipeline construction across wetlands would be similar to typical conventional upland cross-country construction procedures, with several modifications where necessary to reduce the potential for pipeline construction to affect wetland hydrology and soil structure. The directional drilling technique may be considered in certain site-specific wetland conditions due to the presence of special-status plant or wildlife species or other factors and will be determined during the Clean Water Act Section 404 permitting process in consultation with the appropriate state USFWS Ecological Services Field Office.

The wetland crossing method used would depend largely on the stability of the soils at the time of construction. If wetland soils are not excessively saturated at the time of construction and can support construction equipment without equipment mats, construction would occur in a manner similar to conventional upland cross-country construction techniques. Construction equipment working in saturated wetlands would be limited to that area essential for clearing the ROW, excavating the trench, fabricating and installing the pipeline, backfilling the trench, and restoring the ROW. In areas where there is no reasonable access to the ROW except through wetlands, non-essential equipment would be allowed to travel through wetlands only if the ground is firm enough or has been stabilized to avoid rutting.

Where wetland soils are saturated or inundated, the pipeline can be installed using the push-pull technique. The push-pull technique involves stringing and welding the pipeline outside the wetland and excavating and backfilling the trench using a backhoe supported by equipment mats or timber riprap. The prefabricated pipeline is installed in the wetland by equipping it with floats and pushing or pulling it across the water-filled trench. After the pipeline is floated into place, the floats are removed and the pipeline sinks into place. Most pipe installed in saturated wetlands would be coated with concrete or installed with set-on weights to provide negative buoyancy. Final locations requiring weighted pipe for negative buoyancy would be determined by detailed design and site conditions at the time of construction.

Decommissioning

The Pipeline Hazardous Material Safety Administration (PHMSA) has requirements that apply to decommissioning crude oil pipelines in 49 C.F.R. §§ 195.402(c) (10), 195.59, and 195.402. These regulations require that for hazardous liquid pipelines, the procedural manuals for operations, maintenance, and emergencies must include procedures for abandonment, including safe disconnection from an operating pipeline system, purging of combustibles, and sealing abandoned facilities left in place to minimize safety and environmental hazards (49 C.F.R. § 195.402). Further, these regulations require that for each abandoned onshore pipeline facility that crosses over, under, or through a commercially navigable waterway, the last operator of that facility must

file a report with PHMSA upon abandonment of that facility. The report must contain all reasonably available information related to the facility, including information in the possession of a third party. The report must contain the location, size, date, method of abandonment, and a certification that the facility has been abandoned in accordance with all applicable laws.

Keystone will adopt operating procedures to address these requirements for the proposed Project as they have for previous pipeline projects including the existing Keystone Pipeline mainline. TransCanada typically does not abandon large-diameter pipelines but generally idles or deactivates pipe as market conditions dictate. This allows a dormant pipeline to be reactivated or converted to another purpose in the future, subject to applicable regulatory approvals. When a pipeline or a segment of a pipeline is idled or deactivated, the pipe generally is purged of its contents, filled with an inert gas, and left in place with warning signage intact. Cathodic protection (a measure used to prevent corrosion by causing a metallic structure, such as a pipeline, to act as a cathode) would be left functional as would other integrity measures such as periodic inspections under the integrity management plan. Prior to decommissioning the proposed Project, Keystone would identify the decommissioning procedures it would use along each portion of the route, identify the regulations it would be required to comply with, and submit applications for the appropriate environmental permits. At that point, Keystone and the issuing agencies would address the environmental impacts of implementing the decommissioning procedures and identify the mitigation measures required to avoid or minimize impacts.

Normal Operations

Keystone would develop and implement an annual Pipeline Maintenance Program (PMP) to ensure the integrity of the pipeline. The PMP would include valve maintenance, periodic inline inspection, and a cathodic protection program to ensure pipeline reliability. Data collected in each year of the program would be fed back into the decision-making process for the development of the following year's program (DOS 2012). The Project Operation Control Center (OCC) would be manned by experienced and highly trained personnel 24 hours per day, every day of the year in Calgary. In addition, a fully redundant backup OCC would be constructed, operated, and maintained, also in Canada. Primary and backup communications systems would provide real-time information from the pump stations to the OCC (DOS 2012). The control center would have highly sophisticated pipeline monitoring systems including multiple leak detection systems capable of identifying abnormal conditions and initiating visual and audible alarms. Automatic shut-down systems would be initiated if a valve starts to shut and all pumps upstream would turn off automatically.

The proposed Project would include a supervisory control and data acquisition (SCADA) system to constantly monitor the pipeline system (DOS 2012). The SCADA system would be installed and operated in accordance with the requirements of 49 C.F.R. § 195 and PHMSA. The SCADA facilities would be located in the OCC and along the pipeline system, and all pump stations and delivery facilities would have communication software that sends data back to the OCC. The pipeline SCADA system would allow the OCC to remotely read intermediate MLV positions, tank levels, and delivery flow and total volume. The OCC personnel would also be able to start and stop pump stations and open and close automated MLVs.

The pipeline ROW would be inspected via aerial and ground surveillance to provide prompt identification of possible encroachments or nearby construction activities, ROW erosion, exposed pipe, or any other conditions that could result in damage to the pipeline. The aerial surveillance of the pipeline ROW must be carried out at least 26 times per year and the interval between surveillance cannot exceed 3 weeks as required by 49 C.F.R. § 195.412. Landowners would be encouraged to report any pipeline integrity concerns to Keystone or to PHMSA. Intermediate MLVs and MLVs at pump stations would also be inspected. As required by 49 C.F.R. § 195.420(b), they would be inspected at intervals not to exceed 7.5 months but at least twice each calendar year (DOS 2012).

Routine Maintenance

Routine maintenance would include periodic ROW mowing in non-agricultural areas, ROW tree clearing, aerial and ground patrols of the ROW, periodic inspections of operating equipment on the ROW (e.g., MLVs, pump stations), and potential excavation of the proposed pipeline within the first 6 months to 2 years for coating and other inspections.

If Keystone would need to repair or replace a portion of the proposed pipeline or replace aboveground facilities in the ROW, appropriate agencies would be consulted prior to initiating that maintenance work. If an emergency or spill from the proposed pipeline occurs, Keystone would respond to the spill or emergency and then address any impacts in accordance with the Spill Prevention Control and Countermeasures Plan. Impacts to natural resources could be covered under a Natural Resource Damage Assessment conducted by the trustees, including the USFWS and other agencies.

The ROW would be monitored to identify any areas where soil productivity has been degraded as a result of pipeline construction, and restoration measures would be implemented to rectify any such concerns.

Conservation Measures

Conservation measures are actions that benefit or promote the recovery of listed species that are included by the Department as an integral part of the proposed Project. Conservation measures also have been identified below that would contribute to the conservation of the greater sage-grouse and Sprague's pipit. All of these conservation measures will be implemented by the applicant or power providers where specified, and serve to avoid, minimize, or compensate for Project effects on the species under review thereby supporting concurrence by the USFWS of a NLAA for all of the following species except the ABB and candidate species. General conservation measures applicable to all species are listed below followed by species-specific conservation measures for the species under consideration in this BO.

General Conservation Measures

- All equipment maintenance and repairs will be performed in upland locations at least 100 feet from all water bodies and wetlands.
- Refueling and lubrication of construction equipment will be restricted to upland areas at least 100 feet away from streams and wetlands.
- All equipment would be parked overnight at least 100 feet from a watercourse or wetland.

- Equipment will not be washed in streams or wetlands.
- Spills of fuel and other hazardous materials will be cleaned-up immediately in accordance with the SPCCP and hazardous wastes associated with spills and leaks will be disposed of in accordance with applicable laws and regulations (DOS 2012, Appendix D).
- Each construction and cleanup crew will have on site, sufficient tools and materials to stop leaks including supplies of absorbent and barrier materials that would allow for rapid containment and recovery of spilled materials.
- Keystone would mark and maintain a 100-foot area from river crossings, free from all hazardous materials, fuel storage, and vehicle fuel transfers. These buffers would be maintained during construction except when fueling and refueling the water pump near the river edge that is required for the HDD crossing and hydrostatic test water withdrawal. Water pump fueling will be completed by trained personnel, secondary containment will be used, and a spill kit will be onsite.

Black-footed Ferret

Keystone or power providers where specified have committed to incorporating the following conservation measures as part of the proposed Project to prevent potential direct or indirect impacts to the black-footed ferret from construction in Montana. The USFWS believes that there is no suitable habitat for the species along the proposed Project; however, the following measures have been adopted in the event that a black-footed ferret is detected:

- Provide USFWS with the results of the Montana prairie dog town surveys and continue to coordinate with the Montana USFWS Ecological Services Office to determine the need for black-footed ferret surveys, in accordance with the USFWS's Black-footed Ferret Survey Guidelines (USFWS 1989).
- Complete surveys to identify prairie dog colonies in Fallon County, Montana consistent with the Final EIS to determine if any Category 3 colonies or complexes occur and could be avoided.
- Workers will not be allowed to keep domestic pets in construction camps and/or worksites.
- Workers will be made aware of how canine distemper and sylvatic plague diseases are spread (domestic pets and fleas).
- Workers will not be allowed to feed wildlife.
- Concentrations of dead and/or apparently diseased animals (e.g., prairie dogs, ground squirrels, others) would be reported to the appropriate state and federal agencies.
- Pump Station 9 (Montana): Big Flat Electric Cooperative will provide immediate notification to the USFWS in the unlikely event that a black-footed ferret is sighted during the course of power line construction.

Interior Least Tern

Keystone or power providers where specified have committed to incorporating the following conservation measures as part of the proposed Project to prevent potential direct or indirect impacts to the interior least tern:

- Major rivers that contain interior least tern habitat including the Platte, Loup, and Niobrara rivers in Nebraska; Cheyenne River in South Dakota; and Yellowstone and Missouri rivers in Montana, will be crossed using the HDD method.
- HDD boring under the Platte, Loup, and Niobrara rivers in Nebraska; Cheyenne River in South Dakota; and Yellowstone River in Montana will result in a pipeline burial depth of 25 feet or greater below the river bed.
- Pre-construction surveys will occur within 0.25-mile from suitable breeding habitat at the Platte, Loup, and Niobrara rivers in Nebraska; the Cheyenne River in South Dakota; and the Yellowstone and Missouri rivers in Montana during the nesting season (from May 1 through September 1) to ensure that there are no nesting terns within 0.25-mile of the construction area. Daily surveys for nesting terns would be conducted during the nesting season when construction activities occur within 0.25-mile of potential nesting habitat.
- If interior least tern nests are found at the crossings, then Keystone would: 1) adhere to the 0.25-mile buffer of no pipeline construction activity and 2) continue to monitor nests if any are within 0.25-mile of the construction footprint until young have fledged.
- Keystone commits to making minor adjustments to the pipeline corridor to avoid impacts to nesting interior least terns in coordination with USFWS. This may involve shifting the pipeline corridor away from nests to avoid disturbances to interior least tern nests or other modifications depending on the circumstances.
- Down shielding of lights will be used should HDD occur at night should the HDD site lack vegetative screening, and an active interior tern nest is located within 0.25 mile from the HDD site.
- Pump Station 24 (Nebraska): The Nebraska Public Power District agrees to complete nest surveys for interior least terns within an area 0.25-mile upstream and downstream of the proposed river crossing location if construction is expected to take place during the nesting period. Construction would halt if active nests are identified within 0.25-mile of the Platte River crossing area until such time that chicks and adults leave the nest area and nesting is concluded.
- The Nebraska Public Power District will install spiral bird flight diverters on the shield wire on the line span between the banks at the Platte River crossing and one span on each side of the crossing.

Whooping Crane

Keystone or power providers where specified have committed to incorporate the following conservation measures as part of the proposed Project to prevent potential direct or indirect impacts to the whooping crane:

- During spring and fall whooping crane migration periods, environmental monitors will complete a brief survey of any wetland or riverine habitat areas potentially used by whooping cranes in the morning before starting equipment following the Whooping Crane Survey Protocol developed by the USFWS and NGPC and applied to all projects when located near whooping crane habitat (USFWS 2012b) (Appendix F). If whooping cranes are sighted during the morning survey or at any time of the day, the environmental monitor

will immediately contact the USFWS and respective state agency in Nebraska, South Dakota, North Dakota, and/or Montana for further instruction and require that all human activity and equipment start-up be delayed or immediately cease. Work could proceed if whooping crane(s) leave the area. The environmental monitor would record the sighting, bird departure time, and work start time on the survey form. The USFWS would notify the compliance manager of whooping crane migration locations during the spring and fall migrations through information gathered from the whooping crane tracking program.

- Lights will be down-shielded should HDD occur at night during the spring and fall whooping crane migrations in areas that provide suitable habitat.
- Pump Station 9 (Montana): Big Flat Electric Cooperative will install avian markers and deflectors within 0.25-mile of the Milk River that will be traversed by the power line to pump station 9. The USFWS will be contacted should a whooping crane be spotted in the area of the proposed power line construction site.
- Pump Station 10 (Montana): NorVal Electric Cooperative will install bird flight diverters (BFD) in all locations where the power line comes within 0.25-mile on either side of the Milk River. Additionally, BFDs will be installed for 0.25-mile on either side of two unnamed reservoirs crossed by the proposed power line.
- Pump Station 14 (Montana): Montana Dakota Utilities will install BFDs on the static line at 50 foot spacing within 0.25-mile of Pennel Creek and within 0.25-mile of a pond located in the northwest corner of section 35, T9 North, Range 58 East.

  If a whooping crane is sighted on the ground within the transmission line project area during construction, Montana Dakota Utilities will cease construction and contact the USFWS.
- Pump Station 12 (Montana): McCone Electric Cooperative will install avian markers within 0.25-mile of Buffalo Springs Creek and the Redwater River in accordance with Avian Power Line Interaction Committee (APLIC) standards (APLIC 2012). If whooping cranes are sighted during fall and spring migrations, McCone Electric Cooperative will delay all work activity until whooping cranes have left the area and immediately contact the USFWS and MFWP for further instruction.
- Pump Station 20 (South Dakota): A total of 636 BFDs will be installed by Rosebud Electric Cooperative Inc. at three wetland areas located along the proposed power line alignment to avoid and minimize risk of collision by whooping cranes near wetland foraging and roosting habitats. Installation of BFDs will be done in accordance with specific marking locations as previously recommended by the USFWS at these three wetland areas located at Township 101 North, Range 77 West, Section 17 and the SE ¼ Section 32, and Township 100 N Range 78 West, section 10, NW1/4 Section 15.
- Pump Station 21 (South Dakota): A total of 557 BFDs will be installed by Rosebud Electric Cooperative Inc. to avoid and minimize risk of collision by whooping cranes near wetland foraging and roosting habitats. Installation of BFDs will be done in accordance with specific marking locations as previously recommended by the USFWS at these wetland areas located at Township 97 North, Range 73 West SW ¼ of section 25 and Township 95 North, Range 73 West, Sections 16 and 17.

- Pump Station 22, 23, 24, and 26 (Nebraska): The Nebraska Public Power District will complete a field review with USFWS and NGPC to determine if any areas are present with a higher probability of whooping crane use (i.e., wetlands or large ponded areas (stock ponds), meadows, and obvious flight corridors to and from such areas to feeding habitats). Spiral BFDs will be installed, consistent with APLIC standards (APLIC 2012), in appropriate areas as identified in the field review.

  The Nebraska Public Power District will complete daily presence/absence whooping crane surveys according to protocol (found in Appendix F) if construction occurs during the spring and fall migration periods in areas where such surveys are agreed to be appropriate and necessary to avoid disturbance. Should a whooping crane (s) be sighted within 0.5-mile of a work area, all work will cease until the whooping crane (s) leaves that immediate area. The USFWS and NGPC will be contacted immediately and notified of the presence of whooping crane(s).

- Pump Station 27 (Kansas): Westar Energy will install BFDs to prevent avian collisions where the power line crosses the Republican River even though an evaluation of whooping crane use indicated that it was unlikely that the species would be found in this area.

Pallid sturgeon

Keystone or power providers where specified have committed to incorporating the following conservation measures as part of the proposed Project to prevent potential direct or indirect impacts to the pallid sturgeon:

- Keystone will use HDD to cross the Missouri, Yellowstone, and Milk rivers where pallid sturgeons are known to occur.
- Keystone will ensure that HDD boring will result in a burial depth of 25 feet or greater below the river bed in the Missouri, Yellowstone, and Milk rivers.
- Keystone will ensure that the intake end of the pump will be screened to prevent entrainment of larval fish or debris and the intake screens will be periodically checked for fish entrainment when pumping from the Missouri, Yellowstone, and Milk rivers in Montana. Mesh size of the screen will be 0.125-inch and have an intake velocity of less than 0.5 foot/second to avoid larval entrainment and juvenile fish impingement and entrapment. Should a sturgeon become entrained, impinged, or entrapped all pumping operations will immediately cease and the compliance manager for Keystone would immediately contact the USFWS to determine if additional protection measures would be required. The conservation measure is in effect for pumping operations including HDD and hydrostatic testing.
- Keystone will maintain at least a 100-foot setback from the water's edge for the HDD drill pads at the HDD crossings on the Yellowstone, Missouri, and Milk rivers in Montana.
- Pump Station 10 (Montana): NorVal Electric Cooperative will not cross the Milk River with equipment. No disturbances will occur along the river banks or its associated vegetation where the power line crossing would occur.

American Burying Beetle

Keystone or power providers where specified have committed to incorporate the following conservation measures as part of the proposed Project to prevent potential direct or indirect impacts to the ABB:

- Construction camp near Winner, South Dakota will be built on agricultural land in coordination with USFWS.
- Two pipe stockpile sites planned for Tripp County will be placed on agricultural land in coordination with USFWS.
- When working in suitable ABB habitat in Tripp, Keya Paha, and Holt counties, all parking and staging areas will be pre-located within the approved construction footprint.
- Vehicle traffic used in support of preconstruction activities will be confined to approved access roads.
- Construction methods will be used involving sequential replacement of topsoil and re-establishment of natural vegetation to restore natural soil hydrology within the construction ROW and avoid long-term impacts to ABB habitat.
- Prior to construction disturbance and grading for the ROW, capture and relocation of ABB will be implemented only in Nebraska where access is available to remove adult beetles from the construction ROW in accordance with the Nebraska ABB Trapping Protocol (USFWS and NGPC 2008; Appendix K, American Burying Beetle Trapping Protocol and Conservation Measures for Use in Nebraska). Capture and relocation of ABB is not authorized in South Dakota.
- Protective measures at the relocation site such as creating a tunnel in moist soil for each released ABB with a light cover (e.g., a leaf), and not releasing more than 50 ABB at any one site will be implemented to increase the survivability of relocated ABB.
- Mowing and windrowing vegetation will be conducted after the capture and relocation period to temporarily reduce habitat suitability by drying out the soil surface if construction is not planned to be started prior to the next capture and relocate window. Windrowing, which refers to removal of mowed vegetation from an area to avoid accumulation of grass clippings on the soil surface, will be done to remove vegetation residue. Mowing will be done so that vegetation is at most 8 inches in height. Mowing and windrowing will be implemented only in Nebraska. Mowing and windrowing cannot be used in South Dakota as an avoidance and minimization measure because of concerns there about habitat loss for other species, including grassland birds.
- After the capture and relocation efforts are completed, the ROW will be disturbed (graded) prior to the next June ABB active period in Nebraska (e.g., capture and relocate efforts take place during the August active period, and the ROW disturbance would take place prior to the following June active period). June and August active periods are times when ABB are active and above ground. Adult, reproductive ABB are active and above ground in June; adult and offspring ABB are active and above ground in August.

- In areas where the ROW could not be disturbed (graded) before the next activity period, capture and relocation efforts will be repeated in Nebraska (e.g., capture and relocation efforts would be repeated during the June active period, and the ROW would be disturbed prior to the August active period).
- After capture and relocation efforts are completed in Nebraska, a biologist from Keystone will travel the ROW every couple of days during the ABB active period (June through September) to remove any carcasses that may be present within the ROW that may otherwise be attractive to the ABB.
- Keystone will train all workers operating in ABB habitat and would include discussion of habitat, biology, reasons for their decline, and responsibilities of all workers for the protection of the species (including removing food wastes from the ROW each day, reporting any ABB sightings to an environmental inspector, and avoiding bringing dogs and cats to the ROW). Keystone will produce a full color Endangered Species Card with a picture of the ABB and all of this information summarized on the card. The card will be handed out to all construction workers operating in ABB habitat.
- Signs will be posted at all access points to the ROW highlighting the areas as ABB habitat and reminding workers to follow special restrictions in the area.
- Keystone will down-shield lighting and install sodium vapor-type lights or equivalent in coordination with USFWS in instances when construction activities would occur in suitable habitat areas in Keya Paha, Holt, and Tripp counties to avoid attracting the species to the construction site. Keystone will down-shield lighting and install sodium vapor-type lights or equivalent in coordination with USFWS at ancillary facilities within areas occupied by the ABB.
- Keystone will provide compensation for temporary construction and permanent operations impacts to the ABB as part of a Habitat Conservation Trust (ABB Trust) in areas where the species is likely to be impacted including: southwest of Highway 18 in Tripp County, South Dakota and west of Highway 281 in Keya Paha and Holt counties in Nebraska. The Habitat Conservation Trust would be managed by a nongovernment organization experienced in the management of funds for habitat projects. Funds would be used to acquire land though purchase by fee title or through perpetual conservation easements. Funds could also be used for habitat restoration projects. Compensation would be based on total acres impacted where ABB presence was confirmed in Nebraska (see Appendix D for calculation method). Compensation would be calculated based on total acres impacted and would be modified by habitat quality rating multipliers with prime habitat compensation at 3 times the total impact acres; good habitat at 2 times the total impact acres; fair habitat at 1 times the total impact acres; and marginal habitat at 0.5 times the total impact acres. No compensation would be provided for poor habitat. In Nebraska only, no compensation would be provided for habitat where ABB have not been found.
- In South Dakota, compensation will be provided based only on habitat quality rating multipliers and not ABB survey information. Temporary habitat impacts will be scaled for the period of time anticipated for recovery of vegetation cover at 4 years over the 50-year life of the proposed Project or 8 percent of total calculated impacts. All compensation would be based on habitat ratings and compliant with agreements between the Department, USFWS, and Keystone.

- Keystone will provide funding for compliance monitoring upon issuance of a Presidential Permit and prior to initiating Project construction in South Dakota and Nebraska. The Department will designate USFWS or an agreed-upon qualified third-party that would work with USFWS to ensure that vegetation restoration efforts were successful for ABB habitat, as agreed between the Department, USFWS, and Keystone.
- Keystone will reseed disturbed areas in prime, good, fair, and marginal ABB habitats with a seed mix that corresponds to the appropriate Construction/Reclamation (Con/Rec) unit for that property. Reclamation measure and seed mixes for each Con/Rec are provided in Appendix R of the Supplemental DEIS. Should a landowner-directed seed mix be determined to not result in full restoration as stipulated in the Reclamation Performance Bond then the subject acreage amount reseeded will be debited from temporary ABB habitat impacts and credited to permanent ABB habitat impacts and the total donation amount to the ABB Trust will be recalculated.
- Keystone will set aside funds for a restoration performance bond (see Appendix E for calculation method) upon issuance of a Presidential Permit and prior to initiating Project construction in South Dakota and Nebraska. The bond would be applied to supplemental vegetation restoration that could be necessary if restoration for ABB beetle habitat failed, as agreed between the Department, USFWS, and Keystone.
- Pump Station 22 (Nebraska): The Nebraska Public Power District will schedule line construction activities for this line segment for during the ABB dormant or inactive time in the winter when soil would be frozen to avoid soil compaction (September 15 to April 1). The Nebraska Public Power District will coordinate with USFWS and NGPC to determine appropriate measures to minimize potential impacts if such scheduling cannot be accomplished due to unexpected circumstances, including weather delays.

Piping Plover

Keystone or power providers where specified have committed to incorporating the following conservation measures as part of the proposed Project to prevent potential direct or indirect impacts to the piping plover:

- The Platte, Loup, and Niobrara rivers in Nebraska; the Cheyenne River in South Dakota; and the Yellowstone and Missouri rivers in Montana will be crossed using the HDD method which would result in a burial depth of 25 feet or greater below the river bed.
- If construction were to occur during the piping plover nesting season (from April 15 through September 1), Keystone would conduct pre-construction surveys within 0.25-mile from suitable nesting habitat at the Platte, Loup, and Niobrara rivers in Nebraska; the Cheyenne River in South Dakota; and the Yellowstone and Missouri rivers in Montana to ensure that there are no nesting pairs within 0.25-mile of the construction area. Daily surveys for nesting plovers will be conducted when construction activities occur within 0.25-mile of potential nesting habitat during the nesting season.
- If a piping plover nest(s) are found at the crossings, then Keystone will: 1) adhere to the 0.25-mile buffer of no construction activity and 2) continue to monitor nests if any are within 0.25-mile of the construction footprint until the young have fledged.

- Keystone commits to making minor adjustments to the pipeline corridor to avoid impacts to nesting piping plovers in coordination with the USFWS. This may involve shifting the pipeline corridor away from nests to avoid disturbances to piping plover nests or other modifications depending on the circumstances.
- Down shielding of lights will be used should HDD occur at night, should the HDD site lack vegetative screening, and an active piping plover nest is located within 0.25 mile from the HDD sites.
- Pump Station 9 (Montana): Big Flat Electric Cooperative designed and located the power line to this pump station so that it is 3 miles east of any piping plover nesting or habitat areas. If nesting piping plovers are found to be present based on surveys for the species, all construction would cease until piping plover chicks fledge from the site.
- Pump Station 10 (Montana): NorVal Electric Cooperative will install BFD in all locations where the power line comes within 0.25-mile on either side of the Milk River. Additionally, BFDs will be installed for 0.25-mile on either side of two unnamed reservoirs crossed by the proposed power line.
- Pump Station 24 (Nebraska): The Nebraska Public Power District agrees to complete nest surveys for piping plovers within an area 0.25-mile upstream and downstream of the proposed river crossing location if construction is expected to take place during the nesting period. Construction would halt if active nests are identified within 0.25-mile of the Platte River crossing area until such time that chicks and adults leave the nest area.

  The Nebraska Public Power District will install spiral BFDs on the shield wire on the line span between the banks at the Platte River crossing and one span on each side of the crossing.

Western Prairie Fringed Orchid

Keystone or power providers where specified have committed to implementation of the following conservation measures for the western prairie fringed orchid where suitable habitat is present. Habitat suitability surveys will be done by a person who has demonstrated qualifications in completing surveys and is knowledgeable about the habitat requirements for the species. The person selected to conduct surveys will submit documentation of survey qualifications to the USFWS for review and approval.

- Complete habitat suitability surveys prior to construction. Survey results will be submitted to the USFWS for review.
- Keystone will re-route the pipeline around individual plants or populations within the proposed Project footprint to the extent practicable and/or allowed by the landowner. Compensation through a Habitat Conservation Trust will be provided in areas that cannot be avoided.
- Keystone will transplant individual plants that would be affected by construction activities to other locations where suitable habitat is available, when feasible and/or when approved by the land owner if on private land. This action will be done in coordination with USFWS.

- Keystone will reduce the width of the construction ROW, the amount of reduction dependent on the circumstances, in areas where orchid populations have been identified. This will be done in coordination with USFWS.
- Keystone will salvage and segregate topsoil appropriately where populations have been identified to preserve native seed sources in the soil for use in revegetation efforts in the ROW.
- Keystone will provide compensation for suitable western prairie fringed orchid habitat in a Habitat Conservation Trust. Areas along the proposed Project where the species is likely to occur include: southwest of Highway 18 in Tripp County, South Dakota and Keya Paha, Holt, Rock, Antelope, and Boone counties in Nebraska. The Habitat Conservation Trust would be managed by a nongovernment organization experienced in the management of funds for habitat projects. Funds would be used to acquire land though purchase by fee title or through perpetual conservation easements. Funds could also be used for habitat restoration projects. Compensation will be based on total acres impacted where suitable western prairie fringed orchid habitat is present regardless of presence/absence survey results. Habitat surveys will be used to evaluate western prairie fringed orchid habitat. Compensation would be calculated based on total acres impacted multiplied by 31 percent, the probability of encountering a western prairie fringed orchid during the course of survey work (NGPC 2013) (see Appendix G for calculation method). A 3:1 habitat mitigation ratio would be applied to the habitat expected to contain WPFO to offset temporal loss of habitat from between the time construction began to the time orchid habitat is fully restored and that figure would be multiplied by the value of an acre of land (Appendix G).
- Keystone will restore and monitor construction-related impacts to wet meadow habitats identified as suitable for the western prairie fringed orchid consistent with USACE guidelines as follows. The disturbed areas shall be reseeded concurrent with the project or immediately upon completion. Revegetation shall be acceptable when ground cover of desirable species reaches 75%. If this seeding cannot be accomplished by September 15 the year of project completion, then an erosion blanket shall be placed on the disturbed areas. The erosion blanket shall remain in place until ground cover of desirable species reaches 75%. If the seeding can be accomplished by September 15, all seeded areas shall be properly mulched to prevent additional erosion.
- Pump Station 22, 23, 24 (Nebraska): The Nebraska Public Power District will complete field surveys for the western prairie fringed orchid during the appropriate bloom periods only in areas along the final line routes that are considered suitable. The Nebraska Public Power District will delineate and mark areas where western prairie fringed orchid habitat is present as "avoidance areas" where placement of structures and construction traffic will not occur.

Greater Sage-Grouse

The Department has coordinated with the USFWS, BLM, MFWP, and the SDGFP to consider the effects of the proposed Project on the greater sage-grouse, including the effects of habitat fragmentation. Several conservation measures would be implemented by Keystone or power providers where specified to avoid, minimize, and compensate for impacts to the sage-grouse. Many of these were described in *An Approach for Implementing Mitigation Measures to Minimize*

the Effects of Construction and Operation of the Keystone XL Pipeline Project on Greater Sage-Grouse (DOS 2012, Appendix O) and *An Approach for Implementing Mitigation Measures to Minimize the Effects of Construction and Operation of the Keystone XL Pipeline Project on Greater Sage-Grouse in South Dakota; and Associated Correspondences* (DOS 2012, Appendix P). In South Dakota, this strategy was supplemented with compensatory mitigation that was outlined in a proposal submitted to SDGFP in November 2011 and revised in November 2012 (DOS 2012, Appendix P). Those measures include the following:

- Surveys will be conducted for greater sage-grouse leks prior to construction using approved methods to determine lek locations and peak number of males in attendance within 3 miles of the facility unless the facility is screened by topography; also surveys will be done for leks as identified by MFWP, BLM, and SDGFP more than 3 miles from the facility for use as a baseline to determine construction effects on sage-grouse abundance.
- A conservation plan will be developed with MFWP, SDGFP, USFWS, and BLM once the Presidential Permit is signed and before Project construction begins in Montana and South Dakota to address impacts to greater sage-grouse, including construction timing restrictions, habitat enhancement, and any mitigation measures that would be necessary to maintain the integrity of Core Areas or Preliminary Priority Habitat/Protection Priority Areas (USFWS 2012b), which encompasses lek habitats as well as other important habitat necessary for greater sage-grouse to meet life requisites (see DOS 2012: Appendices O and P, Sage Grouse Mitigation Plans).
- Protection and mitigation efforts will be followed as identified by MFWP, SDGFP, and USFWS including identification of all greater sage-grouse leks within the buffer distances from the construction ROW set forth for the greater sage-grouse by USFWS, and avoiding or restricting construction activities as specified by USFWS within buffer zones between March 1 and June 15 (see DOS 2012: Appendices O and P, Sage Grouse Mitigation Plans) unless the facility is screened by topography.
- Construction will be prohibited during March 1 to June 15 within 3 miles of active greater sage-grouse leks in suitable nesting habitat not screened by topography, with an allowance made for one-time equipment movement during mid-day hours through ROW areas with a timing restriction that does not require grading for equipment passage to lessen disturbance to sage-grouse leks.
- Construction within 2 miles of active greater sage-grouse leks on federal land will be prohibited from March 1 to June 15.
- The mound left over the trench in areas where settling would not present a path for funneling runoff down slopes in sagebrush habitat will be reduced, and additional measures would be taken to compact backfilled spoils to reduce settling to avoid funneling runoff down slopes.
- A compensatory mitigation fund for use by MDEQ, MFWP, and BLM will be established to enhance and preserve sagebrush communities for greater sage-grouse and other sagebrush-obligate species in eastern Montana (size of the fund to be based on acreage of silver sagebrush and Wyoming big sagebrush habitat disturbed during pipeline construction within sage-grouse core habitat mapped by MFWP and important habitat between approximate Mileposts 95 to 98 and 100 to 121).

- Inspection over-flights will be limited to afternoons from March 1 to June 15 during operations as practicable in sagebrush habitat designated by MFWP.
- A 4-year study will be funded by Keystone, under the direction of MDEQ, MFWP, and BLM, that would show whether the presence of the facility has affected greater sage-grouse numbers based on the peak number of male sage-grouse in attendance at leks.
- Restoration measures (i.e., application of mulch or compaction of soil after broadcast seeding, and reduced seeding rates for non-native grasses and forbs) will be implemented immediately following construction that favor the establishment of silver sagebrush and big sagebrush in disturbed areas where compatible with the surrounding land use and habitats unless otherwise requested by the affected landowner.
- Studies will be conducted by Keystone prior to construction along the route to identify areas that support stands of silver sagebrush and big sagebrush. This information will be incorporated into restoration activities to prioritize reestablishment of sagebrush communities.
- Establishment of sagebrush on reclaimed areas will be monitored and reported-on, unless otherwise requested by the landowner, annually for at least 4 years to ensure that sagebrush plants become established at densities similar to densities in adjacent sagebrush communities. Additional sagebrush seeding or planting will be implemented, if necessary.
- Criteria will be established in conjunction with MDEQ, MFWP, and BLM to determine when restoration of sagebrush communities has been successful based on pre- and post-construction studies in addition to consideration of revegetation standards.
- Locally adapted sagebrush seed will be used by Keystone for land restoration (collected within 100 miles of the areas to be reclaimed), unless otherwise requested by the effected landowner (seed would be collected as close to the Project as practicable as determined by regional seed production and availability).
- Cover and densities of native forbs and perennial grasses will be monitored exclusive of noxious weeds on reclaimed areas and reseeded with native forbs and grasses where densities are not comparable to adjacent communities.
- Keystone will work in conjunction with the landowner to appropriately manage livestock grazing of reclaimed areas until successful restoration of sagebrush communities has been achieved (livestock grazing in restored sagebrush communities may promote establishment of sagebrush).
- Measures will be implemented to reduce or eliminate colonization of reclaimed areas by noxious weeds and invasive annual grasses such as cheatgrass to the extent that these plants do not exist in undisturbed areas adjacent to the ROW (noxious weed management plans would be developed and reviewed by appropriate county weed specialists and land management agencies for each state crossed by the proposed Project).
- A compensatory mitigation fund will be established by Keystone, in consultation with SDGFP, and managed by a third party for temporary and permanent impacts to greater sage-grouse habitat. The fund will be used by SDGFP to enhance and preserve sagebrush communities within the sagebrush ecosystem in South Dakota, which is found within the

following counties: Butte, Custer, Fall River, and Harding counties and to a lesser degree, Perkins and Meade counties.

- A research fund will be developed by Keystone, in consultation with SDGFP, and managed by a third party to evaluate the effects of pipeline construction on greater sage-grouse.
- Leks will be monitored that are within 3 miles of the Project footprint in South Dakota that are within the view shed of the construction ROW if construction takes place between March 1 and June 15.
- Keystone will implement, in consultation with SDGFP, a modified 3-mile buffer from March 1 to June 15 around active greater sage-grouse leks. The buffer would be modified on a lek-by-lek basis to account for differences in topography, habitat, existing land uses, proximity of the Project to the lek, and line-of-sight between the proposed Project and each lek.
- Construction equipment activity will be restricted in South Dakota to occur only between 10 am and 2 pm to avoid impacts to breeding greater sage-grouse from March 1 through June 15 in areas where a lek is either within 3 miles of the ROW and visible from the ROW or within 1-mile of the ROW and not visible from the Project ROW.
- Pump Station 9 (Montana): Big Flat Electric Cooperative will implement mitigation measures in accordance with APLIC standards (APLIC 2012) and in coordination with the USFWS, BLM, and MFWP to avoid and minimize impacts to the greater sage-grouse. Construction of the power line will be avoided from March 1 through June 15 to avoid impacts to greater sage-grouse leks that are near the power line.

  Big Flat Electric Cooperative will also require its contractors to install a pole top raptor guard on 68 poles identified to be close enough to a lek to provide a perch and visibility of the lek for birds of prey. Pole top raptor guards will also be installed on 24 existing distribution poles to protect a long-established lek located near the new transmission line project to provide service to pump station 9. Additional pole top raptor guards may be installed pending further field assessments completed during construction.

  Big Flat Electric Cooperative will ensure reclamation of disturbed areas that favors establishment of silver sagebrush (big sagebrush is not located north of the Milk River) and other species that encourage development of suitable greater sage-grouse habitat. Only BLM-approved seed sources will be used in reclamation efforts on BLM lands.

- Pump Station 13 (Montana): Tongue River Electric Cooperative has sited the 15.3-mile long power line so that it is located in developed areas near the transportation infrastructure or agricultural land thereby avoiding areas of potential habitat.

- Pump Station 14 (Montana): Montana Dakota Utilities will reroute a portion of the transmission line serving pump station 14 to avoid two sage-grouse leks and install raptor perch guards at structures previously identified by the MFWP.

  Montana Dakota Utilities will work with TransCanada to avoid any construction of the transmission line from March 1 through June 15, if possible. If not possible, Montana Dakota Utilities would minimize disturbance to lekking sage-grouse by avoiding

construction within 1-mile of leks from 8 pm until 2 hours after sunrise the following day and monitor active leks (displaying males) within 3 miles of the Project during construction from March 1 through June 15. Montana Dakota Utilities would contact the USFWS to obtain additional guidance if construction-related disturbance of lekking sage grouse is noted.

- Pump Stations 15, 16, and 17 (South Dakota): Grand Electric Cooperative will install raptor perch deterrents (cones or spike type deterrent devices) at any power pole that is located one-mile or less from a greater sage-grouse lek for the power line alignments to pump stations 15, 16, and 17. Selection of poles to be equipped with perch deterrent devices will be done in coordination with the USFWS.

Sprague's Pipit

Conservation measures have been discussed with multiple agencies and would be implemented by Keystone or power providers where specified to avoid, minimize, and compensate for impacts to the Sprague's pipit as outlined below:

- Disturbed areas in native range will be seeded with a native seed mix after topsoil replacement.
- The Project ROW will be monitored to determine the success of revegetation after the first growing season, and areas will be reseeded where vegetation has not been successfully reestablished.
- Off-road vehicle access to the Project ROW will be controlled with the use of signs; fences with locking gates; slash and timber barriers, pipe barriers, boulders lined across the construction ROW; or planted conifers or other appropriate trees or shrubs in accordance with landowner or manager request.
- A conservation plan will be developed for the proposed Project to comply with the Migratory Bird Treaty Act and implement provisions of Exec. Order No. 13,186 by providing benefits to migratory birds and their habitats within the states where the proposed Project would be constructed, operated, and maintained.
- If construction would occur during the April 15 to July 15, the grassland ground-nesting bird nesting season, Keystone will ensure that nest-drag surveys are completed to determine the presence or absence of nests on federal land in eastern Montana.
- Construction activity will be delayed from April 15 to July 15 within 330 feet of discovered active nests in eastern Montana.
- Pump Station 9 (Montana): Big Flat Electric Cooperative will implement mitigation measures in coordination with the USFWS, BLM, and MFWP to avoid and minimize impacts to the Sprague's pipit. Preconstruction surveys for the species will be coordinated with the USFWS. Unauthorized vehicle access will be restricted by Big Flat Electric Cooperative during the course of project construction to avoid impacts to nesting birds. Big Flat Electric Cooperative will ensure that disturbed areas will be reseeded to encourage redevelopment of native range using a BLM-approved seed mix.

- Pump Station 12 (Montana): McCone Electric Cooperative will site the power line to avoid and minimize encroachment on native prairie habitats. Construction activities will occur outside of the April 15 through July 15 nesting season, if possible. If Sprague's pipit nests are discovered, construction activity will be delayed within 330 feet of the nest, until the young have fledged. McCone Electric Cooperative will ensure all areas disturbed during the course of power line construction are reseeded with a native seed mix after top soil replacement. Access to the power line ROW will be controlled via fences with locking gates, signs, and fences to avoid disturbance to nesting areas.

- Pump Station 14 (Montana): Montana Dakota Utilities will mow the ROW, unless the landowner does not approve mowing. Any mowing would be done in the fall, prior to construction, to discourage bird nesting. Montana Dakota Utilities may decide not to mow the ROW if construction is projected to commence after July 15. Sagebrush will not be mowed.

  Montana Dakota Utilities will work with TransCanada to avoid construction of the transmission line from April 15 through July 15, if possible. If construction is projected to occur in native prairie habitat during the period from April 15 through July 15, Montana Dakota Utilities will mow the ROW unless the landowner does not approve mowing. Any mowing would be done in the fall, prior to construction, to discourage bird nesting. Montana Dakota Utilities may decide not to mow the ROW if construction is projected to commence after July 15. Sagebrush will not be mowed.

Interrelated and Interdependent Actions

Interrelated actions are those actions that are a part of a larger action and depend on the larger action for their justification (50 CFR § 402.02). Interdependent actions are those actions having no independent utility apart from the proposed action (50 CFR § 402.02). The USFWS and the Department have identified three interrelated and interdependent actions. The effects of these actions are discussed in the *Effects of the Action* section of this BO. The interrelated and interdependent actions include the following:

- Electrical distribution lines and substations that would provide electrical service to pipeline pump stations;
- the Big Bend to Witten 230-kilovolt (kV) transmission line (necessary in southern South Dakota for future increase in pipeline through-put;
- The Bakken Marketlink Project near Baker, Montana.

Electrical Substations and Power Distribution Lines to Pump Stations (Montana, South Dakota, Nebraska, and Kansas)

At least 20 separate private power districts or cooperatives would construct transmission lines to deliver power to 20 pump stations located along the United States length of the pipeline from Montana to Nebraska (Table 6) (see Appendix A). The power lines needed to service pipeline pump stations would range in capacity from 69 kV to 240 kV, but the majority would have a capacity of 115 kV. Most of the lines would be strung on single pole and/or H-frame wood poles, and would typically be about 60 to 80 feet high with wire span distances from approximately 250

to 400 feet. The length of the power lines vary. Potential effects of these substations and power distribution lines are addressed in the *Effects of the Action* section in this BO.

Big Bend to Witten 230-kV Transmission Line (South Dakota)

After receipt of information on the power requirements for the proposed pump stations in South Dakota, Western conducted a joint system engineering study to determine system reliability under the proposed loads at full Project electrical energy consumption. Engineering studies determined that a 230-kV transmission line would be required to support voltage requirements for pump stations 20 and 21 in the Witten area when the proposed Project is operating at maximum capacity. To address this requirement, Western proposes to replace the existing Big Bend-Fort Thompson No. 2 230-kV Transmission Line Turning Structure located on the south side of the dam, construct a new double circuit 230-kV transmission line for approximately 1 mile south west of the dam, and construct a new Lower Brule Substation. These actions are part of the larger Big Bend to Witten 230-kV Transmission Line Project.

If a Presidential Permit is issued, Western plans to construct approximately 2.1 miles of new double-circuit transmission line from the Big Bend Dam, located near the town of Fort Thompson, South Dakota, south to a new substation, tentatively named Big Bend Substation, which would also be constructed by Western. The new 2.1-mile, 230 kV transmission line would be constructed, owned, and operated by Western, but the Big Bend Substation would be transferred after construction to the Basin Electric Power Cooperative (BEPC), which would then own and operate it. The BEPC proposes to construct, own, and operate a new 72.9-mile-long 230 kV transmission line from the proposed new Big Bend Substation to the existing Witten Substation, located near the town of Witten in Tripp County. The new Big Bend Substation and approximately 75-mile-long 230 kV transmission line would assure future electric power requirements at pump stations 20 and 21 are met without degrading system reliability if and when the proposed Project is operating at maximum capacity. The RUS is the lead agency, with Western cooperating for a separate environmental review of the Big Bend to Witten line under NEPA and the Act. Potential effects of this transmission line are addressed in the *Effects of the Action* section in this BO. Other federal actions associated with the proposed Project may require separate section 7 consultation with the USFWS.

Bakken Marketlink Project (Montana)

Keystone Marketlink, LLC, a wholly owned subsidiary of TransCanada Pipelines Limited, is proposing to construct and operate the Bakken Marketlink Project. The project would include construction of facilities to provide crude oil transportation service from near Baker, Montana, to Cushing, Oklahoma. Keystone Marketlink, LLC obtained commitments for transport of approximately 65,000 barrels per day (bpd) of crude oil through the Bakken Marketlink Project. The Bakken Marketlink Project could deliver up to 100,000 bpd to Cushing, Oklahoma depending on ultimate shipper commitments.

The Bakken Marketlink facilities in Montana would consist of piping, booster pumps, meter manifolds, and two 250,000-barrel tanks that would be used to accumulate crude from connecting third-party pipelines and terminals, as well as a 100,000-barrel tank that would be used for operational purposes. Tanks at Baker will be external floating roof tanks. The facilities in

Montana would also include a proposed NPS 16 pipeline that would be approximately 5 miles in length, originating south of pump station 14 at a third party tank farm in Fallon County, and extending to the two accumulation tanks adjacent to the proposed pump station 14. TransCanada Pipelines Limited Bakken held introductory meetings with State and local permitting agencies in 2011, and also held a meeting for potentially affected landowners along the route. Adjustments in the alignment are possible as a result of civil surveys, further landowner discussions, and permitting.

Bakken Marketlink would deliver crude oil into Cushing, Oklahoma, a key pipeline transportation and crude oil storage hub with over 50 million barrels of storage capacity. Crude oil delivered by the Bakken Marketlink Project would be received into storage tanks at Cushing and would either be pumped to the Gulf Coast Project pipeline or to other pipelines and tank farms near Cushing. The Cushing area is a major crude oil marketing, refining, and pipeline hub that provides shippers with many delivery options and market access. The proposed in service date for the Bakken Marketlink Project is projected to be the first or second quarter of 2015. Potential effects of Bakken Market Link project are described in general in the BA and the EIS, and are addressed in the *Effects of the Action* section in this document.

American Burying Beetle

Species Description

The ABB is the largest silphid (carrion beetle) in North America, reaching 1 to 1.8 inches in length (Wilson 1971, Anderson 1982, Backlund and Marrone 1997). The ABB is black with orange-red markings. The hardened elytra (wing coverings) are smooth, shiny black, and each elytron has two scallop-shaped orange-red markings. The pronotum (hard back plate on the front portion of the thorax of insects) over the mid-section between the head and wings, is circular in shape with flattened margins and a raised central portion. The most diagnostic feature of the ABB is the large orange-red marking on the raised portion of the pronotum, a feature shared with no other members of the genus in North America (USFWS 1991). The ABB also has orange-red frons (the upper, anterior part of the head), and a single orange-red marking on the clypeus, which is the lower face located just above the mandibles. Antennae are large, with notable orange club-shaped tips.

Gender can be determined from markings on the clypeus; males have a large, rectangular, red marking and females have a smaller, triangular, red marking. The age of the adults is determined by intensity of appearance. The markings of teneral ABBs (young beetles emerging during late summer) are brighter and appear more uniform in color while the exoskeleton is softer and in general more translucent. The pronotum of a mature, early summer adult tends to be darker than the markings on its elytra, with the former appearing dark orange to red and the latter appearing orange. The senescent (mature, post-breeding) ABB has pale elytral markings and are more scarred. They often have pieces missing from the margin of the pronotum or elytra, have cracks in the exoskeleton, and/or are missing appendages such as tarsi, legs, or antennae (USFWS 2008a).

Life History

The life history of the ABB is similar to that of other burying beetles (Kozol et al. 1988; Pukowski 1933; Scott and Traniello 1987; Wilson and Fudge 1984). A nocturnal species, the ABB is active

in the summer months and bury themselves in the soil during the winter. The young tenerals emerge in late summer, over-winter as adults, and comprise the breeding population the following summer (Kozol 1990b). Both adults and larvae are dependent on carrion for food and reproduction.

Winter Inactive Period: When the nighttime ambient air temperature is consistently below 60°F (15.5°C), ABBs bury into the soil and become inactive (USFWS 1991). In Nebraska, this typically occurs between early September to early June (W.W. Hoback, pers. comm.) and these dates are likely similar in South Dakota. However, the length of the inactive period can fluctuate depending on temperature. Recent studies indicate that ABBs bury to depths ranging from 0 to approximately 20 centimeters in Arkansas (Schnell et al. 2007) and at least 18 centimeters deep depending on the depth of frost in Nebraska and probably South Dakota.

During the winter months in the northern portion of ABB's range (i.e., South Dakota and Nebraska), soil commonly freezes to several feet below the surface. In the Nebraska Sandhills, for example, extreme penetration of frost was estimated between four feet and five feet (Floyd 1978), and water pipes to cattle tanks are still typically buried five feet to avoid freezing (K. Graham, pers. comm.). Since these depths exceed ABB burial depths, the species likely uses a survival strategy in Nebraska and South Dakota that permits the lowering of body temperature to freezing or near-freezing during the coldest portions of the winter (W.W. Hoback, pers. comm.). The lowering of body temperature slows metabolism and helps ensure fat reserves are sufficient to last until emergence in late May or early June (W.W. Hoback, pers. comm.). Additionally, recent research appears to show that ABB will burrow to below the frost line to avoid freezing as well (W.W. Hoback, pers. comm.).

Preliminary data suggest that over-wintering results in significant mortality (Bedick et al. 1999). Winter mortality may range from 25 to 70 percent depending on year, location, and availability of carrion in the fall (Schnell et al 2007; Raithel 1996-2002, unpubl. data, as cited in USFWS 2008b). Over-wintering ABBs with access to a whole vertebrate carcass in the fall had a survival rate of 77 percent versus a 45 percent survival rate for those ABBs not provisioned with a carcasses (Schnell et al. 2007).

Summer Active Period: The ABB emerges from its winter inactive period in mid to late May when ambient nocturnal air temperatures consistently exceed 60º F. In Nebraska, Bedick et al. (1999) found that ABB activity was highest when nighttime temperatures were between 59º F (15º C) and 68º F (20º C). They are most active from two to four hours after sunset, with no captures recorded immediately after dawn (Walker and Hoback 2007, Bedick et al. 1999). Weather, such as rain and strong winds can result in reduced ABB activity (Bedick et al. 1999). During the daytime, ABBs are believed to bury under the vegetation litter to avoid desiccation and predators. The ABB begin rearing broods soon after emergence in late May to early June. During late May and early June ABBs secure a mate and carcass for reproduction purposes. The reproductive process takes approximately 48-69 days. Capture rates for ABBs are highest from mid-June to early-July and again in mid-August (Kozol et al. 1988, Bedick et al. 2004, USFWS 1991) with a decrease in pitfall captures in late July (Kozol et al. 1988) because the species has gone underground tending its brood.

Feeding: Carrion selection by adult ABBs *for food* can include an array of available carrion

species and size (Trumbo 1992). However, carrion must be within a specific weight range for it to be used by ABB *for reproductive purposes*. Kozol et al. (1988) found no significant difference in the ABB's preference for avian verses mammalian carcasses. Burying beetles are capable of finding a carcass between one and 48 hours after death at a distance of up to 2 miles (3.22 km, Ratcliffe 1996). Success in finding carrion depends upon many factors including availability of optimal habitats for small vertebrates (Lomolino and Creighton 1996), density of competing invertebrate and vertebrate scavengers, individual searching ability, reproductive condition, temperature (Ratcliffe 1996) and other abiotic factors such as wind speed and humidity.

Reproduction: Upon emergence from their winter hibernation in early June, ABBs begin searching for a proper-sized carcass for reproduction in Nebraska and South Dakota. The species is able to locate carcasses using chemoreceptors on their antennae. Once a carcass has been found, inter-specific as well as intra-specific competition occurs until usually only a single dominant male and female burying beetle remain (Scott and Traniello 1989). Kozol (1991) reported that the ABB typically out-competes other burying beetles as a result of its larger size. Male and female ABBs cooperatively bury a carcass, but individuals of either sex are capable of burying a carcass alone (Kozol et al. 1988). Once underground, both parents shave off the fur or feathers, roll the carcass into a ball, and treat it with anal and oral secretions that retard the growth of mold and bacteria. The female ABB lays eggs in the soil near the carcass. Parental care in this genus is elaborate and unique because both parents participate in the rearing of young (Bartlett 1987, Fetherston et al. 1990, Scott 1990, and Trumbo 1990), with care by at least one parent, usually the female, being critical for larval survival (Ratcliffe 1996).

Brood sizes of ABBs can sometimes exceed 35 larvae, but 12-18 is more typical (Kozol 1990a). Altricial (helpless at birth), lightly hardened larvae hatch in about 12-14 days. The parents move these first instar larvae to the carcass. The developing larvae solicit feeding by stroking the mandibles of the parents. Both male and female parents regurgitate meat to the larvae. The larvae are soon capable of feeding directly from the carcass. In about 10-14 days large, third instar larvae burrow a short distance from the now-diminished carcass and form pupation cells. One or both of the parents may remain with the pupae for several days and at least one parent, usually the female, may remain with the pupae until they pupate (Kozol 1991). So, for approximately 22-28 days, adult ABBs are present with their brood. New adults emerge in about 26-51 days. The reproductive process from carcass burial to eclosure (i.e., emergence of the adult from pupae) is about 48 to 79 days (Ratcliffe 1996, Kozol 1991, Bedick et al. 1999). Females are reproductively capable immediately upon eclosure. The young beetles emerge in late summer and over-winter as adults; they comprise the breeding population the following summer (Kozol 1990b). In Nebraska, Bedick et al (1999) found that ABBs reproduce only once per year.

Movement: American burying beetles are mobile because they must be able to move to find carrion resources for feeding and reproductive purposes. The species has been reported moving distances ranging from 0.10 to 2.6 miles per day in various parts of their range. Creighton and Schnell (1998) conducted a study on movement patterns of ABBs at Camp Gruber and Fort Chaffee in 1992 and 1993. They recaptured 68 ABBs over a 12 night period; of those 68, 23 (29.5 percent) were recaptured at a site different than the original site of capture. The mean distance moved of the 23 recaptured ABBs over the 12 night sampling period was 1.21 miles for each ABB (0.10 miles per night per ABB). The minimum and maximum distance moved by an individual recaptured ABB was 0.16 mile in one night and 4.3 miles in five nights, respectively. Six ABBs

were recaptured two or three times. The mean movement for these six ABBs was 6.2 miles over six nights, 1.03 miles per night over the entire sampling period. The maximum distance moved by one of these six was 0.76 miles in one night (USFWS 2008b).

Bedick et al. (2004) reported average nightly movements of 0.62 mile, with 85 percent of recaptures moving distances of 0.31 miles per night. Schnell et al. (1997-2003) annually determined the average nightly movements of the ABB to be 0.62 miles, using marked individuals over a nine-year period at Camp Gruber. The smallest average nightly movement for any given active season over that same period was 0.52 miles. Schnell et al. (1997-2006) reported a one day movement of 2.6 miles; previously the greatest distance moved was 1.78 miles (Creighton and Schnell 1998).

Habitat: ABBs are considered habitat generalists and have been successfully live-trapped in several vegetation types including native grasslands, grazed pasture, riparian zones, coniferous forests, mature forest, and oak-hickory forest, as well as on a variety of various soil types (Creighton et al. 1993; Lomolino and Creighton 1996; Lomolino et al. 1995; USFWS 1991). Ecosystems supporting ABB populations are diverse and include primary forest, scrub forest, forest edge, grassland prairie, riparian areas, mountain slopes, and maritime scrub communities (Ratcliffe 1996; USFWS 1991). The ABB readily moves between different habitats (Creighton and Schnell 1998, Lomolino et al. 1995) (USFWS 2008b). Although thought to be a habitat generalist, it is likely that the ABB is more substrate (soil) specific in its selection of carrion burial sites. Soil conditions for suitable ABB habitat must be conducive to excavation by ABBs (Anderson 1982; Lomolino and Creighton 1996). Soils in the vicinity of captures are all well drained and include sandy loam and silt loam, with a clay component noted at most sites. Level topography and a well formed detritus layer at the ground surface are common (USFWS 1991). Certain soil types such as very xeric (dry), saturated, or loose, sandy soils are considered unsuitable for carcass burial and thus are unlikely habitats.

Habitat in South Dakota and Nebraska has often been categorized based on moisture, land use, and the presence of ABB from previous studies in Nebraska. For the Nebraska Sandhills population, this ranking system appears to generally describe areas of potential ABB occurrence. The following habitat descriptions for prime and good habitat are consistent with the Backlund et al. (2008) description of the best habitat for ABB in South Dakota, which they described as sandy grasslands with scattered stands of trees dominated by cottonwood, and commonly including sub-irrigated meadows and groundwater streams. As in Nebraska, the dominant land cover in the South Dakota ABB habitat is native grassland, and is primarily used for range and hay land. Low meadows are dominated by grasses and forbs typical of tallgrass prairie while the uplands consist mostly of mixed grass prairie flora.

Status and Distribution

The ABB was designated as a federally endangered species on July 13, 1989 (54 Fed. Reg. 29,652). At that time, only two, disjunct, natural populations occurred at the extremities of the species' historic range of 35 states; one population was known from four counties in Oklahoma and another population was located on a small island off the coast of Rhode Island (USFWS 2008a). Critical habitat was not designated for the ABB.

Distribution: Historically, the geographic range of the ABB included over 150 counties in 35 states, covering most of temperate eastern North America and the southern borders of three eastern Canadian provinces (USFWS 1991; Peck and Kaulbars 1987) (Figure 1). Documentation of records is not uniform throughout this broad historical range. More records exist from the Midwest into Canada and in the northeastern United States than from the southern Atlantic and Gulf of Mexico region (USFWS 1991). However, during the 20th century, the ABB disappeared from over 90 percent of its historical range (Ratcliffe 1995). The last ABB specimens along the mainland of the Atlantic seaboard, from New England to Florida, were collected in the 1940s (USFWS 1991). At the time of listing, known populations were limited to one on Block Island, Rhode Island; and one in Latimer County, Oklahoma. After the species was listed in 1989, survey efforts increased and the ABB was discovered in more locations, particularly in South Dakota, Nebraska, and Oklahoma (Figure 1).

Currently, the ABB is known to occur in eight states thanks to extensive survey efforts for the species (Figure 1). These include Block Island off the coast of Rhode Island, Nantucket Island off the coast of Massachusetts, eastern Oklahoma, western Arkansas (Carlton and Rothwein 1998), Loess Hills in south-central Nebraska and Sandhills in north-central Nebraska (Ratcliffe 1996, Bedick et al. 1999) (Figure 2), Chautauqua Hills region of southeastern Kansas (Sikes and Raithel 2002), south-central South Dakota (Backlund and Marrone 1995, 1997; Ratcliffe 1996) in Todd Tripp, Gregory, and Bennett counties, and northeast Texas (Godwin 2003). There is some concern that the population in Texas has been extirpated due to competition with fire ants (R. Harms, pers. comm.). Most populations are located on private land.

Population Estimate: Although ABB are relatively easy to capture, obtaining precise estimates of absolute or even relative densities of ABB populations remains a challenge (USFWS 2008a). The standard mark and re-capture technique used to estimate population size assumes that marked and unmarked individuals are equally likely to be captured, and that a substantial number of the animals would be recaptured from one trapping period to the next. However, due to ability of the ABBs to range widely and their reproductive strategy that includes retreating underground for several weeks, these assumptions may not apply. Because the ABB has a one-year life cycle, each year's population levels are largely dependent on the reproductive success of the previous year. Therefore, populations are likely cyclic, with high numbers and abundance in one year, followed by a decline in numbers the succeeding year. This may indicate a relatively rapid turnover rate in the trappable ABB population due to factors such as natural mortality, dispersal, and burrowing underground and attending carrion/broods (Creighton and Schnell 1998).

Reasons for decline:

There is little doubt that habitat loss and alteration affect this species at local or even regional levels, and could account for the extirpation of populations once they become isolated from others (Kozol 1995, Ratcliffe 1996, Amaral et al. 1997, Bedick et al. 1999). The prevailing theory regarding the ABBs' decline is habitat fragmentation (USFWS 1991) which: (1) reduces the carrion prey base of the appropriate size for ABB reproduction and (2) increases the vertebrate scavenger competition for this prey (Kozol 1995, Ratcliffe 1996, Amaral et al. 1997, Bedick et al. 1999) due to its relatively large size and specialized breeding behavior (Creighton et al. 2007). The ABB Recovery Plan (USFWS 1991) and the 5-yr status review of the species (2008a) also

identify the following as potential threats to the ABB: disease/pathogens, DDT, loss of genetic diversity in isolated populations, agricultural and grazing practices, and invasive species.

Habitat Loss and Fragmentation: During the westward expansion of settlement in North America, the removal of top-level carnivores such as the grey wolf (*Canis lupis)* and eastern cougar (*Puma concolor)* occurred simultaneously with land use changes that fragmented native forest and grasslands and created more edge habitats (such as the edge between forest and grassland, or grassland and cropland). These two processes resulted in mid-sized carnivores and scavengers becoming more abundant than they were in presettlement times. Mid-sized carnivores prey on small mammals and birds and scavengers directly compete with carrion beetles for carrion. Mid-sized carnivores and scavenger species include American crow (*Corvus brachyrhynchos)*, raccoon (*Procyon lotor)*, red fox (*Vulpus vulpes)*, opossum (*Didelphis virginiana)*, striped skunk (*Mephitis mephitis)*, rats (*Neotoma* spp.) and Hispid cotton rats (*Sigmodon hispidus*), coyotes (*Canis latrans)*, feral cats, and other opportunistic predators (Wilcove et al. 1986) and scavengers.

A number of these species, especially the raccoon and striped skunk, have undergone dramatic population increases over the last century (Garrott et al. 1993), and the coyote and opossum have expanded their ranges. These scavengers may extend hundreds of feet from edges into forest in eastern North America. Matthews (1995) experimentally placed 64 carcasses in various habitats in Oklahoma where ABBs and the roundneck sexton beetle (*N. orbicollis)*, another type of burying beetle and a species thought to have similar life history characteristics as that of the ABB) had been previously documented, then tracked the organisms that scavenged them. Of the carcasses, 83 percent were claimed by ants, flies, and vertebrate scavengers; about 11 percent were claimed by the roundneck sexton beetle, and only one was claimed by ABBs.

Projects that cause ABB habitat fragmentation are common. Since 2011, large tracts of native grassland have been converted to row crops in Nebraska and South Dakota due to elevated grain prices. This conversion has resulted in the loss and fragmentation of a considerable amount of habitat for the ABB. Conversion is considered a permanent loss of habitat.

Carrion requirements: Unavailability of the appropriate sized carrion for reproduction likely also caused the decline of the ABB. Data available for the ABB on Block Island, Rhode Island supports the contention that the primary mechanism for the species' rangewide declines lies in its dependence on carrion of a larger size class relative to that used by all other North American burying beetles, and that the optimum-sized carrion resource base has been reduced throughout the species' range (USFWS 1991).

American burying beetles require carcasses of 3.5 to 7.0 ounces (99.22 to 198.45 g, Kozol et al. 1988) to maximize its fecundity, whereas all other burying beetles can breed abundantly on much smaller carcasses, with the smaller species using carcasses of 0.11 to 0.18 ounces (3.12 to 5.10 g, Trumbo 1992). Since the middle of the 19th century, certain animal species in the favored weight range for ABB reproductive use have either been eliminated from North America or significantly reduced over their historic range (USFWS 1991), including the passenger pigeon (*Ectopistes migratorius)*, greater prairie chicken (*Tympanchus cupido)* and wild turkey *(Meleagris gallopavo)*. The passenger pigeon was estimated at one time to have been the most common bird in the world, numbering 3 to 5 billion (Ellsworth and McComb 2003). There were once as many passenger pigeons within the approximate historic range of the ABB as there are numbers of birds of all

species overwintering in the United States today. Wild turkeys, for example, occurred throughout the range of the ABB, and until recently, were extirpated from much of their former range. Black-tailed prairie dogs (*Cynomys ludovicianus)* which occur in the northern portion of the ABB's range have drastically declined (Miller et al. 1990) and previously dense populations of these mammals may also have been important for reproduction by ABB (USFWS 2008a).

Illumination: Although somewhat anecdotal, it is likely that the gradual lighting of the nighttime sky due to development across the central and eastern United States has also hastened the decline of the ABB. Like all insects, the ABB is attracted to light sources. Attraction to artificial light sources increases the risk or predation, increases energy requirements, and reduces recruitment of the next generation.

Climate Change: A five year review was completed for the ABB which identified the potential effects of global climate change on the ABB habitat and disease (USFWS 2008a). The frequency of extreme weather events on ABB populations, however, has not been assessed. Nevertheless, some predictions, although anecdotal, can be made about how weather events may affect the species. Section 4.14 of the Draft SEIS includes analysis regarding potential climate impacts in the region of the proposed project (DOS 2013). It includes information taken from a report that downscaled four global climate models and averaged them for eight climate regions in the U.S., as well as a review of information from other similarly downscaled global models. A gradual drying trend is predicted in the summer months in South Dakota and Nebraska through 2050. The ABB is subject to desiccation and thus, a drying trend may result in the contraction of the species' range over the next 50 years (i.e., the life of the Project) (W.W. Hoback, pers. comm.). By 2040–2069, the national average annual temperature is predicted to increase above the baseline of 1980 to 2009 by between 2.8°F and 6.6°F, depending on the model and the emissions scenario evaluated (USGCRP 2009). Although difficult to predict, a rise in temperatures could have an effect on the ABB. An elevation in winter temperatures could result in the species not going completely dormant and using extra fat reserves potentially precluding the species from being able to overwinter. This could also result in a range contraction for the species (W.W. Hoback, pers. comm.). As stated above, however, the frequency of extreme weather is not reasonably certain at this point in time.

Analysis of the Species/Critical Habitat Likely to be Effected

The ABB is likely to be adversely affected by the construction, operation, and maintenance of the Keystone XL pipeline and its associated facilities. Various types of disturbance associated with typical construction activities can result in impacts to the ABB. As noted earlier, no critical habitat has been designated for the ABB; therefore, none would be affected by the Project.

Environmental Baseline

The environmental baseline is the past and present impacts of all Federal, State, or private actions and other human activities in an action area, the anticipated impacts of all proposed Federal projects in an action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions that are contemporaneous with the consultation in process (50 C.F.R. § 402.02). The environmental baseline is an analysis of the effects of past and ongoing human induced and natural factors, leading to the current status of the species, its habitat, and

ecosystem, within the action area (i.e., area affected by the project). The environmental baseline is a "snapshot" of the status of the ABB at the time this document was prepared.

In the United States, the ABB is known or likely to occur in the action area only in the states of South Dakota and Nebraska. Therefore, project impacts evaluated in this BO are limited to those in South Dakota and Nebraska. Other factors having little to do with construction and operation of the proposed Project, such as climate change may also affect the ABB in the future.

Status of the Species in the Action Area

The "action area" means all areas to be affected directly or indirectly by the Federal Action and not merely the immediate area involved in the action. For this consultation, the action area consists of not only areas directly impacted by the issuance of the Presidential Permit (the "Action"), but the area also indirectly effected by the proposed Keystone XL pipeline enabled by the permit. These include effects to all land disturbed by the footprint of the Project such as preconstruction, construction, operation, and reclamation activities. Lands affected include the pipeline construction ROW and land used by the above ground ancillary facilities (i.e., additional TWAs, pipe stockpile sites, rail sidings, contractor yards, construction camps, pump stations, delivery facilities and access roads). Also included as part of the action area are the effects of the interrelated and interdependent power lines that would be built by private power companies to supply electricity to 20 Project pump stations along the pipeline as well as the 230 kV transmission line in Tripp and Lyman counties in South Dakota. The facilities required by the Bakken Marketlink project are also considered interrelated and interdependent parts of the proposed Project.

American Burying Beetle

The following is a summary of the species in the proposed Project action area in South Dakota and Nebraska.

South Dakota: The proposed project passes through Tripp County in South Dakota, a county where ABB are known to be present. In 1995, Backlund and Marrone (1997) discovered the ABB in the large blocks of mesic grassland habitat located in the southern portion of Tripp County. The population has been monitored almost annually from 1995-2007, and appears to have remained stable in abundance and distribution (Backlund unpubl data, SDGFP Report) (Backlund and Marrone 2003). This population is likely part of the metapopulation that occurs in the Nebraska Sandhills (W.W. Hoback pers. comm.). Surveys in 2005 showed that ABBs in South Dakota are concentrated in southern Tripp County where the population is conservatively estimated to be approximately 1,000 individual ABBs in an area of approximately 220 square kilometers (54,363 acres) (Backlund et al. 2008). However, the actual number or percentage of ABB in the vicinity of the proposed Keystone XL pipeline in South Dakota cannot be determined because there have not been any surveys done at the proposed Project location.

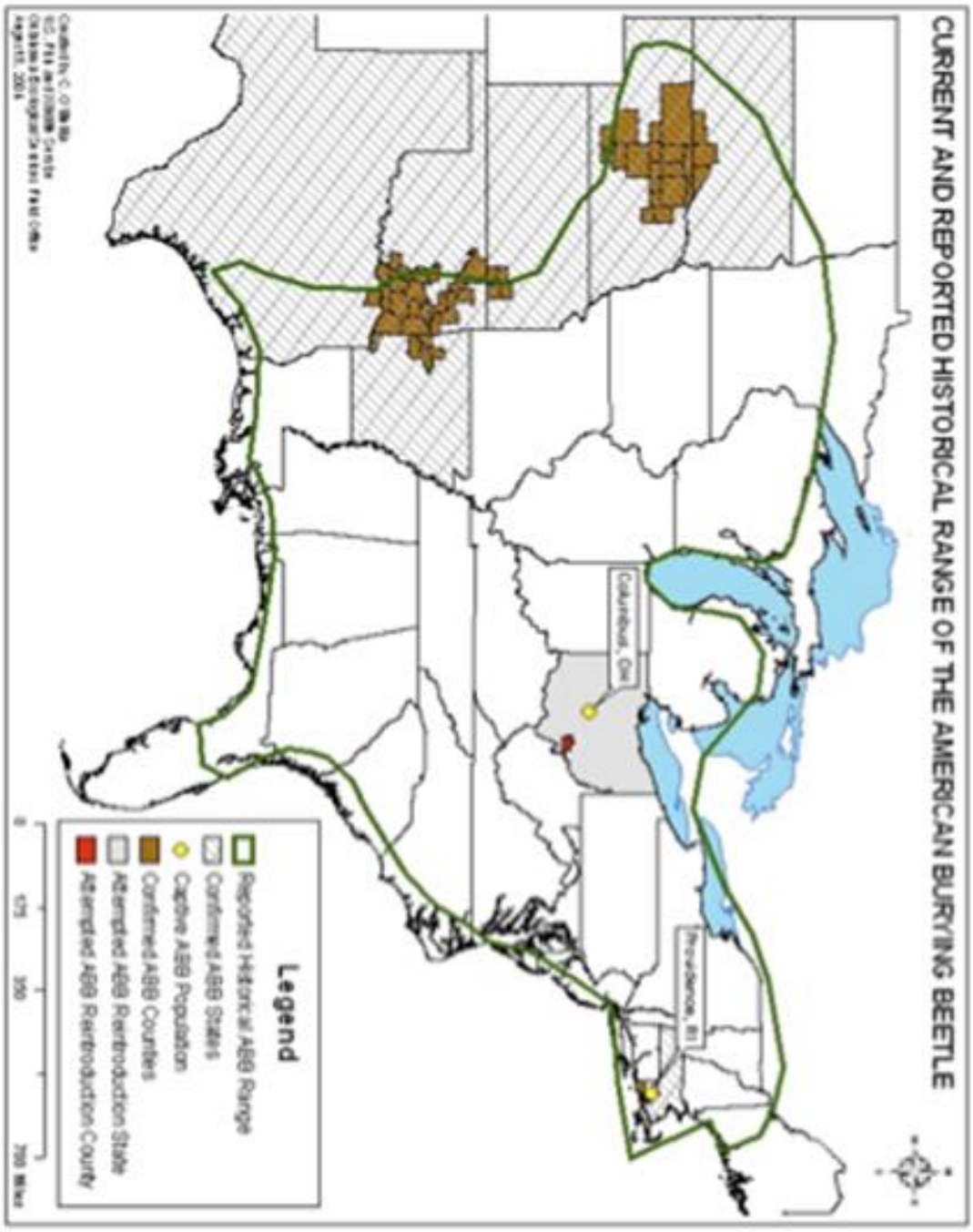

Figure 1. Historic and Current Range of the ABB.

Nebraska: The proposed project passes through three counties in Nebraska with known ABB presence (Keya Paha, Boyd, and Holt counties) and one county with historic ABB occurrence (Antelope County) (Hoback 2012). The proposed pipeline route then passes through a number of central and southern Nebraska counties where the ABB has not been found historically or in the last 10 years based on surveys done for the species.

During the summer of 2012, ABB surveys were conducted at 54 sites in northern Keya Paha, Holt, Antelope, and Boyd counties (Hoback 2012). Surveys occurred between August 2 and August 17, 2012, using standard traps baited and checked for 5 trap nights following standard trapping methods (NGPC and USFWS 2008) (Appendix B). Traps were set on road shoulders of state and county highways within suitable habitat. Ninety-five ABBs were captured at 28 sampling locations in Keya Paha and Holt counties. Capture rates ranged from 0.2 ABB per trap nights to 3.0 ABB per trap night. No ABB were caught in Boyd or Antelope counties. Captures of ABB occurred in northwestern Holt County, but not east of Highway 183. Control traps were run during sampling at sites in Holt County in accordance with protocol (see Appendix B), where ABB are known to be numerous. These traps produced between 0.7 and 7.0 ABB per trap night (Hoback 2012).

The control trap success suggests that populations of ABB to the east of the Sandhills region are not as dense as those in the Sandhills. Very little habitat to support ABB is present east of Highway 183 in Holt County or in Antelope County. The species is also susceptible to desiccation and thus, the drought conditions likely affected trapping success; the 2012 abundance of ABB may have been higher under normal conditions. Drought conditions causing low soil moisture may have affected the number of ABBs caught in 2012 surveys, but control traps did not support that conclusion. Habitat appears to be a more important indicator of abundance compared to soil moisture. Overall, few ABB were captured in 2012 compared to control sites at the same time (Hoback 2012).

Habitat Availability in the Action Area

The proposed Project would result in construction of approximately 500 miles of pipeline through South Dakota and Nebraska. Surveys of habitat suitability for ABBs along the pipeline route in South Dakota and Nebraska were conducted in 2008 to 2012 (DOS 2012). Habitat for the ABB that was crossed by the ROW and other Project facilities was classified using a rating system developed from previous studies in Nebraska. The rating system is based on soil moisture, land use, and the presence of ABB. The ABB uses similar habitat in southern South Dakota and northern Nebraska and thus, the rating system was applicable for use along the pipeline segment located in both states.

The following five habitat rating criteria were used to describe ABB habitat quality in the pipeline ROW in South Dakota and Nebraska:

> **Prime** (5): Undeveloped wet meadows dotted with trees (especially cottonwoods [*Populus deltoids*]) or forest areas visible. Water sources are available including the presence of a river, stream, or sub-irrigated soils. Cropland is not visible within the mile segment evaluated or is at a distance greater than 2 miles.
>
> **Good** (4): Native grasslands (tall or mixed grass prairie) with forbs. Low wetland meadows that are grazed by cattle or used for haying. Trees (usually cottonwoods) are present. Sources of

water are within a mile, but the area has either some cropland or light pollution such as yard lights or houses within a mile.

Fair (3): Grassland with exotic species such as brome grass (*Bromus* spp.). Soil moisture content is lower than for prime or good habitat. Row crop agriculture is located within one mile.

Marginal (2): Potential habitat restricted to one side of the pipeline ROW, with row crop agriculture on one side or dry, sandy, upland areas with exposed soil or scattered dry-adapted plant such as yucca (*Yucca* spp.).

Poor (1): Both sides of the pipeline ROW with row crop agriculture or habitat with the potential for large amounts of light pollution and disturbance associated with town or city edge.

The habitat rating considers soil characteristics and land use data (Hoback 2011a). Row crop agriculture does not support ABB populations, while grazed areas and hay meadows potentially do. Loose soils provide the best habitat for reproduction while tight clays or other tight soil types do not (A. Smith, Smith Environmental and Research Consulting House, pers. comm.). Human disturbance beyond agriculture are also considered because suitable habitat near cities is affected by light pollution, increased scavenger presence, and a different potential prey base. Dry areas are rated as less suitable because burying beetles suffer high rates of mortality due to water loss (Bedick et al. 2004). ABBs seek moist conditions during periods of inactivity under experimental conditions (Hoback 2008).

In Nebraska, after habitat is rated and mapped with windshield surveys, areas ranked 4 (good habitat) or 5 (prime habitat) are surveyed using baited pitfall traps (Hoback 2011a). Excellent habitat does not always support ABB. The species has not been captured in traps placed in habitats rated 1 (poor) or 2 (marginal) and only very rarely have they been captured in habitats rated 3 (fair). In Nebraska, areas that are rated as 3 or less are considered unsuitable to sustain ABB. Habitats rated 3 have caught ABB in traps in less than 1% of samples (3 ABB in 400 trap nights). Because of ABB dispersal abilities with typical flights of more than one mile per night (and up to seven miles), capture rates in marginal habitats are potentially the result of attraction of beetles to unsuitable habitats.

The above habitat descriptions for prime and good habitat are consistent with Backlund et al. (2008) description of the best habitat for ABB in South Dakota, which they described as sandy grasslands with scattered stands of trees dominated by cottonwood, and commonly including sub-irrigated meadows and groundwater streams. As in Nebraska, the dominant land cover in the South Dakota ABB habitat is native grassland, and is primarily used for range and hay land. Low meadows are dominated by grasses and forbs typical of tallgrass prairie while the uplands consist mostly of mixed grass prairie flora.

South Dakota: In South Dakota, ABBs occur south of State Highway 18 (C. Bessken, pers. comm.) in the southern half of Tripp County (Backlund et al. 2008). The Project ROW passes through about 35 miles of habitat where ABBs may occur (25 miles of prime habitat, 8 miles of good habitat, and 2 miles of fair habitat (Figure 2). Remaining habitat north of Highway 18 at about mile post (MP) 563 is fair to marginal and is outside the known range of ABBs (Figure 2). Habitat ratings from mile post (MP) 566 to MP 600 are shown in Table 7 (DOS 2012).

Nebraska: In Nebraska, the Project passes through 47 miles of habitat where ABBs may occur (23 miles of prime habitat, 16 miles of good habitat, and 8 miles of fair habitat) (Figure 2). Suitability ratings for ABB habitat crossed by the proposed Project in Nebraska are provided in Figure 2 and Table 8. Habitat ratings from mile post (MP) 601 to MP 659 are shown in Table 8 (DOS 2012).

Factors Affecting the Species within the Action Area

Adequately evaluating the effects of this proposed project on the ABB requires that the USFWS consider not only the impacts from the proposed Project, but the context in which they would likely occur. This context includes ongoing effects to ABB from current activities as well as anticipated effects from projects likely to occur in the foreseeable future.

In the northern part of their range, the primary causes of decline of the ABB are thought to be (1) pesticide use; and (2) habitat loss, degradation, and fragmentation, which correspond to a decrease in availability of suitable carrion and removal of previously suitable ABB habitat. Developed land and land that has been converted for agricultural, grazing, and other uses, often favor scavenging mammal and bird species that compete with carrion beetles for carcasses. Additionally, developing and converting land has led to declines in ground nesting birds, which probably historically provided a large portion of the carrion available to ABB. Fire suppression in prairie habitats allows the encroachment of woody plant species, particularly the eastern red cedar, which is thought to degrade habitat for burying beetles by limiting their ability to forage for carrion. In South Dakota and Nebraska, we do not have information specific to the proposed Project action area regarding the impacts of ongoing human and natural factors and how those factors may affect the use of the Keystone XL Project sites by ABB. However, it is reasonable to assume that continuing development activities such as conversion of native prairies to row crops, increased human developments or disturbances, increased lighting, and placement of man-made structures such as homes, power lines, and roads on the landscape would affect the ABB and its habitat on proposed Project lands in the same manner as elsewhere.

Shifts in land use are affecting ABB habitat within the species range. South Dakota and Nebraska are losing native prairie rangeland through conversion to cropland at an escalating rate because the accelerating use of ethanol in gasoline has increased demand for corn and consequently raised the price of the grain (GAO 2007). About a third of the average increase in harvested cultivated crop acreage on corn and soybean farms in the United States, results from the average conversion of hay, USDA Conservation Reserve Program grassland or grassland pasture (Pore, Robert. August 28, 2011).

Effects of the Action

The effects of the action are the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action. These effects are considered along with the environmental baseline and the predicted cumulative effects to determine the overall effects to the species for purposes of preparing a BO on the proposed action (50 CFR § 402.02). This BO does not examine any effects that the Proposed Project may contribute to climate change, consistent with the May 14, 2008, memorandum from Director Dale Hall: Expectations for Consultations on Actions that would emit Greenhouse Gases and the October 3, 2008, memorandum from the Solicitor of the Department of the

Interior: Guidance on the Applicability of the Endangered Species Act's Consultation Requirements to Proposed Actions Involving the Emission of Greenhouse Gases.

The "action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 C.F.R. § 402.02). Direct and indirect effects of the Action are part of the action area and include all land disturbed by the footprint of the proposed pipeline Project pre-construction, construction, operation, and reclamation activities. This includes construction of the pipeline ROW and land affected by the above ground ancillary facilities (i.e., additional temporary work space areas, pipe stockpile sites, rail sidings, contractor yards, construction camps, pump stations, delivery facilities, and access roads). Effects to be considered also include the effects of the interrelated and interdependent power lines that would be built by private power companies to supply electricity to Project pump stations along the pipeline, as well as the 230 kV transmission line in Tripp and Lyman counties in South Dakota, and the interrelated and interdependent facility required by the Bakken Marketlink project. The action area extends generally from the border of the United States with Canada to Steele City, Nebraska, and includes pumping stations 27 and 29 in Kansas and their associated power lines.

The proposed Project requires multiple activities at different stages of construction and operation. Each of these may result in different effects to ABB depending on when during the life cycle of the ABB the activities occur. These activities include preconstruction survey and staking of all proposed Project areas. Within the ROW, construction activities would include vegetation clearing; top soil removal and grading; trench excavation, pipe fitting, lowering, welding, inspection, hydrostatic testing, and backfilling and clean up; reclamation activities, such as re-contouring where necessary, soil decompaction and seeding. Post-construction reclamation of all temporary ancillary sites would also involve decompaction of soil where necessary and re-seeding. Borrow material would be used to back fill the pipe trench; for road construction or upgrading and road crossings, and preparation of ancillary sites, as necessary. The operation of the proposed Project would cause increases in temperature around the pipeline as the heat generated by the flowing oil dissipates from the pipe through surrounding soil. Conservation measures have been incorporated into the project to avoid and minimize adverse impacts to federally listed species including the black-footed ferret, whooping crane, pallid sturgeon, least tern, piping plover, ABB, and western prairie fringed orchid to provide for their conservation.

Pre-construction Activities

The pipeline ROW and ancillary sites would be surveyed and staked prior to construction. To the extent that surveying and staking would take place during the summer periods when ABB are above ground, there is a potential of injury to or mortality of ABB from collision or crushing by truck or other vehicles used in ABB habitat in South Dakota and Nebraska. Hoback et al. (2012) found that 99 percent of a closely related species *(N. marginatus)* survived when a pickup was driven and a turn was made over soil containing those individuals; in contrast, 77.2 percent of the beetles survived when a pickup was parked over the soil containing individuals. When working in suitable ABB habitat in Tripp, Keya Paha, and Holt counties, all parking and staging areas will be pre-located within the approved construction footprint. Vehicle traffic used in support of preconstruction activities will be confined to approved access roads when accessing the construction site.

Figure 2: ABB Habitat Ratings along Pipeline Route in South Dakota and Nebraska.

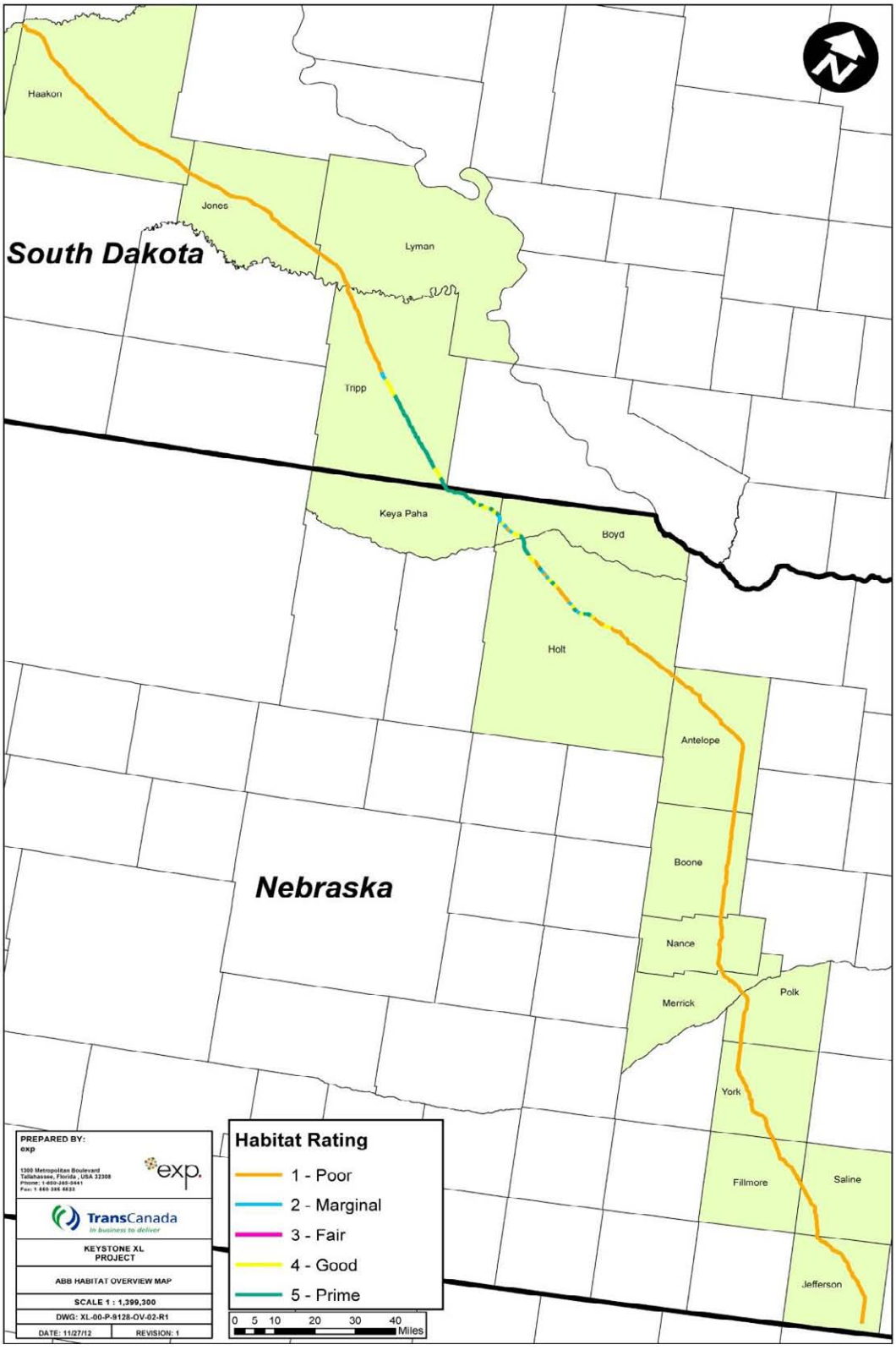

Table 7. Suitability Ratings of ABB habitat for the pipeline route in South Dakota.

County	MP	Prime	Good	Fair	Marginal	Poor	Notes
Tripp	566				x		Agricultural lands with creek bottoms
Tripp	567				x		Agricultural lands with creek bottoms
Tripp	568		x				Grassland Transition Zone
Tripp	569		x				Grassland Transition Zone
Tripp	570		x				Grassland Transition Zone
Tripp	571		x				Grassland Transition Zone
Tripp	572		x				Grassland Transition Zone
Tripp	573	x					Soil changes to sandy loam, drier
Tripp	574	x					Sub-irrigated Meadows
Tripp	575	x					Sub-irrigated Meadows
Tripp	576	x					Sub-irrigated Meadows
Tripp	577	x					Sub-irrigated Meadows
Tripp	578	x					Wet meadows
Tripp	579	x					Sub-irrigated Meadows
Tripp	580	x					Sub-irrigated Meadows
Tripp	581	x					Sub-irrigated Meadows
Tripp	582	x					Sub-irrigated Meadows
Tripp	583	x					Sub-irrigated Meadows
Tripp	584	x					Sub-irrigated Meadows
Tripp	585	x					Sub-irrigated Meadows
Tripp	586	x					Sub-irrigated Meadows
Tripp	587	x					Includes pump yard 20 site 1
Tripp	588	x					Sub-irrigated Meadows
Tripp	589	x					Sub-irrigated Meadows
Tripp	590	x					Sub-irrigated Meadows
Tripp	591	x					Sub-irrigated Meadows
Tripp	592	x					Sub-irrigated Meadows
Tripp	593	x					Sub-irrigated Meadows
Tripp	594	x					Sub-irrigated Meadows
Tripp	595		x				Upland, sandier, drier, hayed
Tripp	596		x				Upland, sandier, drier

County	MP	Prime	Good	Fair	Marginal	Poor	Notes
Tripp	597		x				Upland, sandier, drier
Tripp	598	x					Includes area for pump station-21 and access road
Tripp	599	x					Sub-irrigated Meadows
Tripp	600	x					NE border
Total Miles		**25**	**8**	**0**	**2**	**0**	

Table 8. Suitability ratings of ABB habitat for the pipeline route in Nebraska.

County	MP	Prime	Good	Fair	Marginal	Poor	Notes
Keya Paya	601	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Keya Paya	602	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Keya Paya	603	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Keya Paya	604	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Keya Paya	605	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Keya Paya	606	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Keya Paya	607	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Keya Paya	608	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Keya Paya	609	x					Includes access road 304.
Keya Paya	610		x				At Wolf Creek. Includes access road 305. Disturbance around house
Keya Paya	611	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Keya Paya	612		x				Some terracing and agriculture.
Keya Paya	613		x				State Highway 12, upland.
Keya Paya	614	x					Open range.
Keya Paya	615		x				Modest agricultural disturbance.
Keya Paya	616	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Keya Paya	617				x		Includes access road 306, along row crop.
Boyd	618				x		Includes access roads 307 and 308
Boyd	619		x				Rangeland or hayfields with somewhat dry

County	MP	Prime	Good	Fair	Marginal	Poor	Notes
							conditions or absence of cottonwoods.
Boyd	620				x		Row crop agriculture or alfalfa fields in the ROW.
Boyd	621					x	Center pivots.
Boyd	622				x		Row crop agriculture or alfalfa fields in the ROW.
Boyd	623		x				Rangeland or hayfields with somewhat dry conditions or absence of cottonwoods.
Boyd	624		x				Rangeland or hayfields with somewhat dry conditions or absence of cottonwoods.
Boyd	625	x					Niobrara River
Holt	626	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Holt	627	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Holt	628	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Holt	629	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Holt	630	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Holt	631		x				Hayfield with alfalfa.
Holt	632		x				Rangeland or hayfields with somewhat dry conditions or absence of cottonwoods.
Holt	633					x	Center-pivot.
Holt	634					x	Center-pivot.
Holt	635	x					Includes access road 311.
Holt	636				x		Row crop agriculture or alfalfa fields in the ROW.
Holt	637					x	Row crop agriculture in all directions.
Holt	638				x		Row crop agriculture or alfalfa fields in the ROW.
Holt	639		x				Rangeland or hayfields with somewhat dry conditions or absence of cottonwoods.
Holt	640	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Holt	641		x				Rangeland or hayfields with somewhat dry conditions or absence of cottonwoods.
Holt	642					x	Row crop agriculture in all directions.
Holt	643					x	Row crop agriculture in all directions.
Holt	644					x	Row crop agriculture in all directions.

County	MP	Prime	Good	Fair	Marginal	Poor	Notes
Holt	645					x	Row crop agriculture in all directions.
Holt	646					x	Row crop agriculture in all directions.
Holt	647				x		Row crop agriculture or alfalfa fields in the ROW.
Holt	648		x				Rangeland or hayfields with somewhat dry conditions or absence of cottonwoods.
Holt	649	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Holt	650				x		Row crop agriculture or alfalfa fields in the ROW.
Holt	651		x				Rangeland or hayfields with somewhat dry conditions or absence of cottonwoods.
Holt	652	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Holt	653	x					Wet meadow habitat used for grazing or haying. No agricultural disturbance nearby.
Holt	654		x				Pump station 22 is in marginal habitat because the range west is prime but a center-pivot is directly east.
Holt	655					x	Row crop agriculture in all directions.
Holt	656					x	Row crop agriculture in all directions.
Holt	657					x	Row crop agriculture in all directions.
Holt	658		x				Rangeland or hayfields with somewhat dry conditions or absence of cottonwoods.
Holt	659		x				Connects to 281 north of O'Neil/
Total Miles		**23**	**16**	**0**	**8**	**12**	

The capture relocation method, which is discussed later in the BO, will also be applied in Nebraska prior to Project construction. The ABB will be impacted though implementation of this avoidance and minimization measure as described below.

Construction Activities

Project activities would result in a variety of temporary and permanent effects to the ABB and its habitat. If construction occurs during periods when ABB are active, movement of vehicles, especially heavy equipment and other human activities in the ROW or on ancillary construction sites could cause mortality or injury of adult beetles and larvae through soil compaction. Project construction activities such as clearing and grubbing of trees and shrubs, vegetation removal, grading, removal and stockpiling of topsoil, trenching, pipe laying, soil backfilling and compaction, and final grading and reclamation activities would occur in the pipeline ROW. These ROW construction activities and construction of temporary access roads in grassland areas would result in temporary habitat loss, temporary habitat fragmentation, and/or alteration of suitable ABB

habitat. Habitat degradation from human activities, soil compaction, and vegetation disruption in pipe yards, construction camps and contractor yards would result in similar temporary loss and fragmentation of ABB habitat. The extent of such habitat loss would depend on the time necessary to successfully restore affected grassland habitats after project construction. These actions would likely cause direct injury or mortality of ABB adults, larvae, and eggs by crushing or exposure to desiccation during soil excavation.

Construction of above-ground pump stations (i.e., pump station numbers 21, 22) and construction of power lines to service these pump stations may cause the permanent loss of the ABB habitat. The proposed pump stations in ABB grassland habitat in South Dakota and Nebraska are located along or between roads that already affect ABB habitat to some extent and leave a small permanent footprint (5-15 acres), and Project facilities would not provide habitat to competing wildlife. No ABB habitat would be affected by construction of a power line to pump station 21 in South Dakota. However, there is somewhat degraded ABB habitat in the vicinity of pump station 22 in Nebraska. In recognition of the potential impact to the ABB, NPPD has agreed to schedule substation and line construction activities for the line segment serving pump station 22 for during the ABB dormant or inactive time in the winter when soil would be frozen to avoid soil compaction (September 15 to April 1).

Given the small size of the pump station footprints, lack of ABB habitat along the power line route in South Dakota and commitment made to avoid ABB along the power line route in Nebraska, the effect of that loss in terms of habitat fragmentation of large extensive grassland landscapes is likely not substantial.

Amount of ABB Habitat Affected

Permanent loss of ABB habitat shown in Tables 9 (South Dakota) and 10 (Nebraska) results from: a) habitat covered by the pipeline pump stations (i.e., pipeline pump stations being built on ABB habitat) and b) ABB habitat areas in South Dakota and Nebraska rendered permanently unsuitable habitat by heat dissipating from the operating pipeline. All other Project-related impacts to grasslands should be temporary as shown in Tables 9 (South Dakota) and 10 (Nebraska) and limited to the time necessary for successful post-construction habitat restoration. It is anticipated that the construction methods of replacing topsoil and re-establishing natural vegetation would cause restoration of natural soil hydrology within the construction ROW and avoidance of long-term impacts to ABB habitat.

South Dakota

In South Dakota, the Project ROW and ancillary sites during construction and operation would affect approximately 628.8 acres of land with reasonable potential for occurrence of the ABB (Table 9). Of this 628.8 acres south of Highway 18 in Tripp County, 401.8 acres (63.9 percent) are classified as prime ABB habitat, 117.1 acres (18.6 percent) are good ABB habitat, 80.0 acres (12.7 percent) are fair habitat, and 29.9 acres (4.7 percent) are considered marginal habitat. Within the affected area, 526.28 acres would be temporarily lost up to 4 years or longer, depending on rainfall and success of restoration efforts. Construction and operation of the Project would cause the permanent loss of more than 102.51 acres of ABB habitat in Tripp County due to pump stations and the 22-foot-wide strip centered on the pipeline and affected by heat dissipating through the soil (see Operation of the Project, Thermal Effects from Heat Dissipation).

Table 9. Estimated ABB habitat acreage impacts in South Dakota (DOS 2012).

Permanent Impact[a]	Poor	Marginal	Fair	Good	Prime
Permanent Easement (CL ROW [b])	0.00	5.34	0.00	21.34	66.14
Pump Stations	0.00	0.00	0.00	0.00	8.42
Permanent Access Road Easement	0.00	0.00	0.00	0.00	1.27
Total Acres	**0.00**	**5.34**	**0.00**	**21.34**	**75.83**
Temporary Impact[c]					
Temporary Easement (CL ROW)	0.00	20.96	0.00	85.00	263.25
Additional Temporary Workspace (CL ROW)	0.00	3.37	0.00	10.80	30.91
Auxiliary Site	0.00	0.00	80.01	0.00	29.50
Temporary Access Road Easement	0.00	0.20	0.00	0.00	2.28
Total Acres	**0.00**	**24.53**	**80.01**	**95.80**	**325.94**

[a] Permanent impacts are caused by the placement of permanent above-ground facilities (i.e., pump stations), and the 22-foot corridor spanning the center of the pipeline ROW affected by heat dissipation from the operating pipeline (see *Operation of the Project* subsection, below).
[b] CL ROW = centerline of the ROW.
[c] Temporary impacts are caused by temporary construction workspace, and construction of temporary access roads.
Note: Miles are the same for both temporary and permanent impacts as both are calculated using the pipe centerline.

Nebraska

In Nebraska, the Project would affect approximately 1,138.8 acres confirmed to be currently occupied by the ABB. Of the 1,138.8 acres, 427 acres (37.5 percent) are classified as prime ABB habitat, 269 acres (23.6 percent) are classified as good ABB habitat, 13.44 acres (1.2 percent) are fair habitat, 159 acres (14 percent) are marginal habitat and 270.3 acres (23.7 percent) are considered poor ABB habitat (Table 10); ABBs would be least likely to occur in poor habitat. Within the range of the ABB, 966.53 acres of habitat would be temporarily lost, for approximately four years or longer, depending on rainfall and success of restoration efforts. Construction of the pump stations and operation of the pipeline (see Operation of the Project, Thermal Effects from Heat Dissipation) would cause the permanent loss of approximately 172.30 acres of ABB habitat.

Mortality Estimates

South Dakota: The ABB may occur over 35 miles of the proposed pipeline route in South Dakota. However, no recent ABB presence/absence surveys were conducted along the pipeline ROW or on other Project lands in South Dakota as they were in Nebraska. However, the mortality of adult ABB caused by construction of the pipeline can be estimated by combining the number of acres affected within the ABB range in southern Tripp County (from Table 9, earlier), with the number of ABB estimated to occur per acre [from the Backlund et al. (2008) population estimate for southern Tripp County], and then using a habitat quality modifier to adjust for the likelihood of higher numbers of ABB in better habitat.

For example: 1,000 ABB/54,363 acres (Backlund et al. 2008) = 0.01839 ABB estimated per acre.

Table 10. Estimated ABB habitat acreage impacts in Nebraska (DOS 2012).

Permanent Impact[a]	Poor	Marginal	Fair	Good	Prime
Permanent Easement (CL ROW[b])	32.00	21.33	0.00	42.46	61.47
Pump Stations	0.05	14.99	0.00	0.00	0.00
Permanent Access Road Easement	0.00	0.00	0.00	0.00	0.00
Total Acres	**32.05**	**36.32**	**0.00**	**42.46**	**61.47**
Temporary Impact[c]					
Temporary Easement (CL ROW)	128.00	83.66	0.00	169.78	243.25
Additional Temporary Workspace (CL ROW)	5.63	3.84	0.00	9.75	16.64
Auxiliary Site	104.62	30.10	0.00	33.36	90.65
Temporary Access Road Easement[d]	0.00	5.08	13.44	13.70	15.02
Total Acres	**238.25**	**122.68**	**13.44**	**226.59**	**365.57**

[a] Permanent impacts are caused by the placement of permanent above-ground facilities (i.e., pump stations), and the 22-foot corridor spanning the center of the pipeline ROW affected by heat dissipation from the operating pipeline (see *Operation of the Project* subsection, below).
[b] CL ROW = centerline of the ROW.
[c] Temporary impacts are caused by temporary construction workspace, and construction of temporary access roads.
[d] Includes potential site locations in Spread 8
Note: Miles are the same for both temporary and permanent impacts as both are calculated using the pipe centerline

We do not have an estimate of ABB abundance in the immediate area of the Project; however, we do have an assessment of habitat quality. It is reasonable to assume that higher quality, prime habitat would likely support larger numbers of ABB than lower quality marginal habitat. For this reason, we assigned weighted habitat modifiers that were agreed upon by the USFWS, Department, and Keystone during the course of meetings as a way of determining ABB abundance by habitat quality ratings known from along the Project. These habitat modifiers are: prime = 4, good = 3, fair = 2, marginal = 1, poor = 0 (i.e., encountering a beetle in poor habitat is unlikely) and were used to weight higher quality habitats in our calculation. Using the acres (temporary and permanent combined) provided in the Table 9, approximately 38.67 adult ABB may be killed or injured as a result of construction activities in South Dakota (Table 11).

If construction of the pipeline and ancillary areas takes place during the breeding season in mid-summer (i.e., June1 through August 31), as would be expected given the type and extent of the project, larvae and eggs would be destroyed as well as adults. We calculated the amount of anticipated loss as follows:

Assuming a 50:50 sex ratio in the population, there may be 19.33 pairs of ABB affected by construction (38.67/2). Given the typical range of 12-18 larvae per brood, 15 larvae or eggs per pair of ABB (i.e., 290.02 offspring) (19.33 x 15) might be destroyed by construction activities on the ROW and other Project lands in South Dakota. Thus, the total number of ABB destroyed due to Project construction starting during the breeding season (June-August) in South Dakota would be 328.69 ABB (38.67 adults+290.02 offspring). This is the total anticipated number of ABB that

would be expected to be *destroyed* as a result of Project construction because adults and larvae could not be captured and relocated when they would be underground.

Table 11. Estimated number of ABB killed or injured as a result of Keystone XL pipeline construction in Tripp County, South Dakota.

Habitat Quality	Acres Impacted	ABB/Acre	Quality Modifier	Total ABB
Prime	401.8	0.018	4	28.93
Good	117.1	0.018	3	6.32
Fair	80.0	0.018	2	2.88
Marginal	29.9	0.018	1	0.54
Poor	0	0.018	0	0
Total	**628.8**			**38.67**

The USFWS is required to use the best information available in its section 7 consultations, but when estimating ABB densities based on mark-recapture studies, we also recognize that the "best" information available usually includes some uncertainty. Estimates of population densities, in South Dakota, as discussed above, are based on mark-recapture field studies, but these are somewhat dated and should not be compared with the population estimates for Nebraska. Mark-recapture studies estimate the number of animals in a population based on the proportion of marked animals recaptured during a series of trapping efforts. The method has limitations, particularly when wide-ranging and at times, potentially inaccessible (when breeding underground) species such as ABB are involved. Further, ABB are influenced by weather conditions at the time of trapping and other variables and insect populations can be cyclic. These estimates are represented by specific numbers; we recognize that they represent more a sense of scale or magnitude rather than an exact representation of ABB individuals.

Nebraska: The ABB may occur over 47 miles of the proposed pipeline route in Nebraska. However, the number of ABB killed or injured as a result of construction activities is expected to be low due to implementation of pre-construction conservation measures (i.e., especially capture and relocation; and carrion removal, mowing, and windrowing) and because the pipeline was re-routed away from areas known to have suitable habitat and an abundance of ABB in Nebraska.

The mortality of adult ABB caused by construction of the pipeline can be estimated by combining the number of acres affected within the ABB range in Keya Paha and Holt counties in Nebraska (from Table 10, earlier), with the number of ABB estimated to occur per acre as calculated from survey data from Hoback (2012), and then using a habitat quality modifier to adjust for the likelihood of higher numbers of ABB in higher quality habitat using a similar approach as was done in South Dakota and describe above.

For example: 95 ABB/14,000 acres [based on survey data from Hoback (2012) where 28 locations captured 95 ABB and each pitfall trap is assumed to have the effective ABB survey range of 500 acres] = 0.007 ABB estimated per acre.

It is important to point out that 95 ABB captured in Nebraska could vary over time. The number of ABB per trap location in 2012 ranged from 0.2-7.0 and was likely influenced by habitat

suitability, drought conditions, or other ABB life history characteristics including the ability of the species to move and habit of moving underground during reproduction. Modifiers that reflect habitat quality are: prime = 4, good = 3, fair = 2, marginal = 1, poor = 0 (i.e., encountering a beetle in poor habitat is unlikely). Using the acres (temporary and permanent combined) provided in the Table 10, approximately 18.91 ABB may be killed or injured as a result of construction activities in Nebraska (Table 12).

If construction and use of auxiliary areas takes place during the breeding season in mid-summer, larvae and eggs would be destroyed as well as adults. We calculated the amount of anticipated loss as follows:

Assuming a 50:50 sex ratio in the population, there may be 9.45 pairs of ABB affected by construction (18.91/2). Given the typical range of 12 -18 larvae per brood, perhaps 15 larvae or eggs per pair of ABB (i.e., 141.75 offspring) (9.45 x 15) might be destroyed by construction activities on the ROW and other Project lands in Nebraska. Thus, the total number of ABB destroyed if Project construction would have started during the breeding season (June-August) in Nebraska would be 160.66 ABB (18.91 adults+141.75 offspring). Implementation of the capture relocation method prior to construction actions will occur in Nebraska, however, resulting in 141.75 ABB offspring impacted out of the 160.66 ABB total. Most of these impacts will result due to harassment from use of the capture relocation method but also a small amount may also be injured or destroyed by Project construction activities. As a normal part of their life cycle, adult or senescent ABBs die in the fall after they breed. Therefore, these deaths are not included in the calculation of the number of ABB that would be destroyed if construction occurs outside of the breeding season.

Table 12. Estimated number of ABB killed or injured as a result of Keystone XL pipeline construction in Keya Paha and Holt counties, Nebraska.

Habitat Quality	Acres Impacted	ABB/Acre	Quality Modifier	Total ABB
Prime	427	0.007	4	11.96
Good	269	0.007	3	5.65
Fair	13.44	0.007	2	0.19
Marginal	159	0.007	1	1.11
Poor	270	0.007	0	0
Total	**1138**			**18.91**

Capture Relocation Method

Biologists working on ABB have long supported the use of the capture relocation method as an effective ABB avoidance and minimization measure. The capture relocation method has been utilized as an avoidance measure for ABB in Nebraska for several years on large construction projects. The capture relocation method is not a favored practice in South Dakota given public concerns about relocating ABB to areas adjacent to private lands with suitable ABB habitat. Always of concern, however, was the amount of harassment, injury, and mortality that might be associated with use of the capture relocation method. There was a concern that use of this measure may convey as much harm to the species as the project in ABB habitat itself. Recent research,

however, has provided important insight on the effectiveness and level of injury, mortality, and harassment associated with use of the capture relocation method and appears to support its use as an avoidance and minimization measure (Butler 2011; Hoback 2011b, 2012b).

We determined that use of the capture/relocation method in Nebraska is likely to reduce the level of anticipated injury and mortality of ABB (141.75 offspring) resulting from Project construction down to 22.49 ABB (15.03+0.124+7.34). That said, take of ABB through use of the capture relocation method would still occur and this would result in harassment to 119.3 ABB. Essentially, the capture relocation method involves the capture of ABB in a baited pitfall trap and relocation of individuals to suitable habitat that is at least 5 miles away. Recent research shows that there is a level of injury and death that can be expected, however, when using the capture relocation method. However, the level of injury and death that occurs as a part of the method is far less than what might be expected should the capture relocation method not be used. An estimate of the total amount of injury and death can be calculated by considering the effectiveness of the capture/relocation method, estimated injury and mortality associated with use of the capture/relocation method, and estimating level of injury and mortality that might occur once ABB are released at the relocation site.

Method Effectiveness

Butler (2011) indicated that use of the bucket method (used in the capture relocation method) does not result in the removal of 100 percent of ABB from a project site. In that study, it was determined that after 5 days of trapping, 89.4 percent of the burying beetles were removed leaving 10.6 percent of the ABB uncaptured. The likely cause for ABB not being captured is because they are not hungry and therefore not attracted to a bait source.

Thus, 141.75 ABB multiplied by 0.106 gives 126.72 ABB captured and relocated and 15.03 ABB that would likely not be captured at the Project site, but remain there and could be subject to injury or death.

Capture and Handling

Two additional sources of injury or death that must be calculated when using the capture relocation method are the number of the ABB injured or killed due from: a) capture and handling prior to relocation to a suitable habitat and b) relocation and associated intra- and inter-specific competition that may arise over scarce resources (i.e., carrion) and/or predation especially if the ABB is stressed after capture. During 2011, Hoback (2011b) reported that 5 out of 5,106 ABB captured died during the course of capture, but prior to relocation. Hoback (2011b) reported that two ABB were eaten by a shrew, one died and was partially consumed by another ABB (cause of mortality unknown, but possibly due to intraspecific competition with other ABB captured in the bucket), one ABB was eaten by hister beetles (likely due to resource competition), and another was killed by ants.

Thus, 0.000979 ABB would be expected to die during capture and handling prior to relocation (5/5,106). Multiplying 126.72 ABB captured (using the capture/relocation method) by 0.000979 equals 0.124 ABB that would be expected to be injured or die during the capture and handling phase of the capture relocation method, but prior to relocation of individuals. Thus, the resulting number of ABB remaining to be relocated is 126.60 (126.72-0.124).

Fate of Relocated Individuals

It is difficult to determine the injury or mortality that might occur to ABB once individuals are relocated to suitable habitat at least 5 miles from the site of Project disturbance. Stress, intra- and interspecific competition, predation, and other unknown factors might have a negative impact on relocated ABB or there may be no impact. For example, in August intra-specific competition may occur only at feeding sites. During the June activity period, increased competition for available carcasses required by a breeding pair may occur at the relocation sites. In 2012, Hoback (2012b) conducted research on the effect of relocating ABB by comparing the recaptures of a surrogate species *(N. marginatus)* at a control site with recaptures at a relocation site. Although no significant differences were found, mean recaptures of relocated beetles were lower (3.7 percent) than for the control (10 percent) or resident beetles (9.0 percent). Although there was no statistical difference (i.e., no effect found on the ABB resulting from relocation), we decided to utilize data from the study to estimate the level of harassment, injury, and/or mortality that might occur. An average (9.5 percent) was calculated from the control and resident beetles recapture percentages. The amount of take (5.8 percent) that could be expected based on data from a single year of a two-year study was determined by subtracting the 3.7 percent from 9.5 percent.

Thus, multiplying 126.60 (ABB that would be expected to be captured and relocated) by 0.058 equals 7.34 ABB that would be expected to be harassed, injured, and/or killed following the relocation phase of the capture relocation method. A total of 119.26 ABB could be considered successfully captured and relocated (126.60 – 7.34).

We recognize that determining the level of ABB survivorship after individuals are relocated remains difficult. For example, when considering the data from Hoback (2012b), one may also inquire as to the fate of 96.3 percent of the relocated beetles (i.e., 100 percent – 3.7 percent). As a general rule, ABB recapture rates during mark recapture studies shows that recaptures are almost always low. For example, Jurzenski et al. (2011) conducted a mark recapture study to determine the population of ABB in several counties in the Nebraska Sandhills. In that study, 378 individual ABB were captured in 2003, but only 9.1 percent were recaptured in the 10-day surveys. Hoback (2012b) found a 12.7 percent recapture rate for control burying beetles across all sites over a 10-day trapping period following the capture of 25,163 individual *N. marginatus*. Mark recapture and control trials in the aforementioned studies reported low recapture rates *even though the beetles were released where they were captured and they were not relocated to a different location.* We recognize that relocated ABB could be subject to injury or mortality due to increased risk of predation or competition of resources, but beetles may also adapt to relocation sites. Given the Hoback (2012b) and Jurzenski et al. (2011) recapture results, the USFWS believes that ABB survivorship of relocated beetles is high and comparable to non-relocated beetles.

Summary

Thus, a total level of ABB *injury and mortality* resulting from use of the capture relocation method and Project construction in South Dakota and Nebraska is 351.18 ABB. This was determined by summing the effectiveness of the capture/relocation method (possibly 15.03 ABB left at the construction site after capture and relocation), estimated injury and mortality associated with capture and handling prior to relocation (0.124 ABB), and estimated injury and mortality

associated with relocation (7.34 ABB), and take that would be expected to occur in Tripp County, South Dakota (290.02 offspring+38.67 adult ABB). Actual handling of ABB during capture and relocation is a take through *harassment* as defined by section 9 of ESA (see, 50 CFR §17.3). Thus, the take associated with harassment of ABB through use of the capture relocation method in Nebraska is 126.72 ABB. We have concluded that take which occurs as a result of harassment associated with use of the capture relocation method is preferable to take from injury and mortality that would be expected should the capture relocation method not be used. Therefore in summary, the total amount of take that would be expected to occur through use of the capture relocation method and resulting from Project construction is 477.90 ABB. We have determined that this accounts for all sources of take (i.e., harassment, injury, mortality) as defined by ESA. The project will start during the breeding season in South Dakota and thus adults and larvae are included in the take calculation.

In the previously proposed Project, the pipeline route crossed the Nebraska NDEQ-identified Sandhills Region. Surveys of ABBs showed that this area had high densities of ABB which led to a concern that the capture relocation method, which requires five trap nights, might not have been sufficient to capture all the beetles. In circumstances where beetles could not be cleared due to their high abundance, the USFWS and NGPC agreed to include an additional level of take for ABB. Since the new proposed Project avoids the area where ABB are abundant, there is no longer a concern that five trap nights will be inadequate to clear the area of ABBs.

Miscellaneous Impacts of Construction Activities

Artificial lighting during construction has the potential to attract ABB, as they are known to be positively phototrophic. Lights used during nighttime construction can disrupt ABB foraging behavior and increase predation on ABBs. However, lighting used during construction activities would be down-shielded to reduce the level of light pollution from the activity and limit the impacts to ABB to a smaller area. Localized contamination of soil from diesel fuel or oil spills could occur during refueling or maintenance. However, in the event of a spill, Keystone would implement a SPCCP for potential construction-related fuel spills which would mitigate or avoid any short-term impacts (DOS 2012, Appendix D). In addition, ABB would be unlikely to occur in areas that had been stripped of vegetation, such as the ROW or construction yards, where the refueling and maintenance of equipment would be done. Additionally, all fueling vehicles would carry sufficient absorbent material to contain and facilitate removal of up to moderate fuel spills.

Foraging efficiency of local ABBs would be reduced temporarily by construction activities and permanently from habitat fragmentation due to placement of permanent above ground facilities (pump stations in South Dakota and Nebraska). Reduced availability of carrion may result from greater competition for carrion from vertebrate scavengers attracted to edge effect of pipeline facilities.

Operation of the Project

Thermal Effects from Heat Dissipation

Transport of oil through the pipeline creates heat that is dissipated through the soil to the ground surface. A geothermal model was used to predict soil temperature changes at the ground surface and at various depths and distances from the center of the pipeline (Hazen 2011). Combined with

general assumptions about ABB life history, it is possible to estimate whether adverse impacts to ABB would likely result from the increases in soil temperatures caused by operation of the pipeline.

In northern areas of the ABB range, such as Nebraska and South Dakota, soil temperatures decline to below freezing during the winter when the beetles are underground. The ABB in northern parts of their range likely have adapted a survival strategy that requires cooling to or very near freezing to slow metabolism such that fat reserves are sufficient to last until emergence in late May or early June. Whether ABB would suffer mortality from starvation if they were prohibited from freezing is not known, but the USFWS believes that substantial decreases in the length of time that soil temperatures are below freezing might cause the beetles to use too much fat during the winter months when they are underground. In addition, warming of the soil from the pipeline may also cue the beetles to emerge prematurely (i.e., prior to midnight air temperatures reaching about 60 degrees Fahrenheit (F)). This may result in ABBs coming to the surface when air temperatures preclude foraging activity, or to use more resources to re-bury themselves in the soil, assuming temperatures are warm enough to permit such activity. Additionally, the early emergence of ABB may affect their ability to reproduce successfully because they would temporarily be out of synchrony with the vast majority of ABB in the region (i.e., ABBs overwintering outside the zone of temperature change likely would remain underground for days or weeks until natural environmental cues caused them to emerge).

Impacts from heat dissipation vary with the depth that ABBs overwinter in the soil, and there are a broad range of depths reported in the literature. Schnell et al. (2008) noted in field experiments in Arkansas that ABB overwintered at a depth of 20 cm (approximately 8 inches). However, most information refers to depth of carcass burial associated with reproduction and depths of reproductive chambers are described as "several inches" Ratcliffe (1996, p. 46), or up to 60 cm underground (approximately 24 inches) (Wilson and Fudge 1984, Pukowski 1933, and Hinton 1981; as cited in Scott 1998). The ABB is the largest carrion beetle in North America (Ratcliffe 1996), and Eggert and Sakaluk (2000) found that larger beetles buried carcasses deeper in the soil.

Thermal impacts from operation of the proposed pipeline were evaluated by conducting an analysis of modeled temperature changes (compared to background) at depths of 6 inches, 12 inches and 24 inches, and at various distances from the pipeline center line (Table 13). Two basic soil types at different water saturations were included in the analysis. The temperature modeling predicted that background temperatures (i.e., at 80 feet from the center line of the pipe) would be below freezing during the winter at a depth of 24 inches in all but the driest of the two types of soils (Table 13). In the three sandy soils prevalent in the Sandhills (i.e., SH4, SH5, and SH6), background temperatures at 12 inches depth equaled or fell below 32.0 degrees F. during seven or eight two-week intervals during the winter. However, at 11 feet from the pipe (22-foot-wide sub corridor), soil froze during four and six two-week intervals (i.e., in SH5 and SH6), and not at all in SH4 soils (Table 13). Modeling showed a reduction in the incidence of frozen soil from 25 percent (twice) to 100 percent (twice) at a depth of 12 inches and 11 feet from the pipe center line.

Because the model produces output at two-week intervals, the duration of temperature shifts would likely be substantial, and would adversely affect ABB overwintering at those depths. While acknowledging uncertainties and assumptions associated with the modeling and biology of the ABB, the USFWS nevertheless considers the modeled temperature shifts substantial enough to render habitat out to 11 feet from the pipeline (i.e., a 22-foot width) unsuitable to serve as wintering habitat for the ABB and would be considered a permanent habitat loss. It is possible that

the impact extends beyond the 22-foot width, but 11 feet from the pipe center was the maximum modeled distance that could be compared to background temperatures. Therefore, permanent impacts to ABB habitat from operation of the pipeline include the central 22-foot width affected by the heat generated during pipeline operation along the 87-mile long segment of pipeline located in ABB habitat in South Dakota and Nebraska.

Crude Oil Spills

During operation, the proposed Keystone XL pipeline is considered to be a permanent fixture underground, with operations and maintenance occurring nearly continuously for 50 years. DOS (2012) has stated that adverse effects to ABB resulting from a crude oil spill from the operating pipeline are highly improbable due to: a) the low probability of a spill, b) the low probability of a spill coinciding with the presence of ABBs, and c) the low probability of an ABB contacting the spilled product (DOS 2012).

The spill risk to a species is based upon the length of pipeline crossing its migration habitat/habitat and the spill risk incident rate as described in Section 4.14 of the Draft Supplemental Environmental Impact Statement (DOS 2013). For example, based upon a 119 mile pipeline segment that passes through native grass prairie for Sprague's pipit habitat and an incident spill risk of 0.00025 incident/ mile-year, the estimated spill risk occurrence within the habitat is 34 years or 0.030 incidences per year. For other species along the Proposed route, such as ABB, the distance of a species habitat crossed by the Proposed project route is less than that crossed for Sprague's pipit habitat; therefore, the spill risk occurrence for these other species is lower than the 0.030 incidents per year (i.e., more than 34 years before an incident occurs).

Spill volume cannot be predicted for any species mitigation habitat/habitat; however, because 80% of historical spill volumes are less than 50 barrels (bbls), the probable spill volume could be less than 50 bbls which could result in a radial impact from the pipeline of up to 112 feet (34.1 meters)(DOS 2013).

While there is still a very low probability that individual ABBs would come in contact with the oil from a spill, the more likely affect to ABB would come from soil compaction and soil disturbance during spill clean-up activities. We are not exempting any take due to oil spills because a spill is not reasonably certain to occur. If a spill would occur, however, Keystone should notify the U.S. Environmental Protection Agency (USEPA). The USEPA would consult with the USFWS on spill containment, clean-up, and restoration measures to avoid, minimize, and compensate for impacts to the ABB.

Pump Station Lighting

Lights associated with operation and security of above-ground pump stations may have an adverse effect to ABB. However, only one light above each pump station door would be used during pipeline operation and those lights would be of sodium vapor-type and down-shielded in areas within the range of ABBs in South Dakota (Pump Station 21) and Nebraska (Pump Station 22). Use of sodium vapor-type lights and down-shielding lessens the likelihood that ABB would be attracted to them.

Post-construction and Reclamation

Post-construction activities associated with reclamation, such as grading of lands to approximate pre-construction contours, would not result in additional mortality of beetles on already disturbed lands. On auxiliary lands where the grass may not have been removed, soil compaction from vehicular traffic would have rendered this area unusable for reproduction by ABB (i.e., ABB cannot bury carcasses in compacted soils). Therefore, subsurface tillage of proposed Project lands to loosen compacted soils as part of the reclamation process likely would not result in additional ABB mortality. However, if soil erosion occurs and extends to off-project lands, such erosion may disturb or expose ABB broods or over-wintering adults to adverse environmental conditions if they are displaced. Indirect mortality of eggs and larvae could occur if adults abandon active broods in occupied habitat as a result of disturbance or habitat disruption.

Table 13. The incidence of modeled soil temperatures at freezing or below (i.e., ≤ 32° F. at various distances from pipeline center line, and at different depths. Incidence of temperatures ≤ 32° F. are described in W-X-Y-Z format, where W is the incidence of freezing at the ground surface, X is the incidence of freezing at a depth of 6 inches, Y is the incidence of freezing at 12 inches and Z is the incidence at 24 inches deep. Temperature output is modeled at 2-week intervals. Differences in incidence of frozen soil between background (80 feet) and at 11 feet from the center of the pipe (i.e., a 22-foot width) are shown in bold, red, italics.

	Silty Loam Soil			Sandy Soil		
Distance from Center Line	**SH1**	**SH2**	**SH3**	**SH4**	**SH5**	**SH6**
80 ft. (BkGr)	8-***9-6***-0	8-8-***7-3***	9-***8-8-2***	8-***8-7***-0	8-***8-7-4***	9-***8-8-5***
11 ft.	8-***7-0***-0	8-8-***5-0***	9-***7-6-0***	8-***5-0***-0	8-***7-4-0***	9-***7-6-0***
7 ft.	8-5-0-0	8-6-0-0	7-6-0-0	7-3-0-0	7-5-0-0	7-6-0-0
3 ft.	8-2-0-0	6-0-0-0	5-0-0-0	6-0-0-0	4-0-0-0	4-0-0-0

Regular post-construction maintenance of the ROW through mowing in wooded areas may cause mortality of adult ABB exposed to mowing equipment. However, grassland areas would likely not be mowed as a part of regular maintenance of the ROW (J. Schmidt, pers. comm.). If mowing of the ROW reduces vegetation height to less than 8 inches, the soil may dry to the point that: a) ABBs have difficulty burying carcasses, b) soil may not structurally support reproductive chambers, or c) adult or larval ABB become desiccated (Bedick 2006). Any of these potential consequences of leaving grass and vegetation less than 8 inches tall could adversely affect ABB reproduction.

Exotic, invasive grasses are disruptive to the native ecosystem (Smith and Knapp 2001). Sod-forming, cool season grasses do not promote conservation of the ABB because they slow carcass burial (S. McPherron and W.W. Hoback, pers. comm.). Additionally, genetically modified cultivars of prairie grasses or non-local seed mixes can affect plant community structure, ecosystem function, and the short- and long-term success of grassland restorations (Gustafson et al.

2004; Annese et al. 2006, Martin et al. 2005). For this reason, Keystone will reseed disturbed areas in prime, good, fair, and marginal ABB habitats with a seed mix that matches the Con/Rec designation of the land impacted (see Appendix R of the SDEIS) unless otherwise instructed by the landowner to seed an alternative seed mix. Should the landowner-directed seed mix be determined to not result in full restoration as stipulated in the Reclamation Performance Bond, then the subject acreage amount reseeded will be debited from temporary ABB habitat impacts and credited to permanent ABB habitat impacts and the total amount to the ABB Habitat Conservation Trust will be recalculated.

Effects of Mitigation and Conservation Measures

The following agreements were developed during formal consultation and will go into effect if and only if the Department determines to issue a permit for the proposed Keystone XL pipeline and prior to construction in the states of South Dakota and Nebraska.

Monitoring Program

The Department would retain a third-party contractor to develop and implement an ABB monitoring program or ABB monitoring would be included as a possible wider project level monitoring program for the proposed Project. The program would include monitoring of incidental take of ABB. This monitoring program would be approved and overseen by Department in consultation with USFWS. Keystone would fund the monitoring program prior to construction of the proposed Project.

Monitoring would not replace the environmental quality control plan or the actions that Keystone would put in place, but is in addition to those tasks and would serve as a quality control monitor on behalf of the Department. The monitoring program would include but is not limited to, a combination of site visits, aerial surveillance, and spot checks that would be recorded in monitoring logs with photographs to provide a reasonable level of confidence that avoidance, minimization, and mitigation measures are followed. Monitoring would look at, but is not limited to, replacement of top soil; compliance with seeding specifications and seed mix; erosion control; that construction impacts match permitted footprint, and habitat restoration for the ABB. This monitoring program would identify the number of acres disturbed by the project in the states of South Dakota and Nebraska and the number of acres restored as described in the Reclamation Performance Bond stipulations (Appendix E). The information collected would be used to evaluate whether the impacts to ABB described in this BO are comparable to impacts that result from construction and operation of the proposed Project.

ABB Habitat Conservation Trust

The establishment of an ABB Habitat Conservation Trust as described in Appendix D would offset permanent and temporary losses of ABB habitat in South Dakota and Nebraska at ratios greater than 1:1, and thereby provide long-term benefits to ABB populations in those areas. Land crossed by the pipeline in South Dakota and Nebraska is almost entirely in private ownership. The ABB Habitat Conservation Trust would perpetually protect grasslands through conservation easement or purchase by fee title from willing landowners at ratios greater than 1:1, assuming lands temporarily disturbed are restored to conditions stipulated in the Reclamation Performance Bond (Appendix

E). Protection of privately-owned grasslands at greater than a 1:1 ratio would also incrementally offset habitat loss of grasslands from conversion to agriculture in the South Dakota and Nebraska. The number of acres of prime habitat lost would be mitigated at a 3:1 ratio, and the loss of good habitat would be mitigated at a 2:1 ratio.

These two classifications of quality habitat (combined) comprise 73 percent of the 274.84 acres permanently lost and 68 percent of the 1492.81 acres temporarily lost due to proposed Project construction and operation in South Dakota and Nebraska. Proper management and protection of grasslands through the Habitat Conservation Trust would more than offset permanent and temporary loss of ABB habitat due to construction and operation of the proposed Project and is consistent with recovery actions 1.23 and 5.3 in the Recovery Plan for the ABB (USFWS 1991).

Reclamation Performance Bond

To ensure restoration of disturbed areas within ABB habitat, Keystone would establish a Reclamation Performance Bond that includes the stipulated requirements in Appendix E. Written conditions would ensure this performance bond would be accessible and executed by the Department, or a third party contractor under direction of the Department, in the case that disturbed land in the ABB habitat area, as defined by the 2012 BA (DOS 2012), should fail to re-vegetate in a manner as outlined in Appendix E, and if Keystone fails to take corrective action. Release of funds pursuant to the Bond would be solely at the discretion of the Department after soliciting recommendations from USFWS. The establishment of the Reclamation Performance Bond serves as an additional back-up measure in the Project CMRP which would be undertaken by Keystone to successfully re-vegetate lands temporarily affected by the Project to vegetation conditions in surrounding areas.

Effects of Interrelated and Interdependent Actions

The USFWS is required to evaluate the effects of the action under consideration (i.e., Department potential issuance of a Presidential Permit enabling the proposed Project) "…together with the effects of other activities that are interrelated to, or interdependent with, that action." (50 C.F.R. § 402.02).

Power Lines to Pump Stations and Associated Substations

The construction of power lines to pump stations and the associated substations are interrelated and interdependent actions and may cause adverse impacts to ABB within the range of the species in Nebraska and South Dakota. These impacts might include mortality of ABB during construction of the power lines due to interaction with construction equipment during clearing of vegetation, soil compaction, and during excavation of holes or foundations for the power poles. Restoration of vegetation after construction would not likely cause adverse effects unless grading of undisturbed habitats are involved, and those instances should be infrequent. Maintenance of vegetation under the power lines may also result in ABB injury or mortality if mowing or use of herbicides or pesticides occurs during times when ABB are active above ground.

Only two of the 20 planned power line routes to pump stations would occur within the current occupied range of the ABB: power lines to pump stations 21 and 22 (DOS 2012). The power line

to pump station 21 would be built by Rosebud Electric Cooperative in South Dakota; alignment of that power line is unlikely to have an effect on the ABB given the lack of suitable habitat and anticipated minimal disturbance associated with the proposed power line project. The Nebraska Public Power District and Niobrara Public Power District will construct a power line to provide electrical service to pump station 22. Currently, the length and alignment of that power line is unknown, however, it appears, based on preliminary discussions that the line would be less than 5 miles in length and likely extend along an existing public roadway. Surveys for ABB done in that area did result in captures of the species in low abundance; the habitat in the area is considered marginal because it is partially overgrazed, drought-affected and several center pivots are present to irrigate row crops. Nevertheless, NPPD has agreed, in a letter dated March 4, 2013, to construct the power line during the winter months when the ground is frozen and ABB is inactive and hibernating below the frost line thereby avoiding compaction and negative impacts to the species. It is unlikely that ROW vegetation management would need to occur given that the power line would pass near corners of center pivots irrigation systems and over-grazed pasture. The power lines providing electricity to pump stations 27 and 29 in Kansas will have no effect on the ABB because there is no suitable habitat for the species there.

Big Bend to Witten 230 kV Transmission Line

In South Dakota, the principal population of ABB occurs south of Highway 18 in southern Tripp County. For this reason, impacts to ABB from construction of the pipeline Project were considered only south of Highway 18 (DOS 2012). The Big Bend to Witten 230 kV transmission line in Tripp County, South Dakota, occurs north of Highway 18, outside the southern Tripp County area where ABB occurs in substantial numbers. Therefore, impacts from this interrelated and interdependent Big Bend to Witten transmission line are not likely to result in adverse impacts to ABB.

Bakken Marketlink Project

Aside from the Keystone XL pipeline to transport the oil, this interrelated and interdependent project would consist of piping, booster pumps, meter manifolds, two storage tanks, and one operational tank near Baker, Montana. In addition, the project would include a proposed pipeline, approximately 5 miles long, originating at an existing Montana tank farm facility in Township 7N, Range 58 East, Section 4. The ABB does not occur in Montana, so the Bakken Marketlink Project would have no impact on the ABB.

Cumulative Effects

Cumulative effects are those effects of future, non-federal state, tribal, local government, and private actions that are reasonably certain to occur in the action area considered in this BO. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

In addition to those projects with a federal nexus that undergo consultation, there are numerous actions that do not require federal funding, permitting, or authorization and consequently do not require consultation with the USFWS. Any of several private development projects may occur in South Dakota and Nebraska. Examples of these include conversion of native prairie rangeland to cropland.

When large areas of native woodland and native grasslands are affected, loss and fragmentation of these habitats incrementally reduce the recovery potential of ABBs by damaging the functionality of these supporting ecosystems. Philpott (2013) reported 1.3 acres of grassland was converted from grassland to cropland in Nebraska, South Dakota, Iowa, Minnesota, and North Dakota from 2006 to 2011, due to high grain prices and federally subsidized crop insurance. In South Dakota, over 650,000 acres of grassland was converted to corn and soybeans. In Nebraska, over 300,000 acres was converted from grass to corn and soybeans and a considerable amount of this conversion has been with the ABB range in Nebraska. For example, one owner of approximately 1,500 acres of grassland in Keya Paha County, Nebraska, converted that grassland to row crops in 2012; in 2013, approximately 720 acres are planned for conversion. Trapping for ABB adjacent to this grassland found low densities of ABB present, but all of the ABB using the converted grasslands would be lost when the grasslands are converted to row crops.

Commercial development is expanding to undeveloped lands on the periphery or in suburbs of cities. Residential developments are being constructed outside city limits or in previously undeveloped or rural areas. The specific numbers of new or anticipated projects and associated acres of disturbance are difficult if not impossible to quantify. However, it is clear that there are numerous, continuing, and expanding impacts to ABBs and their habitat from projects without a federal nexus. All of the above activities can cause loss and further fragmentation of ABB habitat in Nebraska and South Dakota. Construction activities that disturb soils within the current range of ABB cause mortality of ABB adults, and (potentially) ABB larvae and eggs. Although direct mortality of ABB from individual construction activities is local and constitutes a short-term adverse effect, the cumulative loss of ABB from multiple development projects in a larger area may eventually reduce the ability of a given population to survive in a fragmented landscape.

Lighting associated with construction of new roads (i.e., not associated with the proposed Project) and new residential developments can result in harassment and disruption of normal feeding behavior when ABB are attracted to lights. Future construction and developments of this type by state or private entities may harass the ABB and interfere with feeding or breeding by distracting the species from meeting life requisites.

Conclusion

After reviewing the current status of the ABB, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the USFWS's opinion that the proposed Project is not likely to jeopardize the continued existence of the ABB. "Jeopardize the continued existence of means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR §402.02). No critical habitat has been designated for this species; therefore, none would be affected. Our determination is based on the following primary factors.

- Since the Recovery Plan was developed in 1991, numerous other populations have been discovered, and the recovery objective of reducing the immediate threat of extinction through discovery or establishment of new populations has been met as discussed in the 5-year review completed for the ABB (USFWS 2008a). Currently, at least four eco-regions support ABB populations estimated at greater than 1,000 individual ABBs (USFWS

2008a). Based on population modeling, K. Holzer, Amaral et al. (eds) (2005) surmised that a population of greater than 1,000 ABB has the potential to remain demographically viable over the long term in the absence of severe catastrophic events or reductions in carrying capacity through reduced carcass availability, habitat loss, or fragmentation.

In 2010, more than 1,000 ABB were trapped in the eastern Sandhills in Holt County, Nebraska with relatively limited trapping. During the course of the ABB capture relocation efforts for the previously proposed Project that were done along the previous route through the Sandhills, 2,486 ABB were captured in Keya Paha, Holt, Garfield, and Wheeler Counties (TransCanada 2011), well exceeding 1,000 individuals needed for a viable population. Trapping of ABB in Tripp County, South Dakota by Backlund et al. (2008) also showed that the population there exceeds 1,000 individuals. These large ABB populations in Nebraska and South Dakota are located in the general Project area and demonstrate the large, apparently viable ABB population that occurs there. Based on these survey results and previous population modeling, we have concluded that the short term loss of ABB at the anticipated levels that are described above, resulting from the proposed Project is not likely to appreciably reduce survival and recovery of the species in the wild.

- The sentinel population of ABB on Block Island off the coast of Rhode Island is stable. The population of ABB in southern Tripp County, South Dakota is thought to be stable, however, this assertion is based on data collected eight years ago, in 2005 (Backlund et al. 2008), which may no longer be representative of the population. We are admittedly concerned about the viability status of this population. However, the USFWS has determined that Backlund et al. (2008) represents the best available scientific information for the ABB population in Tripp County. A large ABB population from the eastern Sandhills of Nebraska is one of the most abundant in the United States. The moderately large Nebraska Loess Hills population was thought to be declining in 2006 and 2007, but that short-term decline was likely caused by the effects of drought on carrion availability (W.W. Hoback, pers. comm.), and that population has increased in recent years with relief from the drought. Additionally, several habitat improvement projects in the Loess Hills have or will soon remove counterproductive red cedars from the Loess Hills, improving ABB habitat there. Population levels of ABB in Oklahoma and Arkansas fluctuate every other year or so, but downward or upward trends in the long term are difficult to ascertain. Fort Chaffee in western Arkansas and Fort Gruber in eastern Oklahoma have robust populations of ABB that, along with populations in Nebraska, are believed to be resilient to the effects of stochastic weather events (USFWS 2008a). Little information is available on trends in the small populations of ABB in Kansas and there is some evidence that a small population of ABB in northern Lamar County, Texas, may be declining (USFWS 2008a). Therefore, although one small population on the periphery of the range may be declining, available evidence indicates that populations of ABB are relatively stable further supporting the assertion that the proposed Project is not likely to appreciably reduce survival and recovery of the species in the wild.

- The loss of ABBs from a limited area in the current range of the ABB known to have a large viable population constitutes a short-term pulse of adverse effect, and has a smaller effect on the species' ability to survive than a longer-term, chronic effect. The proposed Project extends though large grassland areas which provide suitable habitat for ABB. As

such, it is reasonable to expect recolonization of areas that were disturbed during project construction from nearby areas. Additionally, ABB naturally experience fluctuations caused by poor reproduction in some years (e.g., due to weather, disease, etc.), and these short-term stochastic events do not have long-term effects in robust populations like those known in South Dakota and Nebraska. Other factors having little to do with construction and operation of the proposed Project, such as climate change may also affect the ABB in the future. However, for the reasons discussed above, the USFWS has determined that loss of ABB at the anticipated levels is not likely to appreciably reduce survival and recovery of the species in the wild.

- The cumulative effect of loss of ABB habitat from the conversion of grasslands to cropland in Nebraska and South Dakota and multiple development projects may eventually reduce the ability of a given ABB population to survive and recover in a fragmented landscape. We remain concerned about the effects of the large acreages of grasslands converted to corn and soybeans in Nebraska and South Dakota (Philpott 2013) on ABB populations. However, this level of cumulative impact apparently has not yet been reached in Nebraska and South Dakota, where ABB population levels (as shown from survey efforts) appear healthy and stable in a landscape that still consists of broad areas of native grassland. Thus, based on the best available information, current levels of moderate to high quality ABB habitat are supporting populations of ABB across the vast majority of its current range. For this reason, we have concluded that loss of ABB due to cumulative impacts is not likely to appreciably reduce survival and recovery of the species in the wild. And, for the reasons stated above, we do not believe that any loss from these cumulative effects combined with the loss from the proposed Project, is likely to jeopardize the ABB.

- A total of approximately 274.84 acres of ABB habitat would be permanently lost in South Dakota (Table 9) and Nebraska (Table 10) of which 73 percent of the same or 201.10 acres are classified as prime or good ABB habitat. Of the 1,492.81 acres of ABB habitat temporarily lost in South Dakota (Table 9) and Nebraska (Table 10) due to construction of the proposed Project, 1013.91 acres, or 68 percent is categorized a prime or good ABB habitat. However, the loss of this amount of habitat spread over approximately 82 miles of ROW (35 miles in South Dakota + 47 miles in Nebraska) and areas under isolated pump stations does not constitute a significant portion of available habitat for ABB breeding, feeding and sheltering. To put these figures into perspective, in Nebraska and South Dakota, this combined acreage represents, 0.071 percent of grasslands (1492.81/2,098,876) in the counties with ABB affected by the Project (i.e., Holt County (1,184,143 grassland acres) Keya Paha County (398,016 grassland acres), and Tripp County (516,717 grassland acres south of Highway 18)) that would be temporarily lost. Similarly, 0.013 percent of the grasslands (274.81/2,098,876) in the same area would be permanently lost. Given this acreage comparison, we have determined that these permanent and temporary habitat losses would not appreciably reduce the likelihood of survival and recovery of the ABB.

Conservation measures included as part of the Keystone XL Project especially the ABB Habitat Conservation Trust (Appendix C) would likely result in a net increase in protected ABB habitat. The Reclamation Performance Bond (Appendix E) would provide assurances that disturbed habitat would be restored following proposed Project construction. Within the context of stable or increasing populations in the northern portion of the species range, an increase in protected ABB

habitat in an area where a portion of unprotected habitat may be lost through conversion to agriculture would improve the likelihood of survival and recovery of the species. Establishment of the ABB Habitat Conservation Trust and the habitat protection it would enable are consistent with recovery actions 1.23 and 5.3 in the recovery plan (USFWS 1991). Protection of privately-owned grassland habitat that is vulnerable to loss through conversion to agriculture would be particularly beneficial and facilitate survival and recovery of the species in the northern portion of the species range. Protection of privately-owned grassland habitat that is vulnerable to loss through conversion to agriculture would be particularly beneficial and facilitate survival and recovery of the species in the northern portion of the species range. Thus, these conservation measures contribute to the recovery of the ABB.

The combination of the ABB monitoring program (Appendix C) and the Reclamation Performance Bond (Appendix E) would provide assurances that the acres disturbed by the Project would be restored appropriately. A 1:1 ratio (i.e., 3:1 or 2:1 for prime and good habitat, respectively) habitat mitigation ratio would be applied to supplemental vegetation reclamation if restoration for ABB habitat failed and Keystone fails to take corrective action. These actions are also consistent with recovery actions 1.23 and 5.3 in the recovery plan (USFWS 1991).

In Nebraska, trapping and relocating of ABB from Project lands, followed by measures to discourage reestablishment of ABB on Project lands prior to pipeline construction (e.g., carrion removal, mowing, and windrowing), would substantially reduce injury and mortality of ABB caused by construction and operation of the pipeline. Based on our calculations, 119.26 ABB would be successfully removed from Project lands using the capture relocation method, and moved to prime or good habitats at release sites known to be occupied by the species. Procedures implemented at the release site further promote ABB survival and success at their new location. These measures would minimize adverse effects to survival of the ABB population in Nebraska.

In summary, after reviewing the effects of the action, including the effects of interrelated and interdependent activities, and any cumulative effects on the ABB, we conclude that the reproduction, numbers, or distribution, of the ABB will not be reduced in such a manner that would reduce appreciably the survival and the recovery of the ABB.

Incidental Take Statement

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the USFWS as an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by the USFWS as intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered

to be prohibited under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Department so that they become binding conditions for any action, grant, or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The Department is the lead agency with oversight of the activity covered by this incidental take statement. If the Department: (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Department must report the progress of the action and its impact on the species to the USFWS as specified in the Incidental Take Statement. [50 C.F.R § 402.14(i) (3)].

Amount and Extent of Incidental Take Anticipated

Anticipated Take from Pre-construction Activities

Incidental take of ABB associated with implementation of the pre-construction capture relocation method in Nebraska will result in the take through *harassment* of 126.72 or 127 ABB in Nebraska (141.75 x .106) (see previous section: Capture Relocation method).

Anticipated Take from Construction and Operation Activities

Incidental take in the form of *mortality or injury* of individual ABBs is likely to occur as a result of the proposed Project construction in South Dakota and Nebraska; injury and mortality could also result from use of the capture relocation method in Nebraska. We calculated a total of 351.18 or 352 ABBs that would be injured or die from capture and relocation in Nebraska and construction in both Nebraska and South Dakota.

The USFWS requires that incidental take of ABB be monitored during the Project using survey methods advocated by the USFWS and NGPC (2008) by comparing the number of ABB captured during surveys done immediately before Project construction (within 9 months; should construction begin in May, surveys would be done the previous August while ABB is active) with the number of ABBs used for calculating the incidental take (39 individual ABBs (see Table 11) and 19 individual ABBs (see Table 12)), the previously calculated level of take for adults expected in the South Dakota and Nebraska segments of the Project, respectively. Results of the Pre-construction surveys should be run through the calculations in Table 11 and 12 and then the comparison should be made. These figures are not inclusive of ABB eggs or larvae because of their difficulty in detection when underground.

Reasonable and Prudent Measures (RPMs) to Minimize Incidental Take, and Corresponding Terms and Conditions for the RPMs

The USFWS believes the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of the ABB. In order to be exempt from the prohibitions of section 9 of the Act, Keystone and its contractors must comply with the terms and conditions, which implement the reasonable and prudent measures and outline required reporting requirements. These terms and conditions are non-discretionary.

RPM 1: Injury and mortality that occurs during the capture relocation method can be minimized to the extent possible through the use of knowledgeable field technicians experienced in the use of the American Burying Beetle Trapping Protocol, Conservation Measures, Distribution Map, and Qualification Criteria (Appendix B).

Terms and Conditions for RPM 1:

1(a): Only field technicians who have been trained and have experience trapping and relocating ABB according to the approved protocols (Appendix B) will participate in the pre-construction "clearing" effort in Nebraska. Keystone must submit in writing to the Nebraska Field Office USFWS how field technicians meet the ABB Qualification Criteria, April 2012 (USFWS 2012).

1(b): The trapping and relocation protocols will be consistently followed. These protocols are described in two December 2008 documents in Appendix B: "American Burying Beetle - Nebraska Trapping Protocol" and "Conservation Measure for the American Burying Beetle (ABB)," developed by the USFWS and NGPC. If any deviations from the protocol are necessary due to unforeseen circumstances, a change in field activity may be made only after consultation with both the USFWS Nebraska Field Office and the NGPC.

1(c): ABB must be relocated to good or prime rated habitat a distance of three to five miles from the point of capture.

1(d): To reduce the potential for post-release, intra-specific competition for carrion at relocation sites, no more than 50 beetles will be released at any re-location site, and the release site will be at least three to five miles from the capture site.

1(e): All injuries or deaths of ABBs will be recorded along with apparent cause of mortality at the time of observation, and reported immediately to Mike Fritz at the NGPC (phone 402-471-5419), and Robert Harms at the USFWS (phone 308-390-0871). Following the capture relocation effort, a report will be submitted to the Nebraska Field Supervisor, USFWS, and to the NGPC by October of the trapping year, documenting the trapping, relocation, and habitat maintenance (of cleared sites) activities. The report would include, at a minimum, a summary of mortality by age class (e.g., senescent or teneral) and site, number and age class (e.g., senescent or teneral) of ABB captured per trap night, and average catch per trap night per pipeline mile post and other Project land, and whether the site was "cleared." Where, when, and at what distance ABB were released with a habitat rating of all release sites would also be documented, along with a description of post-clearing habitat modification activities.

1(f): The Department designated point of contact would contact the USFWS point of contact when the Reasonable and Prudent Measures and Terms and Conditions set forth in the USFWS's BO are not being met to remedy the situation(s). Reinitiation of consultation will occur if incidental take associated with the capture and relocation method exceeds 10 ABB in 2013 and 10 ABB in 2014 in Nebraska. This level of take was previously developed by biologists familiar with the population and life history of the ABB in Nebraska and are included in individual recovery permits for the ABB in Nebraska.

RPM 2: Incidental take of ABBs will be monitored during Project construction.

Terms and Conditions of RPM 2:

2(a): Pre-construction ABB surveys will be conducted (within 9 months; should construction begin in May, surveys would be done the previous August while ABB is active) from pipeline mile post 566 to 600 in Tripp County, South Dakota and from mile post 600 to 659 in Keya Paha and Holt counties in Nebraska, the pipeline segment where ABB is known to occur. ABB surveys will be conducted in accordance with ABB survey protocols in Appendix B.

2(b): Results of the Pre-construction ABB surveys will be compared to the calculated amount of individual ABBs that would be taken in South Dakota (39 individual ABBs from Table 11) and Nebraska (19 individual ABBs from Table 12).

2(c): The Department designated point of contact would contact the USFWS point of contact when the Reasonable and Prudent Measures and Terms and Conditions set forth in the USFWS's BO are not being met to remedy the situation(s). Reinitiation of consultation will occur should ABB numbers resulting from Pre-construction surveys (following the calculation method in Tables 11 and 12) exceed the estimates of take calculated for South Dakota (39 individuals) or Nebraska (19 individuals).

RPM 3: Keystone will use restoration methods described in Appendix A of the BA, in conjunction with agreements developed with the USFWS and NGPC, to restore lands to the condition of adjacent land as they were found immediately prior to construction and within a time frame between May 15, 2013 and May 15, 2014 on Project ROW and work areas.

Terms and Conditions of RPM 3:

3(a): By October 1 of each year after construction, the Department would submit an annual monitoring report to the USFWS documenting the monitoring accomplished and progress of restoration of Project lands. The report would detail and document the number of acres affected by Project activities, and the number of acres meeting reclamation stipulations of the bond [Appendix E]). At the end of this Agreement, all original files and documents would be provided to the USFWS.

3(b): The Department designated point of contact would contact the USFWS point of contact when the Reasonable and Prudent Measures and Terms and Conditions set forth in the USFWS's BO are not being met and work with the Department to remedy the situation(s). Reinitiation of consultation will occur if the number of acres of ABB habitat permanently lost within the current range of the species (i.e., as calculated in the effects section of this BO - 593.1 acres) plus the number of acres in the same areas where restoration (as defined by Reclamation Bond stipulations) fails to occur by the fall of post-construction year 8, is greater than anticipated in this BO.

RPM 4: The ABB avoidance and minimization measure benefits will be maximized to reduce impacts to adult ABB; and young-of-the-year ABB which comprise the following years breeding individuals.

Terms and Conditions of RPM 4:

4(a): In Nebraska, the capture relocation method will be implemented prior to the start of Project construction.

4(b): Where capture and relocation efforts have not been completed, the proposed Project will not start during the ABB breeding season in Nebraska which extends from June 1 through August 31.

Conservation Recommendations

1. Conduct research on the ABB coordinated with the USFWS. For example, provide funding to: a) monitor use of restored Project lands by ABB or, b) evaluate success of various vegetation restoration methods or, c) investigate the effect of soil compaction on non-endangered burying beetles or, d) measure the actual temperature increases surrounding the operating pipe to determine accuracy of modeled temperature dissipation around operating pump or, conduct an ABB mark recapture study on ABB in South Dakota to assess the viability of the population.

2. The Department can promote actions supporting conservation of ABB through its responsibilities under section 7(a) (1) of the Act.

3. Minimize habitat loss and alteration by minimizing soil disturbance to the extent feasible, utilizing existing roads, staging areas, etc.

4. Develop educational/informational materials, with the assistance of the USFWS, for placement onsite to inform visitors of the potential ABB presence in the area, encourage reporting of sightings, and potentially reduce the risk of potential disturbance scenarios.

Closing Statement

This concludes formal consultation on the actions outlined in the December 21, 2012, request from the Department for formal consultation on the construction and operation of the Keystone XL pipeline, as described in the Final Biological Assessment and subsequent additions/amendments to same. As provided in 50 C.F.R. § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control is authorized by law and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, especially as this information relates to climate change and the ability of ABB to overwinter and tolerate dryer environments over the next 50 years (i.e., the life of the Project); 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action.

The USFWS appreciates the cooperation extended by the Department, Keystone, Hoback Consulting, and multiple USFWS Ecological Services Field Offices and State resource agencies in this consultation. If further assistance or information is required, please contact Mr. Robert R. Harms or me at the above address or telephone (308) 382-6468.

Sincerely,

Michael D. George
Nebraska Field Supervisor

cc: Regional Director, USFWS, Denver, CO

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Appendix A

Project Maps

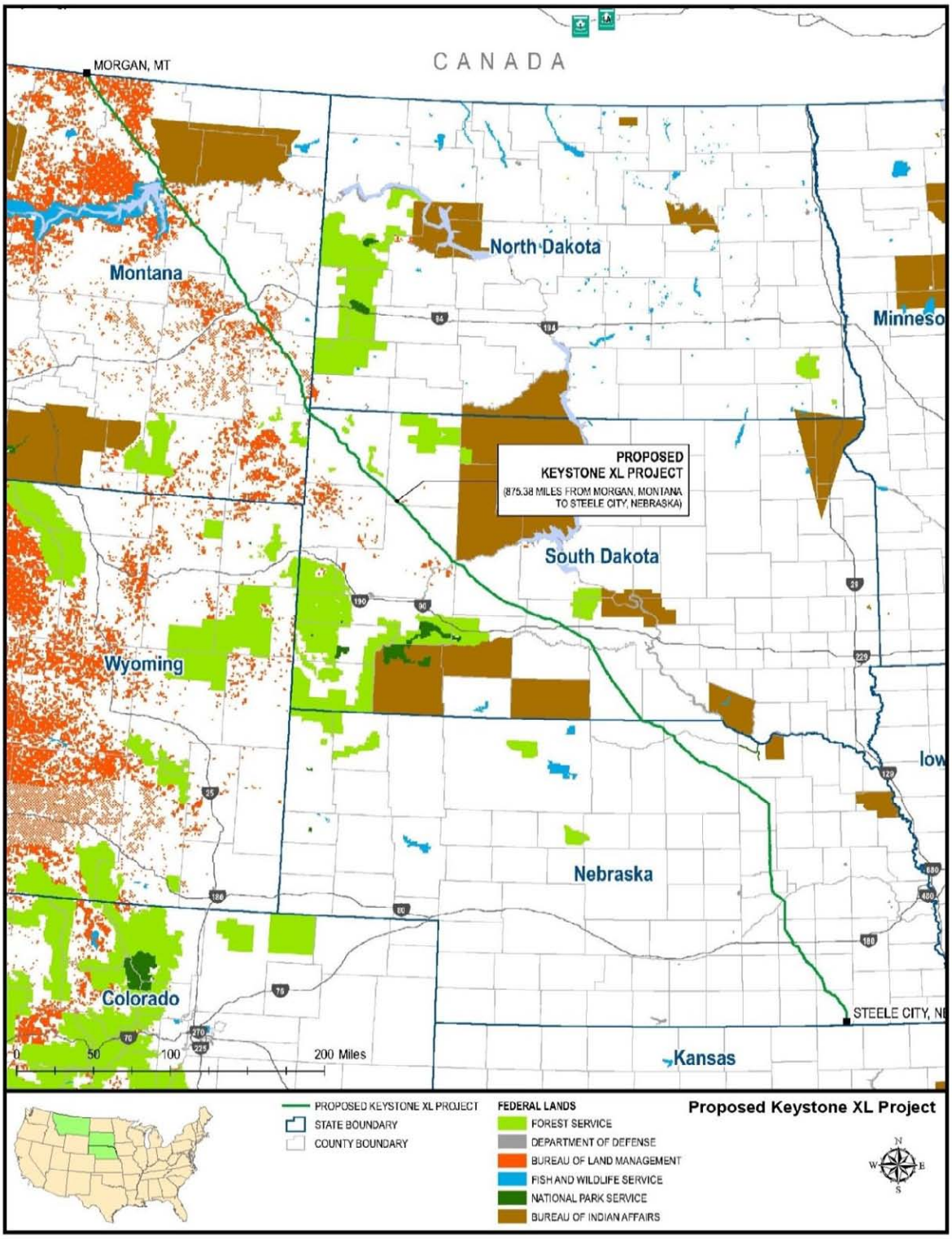

Figure 1. Overview of Keystone Pipeline Project

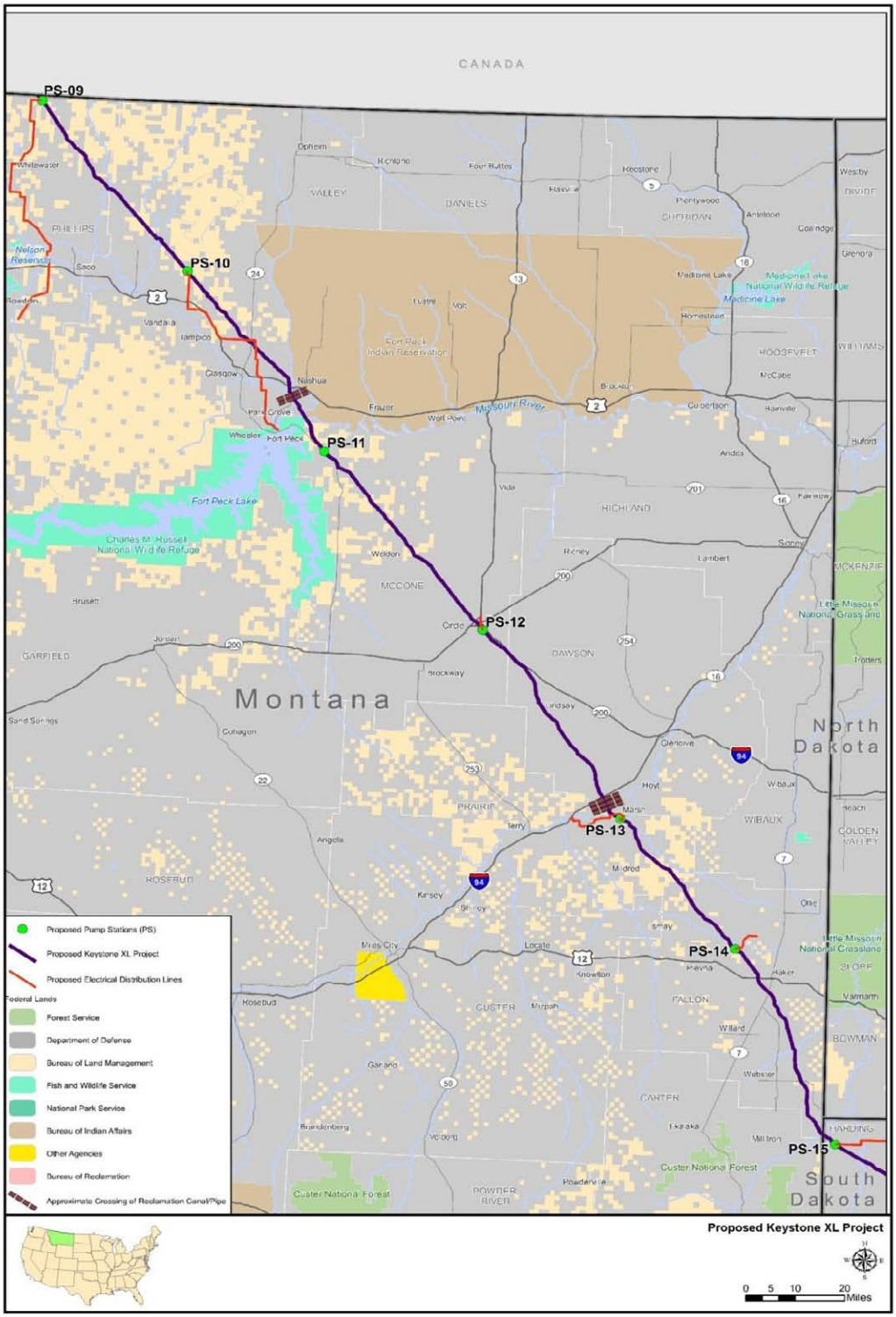

Figure 2. Montana segment of the Keystone Pipeline Project

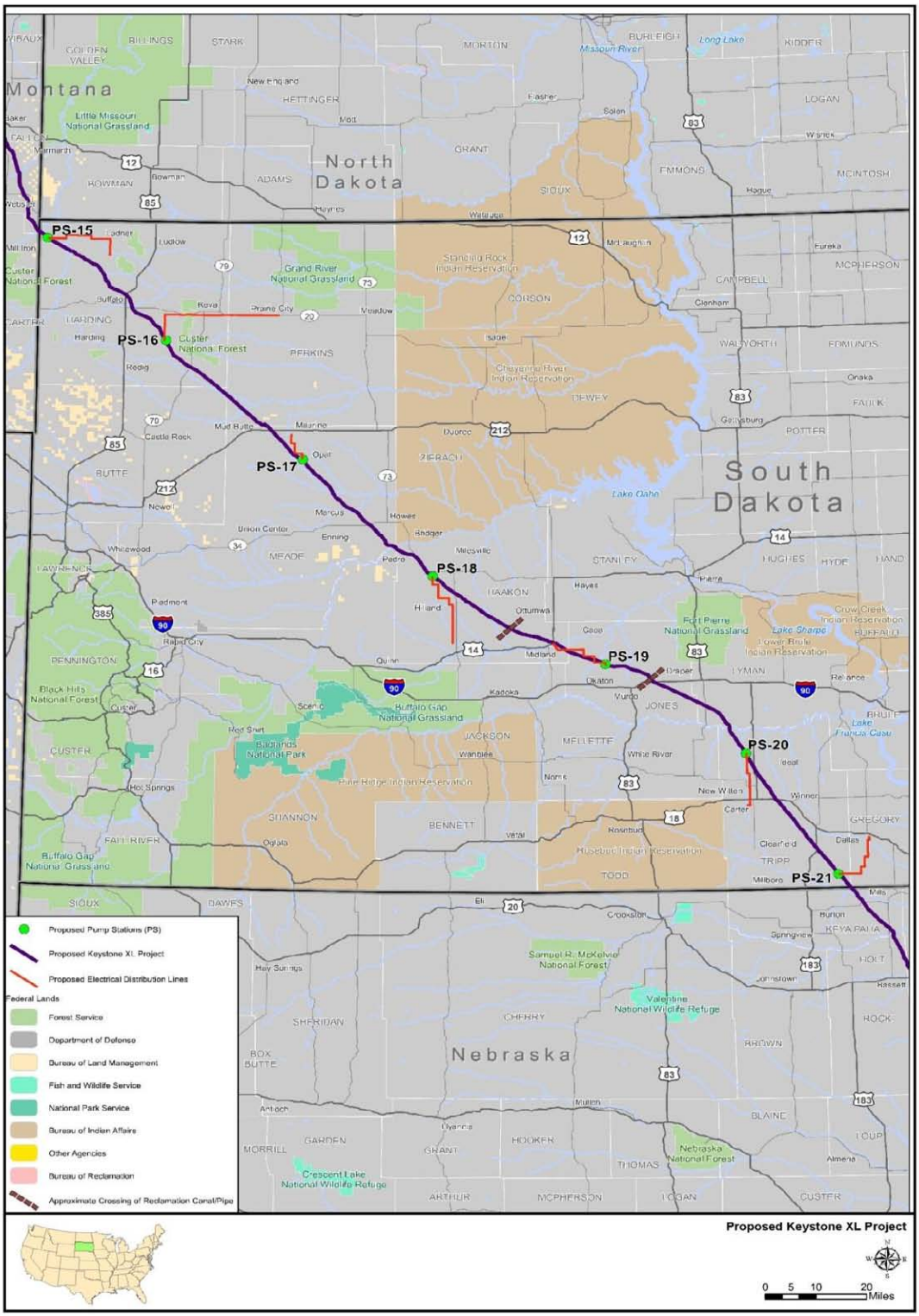

Figure 3. South Dakota segment of the Keystone Pipeline Project

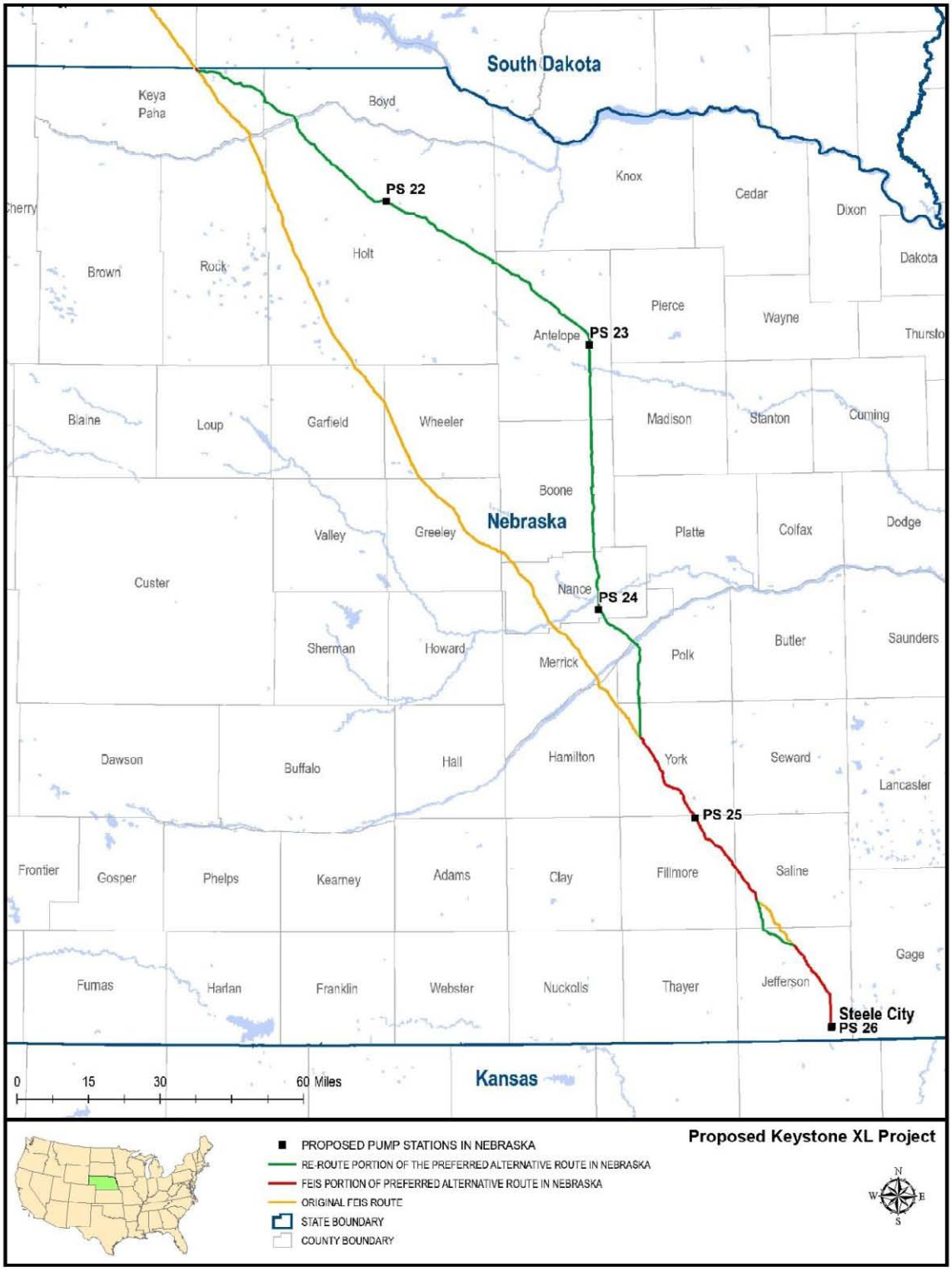

Figure 4. Nebraska segment of the Keystone Pipeline Project

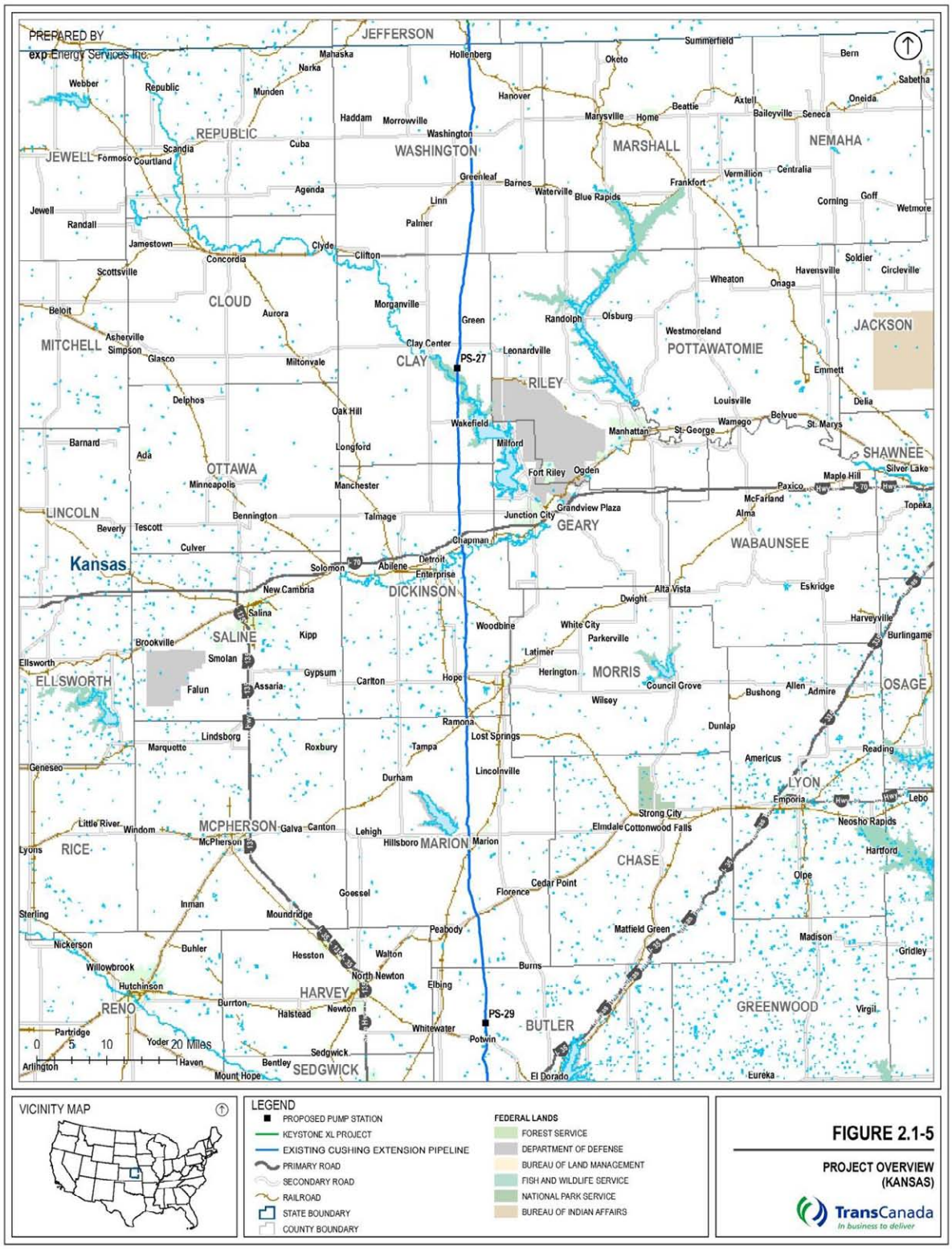

Figure 5. Kansas segment of the Keystone Pipeline Project

Appendix B

American Burying Beetle

Trapping Protocol

Conservation Measures

Qualification Criteria

Nebraska

Trapping Protocol

December 2008

Trapping methods are used for both Presence/Absence surveys and Capture and Relocation. Trapping for the American burying beetle (*Nicrorphorus americanus*) (ABB) will be conducted with a modified version of the U.S. Fish and Wildlife Service's (1991) protocol, as described by Bedick et al. (2004). Trapping for the ABB may be conducted during two periods in the year in Nebraska.

The first period in early summer (approximately June 7to July 1) is after beetles have emerged from hibernation and prior to beetles going underground during the larvae rearing cycle. The second trapping period is in late summer (approximately August 7th to September 1st), after the larval cycle when both senescent and teneral beetles are present. For the early summer period, trapping will be conducted when the average temperature at midnight is 60 degrees Fahrenheit or greater. It is recommended that trapping be conducted when the average temperature at midnight is 60 degrees Fahrenheit or greater. Trapping of ABB may be conducted during this period when the average temperature at midnight is 55 degrees Fahrenheit or greater, however, false negative presence data may be obtained under these conditions.

A positive control should be used in association with trapping. A positive control establishes that conditions were correct in a given geographic area and that ABB were active during the timeframe of the trapping. Only one ABB capture is necessary to establish a positive control. The positive control window may be up to seven days prior to trapping, or during, but not after the trapping timeframe. There are several locations within Nebraska with a recent history of dense populations and that have been documented through regular research.

Coordination with the U.S. Fish and Wildlife Service (USFWS) and Nebraska Game and Parks Commission (NGPC) may provide existing projects with positive controls. When trapping south of the Platte River, Lincoln County may be used and for trapping north of the Platte River, an area near the town of Chambers can be used.

Adult ABBs will be captured by use of baited pitfall traps consisting of a five-gallon (18.92 Liter) plastic bucket (diameter 28.5cm). Bedick (1997) found a five-gallon bucket to be the most appropriate pitfall trap when sampling for the ABB because they provide a larger surface area for each beetle to escape from other carrion beetles. Alternatively, a one-gallon bucket may be used as a pitfall trap in those instances where burial of the five-gallon bucket would be difficult.

All buckets will be washed using bleach and thoroughly rinsed prior to being used as traps. All buckets will be buried in the ground, with approximately 4-5 cm of the bucket above ground

level. Soil will then be built-up around the bucket, creating a gradient from ground level upwards to the bucket rim. This will be done to limit the amount of water entering the buckets through runoff and splashing of water during rainfall events. Buckets will be located on elevated terrain so as to prevent inundation during rainfall events as beetles can drown very easily in even a small amount of water. Traps should not be placed within 10 feet of ant colonies, as they can kill the beetles that have been captured. Approximately 5-8 cm of moist soil will be placed in the bottom of the bucket to give trapped carrion beetles room to burrow into the soil to avoid competitors, high temperatures, and low moisture levels above the soil. To prevent rainfall and debris from directly entering the bucket, a square piece of plywood (37 cm by 37 cm) will be placed on top of the trap, supported by two or more sticks/narrow boards ranging from 1.5-2.5 cm in thickness. Additional weight (e.g. soil plug, rocks, etc.) will then be placed on top of the trap cover to reduce bait loss to vertebrate scavengers and to prevent the cover from being moved by wind or small animals.

It is recommended that all traps be baited with previously-frozen, 275-374 g laboratory rats (*Rattus norvegicus* – available from online dealers such as RodentPro.com). If rats are not available, bait items of comparable size and structure may be used. The bait will be aged in airtight containers for 3 to 7 days, depending on the temperature and other weather conditions. In contrast to the previous protocol, the bait will not be placed into containers within the traps. What is critical is that the bait is ripe and emits a powerful odor as beetles key in on odor to locate food. With larger numbers of traps spread across a relatively large area, it is better to allow carrion beetles to feed on the bait, which also helps maintain moisture levels in the soil within the trap and reduces stress. This will also prevent loss of beetles to inter-beetle predation and desiccation, which has been determined to be a potential mortality factor for Silphidae on hot mornings by Bedick (1997). Traps will be spaced no farther than 1 mile (1.6 km) apart to ensure that the entire survey area will be covered by the predicted radius of the trap (0.5-mile (800 m)). Traps will be set on the first trap day before 1800 hours and checked every subsequent morning by 1100 hours.

Trapping will be conducted for a minimum of five consecutive days. When trapping for ABB, if weather conditions are unsuitable for trapping during the 5 consecutive days, it is not necessary to begin the 5-day session again, but rather add one night of trapping for each night of unsuitable conditions. Unsuitable weather conditions include nights when the temperature drops below 55°F or if it is raining. It is assumed that on nights with unsuitable conditions, beetles will not be active.

At each trap site, a GPS location and digital photograph will be taken to document the location of the trap and the general habitat characteristics there. All carrion beetles captured will be identified to species whenever there is available time and resources, and the ABB will be sexed by use of Ratcliffe (1996). If the goals and objectives of the survey effort are to assess

population status and requires marking beetles, all ABB captured will be recorded and marked using a drop of model paint (such as Testors) placed on the pronotum or the posterior portion of one or both elytra. Paint will be applied in a manner that will not cause damage to the elytra. If the purpose of the trapping effort is to clear an area, marking beetles is not necessary.

All ABB captured during the second trapping period (August 7th through September 1) will be evaluated for being either teneral or senescent, if the surveyor(s) have been properly trained. Captured ABB will be released as quickly as possible. For research purposes, the ABB may be released at the point of capture or at locations away from the capture point if such release methods are identified in an approved research design and the release sites have been evaluated as providing suitable habitat for the beetle. For the purpose of clearing a site of ABB prior to disturbance activities, captured beetles will be released in suitable habitat at a minimum distance of two miles away from the capture site. The release sites should be included in proposed conservation measures by the project proponent for concurrence on the project. All captures of ABB will be recorded in the format of the Natural Heritage's Database housed by the NGPC, including recording captures in a Geographic Information System Database, as applicable, for future reference and analysis. Results of surveys will be sent to the NGPC and USFWS in accordance with applicable federal and state permit requirements.

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Conservation Measures

Background

The federal and state endangered American burying beetle (ABB) is the largest member of the carrion beetle family and has a lifespan of about one year. It ranges from 1 to 1.5 inches in length, has four red-orange spots on its wing covers, and is distinguished by its larger size and its orange-red pronotum. The ABB was common over the eastern half of North America as recently as the 1920's, but has disappeared over 90 percent of their historic range (Sikes and Raithel 2002). The ABB's current range now includes Rhode Island, Oklahoma, Arkansas, and Nebraska. Reasons for its decline are not well understood but habitat loss and degradation, human activity, light pollution, and pesticides are all considered contributing factors (Sikes and Raithel 2002). In Nebraska, historical records of ABB have been observed in Antelope, Custer, and Lancaster counties. Other counties that have suitable habitat include: Antelope, Blaine, Boone, Boyd, Brown, Cherry, Custer, Dawson, Frontier, Garfield, Gosper, Grant, Holt, Hooker, Keya Paha, Lincoln, Logan, Loup, Rock, Thomas, Valley, and Wheeler.

The ABB has been captured in a variety of habitats including grasslands, grazed pasture, bottomland forest, riparian zones, and oak-hickory forests (Creighton et al. 1993; Lomolino and Creighton 1996; NatureServe Explorer 2007; and U.S. Fish and Wildlife Service 1991) and have been labeled a vegetation generalist (Lomolino et al. 1995). In Nebraska, ABB have been found in mesic areas such as wet meadows and wetlands in association with relatively undisturbed semi-arid, sandhill and loam grasslands. Such areas have been observed to have a thick stand of grassland vegetation with some woody vegetation. The ABB are also found in the Loess Canyons, primarily located in Lincoln County. These steep loess hills and canyons support mixed-grass prairie, but much of the area is heavily invaded by eastern red cedars (Schneider et al. 2005).

It is suspected that carrion availability in a given area is more indicative of ABB presence than vegetation structure since carrion is the sole food source for ABB and is an essential component in a complex reproductive cycle for the species (U.S. Fish and Wildlife Service 1991). The ABB is able to efficiently locate carrion (Bedick et al. 1999) and can move over two miles to a carrion source (Creighton and Schnell 1998). Because of their habit of feeding on carrion, their sole food source, the species may be found in marginal habitat like roadsides where they likely forage on roadkill.

For the ABB to use the carrion for reproductive purposes, the carrion must also be the approximate size of a squirrel and also be located in an area where soil conditions are conducive to excavation by ABBs (Anderson 1982, Lomolino and Creighton 1996). When the ABB locates a suitable carcass, a mated pair will bury the carcass for egg deposition and brood rearing. The larvae feed on the carcass and remain underground through the pupal stage and the parents care

for the developing young underground. The development process from egg to adult takes approximately 48 – 65 days (Ratcliffe and Spomer 2002). Adults and newly-hatched adults (tenerals) will emerge from the ground to feed in preparation for winter hibernation. Current research suggests that the adults return to the ground to overwinter. In Nebraska, ABB have been found in association with soils composed of some clay with a prominent duff (litter) layer have also been observed.

Adult ABB are fully nocturnal and are typically active when night time temperatures reach 60° F. Thus, the ABB active period in Nebraska can be as long as April 1 to October 29, with peak periods of activity in June and August. The first peak active period in early summer (approximately June 7to July 1) is after beetles have emerged from hibernation and prior to beetles going underground during the larvae rearing cycle. The second peak active period is in late summer (approximately August 7 to September 1), after the larval cycle when both senescent and teneral beetles are present. The ABB enter an inactive period spent underground throughout the winter when the nighttime low temperatures are consistently 60° F or below. In Nebraska, this typically occurs from October 29 to April 1.

Purpose

Surveys for ABB are designed to ensure awareness and resolution to any potential conflicts between ABB and potentially disruptive human activities. To prevent conflict, two types of actions are recommended, depending on the location: **Presence/Absence Surveys and Capture/Relocation Conservation Measures**. In addition, **Maintaining Clear Activities** may be necessary depending on the situation. One factor when deciding which actions are necessary is the ABB Distribution Map (Attached). In areas of counties with ABB, first a Presence/Absence Survey should be conducted to determine if relocation is necessary. Habitat for ABB should assume presence and Capture and Relocation conservation measures should be implemented, followed by Maintaining Clear Activities.

These measures/surveys and activities are to occur in areas of suitable habitat in construction areas. Construction areas include areas that will be impacted by construction, where heavy equipment and materials will be staged and/or stored, all areas within the Limits of Construction, potential haul or temporary roads and borrow site areas. Areas of unsuitable habitat are defined below. Since this species is found in a variety of habitats, the NGPC and USFWS encourage the project proponent to discuss additional unsuitable habitat or potential habitat if the project proponent desires further guidance in determining where conservation activities are necessary.

If the project proponent chooses to conduct a survey, the Nebraska ABB Survey Protocol is recommended (See Attached). A valid section 10 permit from the USFWS and Scientific and Education Permit from the NGPC are required for anyone conducting such surveys. All survey

results, positive or negative, must be submitted in writing to these Agency offices for review prior to initiating any ground disturbing activities.

Presence Absence Survey (PA)

An initial screening of the project may reduce the area where the PA survey is necessary. Urban areas dominated by pavement, areas dominated by row crop agriculture, and areas consistently inundated with water need not be surveyed for presence or absence. Wet meadows, often associated with wetlands and riparian areas are ideal habitat and cannot be eliminated. Open grassland areas with scattered cottonwood trees also represent potential habitat. If the project proponent chooses to reduce the PA survey area based on these habitat criteria, a revised area where the PA survey will be conducted should be submitted to the USFWS and the NGPC to ensure areas of potential habitat are not inadvertently omitted.

The PA Survey needs to be conducted when the ABB is active. Research suggests that when the average temperature at midnight is 60 degrees Fahrenheit or greater, detection results are the most consistent. The PA Survey for ABB may be conducted during this period when the average temperature at midnight is 55 degrees Fahrenheit or greater, however, false negative presence data may be obtained under these conditions. Each situation is unique and the project proponent will need to determine, based on local conditions if surveys are valid or if a repeat PA Survey is necessary. The USFWS and NGPC welcome questions as they arise during a survey. A photograph should be taken of each trap site and sent to the NGPC.

The Presence Absence Survey needs to be conducted for a minimum of 5 consecutive trap nights. If no beetles are captured during those 5 nights, the ABB is considered absent and the area is considered "clear." This information needs to be sent to the USFWS NGPC. If the project has concurrence from these agencies, then n*o further conservation measures are necessary and construction may begin.* If a beetle is caught anytime during those 5 days, this is considered a positive survey and the P/A may cease. Depending on the project, if capture and relocation measures are recommended, they may begin immediately if conditions are adequate. If capture and relocation measures will not follow the P/A survey, any ABB captured during the PA Survey should be released on site. Notify the USFWS and NGPC of any change of trapping type. Survey results must be submitted to both the NGPC and USFWS. A photo should be taken of the first ABB captured to serve as a voucher specimen.

Capture and Relocation (CR) Conservation Measure

An initial screening of the project may reduce the area where the CR Conservation measure is necessary. Urban areas dominated by pavement, areas dominated by row crop agriculture, and areas consistently inundated with water need not have an attempt to remove ABB because the species would not be present there. Wet meadows, often associated with wetlands and riparian

areas are ideal habitat and cannot be eliminated. Open grassland areas with scattered cottonwood trees also represent potential habitat. If the project proponent decides to reduce the CR area based on these habitat criteria, a revised area where the CR Conservation measures will be conducted should be submitted to the USFWS and NGPC to ensure areas of potential habitat are not inadvertently omitted.

The CR Conservation Measures needs to be conducted when the ABB is active. Research suggests that when the average temperature at midnight is 60 degrees Fahrenheit or greater, detection and capture results are the most consistent. The CR Conservation Measure for ABB may be conducted during this period when the average temperature at midnight is 55 degrees Fahrenheit or greater, however, false negative presence data may be obtained under these conditions. Each situation is unique and the project proponent will need to determine, based on local conditions if surveys are valid or if a repeat is necessary. The USFWS and NGPC welcome questions as they arise during a survey or trapping series. A photograph should be taken of each trap site and sent to the NGPC.

When trapping for ABB, if weather conditions are unsuitable for trapping during the 5 consecutive days, it is not necessary begin the session again, but rather add one night to the end of the session. Unsuitable weather conditions include nights when the temperature drops below 55°F or it is raining.

Trapping for relocation must be conducted for a minimum of 5 consecutive nights. For an area to be "cleared" the last three consecutive nights must have no ABB. Any captured ABB must be moved to suitable habitat areas located at least 2 miles from the area of construction. Photo documentation of the release sites should be taken and submitted to the USFWS and NGPC. Upon completion of the capture and relocation measures, if the project is within the known ABB distribution, *Maintaining Clear Activities must be implemented within 3 days of establishing "clear," regardless of the presence or absence of ABB*. If the project is not in the current distribution area of the map and no ABB were detected, no further conservation actions are necessary for that calendar year. Results of the survey must be submitted to both the NGPC and USFWS. A photo should be taken of the first ABB captured to serve as a voucher specimen.

If a site cannot be cleared by the capture and relocation procedure after 10 days of trapping, contact the USFWS and NGPC for additional guidance. This situation is considered unlikely, and will need to be dealt with on a case by case basis. Additionally, no more than 50 ABB should be moved to each re-location site.

If the project will impact suitable ABB habitat or impact areas of known ABB occurrences for multiple years, a new survey, the capture/relocation procedure and the standard conservation measures may be necessary for each year of construction. Surveys results are typically only

valid for one season. The sequence of construction will determine what measures are necessary. In this situation, it is recommended that the details and necessary measures be determined through the information consultation process between the NGPC and USFWS.

Maintaining Clear Activities

The purpose of Maintaining Clear (MC) Activities is to ensure that once an area is "cleared" that ABB are not attracted to the site during construction. MC Activities are necessary when the ABB is active, so depending on the disturbance timeframe, the maximum time they may be necessary is from April 1 through September 15. Upon completion of Capture and Relocation Conservation Measures, Maintaining Clear Activities must be implemented within 3 days. However, these activities may be implemented prior to survey or capture/relocation completion. These activities are designed to deter ABB from utilizing the site, so it may be in the project proponent's best interest to begin these activities as early as April 1. If only these activities are being implemented (if the clearing activities occurred the previous fall), then these activities should begin by April 15th if the construction will occur after that time. If construction will occur on or before April 15th, then these MC Activities should begin 2 weeks prior to April 15th.

The project proponent will prepare the area by removing any and all carcasses prior to construction. Carcasses as small as songbirds are ideal food for ABB, so this removal activity must be thorough. Carcass removal must continue until September 15 or until construction is completed, whichever is earlier. Carcass removal can be done at any time throughout the day, but the preferred timing is late afternoon. This will ensure that the nocturnal ABB is not drawn to the area by road kill caused by daytime traffic. Disposal of carcasses should be at least 0.5 miles from the project site.

In addition, the area of construction should be mowed such that the vegetation is as low as possible without causing erosion. This short vegetation height shall be maintained by the project proponent for the duration of the project. Along with mowing, the residual vegetation from mowing needs to be removed from the area. Possible methods are raking, windrowing or bailing. Alternatively, mowing can be done approximately every 2 weeks and the vegetation kept less than 8 inches tall. No vegetation removal is necessary if this height is maintained. All construction, work vehicles and personal vehicles should be staged in mowed areas.

Photo documentation of these MC activities is in the best interest of the project proponent. The USFWS and NGPC request that photographs of mowing and carrion that is removed be included in weekly reports to the Environmental Analyst (NGPC) and Fish and Wildlife Biologist (Service).

Unusual Circumstances

This protocol was developed as a standard for most projects that may disturb ABB habitat, but unique situations may require an individualized approach. If the project proponent has an

alternative to the suggested conservation actions described in this protocol, the USFWS and NGPC will discuss potential alternative methods for avoiding take of ABB.

Night Work and Light Pollution Concerns

Artificial light sources have been implicated in causing insect population losses (Pyle *et al* 1981). The ABB's attraction to artificial lighting could cause it to fly from suitable habitat resulting in excessive energy expenditure and reduced reproductive success as well as make it vulnerable to nocturnal predators such as other insects and bats. The USFWS and NGPC are aware that the ABB is attracted to ultraviolet light since several individuals have been trapped on other project areas using black light traps. In addition, forms of insect control used at residential areas, which involve the use of black lights as an attractant and a lethal electric grid have been known to kill ABBs.

To avoid attracting the ABB from nearby habitats to the proposed project site, it is recommended that the following conservation measures be implemented for permanent structures:

- No light traps should be used as a means of insect control.
- All exterior lighting sources should be low pressure sodium vapor lights;
- All exterior lighting should have downward shields installed to direct light to the ground and not illuminate the project area;
- All exterior lighting should be low mast to minimize light dispersion thereby reducing the attraction to the ABB;
- Where possible, a vegetative screen consisting of native trees and shrubs should be established between the proposed permanent facilities and nearby habitats that may harbor the ABB; and
- In areas of known ABB populations or where ABB have been positively identified night work may need to be restricted during the ABB active seasons due to potential impacts to the species.

The appropriate course of action involving all or a subset of the above bulleted items would need to be determined on a case by case situation.

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American Burying Beetle

Qualification Criteria
April 2012

It is important that individuals conducting research on the American burying beetle (ABB) meet the following qualifications for handling and surveying for the species. Survey work done incorrectly can cause unnecessary injury and/or mortality to the ABB. All potential Permit holders must have at least a bachelor's degree in wildlife management, entomology, biology, wildlife ecology, or similar field; or have worked in one of these fields for at least 10 years. All individuals range wide must operate under a Section 10(a)1(A) recovery permit, have undergone training, and have met the following qualifications prior to conducting surveys for the species.

Qualifications

a) Provide citations for ABB literature reviewed to gain knowledge about the species before training begins.

b) Familiarity with local and national survey protocols.

c) Familiarity with ABB conservation measures.

d) Training in the ability to identify suitable ABB habitat.

e) Identification of ABB including sex, age (teneral/senescent), size, and other Nicrophorus species occurring in the state for which the applicant will be permitted.

f) Trap preparation, bait selection and preparation, trap site selection, and trap installation.

g) Under the supervision of a qualified surveyor, complete a whole field trapping sequence/cycle in which an ABB is captured. The cycle is to include trap installation, trap checking, burying beetle identification, bait checking and replacement, ABB handling, and release, relocation, trap removal, and site reclamation.

h) Survey reporting and completion of all required forms, whether federal and/or state.

i) Familiarity with a section 10 recovery permit, including special conditions for the ABB and annual reporting requirements.

Applications for a section 10 recovery permit will include the application for the permit, a curriculum vitae or resume, and signed documentation from the trainer attesting to the completion of all qualification requirements.

Appendix C

Monitoring Program

Compliance Monitoring Program for the American Burying Beetle

Keystone XL Pipeline

The U.S. Department of State (DOS) will retain a third-party contractor to develop and implement an American burying beetle (ABB) monitoring program or ABB monitoring would be included as a possible wider project level monitoring program for the proposed Project to assure that the provisions of the USFWS's Keystone XL Pipeline Biological Opinion under section 7 of the Endangered Species Act (ESA) (16 U.S.C. § 1536(a) (2)) are met through monitoring and habitat reclamation activities. This monitoring program would be approved and overseen by DOS in consultation with USFWS. TransCanada Keystone Pipeline, LP (Keystone) would fund the monitoring program prior to construction of the proposed Keystone XL pipeline (Project) in the states of South Dakota and Nebraska.

Monitoring will not replace the environmental quality control plan or the actions that Keystone would put in place, but is in addition to those tasks and will serve as a quality control monitor on behalf of DOS. The monitoring program would include, but is not limited to, a combination of site visits and aerial surveillance to provide a reasonable level of confidence that avoidance, minimization, and mitigation measures are being followed during construction of the Project. Monitoring would include, but is not limited to, implementation of conservation measures and reasonable and prudent measures and associated term and conditions as identified in the BO, including ensuring that construction impacts match permitted footprint, and habitat restoration for the ABB. Monitoring will not include surveys for the ABB that are recommended to be conducted to monitor incidental take expected during the course of Project construction.

This monitoring program will identify the number of acres disturbed by the Project in the states of South Dakota and Nebraska, and the number of acres restored as described in Appendix D.

The third party contractor will monitor the project for four (4) years commencing on the date of construction of the proposed Project in the states of South Dakota and Nebraska. With concurrence of the DOS and the USFWS, the monitoring program may be continued for another four (4) years in the event of failure of habitat reclamation or delays in construction of the Project and/or reclamation activities.

The third-party contractor would undertake the following:

1. By October 1 of each year submit an annual monitoring plan for the following fiscal year in a letter to the DOS. This plan would include the anticipated work effort and schedule, subject to the variability of weather, construction season, etc.

2. Maintain monitoring logs, photographs, and documents and provide DOS a summarized monthly report during construction and a biannual report in the years after construction. At the end of this Agreement, all original files and documents will be provided to DOS with copies retained by USFWS.

3. Contact the DOS designated point of contact when listed conservation measures and Reasonable and Prudent Measures and Terms and Conditions set forth in the USFWS's Biological Opinion are not being met and work with DOS to remedy the situation(s).

4. Be available to DOS for meetings or phone calls concerning the proposed Project, as the agencies deem appropriate.

5. Have designated inspector(s) attend safety training or meet other requirements Keystone may have for inspector(s) to access construction job sites.

6. Recognize and support that DOS, in consultation with USFWS, will have final determination of appropriate remedies for any failures by Keystone to comply with the requirements of the USFWS Biological Opinion, exclusive of the Migratory Bird Treaty Act.

Appendix D

American Burying Beetle

Habitat Conservation Trust

AGREEMENT

Habitat Conservation Trust

American Burying Beetle Habitat
Keystone XL Pipeline
U.S. Fish and Wildlife Service, U.S. Department of State, TransCanada Keystone Pipeline, LP

PURPOSE

This Agreement (Agreement) is entered into by and between the U.S. Fish and Wildlife Service (USFWS), the U.S. Department of State (DOS), and TransCanada Keystone Pipeline, LP (Keystone). The purpose of this Agreement is to establish responsibilities of the three parties for compensatory mitigation to offset temporary and permanent loss of habitat for the federally endangered American burying beetle (ABB) resulting from construction and operation of the proposed Keystone XL Project pipeline (Project) in the states of South Dakota and Nebraska consistent with the USFWS Biological Opinion, dated May 15, 2013.

Keystone agrees to provide compensation for temporary and permanent ABB habitat loss due to Keystone XL pipeline construction and operations in areas where the species is likely to be impacted including: south of Highway 18 in Tripp County in South Dakota and Keya Paha and Holt counties (north and west of Highway 281 or the City of O'Neil) in Nebraska (Attachment A).

Compensation is based on total acres impacted and has been modified by habitat quality rating multipliers with prime habitat compensation at 3 times the total impact acres, good habitat at 2 times the total impact acres, fair habitat at 1 times the total impact acres, and marginal habitat at 0.5 times the total impact acres. Rating multipliers were developed based on the temporal loss of habitat. Higher quality, prime habitat would reasonably be expected to be more important to ABB than marginal habitat and thus, its loss is reflective by applying a larger habitat multiplier. No compensation is required for poor habitat. Temporary habitat impacts are scaled for the period of time anticipated for recovery of vegetation cover at 4 years over the 50 year life of the Project or 8% of total calculated impacts. All compensation is based on habitat ratings and the number of acres affected, and is compliant with verbal agreements between DOS, USFWS and Keystone.

The ABB Habitat Conservation Trust (Trust) will be used to acquire lands and easements from willing sellers, and to develop conservation plans and agreements with landowners for protecting and enhancing ABB habitat in Nebraska and South Dakota. Additionally, up to 10 percent of the Trust funds may be used for appropriate research such as research on recolonization of ABB on disturbed sites and other research which would contribute to the recovery of the ABB. Funds will be placed with a nongovernmental organization (NGO) experienced and familiar with managing conservation trust funds or a similar mutually agreeable NGO. Habitat projects and land or easement acquisitions for the benefit of the ABB will be approved for funding by the NGO in coordination with USFWS offices in South Dakota and Nebraska. There will be no time limit on when the funds can be expended, but it is expected that most of the work and opportunities will occur within the first five years after the fund is established. To help ensure a continuous source of funds are available, 10% of the funds will go to a permanent endowment, also managed by the NGO for the long-term benefit

and management of endangered and other at risk species in Nebraska and South Dakota in coordination with the South Dakota and Nebraska USFWS offices and the Nebraska Game and Parks Commission.

PAYMENT TERMS & SCHEDULE

Keystone will establish a conservation trust to be managed by NCF/nongovernmental organization within six months of approval of the Presidential Permit for the proposed Project and prior to Project construction in South Dakota and Nebraska, consistent with funds transfer and accounting documents as may be required by the USFWS as calculated in Attachment A to this Agreement.

Total compensatory mitigation for ABB habitat impacts based on the attached valuation (Attachment A) is summarized in Table 1.

Table 1. Compensatory Mitigation for ABB Habitat Impacts Resulting from Construction and Operation of the proposed Keystone XL Project.

	Temporary ABB Habitat Impacts		**Permanent ABB Habitat Impacts**		
State	**Acres**	**Value**	**Acres**	**Value**	**Total**
South Dakota	526.28	$181,684.08	102.51	$491,112	$672,796.08
Nebraska	728.28	$232,017.12	140.25	$517,482	$749,499.12
Total	**1,254.56**	**$413,701.20**	**242.76**	**$1,008,594**	**$1,422,295.20**

INDEPENDENT AUTHORITIES

This agreement in no way diminishes the independent authorities or responsibilities of either the DOS or the USFWS.

DESIGNATED POINTS OF CONTACT

For USFWS:
Michael D. George
Project Leader, Nebraska Ecological Services, U.S. Fish & Wildlife Service, Grand Island, NE

For DOS: [reserved]

For Keystone:
Sandra Barnett
Environmental Manager
Keystone Pipeline Project
TransCanada Keystone Pipeline, L.P.

EFFECTIVE DATE

This agreement becomes effective upon approval by signature of USFWS, DOS, and Keystone.

MODIFICATION AND/OR TERMINATION

This Agreement may be modified upon agreement by all of the Parties.

This Agreement may be terminated by either the DOS or the USFWS upon 30 days notification to the other party. If there are any unspent funds from the amount transferred from Keystone to the conservation trust at the time of termination, such funds shall be returned to Keystone within 60 days of the date of termination of the Agreement.

U.S. FISH & WILDLIFE SERVICE

BY:_____DATE_____

TRANSCANADA KEYSTONE PIPELINE, LP

BY:_____DATE_____

U.S. DEPARTMENT OF STATE

BY:_____DATE_____

Attachment A: ABB Habitat Conservation Trust Calculations

Table A1. Conservation measures to ameliorate impacts to ABB habitat resulting from construction and operation of the Keystone XL pipeline in South Dakota. Project spatial data supplied by Keystone were used by DOS to determine acres of habitat affected (DOS 2012).

Permanent Impacts[a]

Habitat Rating	ABB Acres Impacted	Modifier	Weighted Acres	Land Value/Acre ($)	Amount ($)
Prime	75.83	3	227.49	1,800	409,482
Good	21.34	2	42.68	1,800	76,824
Fair	0	1	0	1,800	0
Marginal	5.34	0.5	2.67	1,800	4806
Total	102.51				491,112

Temporary Impacts[b]

Habitat Rating	ABB Acres Impacted	Modifier	Weighted Acres	Land Value/Acre ($)	Conservation Amount ($)
Prime	325.94	3	977.82	1,800	1,760,076
Good	95.80	2	191.60	1,800	344,880
Fair	80.01	1	80.01	1,800	144,018
Marginal	24.53	0.5	12.26	1,800	22,077
Total	526.28				2,271,051

[a] Permanent impacts are caused by the placement of permanent above-ground facilities (i.e., pump stations), and the 22-foot corridor spanning the center of the pipeline ROW affected by heat dissipation from the operating pipeline.
[b] Temporary impacts are caused by temporary construction workspace, and construction of temporary access roads.
Note: Miles are the same for both temporary and permanent impacts as both are calculated using the pipe centerline
Note: Temporary habitat impacts are scaled for the period of time anticipated for recovery of vegetation cover at 4 years over the 50 year life of the Project or 8% of total calculated impacts (0.08 x 2,271,051). Thus, the total amount contributed would be $181,684.08.

Table A2. Conservation measures to ameliorate impacts to ABB habitat resulting from construction and operation of the Keystone XL pipeline in Nebraska. Project spatial data supplied by Keystone were used by DOS to determine acres of habitat affected (DOS 2012).

Permanent Impacts[a]

Habitat Rating	ABB Acres Impacted	Modifier	Weighted Acres	Land Value/Acre ($)	Conservation Amount ($)
Prime	61.47	3	184.41	1,800	331,998
Good	42.46	2	84.92	1,800	152,856
Fair	0	1	0	1,800	0
Marginal	36.32	0.5	18.16	1,800	32,482
Total	140.25				517,482

Temporary Impacts[b]

Habitat Rating	ABB Acres Impacted	Modifier	Weighed Acres	Land Value/Acre ($)	Conservation Amount ($)
Prime	365.57	3	1,096.71	1,800	1,974,078
Good	226.59	2	453.18	1,800	815,724
Fair	13.44	1	13.44	1,800	24,192
Marginal	122.68	0.5	61.34	1,800	110,412
Total	728.28				2,900,214

[a] Permanent impacts are caused by the placement of permanent above-ground facilities (i.e., pump stations), and the 22-foot corridor spanning the center of the pipeline ROW affected by heat dissipation from the operating pipeline.
[b] Temporary impacts are caused by temporary construction workspace, and construction of temporary access roads.
Note: Miles are the same for both temporary and permanent impacts as both are calculated using the pipe centerline
Note: Temporary habitat impacts are scaled for the period of time anticipated for recovery of vegetation cover at 4 years over the 50 year life of the Project or 8% of total calculated impacts (0.08 x 2,900,214). Thus, the total amount contributed would be $232,017.12.

Appendix E

Reclamation Performance Bond

Performance Reclamation Bond

A reclamation performance bond will be established for a period of eight years. The bond will be applied to supplemental vegetation reclamation if restoration for American burying beetle (ABB) habitat failed, as discussed during consultation among the U.S. Department of State (DOS), U.S. Fish and Wildlife Service (USFWS), and Keystone. This performance bond will be accessible and executed by DOS, or a third party at the discretion of the DOS, if and when disturbed land in the ABB habitat area, as defined by the Biological Assessment (BA) (DOS 2012), should fail to revegetate in a manner outlined below, and Keystone fails to take corrective action. Release of the bond will be solely at the discretion of DOS after soliciting recommendations from the USFWS and the Nebraska Game and Parks Commission.

Bond Stipulations

Bond covers cost of supplemental reclamation for failure of land to appropriately revegetate, starting four years after commencement of construction.

Bond coverage is limited to ABB habitat areas as defined in the BA (except for smaller areas within ABB habitat that are unsuitable for beetle occupation, such as crests of windblown hills).

Successful reclamation criteria:

- Reclamation will be measured four years after the commencement of construction.
- For reclamation to be deemed successful, native grasslands restored on the right-of-way (ROW) must be comparable to those on adjacent undisturbed lands.
- 70 percent of the dominant species on the ROW must be the same as those that occur on adjacent off-ROW lands.

Reclamation success will be determined by inspection of the defined areas jointly by Keystone and DOS or its designated agent.

Reclamation will not be deemed successful on private lands where the landowner makes alterations to the seed mix proposed in the project's CMRP and Con/Rec unit.

The value of the bond will be based on an assumed reclamation 10 percent failure rate, using the market cost of seed and an appropriate labor cost totaling $300/acre, and the habitat acreages and multipliers reflected on the attached spreadsheet. On this basis, the initial amount of the bond will be $113,899.62.

At year four, the bond amount will be adjusted to reflect the actual acreage where reclamation has not met the reclamation criteria. Each year after year four, for the duration of the bond period, the bond amount will be readjusted to reflect the remaining acreage that has not met the reclamation criteria.

If Keystone should fail to meet the conditions of these bond stipulations, funds from the bond up to the full amount available, will be released to DOS or its designated agent(s) to complete the reclamation work.

Performance Bond Calculations for ABB habitat reseeding failure

Habitat Quality Rating	SD Acres	NE Acres	Total	Quality Multiplier	Acreage Value
TEMP Prime	325.94	365.57	691.51	3	2,074.53
TEMP Good	95.80	226.59	322.39	2	644.78
TEMP Fair	80.01	13.44	93.45	1	93.45
Total potential ABB acres affected					**3451.54**
10% Failure rate after 4 years (acres)					345.15
10% Failure rate after 8 years (acres)					34.52
Total acres for performance bond					379.67
Total Bond (acres x $300)					113,899.62

Appendix F

Whooping Crane Survey Protocol

Whooping Crane Fact Sheet

Whooping Cranes in Flight

Foraging Whooping Cranes

Adult with juvenile

The Whooping Crane (*Grus americana*) is a federal and state listed endangered migratory species. The Whooping Crane was federally listed as endangered in 1967. Major river systems used by whooping cranes in Nebraska include the Platte, Loup, Republican, and Niobrara rivers. Additionally, a 3-mile-wide, 56-mile-long reach of the Platte River between Lexington and Denman, Nebraska, has been federally designated as critical habitat for whooping cranes. (Information from U.S. Fish and Wildlife Service)

Whooping Crane (*Grus americana*)
Order: *Gruiformes*
Family: *Gruidae*
Status: State and Federally Endangered. **Description:** L 52"(132 cm) W 87"(221 cm). Sexes similar but males are larger. White body with red and black facial markings. Yellow bill and long dark legs. Immature is white with tawny head and neck, and reddish-brown mottling on rest of body. **Habitat:** In Nebraska is found along the Platte Valley, with its wide slow moving river and associated sandbars and islands. Nearby wet meadows, croplands, and marshlands are important for foraging. **Status/Range:** Occasional spring and fall migrant along Platte Valley. 90% of sightings within 30 miles of Platte River, and 80% occurred between Lexington and Grand Island. **Call:** Shrill "*ker-loo-ker-lee-loo"* trumpet. **Comments:** Endangered. Management and protection programs slowly succeeding.

Similar: Sandhill Crane, Snow Geese, and especially American White Pelicans in flight: (Information from Nebraska Game and Parks Commission website)

American White Pelican

The Whooping Crane is one of the rarest birds in North America and also one of the largest. Whooping cranes are vulnerable to accidents during migration. Each spring they travel north from their wintering grounds around Aransas National Wildlife Refuge in Texas to their breeding grounds in Wood Buffalo National Park in central Canada (2,400 miles). Each fall this route is reversed. Their journey traverses eastern Montana, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma and Texas. In Nebraska, they stop to rest and feed on the Platte, North and Middle Loup and Niobrara Rivers. (Information taken from the USFWS Draft Revised International Whooping Crane Recovery Plan Jan 2005)

Whooping Crane Survey Protocol

Whooping Cranes can be disturbed by sight (human figures, equipment within sight) and sound (loud equipment, banging, etc.) that are abnormal (roadway traffic is normal), therefore surveys are needed to ensure disturbance is minimized.

Dates of Survey:

- Spring Migration – March 23 – May 10
- Fall Migration – September 16 – November 16
- Surveys should be conducted daily during these two time frames.

Bridge Projects (Roosting Survey)

Time of Survey:

- Prior to sunrise (published clock time) to make use of the beginning daylight hours, record start and stop time
- *Optional* evening survey (after 4:00 pm) to check for birds potentially coming into roost
- Do east side of bridge first to reduce glare from sun.

Method of Survey:

- Stand at the four corners of the bridge – look at all up and down stream channels as far as you can see
- Use binoculars or spotting scope
- Watch for at least 15 minutes overall
    - Look for bird movements – possibly moving within channel among vegetation
    - Look for Whooping Cranes among Sandhill Crane groups
- If cloudy, overcast or foggy and visibility is reduced to below 0.5 miles, allow time for clearing– take additional time to ensure the best survey possible

Linear Projects (Foraging Survey)-not crossing a major river

Time of Survey:

- Survey project within one hour of start of workday, with at least one survey done no later than 10 am. Record start and stop time.
- Survey using binoculars or spotting scope area within 0.5 miles of project.

For projects which are a combination of bridge and linear work use both methods.

If Whooping Cranes are not seen during the morning survey, work may begin after completion of the survey.

If Whooping Cranes are spotted within 0.5 miles of the active construction:

- Do not start work. Contact the Commission or the USFWS for further instruction.
- Stop work if seen at times other than the morning survey.
- Work can begin or resume if birds move off; record sighting, bird departure time, and work start time on survey form.

Appendix G

Western Prairie Fringed Orchid

Habitat Conservation Trust

AGREEMENT

Habitat Conservation Trust
Western Prairie Fringed Orchid Habitat
Keystone XL Pipeline
U.S. Fish and Wildlife Service, U.S. Department of State, TransCanada Keystone Pipeline, LP

PURPOSE

This Agreement (Agreement) is entered into by and between the U.S. Fish and Wildlife Service (USFWS), the U.S. Department of State (DOS), and TransCanada Keystone Pipeline, LP (Keystone). The purpose of this Agreement is to establish responsibilities of the three parties for compensatory mitigation to offset loss of habitat for the federally threatened western prairie fringed orchid (WPFO) resulting from construction and operation of the proposed Keystone XL Project pipeline (Project) in the states of South Dakota and Nebraska consistent with the USFWS's Biological Opinion, dated May 15, 2013.

Keystone agrees to provide compensation for impacts to the western prairie fringed orchid through a Habitat Conservation Trust (Trust) in areas where the species is likely to be found including: southwest of Highway 18 in Tripp County, South Dakota and Keya Paha, Holt, Rock, Antelope, and Boone counties in Nebraska. Compensation will be based on total acres impacted where suitable western prairie fringed orchid habitat is present, regardless of presence/absence survey results. Compensation will be calculated based on total acres impacted (currently unknown) multiplied by 31 percent, the probability of encountering a western prairie fringed orchid in suitable habitat during the course of habitat survey work (NGPC 2013). Habitat surveys will be used to evaluate western prairie fringed orchid habitat. The resultant acreage will be designated as WPFO potentially occupied habitat. A 3:1 habitat mitigation ratio would be applied to the WPFO potentially occupied habitat to offset temporal loss of habitat between the time construction begins and the time orchid habitat is fully restored. The resultant mitigation total acres would be multiplied by the value of an acre of land.

Funds will be placed with a nongovernmental organization (NGO) experienced and familiar with managing conservation trust funds or another mutually agreeable NGO. The Trust will be used by the NGO to acquire lands and easements from willing sellers, and to develop conservation plans and agreements with landowners for protecting and enhancing WPFO habitat in Nebraska and South Dakota. Additionally, up to 10 percent of the Trust funds may be used for appropriate research which would contribute to the recovery of the WPFO. Habitat projects and land or easement acquisitions for the benefit of the WPFO will be approved for funding by the nongovernmental entity in coordination with the South Dakota and Nebraska USFWS offices. There will be no time limit on when the funds can be expended after the fund is established. To help ensure a continuous source of funds are available, 10 percent of the funds will go to a permanent endowment, also managed by the NGO, for the long-term benefit and management of endangered and other at risk species in

coordination with the South Dakota and Nebraska USFWS offices and the Nebraska Game and Parks Commission.

PAYMENT TERMS & SCHEDULE

Keystone will establish a conservation trust to be managed by a NGO within six months of approval of the Presidential Permit for the proposed Project and prior to Project construction in South Dakota and Nebraska, consistent with funds transfer and accounting documents as may be required by the USFWS as calculated in Attachment A to this Agreement.

Total compensatory mitigation for WPFO habitat impacts is based on the attached valuation (Attachment A) and is summarized in Table 1.

Table 1. Compensatory Mitigation for WPFO Habitat Impacts Resulting from Construction of the proposed Keystone XL Project.

Permanent WPFO Habitat Impacts

State	**Acres**	**Value ($)**
South Dakota	X	Z3(X(.31))
Nebraska	X	Z3(X(.31))
Total		

INDEPENDENT AUTHORITIES

This agreement in no way diminishes the independent authorities or responsibilities of either the DOS or the USFWS.

DESIGNATED POINTS OF CONTACT

For USFWS:
Michael D. George
Project Leader, Nebraska Ecological Services, U.S. Fish & Wildlife Service, Grand Island, NE

For DOS: [reserved]

For Keystone:
Sandra Barnett
Environmental Manager
Keystone Pipeline Project
TransCanada Keystone Pipeline, L.P.

EFFECTIVE DATE

This agreement becomes effective upon approval by signature of USFWS, DOS, and Keystone.

MODIFICATION AND/OR TERMINATION

This Agreement may be modified upon agreement by all of the Parties.

This Agreement may be terminated by either the DOS or the USFWS upon 30 days notification to the other party. If there are any unspent funds from the amount transferred from Keystone to the conservation trust at the time of termination, such funds shall be returned to Keystone within 60 days of the date of termination of the Agreement.

U.S. FISH & WILDLIFE SERVICE

BY:_____DATE_____

TRANSCANADA KEYSTONE PIPELINE, LP

BY:_____DATE_____

U.S. DEPARTMENT OF STATE

BY:_____DATE_____

Attachment A: WPFO Habitat Conservation Trust Calculations

Table A1. Conservation measures to ameliorate impacts to WPFO habitat resulting from construction of the Keystone XL pipeline in South Dakota. Data used to develop this table is from DOS (2012) and based on habitat surveys conducted in summer 2013.

Permanent Impacts (South Dakota)

WPFO Suitable Habitat Acres Impacted	Probability of Encounter	Acres likely Encountered	Modifier	Weighted Acres	Land Value/ Acre ($)	Amount ($)
X	31%	X(.31)	3	3(X(.31))	Z	Z3(X(.31))

Table A2. Conservation measures to ameliorate impacts to WPFO habitat resulting from construction of the Keystone XL pipeline in Nebraska. Data used to develop this table is from DOS (2012) and based on habitat surveys conducted in summer 2013.

Permanent Impacts (Nebraska)

WPFO Suitable Habitat Acres Impacted	Probability of Encounter	Acres likely Encountered	Modifier	Weighted Acres	Land Value/Acre ($)	Amount ($)
X	31%	X(.31)	3	3(X(.31))	Z	Z3(X(.31))

NOTICE: This report is required by 49 CFR Part 195. Failure to report can result in a civil penalty not to exceed $100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122.	OMB NO: 2137-0047 EXPIRATION DATE: 01/31/2014

U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	**Original Report Date:**	06/21/2010
	No.	20100119 - 17791 --- (DOT Use Only)

ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0047. Public reporting for this collection of information is estimated to be approximately 10 hours per response (5 hours for a small release), including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.

INSTRUCTIONS

Important: *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline.*

PART A - KEY REPORT INFORMATION

Report Type: *(select all that apply)*	**Original:**	**Supplemental:**	**Final:**
		Yes	**Yes**

Last Revision Date:	04/03/2013
1. Operator's OPS-issued Operator Identification Number (OPID):	32334
2. Name of Operator	TC OIL PIPELINE OPERATIONS INC
3. Address of Operator:	
3a. Street Address	717 TEXAS AVE
3b. City	HOUSTON
3c. State	Texas
3d. Zip Code	77002
4. Local time *(24-hr clock)* and date of the Accident:	05/21/2010 13:45
5. Location of Accident:	
Latitude:	44.62351
Longitude:	-97.92161
6. National Response Center Report Number (if applicable):	941193
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	05/21/2010 18:41
8. Commodity released: *(select only one, based on predominant volume released)*	Crude Oil
- Specify Commodity Subtype:	
- If "Other" Subtype, Describe:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Ethanol Blend, then % Ethanol Blend: %:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Biodiesel, then Biodiesel Blend (e.g. B2, B20, B100): B	
9. Estimated volume of commodity released unintentionally (Barrels):	.11
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):	
11. Estimated volume of commodity recovered (Barrels):	
12. Were there fatalities?	No
- If Yes, specify the number in each category:	
12a. Operator employees	
12b. Contractor employees working for the Operator	
12c. Non-Operator emergency responders	
12d. Workers working on the right-of-way, but NOT associated with this Operator	
12e. General public	
12f. Total fatalities (sum of above)	
13. Were there injuries requiring inpatient hospitalization?	No
- If Yes, specify the number in each category:	
13a. Operator employees	
13b. Contractor employees working for the Operator	
13c. Non-Operator emergency responders	

13d. Workers working on the right-of-way, but NOT associated with this Operator	
13e. General public	
13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	Yes
- If No, Explain:	
- If Yes, complete Questions 14a and 14b: *(use local time, 24-hr clock)*	
14a. Local time and date of shutdown:	05/21/2010 14:00
14b. Local time pipeline/facility restarted:	05/27/2010 09:00
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	No
16. Did the commodity explode?	No
17. Number of general public evacuated:	
18. Time sequence *(use local time, 24-hour clock)*:	
18a. Local time Operator identified Accident:	
18b. Local time Operator resources arrived on site:	

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the origin of Accident onshore?	Yes
If Yes, Complete Questions (2-12)	
If No, Complete Questions (13-15)	
- If Onshore:	
2. State:	South Dakota
3. Zip Code:	57322
4. City	Carpenter
5. County or Parish	Beadle
6. Operator-designated location:	Milepost/Valve Station
Specify:	311.0
7. Pipeline/Facility name:	Carpenter Pump Station
8. Segment name/ID:	Glacial Lakes
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Totally contained on Operator-controlled property
11. Area of Accident (as found):	Underground
Specify:	Under soil
- If Other, Describe:	
Depth-of-Cover (in):	96
12. Did Accident occur in a crossing?	No
- If Yes, specify below:	
- If Bridge crossing –	
Cased/ Uncased:	
- If Railroad crossing –	
Cased/ Uncased/ Bored/drilled	
- If Road crossing –	
Cased/ Uncased/ Bored/drilled	
- If Water crossing –	
Cased/ Uncased	
- Name of body of water, if commonly known:	
- Approx. water depth (ft) at the point of the Accident:	
- Select:	
- If Offshore:	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- On the Outer Continental Shelf (OCS) - Specify:	
- Area:	
- Block #:	
15. Area of Accident:	

PART C - ADDITIONAL FACILITY INFORMATION

1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Pump/Meter Station Equipment and Piping
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	
3. Item involved in Accident:	Valve

- If Pipe, specify:	
3a. Nominal diameter of pipe (in):	
3b. Wall thickness (in):	
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	
3d. Pipe specification:	
3e. Pipe Seam , specify:	
- If Other, Describe:	
3f. Pipe manufacturer:	
3g. Year of manufacture:	
3h. Pipeline coating type at point of Accident, specify:	
- If Other, Describe:	
- If Weld, including heat-affected zone, specify:	
- If Other, Describe:	
- If Valve, specify:	Mainline
- If Mainline, specify:	Ball
- If Other, Describe:	
3i. Manufactured by:	Cameron
3j. Year of manufacture:	2009
- If Tank/Vessel, specify:	
- If Other - Describe:	
- If Other, describe:	
4. Year item involved in Accident was installed:	2009
5. Material involved in Accident:	Carbon Steel
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Leak
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	Connection Failure
- If Other, Describe:	
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	

PART D - ADDITIONAL CONSEQUENCE INFORMATION

1. Wildlife impact:	No
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	Yes
3. Long term impact assessment performed or planned:	No
4. Anticipated remediation:	No
4a. If Yes, specify all that apply:	
- Surface water	
- Groundwater	
- Soil	
- Vegetation	
- Wildlife	
5. Water contamination:	No
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	
- Groundwater	
- Drinking water: *(Select one or both)*	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	
5c. Name of body of water, if commonly known:	
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	No
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	No
7a. If Yes, specify HCA type(s): *(Select all that apply)*	
- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect"	

determination for this Accident site in the Operator's Integrity Management Program?	
- High Population Area:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Other Populated Area	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Drinking Water	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Ecological	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
8. Estimated Property Damage:	
8a. Estimated cost of public and non-Operator private property damage	$ 0
8b. Estimated cost of commodity lost	$ 8
8c. Estimated cost of Operator's property damage & repairs	$ 2,500
8d. Estimated cost of Operator's emergency response	$ 155,000
8e. Estimated cost of Operator's environmental remediation	$ 50,000
8f. Estimated other costs	$ 0
Describe:	
8g. Total estimated property damage (sum of above)	$ 207,508

PART E - ADDITIONAL OPERATING INFORMATION

1. Estimated pressure at the point and time of the Accident (psig):	500.00
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	1,440.00
3. Describe the pressure on the system or facility relating to the Accident (psig):	Pressure did not exceed MOP
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	No
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	No
- If Yes - (*Complete 5a. – 5e. below)*	
5a. Type of upstream valve used to initially isolate release source:	
5b. Type of downstream valve used to initially isolate release source:	
5c. Length of segment isolated between valves (ft):	
5d. Is the pipeline configured to accommodate internal inspection tools?	
- If No, Which physical features limit tool accommodation? (*select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	
- If Yes, Which operational factors complicate execution? (*select all that apply*)	
- Excessive debris or scale, wax, or other wall buildup	

- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	> 20% SMYS Regulated Trunkline/Transmission
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	No
If Yes -	
6a. Was it operating at the time of the Accident?	
6b. Was it fully functional at the time of the Accident?	
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	No
- If Yes:	
7a. Was it operating at the time of the Accident?	
7b. Was it fully functional at the time of the Accident?	
7c. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	
7d. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	
8. How was the Accident initially identified for the Operator?	Local Operating Personnel, including contractors
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Guard Patrol by Operator or its contractor" is selected in Question 8, specify the following:	Operator employee
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	No, the facility was not monitored by a controller(s) at the time of the Accident
- If No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)*	
- If Yes, specify investigation result(s): *(select all that apply)*	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
Provide an explanation for why not:	
- Investigation identified no control room issues	
- Investigation identified no controller issues	
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above:	
Describe:	

PART F - DRUG & ALCOHOL TESTING INFORMATION

1. As a result of this Accident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
1a. Specify how many were tested:	
1b. Specify how many failed:	

2. As a result of this Accident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
2a. Specify how many were tested:	
2b. Specify how many failed:	

PART G – APPARENT CAUSE

Select only one box from PART G in shaded column on left representing the APPARENT Cause of the Accident, and answer the questions on the right. Describe secondary, contributing or root causes of the Accident in the narrative (PART H).

Apparent Cause:	G6 - Equipment Failure
G1 - Corrosion Failure - only one **sub-cause** can be picked from shaded left-hand column	
External Corrosion:	
Internal Corrosion:	
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground?	
- If Yes :	
4a. Was failed item considered to be under cathodic protection at the time of the Accident?	
If Yes - Year protection started:	
4b. Was shielding, tenting, or disbonding of coating evident at the point of the Accident?	
4c. Has one or more Cathodic Protection Survey been conducted at the point of the Accident?	
If "Yes, CP Annual Survey" – Most recent year conducted:	
If "Yes, Close Interval Survey" – Most recent year conducted:	
If "Yes, Other CP Survey" – Most recent year conducted:	
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	
- If Internal Corrosion:	
6. Results of visual examination:	
- Other:	
7. Type of corrosion *(select all that apply)*: -	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	
- Erosion	
- Other:	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following *(select all that apply)*: -	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
9. Location of corrosion *(select all that apply)*: -	
- Low point in pipe	
- Elbow	
- Other:	

- If Other, Describe:	
10. Was the commodity treated with corrosion inhibitors or biocides?	
11. Was the interior coated or lined with protective coating?	
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	
13. Were corrosion coupons routinely utilized?	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Tank/Vessel.	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
15. Has one or more internal inspection tool collected data at the point of the Accident?	
15a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage Tool	
Most recent year:	
- Ultrasonic	
Most recent year:	
- Geometry	
Most recent year:	
- Caliper	
Most recent year:	
- Crack	
Most recent year:	
- Hard Spot	
Most recent year:	
- Combination Tool	
Most recent year:	
- Transverse Field/Triaxial	
Most recent year:	
- Other	
Most recent year:	
Describe:	
16. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
If Yes -	
Most recent year tested:	
Test pressure:	
17. Has one or more Direct Assessment been conducted on this segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident::	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
18a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G2 - Natural Force Damage - only one **sub-cause** can be picked from shaded left-handed column	
Natural Force Damage – Sub-Cause:	
- If Earth Movement, NOT due to Heavy Rains/Floods:	
1. Specify:	

- If Other, Describe:	
- If Heavy Rains/Floods:	
2. Specify:	
- If Other, Describe:	
- If Lightning:	
3. Specify:	
- If Temperature:	
4. Specify:	
- If Other, Describe:	
- If High Winds:	
- If Other Natural Force Damage:	
5. Describe:	
Complete the following if any Natural Force Damage sub-cause is selected.	
6. Were the natural forces causing the Accident generated in conjunction with an extreme weather event?	
6a. If Yes, specify: *(select all that apply)*	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Describe:	
G3 - Excavation Damage - only one **sub-cause** can be picked from shaded left-hand column	
Excavation Damage – Sub-Cause:	
- If Excavation Damage by Operator (First Party):	
- If Excavation Damage by Operator's Contractor (Second Party):	
- If Excavation Damage by Third Party:	
- If Previous Damage due to Excavation Activity:	
Complete Questions 1-5 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
1. Has one or more internal inspection tool collected data at the point of the Accident?	
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
4. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	

5. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
5a. If Yes, for each examination, conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
Complete the following if Excavation Damage by Third Party is selected as the sub-cause.	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from: *(select all that apply)* -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: *(select all that apply)* -	
- Public	
- If "Public", Specify:	
- Private	
- If "Private", Specify:	
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks visible in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption (hours)	
17. Description of the CGA-DIRT Root Cause *(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):*	
Root Cause:	
- If One-Call Notification Practices Not Sufficient, specify:	
- If Locating Practices Not Sufficient, specify:	
- If Excavation Practices Not Sufficient, specify:	
- If Other/None of the Above, explain:	
G4 - Other Outside Force Damage - *only one **sub-cause** can be selected from the shaded left-hand column*	
Other Outside Force Damage – Sub-Cause:	
- If Nearby Industrial, Man-made, or Other Fire/Explosion as Primary Cause of Incident:	
- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:	
1. Vehicle/Equipment operated by:	
- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring:	

2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Heavy Rains/Flood	
- Other	
- If Other, Describe:	
- If Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation:	
- If Electrical Arcing from Other Equipment or Facility:	
- If Previous Mechanical Damage NOT Related to Excavation:	
Complete Questions 3-7 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
3. Has one or more internal inspection tool collected data at the point of the Accident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
6. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
7. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
- If Intentional Damage:	
8. Specify:	
- If Other, Describe:	
- If Other Outside Force Damage:	
9. Describe:	

G5 - Material Failure of Pipe or Weld - only one **sub-cause** can be selected from the shaded left-hand column	
Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."	
Material Failure of Pipe or Weld – Sub-Cause:	
1. The sub-cause selected below is based on the following: *(select all that apply)*	
- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Original Manufacturing-related (NOT girth weld or other welds formed in the field):	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related:	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Environmental Cracking-related:	
3. Specify:	
- Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional factors: (*select all that apply*):	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Describe:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	

Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
7. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident -	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site -	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G6 – Equipment Failure - only one **sub-cause** can be selected from the shaded left-hand column	
Equipment Failure – Sub-Cause:	Threaded Connection/Coupling Failure
- If Malfunction of Control/Relief Equipment:	
1. Specify: *(select all that apply)* -	
- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	
- Relief Valve	
- Power Failure	
- Stopple/Control Fitting	
- ESD System Failure	
- Other	
- If Other – Describe:	
- If Pump or Pump-related Equipment:	
2. Specify:	
- If Other – Describe:	
- If Threaded Connection/Coupling Failure:	
3. Specify:	Threaded Fitting
- If Other – Describe:	
- If Non-threaded Connection Failure:	
4. Specify:	
- If Other – Describe:	
- If Defective or Loose Tubing or Fitting:	
- If Failure of Equipment Body (except Pump), Tank Plate, or other Material:	
- If Other Equipment Failure:	
5. Describe:	
Complete the following if any Equipment Failure sub-cause is selected.	
6. Additional factors that contributed to the equipment failure: *(select all that apply)*	
- Excessive vibration	
- Overpressurization	
- No support or loss of support	
- Manufacturing defect	

- Loss of electricity	
- Improper installation	Yes
- Mismatched items (different manufacturer for tubing and tubing fittings)	
- Dissimilar metals	
- Breakdown of soft goods due to compatibility issues with transported commodity	
- Valve vault or valve can contributed to the release	
- Alarm/status failure	
- Misalignment	Yes
- Thermal stress	
- Other	
- If Other, Describe:	

G7 - Incorrect Operation - only one **sub-cause** can be selected from the shaded left-hand column

Incorrect Operation – Sub-Cause:	
Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage	
Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow	
1. Specify:	
- If Other, Describe:	
Valve Left or Placed in Wrong Position, but NOT Resulting in a Tank, Vessel, or Sump/Separator Overflow or Facility Overpressure	
Pipeline or Equipment Overpressured	
Equipment Not Installed Properly	
Wrong Equipment Specified or Installed	
Other Incorrect Operation	
2. Describe:	
Complete the following if any Incorrect Operation sub-cause is selected.	
3. Was this Accident related to *(select all that apply)*: -	
- Inadequate procedure	
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	

G8 - Other Accident Cause - only one **sub-cause** can be selected from the shaded left-hand column

Other Accident Cause – Sub-Cause:	
- If Miscellaneous:	
1. Describe:	
- If Unknown:	
2. Specify:	

PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT

TransCanada Keystone regional operations staff discovered signs of crude oil within the vicinity of the station by-pass, station discharge and station suction valves located at the Carpenter pump station. The facility was isolated and the station valves were excavated. The excavation revealed that a threaded 1½¿union on the body bleed piping assembly on the pump station suction valve was leaking. The body bleed assembly piping was removed and the port plugged. The repair plan for the body bleed assembly piping is addressed in the Keystone Valve Body Repair Plan which is attached.

File Full Name

PART I - PREPARER AND AUTHORIZED SIGNATURE

Preparer's Name	Daniel Cerkoney
Preparer's Title	Regulatory Compliance Specialist
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Preparer's E-mail Address	dan_cerkoney@transcanada.com
Preparer's Facsimile Number	7014831431
Authorized Signature's Name	Daniel Cerkoney
Authorized Signature Title	Regulatory Compiance Specialist
Authorized Signature Telephone Number	7014831434
Authorized Signature Email	dan_cerkoney@transcanada.com
Date	04/03/2013

NOTICE: This report is required by 49 CFR Part 195. Failure to report can result in a civil penalty not to exceed $100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122.	OMB NO: 2137-0047 EXPIRATION DATE: 01/31/2014

U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	**Original Report Date:**	08/05/2010
	No.	20100166 - 17790 --- (DOT Use Only)

ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS

INSTRUCTIONS

Important: *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline.*

PART A - KEY REPORT INFORMATION

Report Type: *(select all that apply)*	**Original:**	**Supplemental:**	**Final:**
		Yes	**Yes**

Last Revision Date:	04/03/2013
1. Operator's OPS-issued Operator Identification Number (OPID):	32334
2. Name of Operator	TC OIL PIPELINE OPERATIONS INC
3. Address of Operator:	
3a. Street Address	717 TEXAS AVE
3b. City	HOUSTON
3c. State	Texas
3d. Zip Code	77002
4. Local time *(24-hr clock)* and date of the Accident:	06/23/2010 12:00
5. Location of Accident:	
Latitude:	43.965346
Longitude:	-97.694305
6. National Response Center Report Number (if applicable):	945213
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	06/23/2010 17:00
8. Commodity released: *(select only one, based on predominant volume released)*	Crude Oil
- Specify Commodity Subtype:	
- If "Other" Subtype, Describe:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Ethanol Blend, then % Ethanol Blend: %:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Biodiesel, then Biodiesel Blend (e.g. B2, B20, B100): B	
9. Estimated volume of commodity released unintentionally (Barrels):	2.38
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):	
11. Estimated volume of commodity recovered (Barrels):	2.38
12. Were there fatalities?	No
- If Yes, specify the number in each category:	
12a. Operator employees	
12b. Contractor employees working for the Operator	
12c. Non-Operator emergency responders	
12d. Workers working on the right-of-way, but NOT associated with this Operator	
12e. General public	
12f. Total fatalities (sum of above)	
13. Were there injuries requiring inpatient hospitalization?	No
- If Yes, specify the number in each category:	
13a. Operator employees	
13b. Contractor employees working for the Operator	
13c. Non-Operator emergency responders	

13d. Workers working on the right-of-way, but NOT associated with this Operator	
13e. General public	
13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	No
- If No, Explain:	Isolated at the pump station, sump pump
- If Yes, complete Questions 14a and 14b: *(use local time, 24-hr clock)*	
14a. Local time and date of shutdown:	
14b. Local time pipeline/facility restarted:	
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	No
16. Did the commodity explode?	No
17. Number of general public evacuated:	0
18. Time sequence *(use local time, 24-hour clock)*:	
18a. Local time Operator identified Accident:	06/23/2010 12:00
18b. Local time Operator resources arrived on site:	06/23/2010 12:00

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the origin of Accident onshore?	Yes
If Yes, Complete Questions (2-12)	
If No, Complete Questions (13-15)	
- If Onshore:	
2. State:	South Dakota
3. Zip Code:	57349
4. City	Howard
5. County or Parish	Miner
6. Operator-designated location:	Milepost/Valve Station
Specify:	358.3
7. Pipeline/Facility name:	Roswell Pump Station
8. Segment name/ID:	Glacial Lakes
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Totally contained on Operator-controlled property
11. Area of Accident (as found):	Aboveground
Specify:	Typical aboveground facility piping or appurtenance
- If Other, Describe:	
Depth-of-Cover (in):	
12. Did Accident occur in a crossing?	No
- If Yes, specify below:	
- If Bridge crossing –	
Cased/ Uncased:	
- If Railroad crossing –	
Cased/ Uncased/ Bored/drilled	
- If Road crossing –	
Cased/ Uncased/ Bored/drilled	
- If Water crossing –	
Cased/ Uncased	
- Name of body of water, if commonly known:	
- Approx. water depth (ft) at the point of the Accident:	
- Select:	
- If Offshore:	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- On the Outer Continental Shelf (OCS) - Specify:	
- Area:	
- Block #:	
15. Area of Accident:	

PART C - ADDITIONAL FACILITY INFORMATION

1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Pump/Meter Station Equipment and Piping
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	
3. Item involved in Accident:	Pump

- If Pipe, specify:	
3a. Nominal diameter of pipe (in):	
3b. Wall thickness (in):	
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	
3d. Pipe specification:	
3e. Pipe Seam , specify:	
- If Other, Describe:	
3f. Pipe manufacturer:	
3g. Year of manufacture:	
3h. Pipeline coating type at point of Accident, specify:	
- If Other, Describe:	
- If Weld, including heat-affected zone, specify:	
- If Other, Describe:	
- If Valve, specify:	
- If Mainline, specify:	
- If Other, Describe:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	
- If Other - Describe:	
- If Other, describe:	
4. Year item involved in Accident was installed:	2009
5. Material involved in Accident:	Carbon Steel
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Leak
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	Connection Failure
- If Other, Describe:	
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	

PART D - ADDITIONAL CONSEQUENCE INFORMATION

1. Wildlife impact:	No
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	Yes
3. Long term impact assessment performed or planned:	No
4. Anticipated remediation:	Yes
4a. If Yes, specify all that apply:	
- Surface water	
- Groundwater	
- Soil	Yes
- Vegetation	
- Wildlife	
5. Water contamination:	No
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	
- Groundwater	
- Drinking water: *(Select one or both)*	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	
5c. Name of body of water, if commonly known:	
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	No
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	No
7a. If Yes, specify HCA type(s): *(Select all that apply)*	
- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect"	

determination for this Accident site in the Operator's Integrity Management Program?	
- High Population Area:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Other Populated Area	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Drinking Water	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Ecological	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
8. Estimated Property Damage:	
8a. Estimated cost of public and non-Operator private property damage	$ 0
8b. Estimated cost of commodity lost	$ 167
8c. Estimated cost of Operator's property damage & repairs	$ 250
8d. Estimated cost of Operator's emergency response	$ 5,000
8e. Estimated cost of Operator's environmental remediation	$ 25,000
8f. Estimated other costs	$ 0
Describe:	
8g. Total estimated property damage (sum of above)	$ 30,417

PART E - ADDITIONAL OPERATING INFORMATION

1. Estimated pressure at the point and time of the Accident (psig):	500.00
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	1,440.00
3. Describe the pressure on the system or facility relating to the Accident (psig):	Pressure did not exceed MOP
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	No
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	No
- If Yes - (*Complete 5a. – 5e. below)*	
5a. Type of upstream valve used to initially isolate release source:	
5b. Type of downstream valve used to initially isolate release source:	
5c. Length of segment isolated between valves (ft):	
5d. Is the pipeline configured to accommodate internal inspection tools?	
- If No, Which physical features limit tool accommodation? (*select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	
- If Yes, Which operational factors complicate execution? (*select all that apply*)	
- Excessive debris or scale, wax, or other wall buildup	

- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	> 20% SMYS Regulated Trunkline/Transmission
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	Yes
If Yes -	
6a. Was it operating at the time of the Accident?	Yes
6b. Was it fully functional at the time of the Accident?	Yes
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	No
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	No
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	Yes
- If Yes:	
7a. Was it operating at the time of the Accident?	Yes
7b. Was it fully functional at the time of the Accident?	Yes
7c. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	No
7d. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	No
8. How was the Accident initially identified for the Operator?	Local Operating Personnel, including contractors
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Guard Patrol by Operator or its contractor" is selected in Question 8, specify the following:	Operator employee
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: (provide an explanation for why the Operator did not investigate)
- If No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)*	The sump pump was in manual operation by the local operations personnel at the time of the accident.
- If Yes, specify investigation result(s): *(select all that apply)*	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
Provide an explanation for why not:	
- Investigation identified no control room issues	
- Investigation identified no controller issues	
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above:	
Describe:	

PART F - DRUG & ALCOHOL TESTING INFORMATION

1. As a result of this Accident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
1a. Specify how many were tested:	
1b. Specify how many failed:	

2. As a result of this Accident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
2a. Specify how many were tested:	
2b. Specify how many failed:	

PART G – APPARENT CAUSE

Select only one box from PART G in shaded column on left representing the APPARENT Cause of the Accident, and answer the questions on the right. Describe secondary, contributing or root causes of the Accident in the narrative (PART H).

Apparent Cause:	G6 - Equipment Failure

G1 - Corrosion Failure - only one **sub-cause** can be picked from shaded left-hand column

External Corrosion:	
Internal Corrosion:	
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground?	
- If Yes :	
4a. Was failed item considered to be under cathodic protection at the time of the Accident?	
If Yes - Year protection started:	
4b. Was shielding, tenting, or disbonding of coating evident at the point of the Accident?	
4c. Has one or more Cathodic Protection Survey been conducted at the point of the Accident?	
If "Yes, CP Annual Survey" – Most recent year conducted:	
If "Yes, Close Interval Survey" – Most recent year conducted:	
If "Yes, Other CP Survey" – Most recent year conducted:	
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	
- If Internal Corrosion:	
6. Results of visual examination:	
- Other:	
7. Type of corrosion *(select all that apply)*: -	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	
- Erosion	
- Other:	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following *(select all that apply)*: -	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
9. Location of corrosion *(select all that apply)*: -	
- Low point in pipe	
- Elbow	
- Other:	

- If Other, Describe:	
10. Was the commodity treated with corrosion inhibitors or biocides?	
11. Was the interior coated or lined with protective coating?	
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	
13. Were corrosion coupons routinely utilized?	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Tank/Vessel.	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
15. Has one or more internal inspection tool collected data at the point of the Accident?	
15a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage Tool	
Most recent year:	
- Ultrasonic	
Most recent year:	
- Geometry	
Most recent year:	
- Caliper	
Most recent year:	
- Crack	
Most recent year:	
- Hard Spot	
Most recent year:	
- Combination Tool	
Most recent year:	
- Transverse Field/Triaxial	
Most recent year:	
- Other	
Most recent year:	
Describe:	
16. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
If Yes -	
Most recent year tested:	
Test pressure:	
17. Has one or more Direct Assessment been conducted on this segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident::	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
18a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G2 - Natural Force Damage - only one **sub-cause** can be picked from shaded left-handed column	
Natural Force Damage – Sub-Cause:	
- If Earth Movement, NOT due to Heavy Rains/Floods:	
1. Specify:	

- If Other, Describe:	
- If Heavy Rains/Floods:	
2. Specify:	
- If Other, Describe:	
- If Lightning:	
3. Specify:	
- If Temperature:	
4. Specify:	
- If Other, Describe:	
- If High Winds:	
- If Other Natural Force Damage:	
5. Describe:	
Complete the following if any Natural Force Damage sub-cause is selected.	
6. Were the natural forces causing the Accident generated in conjunction with an extreme weather event?	
6a. If Yes, specify: *(select all that apply)*	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Describe:	
G3 - Excavation Damage - only one **sub-cause** can be picked from shaded left-hand column	
Excavation Damage – Sub-Cause:	
- If Excavation Damage by Operator (First Party):	
- If Excavation Damage by Operator's Contractor (Second Party):	
- If Excavation Damage by Third Party:	
- If Previous Damage due to Excavation Activity:	
Complete Questions 1-5 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
1. Has one or more internal inspection tool collected data at the point of the Accident?	
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
4. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	

5. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
5a. If Yes, for each examination, conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
Complete the following if Excavation Damage by Third Party is selected as the sub-cause.	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from: *(select all that apply)* -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: *(select all that apply)* -	
- Public	
- If "Public", Specify:	
- Private	
- If "Private", Specify:	
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks visible in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption (hours)	
17. Description of the CGA-DIRT Root Cause *(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):*	
Root Cause:	
- If One-Call Notification Practices Not Sufficient, specify:	
- If Locating Practices Not Sufficient, specify:	
- If Excavation Practices Not Sufficient, specify:	
- If Other/None of the Above, explain:	
G4 - Other Outside Force Damage - *only one **sub-cause** can be selected from the shaded left-hand column*	
Other Outside Force Damage – Sub-Cause:	
- If Nearby Industrial, Man-made, or Other Fire/Explosion as Primary Cause of Incident:	
- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:	
1. Vehicle/Equipment operated by:	
- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring:	

2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Heavy Rains/Flood	
- Other	
- If Other, Describe:	
- If Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation:	
- If Electrical Arcing from Other Equipment or Facility:	
- If Previous Mechanical Damage NOT Related to Excavation:	
Complete Questions 3-7 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
3. Has one or more internal inspection tool collected data at the point of the Accident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
6. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
7. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
- If Intentional Damage:	
8. Specify:	
- If Other, Describe:	
- If Other Outside Force Damage:	
9. Describe:	

G5 - Material Failure of Pipe or Weld - only one **sub-cause** can be selected from the shaded left-hand column	
Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."	
Material Failure of Pipe or Weld – Sub-Cause:	
1. The sub-cause selected below is based on the following: *(select all that apply)*	
- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Original Manufacturing-related (NOT girth weld or other welds formed in the field):	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related:	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Environmental Cracking-related:	
3. Specify:	
- Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional factors: (*select all that apply*):	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Describe:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	

Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
7. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident -	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site -	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G6 – Equipment Failure - only one **sub-cause** can be selected from the shaded left-hand column	
Equipment Failure – Sub-Cause:	Threaded Connection/Coupling Failure
- If Malfunction of Control/Relief Equipment:	
1. Specify: *(select all that apply)* -	
- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	
- Relief Valve	
- Power Failure	
- Stopple/Control Fitting	
- ESD System Failure	
- Other	
- If Other – Describe:	
- If Pump or Pump-related Equipment:	
2. Specify:	
- If Other – Describe:	
- If Threaded Connection/Coupling Failure:	
3. Specify:	Pipe Nipple
- If Other – Describe:	
- If Non-threaded Connection Failure:	
4. Specify:	
- If Other – Describe:	
- If Defective or Loose Tubing or Fitting:	
- If Failure of Equipment Body (except Pump), Tank Plate, or other Material:	
- If Other Equipment Failure:	
5. Describe:	
Complete the following if any Equipment Failure sub-cause is selected.	
6. Additional factors that contributed to the equipment failure: *(select all that apply)*	
- Excessive vibration	
- Overpressurization	
- No support or loss of support	
- Manufacturing defect	

- Loss of electricity	
- Improper installation	Yes
- Mismatched items (different manufacturer for tubing and tubing fittings)	
- Dissimilar metals	
- Breakdown of soft goods due to compatibility issues with transported commodity	
- Valve vault or valve can contributed to the release	
- Alarm/status failure	
- Misalignment	
- Thermal stress	
- Other	
- If Other, Describe:	

G7 - Incorrect Operation - only one **sub-cause** can be selected from the shaded left-hand column

Incorrect Operation – Sub-Cause:	
Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage	
Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow	
1. Specify:	
- If Other, Describe:	
Valve Left or Placed in Wrong Position, but NOT Resulting in a Tank, Vessel, or Sump/Separator Overflow or Facility Overpressure	
Pipeline or Equipment Overpressured	
Equipment Not Installed Properly	
Wrong Equipment Specified or Installed	
Other Incorrect Operation	
2. Describe:	
Complete the following if any Incorrect Operation sub-cause is selected.	
3. Was this Accident related to *(select all that apply)*: -	
- Inadequate procedure	
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	

G8 - Other Accident Cause - only one **sub-cause** can be selected from the shaded left-hand column

Other Accident Cause – Sub-Cause:	
- If Miscellaneous:	
1. Describe:	
- If Unknown:	
2. Specify:	

PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT

The location of the release is a pump station owned and operated by TransCanada Keystone Pipeline, LP (TransCanada). The pump station is in a rural area located at approximately three miles south of Roswell, South Dakota. The release of petroleum was entirely contained on TransCanada property. The release occurred from a loose fitting on an above ground damper system associated with an injection pump. Oil was released from the loose fitting for an approximate 3 second period until the system was manually shut down. An estimated 100 gallons of oil sprayed over an area of approximately 60 feet by 110 feet within the pump station location. TransCanada personnel were onsite at time of the oil release, the injector pump was immediately shut down

and containment and recovery activities initiated. A maintenance team mobilized to the site upon notification of the release on June 23, 2010 at 12 noon CDT. The pulsation dampener on the injection pump was removed and visually inspected. The inspection revealed the threaded nipple was not installed properly and was not the correct length. The threaded nipple on the pulsation dampener was replaced.

File Full Name

PART I - PREPARER AND AUTHORIZED SIGNATURE

Preparer's Name	Daniel Cerkoney
Preparer's Title	Manager Regulatory Compliance
Preparer's Telephone Number	7012901176
Preparer's E-mail Address	dan_cerkoney@transcanada.com
Preparer's Facsimile Number	7014831431
Authorized Signature's Name	Daniel Cerkoney
Authorized Signature Title	Manager Regulatory Compliance
Authorized Signature Telephone Number	7136936466
Authorized Signature Email	dan_cerkoney@transcanada.com
Date	04/03/2013

DENR FILE #: 2010.126

WRITTEN CONTAMINATION INCIDENT FOLLOW-UP REPORT
(Page 1 of 2)

RETURN COMPLETED FORM TO

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
GROUND WATER QUALITY PROGRAM
JOE FOSS BUILDING
523 EAST CAPITOL AVENUE
PIERRE SD 57501-3182

SITE NAME: TransCanada Keystone Pipeline-Roswell Pump Station

SPILL LOCATION: 42592 236th Street, Roswell, SD

LATITUDE: 43.965346 LONGITUDE : -97.694305

LEGAL LOCATION (TOWNSHIP/RANGE): SE 1/4 SEC.20, T106N, R57W

RESPONSIBLE PARTY: TransCanada Keystone Pipeline, LP

MAILING ADDRESS: 13710 FNB Parkway

CITY: Omaha STATE : NE ZIP: 68154

TELEPHONE: _____ (HOME) (402) 492-7300 (WORK)

DATE OF SPILL OR WHEN DETECTED: 6/23/2010 TIME: 12 noon, CDT

WHAT WAS THE DURATION OF THE RELEASE? Approx. 3 seconds of oil spray on 6/23/2010

SUBSTANCE(S) RELEASED: Crude Oil

QUANTITY RELEASED: Approximately 100 gallons

CHEMICAL NAME: Canadian Sour Crude CAS #: _____
CAS # 8002.05.09
_____

IS SUBSTANCE ON THE "SARA 302 LIST"?	YES	NO ✓	DON'T KNOW
"CERCLA HAZARDOUS SUBSTANCE LIST"?	YES	NO ✓	DON'T KNOW
"SOUTH DAKOTA REGULATED SUBSTANCE"?	YES ✓	NO	DON'T KNOW

CONSULTANT: URS Corporation

IDENTIFY KNOWN HEALTH RISKS: None known

WHAT PERTINENT MEDICAL ADVICE WAS ISSUED? None required

LAND USE (RESIDENTIAL, INDUSTRIAL, RURAL, OTHER): Rural

UTILITIES INVESTIGATED (WATER, SEWER, TELEPHONE, CATV, STORM WATER, OTHER):

Release occurred in rural setting. No utilities.

FOLLOW-UP REPORT CONTINUED
(Page 2 of 2)

DENR FILE #: 2010.126

ENVIRONMENTAL MEDIA IMPACTED (SURFACE SOIL, SUBSURFACE SOIL > 3' BELOW GROUND, GROUND WATER, SURFACE WATER, INDOOR AIR, OUTDOOR AIR, ETC.):

Surface soil and surface rain water only.

DISTANCE TO AND NAME OF CLOSEST SURFACE WATER OR DRAINAGE:

Road ditch along 236th Street with Twin Lakes 1 mile west of site.

DEPTH/DISTANCE TO AND NAME OF CLOSEST AQUIFER: 25-50 feet/0 feet to Floyd Aquifer

DEPTH/DISTANCE TO NEAREST DRINKING WATERWELL: Suspect farm 2 miles south

CUBIC YARDS OF SOIL EXCAVATED/TREATED: Approximately 200

WAS FREE PHASE OR POOLED PRODUCT PRESENT? Yes

DIMENSIONS OF EXCAVATION: 60 ft. by 110 ft.

CONTAMINATED MATERIALS DISPOSAL SITE: Waste Management-Spruce Ridge LF

DATE MATERIAL WAS DISPOSED OF: To be determined. Scheduled for late July, 2010.

IMMEDIATE CORRECTIVE ACTION TAKEN AND ADDITIONAL WORK PLANNED:

See attached text.

FORM COMPLETED BY: Hubert Huls, URS Corporation DATE: July 20, 2010

Safety-Kleen Systems, Inc.

5360 Legacy Drive,
Building 2, Suite 100
Plano, Texas 75024
800-669-5740
605-332-0231

CUSTOMER# 10014347 TRANSCANADA KEYSTONE PIPELINE
19051 415TH AVENUE
CARPENTER SD 57322
PHONE 402-492-7464

REFERENCE NBR.
51385840
SRVC WEEK: 2010-28
SRVC DATE: 07/09/10 16:56

PURCHASE ORDER# rswl ps

TAX EXEMPTION NBR

PRODUCT/SERVICES

SERVICE/ PRODUCT		QTY	UNIT PRICE	TAX	TOTAL CHARGE
40423593/ 66666	VACUUM SVC LIQ (PQUAL) SERVICE TERM 52 VAC PH TEST: 8	2500.000	0.0000	0.00	0.00
10901	VAC SVS SERVICEFEE 1	1.000	87.0000	3.48	90.48
10970	FEE, VAC SVC NO SOLIDS	2500.000	0.9500	0.04	2375.04
	TOTAL SERVICE/PRODUCTS		87.9500	98.48	2560.48

TOTAL CHARGE 2560.48
CREDITS 0.00
TOTAL DUE 2560.48

UNPAID BALANCE THIS RECEIPT 2560.48

Per SK BOG M420-001 the halogen detecting instrument has been zeroed and validated.

GENERATOR STATUS
CESQG: Non-vehicle

Customer certifies that (i) the above-named materials are properly classified, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and (ii) no material change has occurred either in the characteristics of the waste/material or in the process generating the waste/material. Customer agrees to pay the above charges and to be bound by the terms and conditions (1) set forth in (a) the General Terms and Conditions provided separately to Customer or (b) any SK agreement signed by Customer and SK, and (2) incorporated herein by reference. Unless otherwise indicated in the payment received section, SK is authorized to charge Customer's account for this transaction. Customer certifies that the individual signing this Service Acknowledgement is duly authorized to sign and bind Customer. The following provision is applicable to Safety-Kleen's parts cleaner and paint gun cleaner services: Customer agrees that it will not introduce any substance into the solvent or aqueous cleaning solution, including without limitation any hazardous waste or hazardous waste constituent, except to the extent such introduction is incidental to the normal use of the machine. Customer further agrees that it will not clean parts/paint guns that have been contaminated with or otherwise introduce polychlorinated biphenyls (PCB's), herbicides, pesticides, dioxins or listed hazardous waste into the solvent or aqueous cleaning solution. Safety-Kleen has the capacity and is permitted to accept, store, and/or reclaim the spent parts washer solvent; paint thinners, solvents and paints generated by customer; or dry cleaning filter cartridges, powder, and still residues containing perchloroethylene, petroleum naphtha, or trifluorotrichloroethane dry cleaning solvents. Safety-Kleen and customer agree that this agreement is intended to satisfy the requirements of 40 CFR 262.20(e). IN THE EVENT OF AN EMERGENCY CALL 1-800-468-1760 (24 hours)

X

CUSTOMER / GENERATOR :bob baumgartner

X

TRANSPORTER :bgalvin

The location of the release is a pump station owned and operated by TransCanada Keystone Pipeline, LP (TransCanada). The pump station is in a rural area located at 42592 236th Street near the intersection with 426th Avenue (Figure 1), approximately three miles south of Roswell, South Dakota. The release of petroleum was entirely contained on TransCanada property.

The release occurred from a loose fitting on an above ground damper system associated with an injection pump. Oil was released from the loose fitting for an approximate 3 second period until the system was manually shut down. An estimated 100 gallons of oil sprayed over an area of approximately 60 feet by 110 feet within the pump station location.

TransCanada personnel were onsite at time of the oil release, the injector pump was immediately shut down and containment and recovery activities initiated. A maintenance team mobilized to the site upon notification of the release on June 23, 2010 at 12 noon CDT. A vac truck, skid-steer loader, hydrovac, and other equipment were mobilized to the site along with qualified response team personnel.

The site had been exposed to heavy rainfall prior to the release event. As such, saturated conditions were encountered below grade in the surface gravel at the site. The area of the spill was de-watered using shallow excavation sumps constructed to prevent the spread of product along the ground surface. Collected free product was pumped from shallow surface sumps and 80 gallons was recovered during initial response operations. Collected product was transferred to the on-site sump tank. Oily water was collected via vacuum truck and transported offsite for storage and proper disposal at a permitted facility.

Residual oil had accumulated around pipelines, cable racks, pump foundations and other structures, and over a portion of the gravel covered pump station yard. Visually stained soils were excavated around the structures using a hydrovac truck and the stained gravel yard area was scraped using an excavator. Impacted soil was placed in roll-off containers for later transfer to an approved landfill facility. All excavations were less than three feet in depth and groundwater was not encountered.

Soils were screened using a photoionization detector (PID) with 10.6 eV lamp after excavation and hydrovac removal activities to determine the required limits of excavation. In addition, the scraped surface yard was screened using the PID. This included four potholes locations dug to confirm clean conditions. Confirmation soil samples were collected at eight locations after excavation was completed. Sampling and PID screening locations and excavation areas are shown in Figures 2 and 3. Confirmation sample ROS-8 is a composite of three discrete samples collected in the south grass mowed area as shown in Figure 2.

The field PID screening and laboratory analytical results for benzene, toluene, ethylbenzene and xylenes (BTEX), naphthalene, and Total Petroleum Hydrocarbons as Diesel (TPH-Diesel) are summarized on Table 1 and Table 2. In addition, two composite

waste soil samples were collected from the soil stockpiles and laboratory analysis results are shown in Table 2.

Based on field observations, measurements, and analytical data, the response excavation efforts have mitigated impacts to the surface and subsurface soils to below SD DENR Tier 1 action levels for BTEX, naphthalene, and TPH-Diesel. The excavated areas have been backfilled with clean material and no additional work is planned.

A total of 2,500 gallons of oily water was transported on July 7, 2010 by Safety-Kleen Systems for disposal at ESI in Indianapolis, IN. A receipt from Safety –Kleen is attached to this submittal. A total of approximately 200 cubic yards of impacted soil was stockpiled in roll-off containers and is waiting transport to the disposal landfill. The soils are planned to be hauled during late July, 2010 to the Waste Management –Spruce Ridge Landfill for disposal. Waste manifests and landfill tickets will be sent to SD DENR when disposal is completed.

Table 1 - Laboratory Analysis Soil Verification
TransCanada Keystone Pipeline
Roswell Pump Station; Roswell, South Dakota

Location	Units	ROS-1	ROS-2	ROS-3	ROS-4	ROS-5	ROS-6	ROS-7	ROS-8-COMP	Tier 1 Action Level
Sample Date		6/27/10	6/27/10	6/27/10	6/27/10	6/27/10	6/27/10	6/27/10	6/28/10	
Lithology		Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Top soil	
Depth	(feet)	<3	<3	<3	<3	<3	<3	<3	<3	
PID	(ppm)*	0.20	0.20	0.35	2.55	36.00	2.35	0.60	0.0	
Chemical of Concern										
Benzene	µg/kg	<23.4	<25.1	<24.2	<22.0	<22.0	<23.4	<22.1	<25.9	200
Ethylbenzene	µg/kg	<58.5	<62.8	<60.4	<55.0	<55.0	<58.4	<55.2	<64.9	1,500
Toluene	µg/kg	<58.5	<62.8	<60.4	<55.0	<55.0	<58.4	<55.2	<64.9	1,000
Xylene (Total)	µg/kg	<176	<189	<181	<165	<165	<175	<165	<195	300,000
Naphthalene	µg/kg	<234	<251	<242	<220	<220	<234	<221	<259	25,000
Diesel Components	mg/kg	<11.5	<12.6	<13.3	<11.2	20	<11.5	<11.0	<13.2	500**

NOTES: mg/kg = Milligrams per kilogram, equivalent to parts per million (ppm) dry weight
µg/kg= Micrograms per kilogram dry weight
<x = Not detected to reporting limits of x
* = Total organic vapors (ppm as benzene)
** = Tier 1 "Trigger Level" for total petroleum hydrocarbons
COMP = Composite of three samples
< 3= less than three feet of excavation

Table 2 - Yard (Pothole) Area PID Screening and Waste Soil Analysis
TransCanada Keystone Pipeline
Roswell Pump Station; Roswell, South Dakota

Location	Units	East-1 Pothole	East-2 Pothole	South-3 Pothole	West-4 Pothole	GS-75	GS-30	ROS-1 Waste Comp	ROS-2 Waste Comp	Tier 1 Action Level
Sample Date		6/26/10	6/26/10	6/26/10	6/26/10	6/25/10	6/25/10	6/30/10	6/30/10	
Lithology		Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	
Depth	(feet)	<3	<3	<3	<3	<3	<3			
PID	(ppm)*	0.00	0.00	0.00	0.00	0.00	0.00			
Chemical of Concern										
Benzene	µg/kg							<22.0	<22.1	200
Ethylbenzene	µg/kg							208	<55.2	1,500
Toluene	µg/kg							104	<55.2	1,000
Xylene (Total)	µg/kg							1280	280	300,000
Diesel Components	mg/kg							895	1510	500**

NOTES: mg/kg = Milligrams per kilogram, equivalent to parts per million (ppm) dry weight
<x = Not detected to reporting limits of x
* = Total organic vapors (ppm as benzene)
** = Tier 1 "Trigger Level" for total petroleum hydrocarbons
COMP = Composite of several samples
< 3= less than three feet of excavation

Safety-Kleen Systems, Inc.

5360 Legacy Drive,
Building 2, Suite 100
Plano, Texas 75024
800-669-5740
605-332-0231

CUSTOMER# 10014347 TRANSCANADA KEYSTONE PIPELINE
19051 415TH AVENUE
CARPENTER SD 57322
PHONE 402-492-7464

REFERENCE NBR 51385840
SRVC WEEK: 2010-28
SRVC DATE: 07/09/10 16:56

PURCHASE ORDER# rswl ps

TAX EXEMPTION NBR

PRODUCT/SERVICES

SERVICE/ PRODUCT		QTY	UNIT PRICE	TAX	TOTAL CHARGE
40423593/ 66666	VACUUM SVC LIQ (PQUAL) SERVICE TERM 52 VAC PH TEST: 8	2500.000	0.0000	0.00	0.00
10901	VAC SVS SERVICEFEE 1	1.000	87.0000	3.48	90.48
10970	FEE, VAC SVC NO SOLIDS	2500.000	0.9500	0.04	2375.04
	TOTAL SERVICE/PRODUCTS		87.9500	98.48	2560.48

TOTAL CHARGE 2560.48
CREDITS 0.00
TOTAL DUE 2560.48

UNPAID BALANCE THIS RECEIPT 2560.48

Per SK BOG M420-001 the halogen detecting instrument has been zeroed and validated.

GENERATOR STATUS
CESQG: Non-vehicle

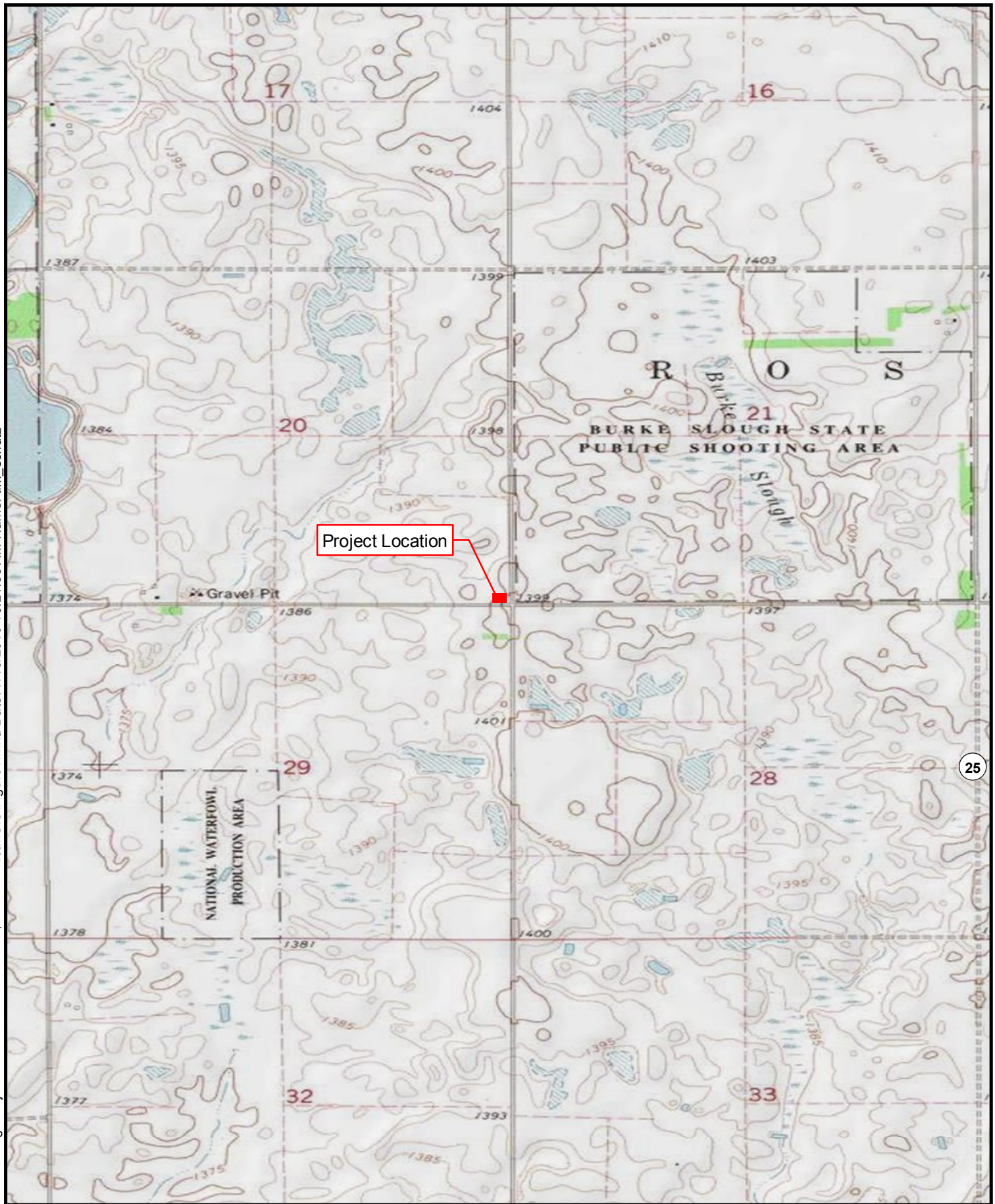
Customer certifies that (i) the above-named materials are properly classified, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and (ii) no material change has occurred either in the characteristics of the waste/material or in the process generating the waste/material. Customer agrees to pay the above charges and to be bound by the terms and conditions (1) set forth in (a) the General Terms and Conditions provided separately to Customer or (b) any SK agreement signed by Customer and SK, and (2) incorporated herein by reference. Unless otherwise indicated in the payment received section, SK is authorized to charge Customer's account for this transaction. Customer certifies that the individual signing this Service Acknowledgement is duly authorized to sign and bind Customer. The following provision is applicable to Safety-Kleen's parts cleaner and paint gun cleaner services: Customer agrees that it will not introduce any substance into the solvent or aqueous cleaning solution, including without limitation any hazardous waste or hazardous waste constituent, except to the extent such introduction is incidental to the normal use of the machine. Customer further agrees that it will not clean parts/paint guns that have been contaminated with or otherwise introduce polychlorinated biphenyls (PCB's), herbicides, pesticides, dioxins or listed hazardous waste into the solvent or aqueous cleaning solution. Safety-Kleen has the capacity and is permitted to accept, store, and/or reclaim the spent parts washer solvent; paint thinners, solvents and paints generated by customer; or dry cleaning filter cartridges, powder, and still residues containing perchloroethylene, petroleum naphtha, or trifluorotrichloroethane dry cleaning solvents. Safety-Kleen and customer agree that this agreement is intended to satisfy the requirements of 40 CFR 262.20(e). IN THE EVENT OF AN EMERGENCY CALL 1-800-468-1760 (24 hours)

X

CUSTOMER / GENERATOR :bob baumgartner

X

TRANSPORTER :bgalvin



URS Corporation V:\Envir Mngt\Projects\TransCanada\Roswell, SD\Technical\GIS\Figure1.mxd Date: 7/15/2010 10:21:36 AM Name: tim_schutz

2,000
Feet

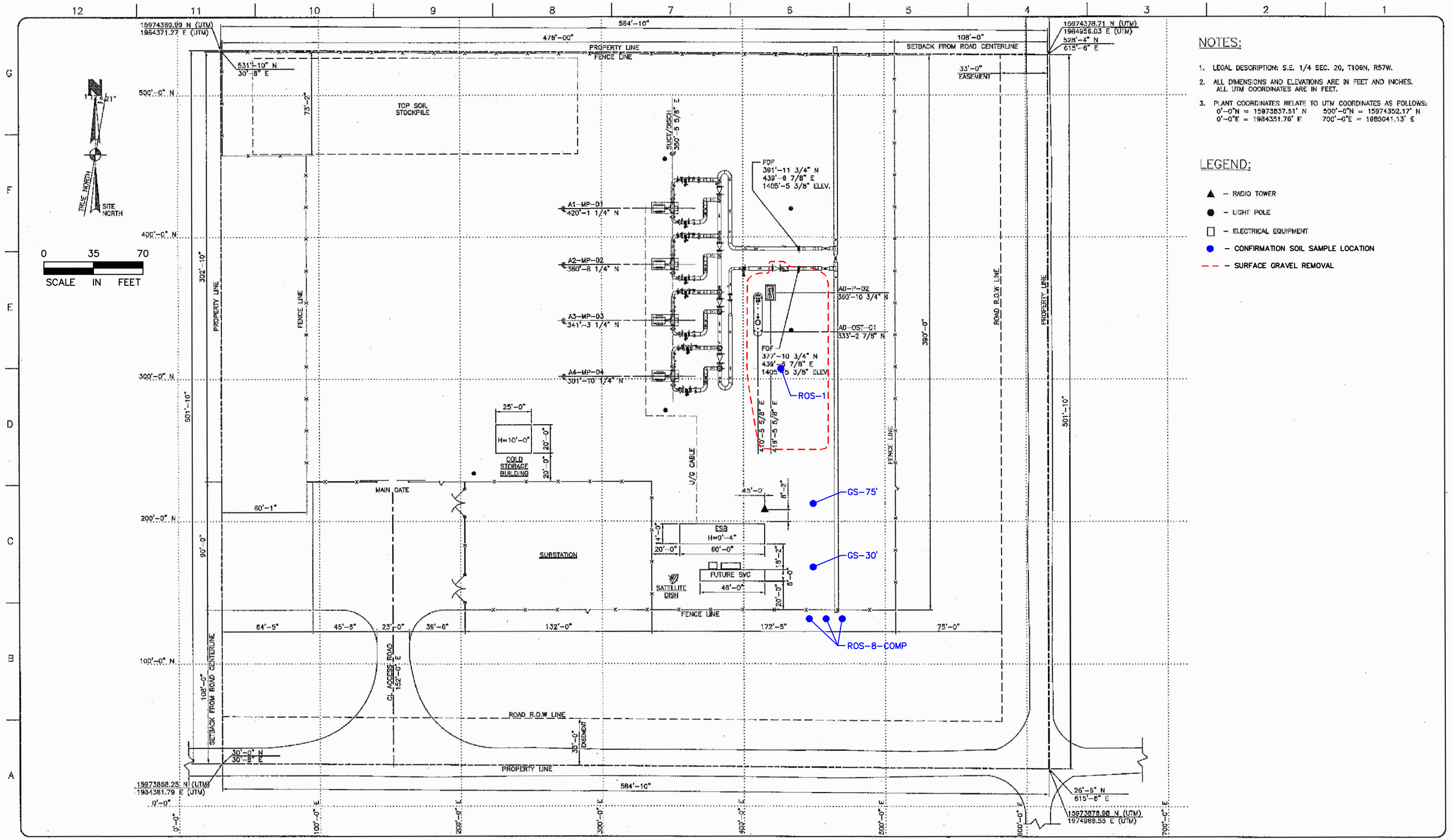
Source:
USGS Bitter Lake, SD.
Quad dated 1973

SITE LOCATION MAP
TRANSCANADA KEYSTONE PIPELINE
ROSWELL, SOUTH DAKOTA

URS

Fifth Street Towers
100 South Fifth Street,
Suite 1500
Minneapolis, MN 55402
612.370.0700 Tel
612.370.1378 Fax

DRN BY:	TS	DATE:	5/17/10	PROJECT NO.	FIG. NO.
CHK'D BY:	HH	DATE:	5/17/10	31810187	1



NOTES:

1. LEGAL DESCRIPTION: S.E. 1/4 SEC. 20, T106N, R57W.
2. ALL DIMENSIONS AND ELEVATIONS ARE IN FEET AND INCHES. ALL UTM COORDINATES ARE IN FEET.
3. PLANT COORDINATES RELATE TO UTM COORDINATES AS FOLLOWS:
   0'-0"N = 15973837.51' N 500'-0"N = 15974352.17' N
   0'-0"E = 1984351.76' E 700'-0"E = 1985041.13' E

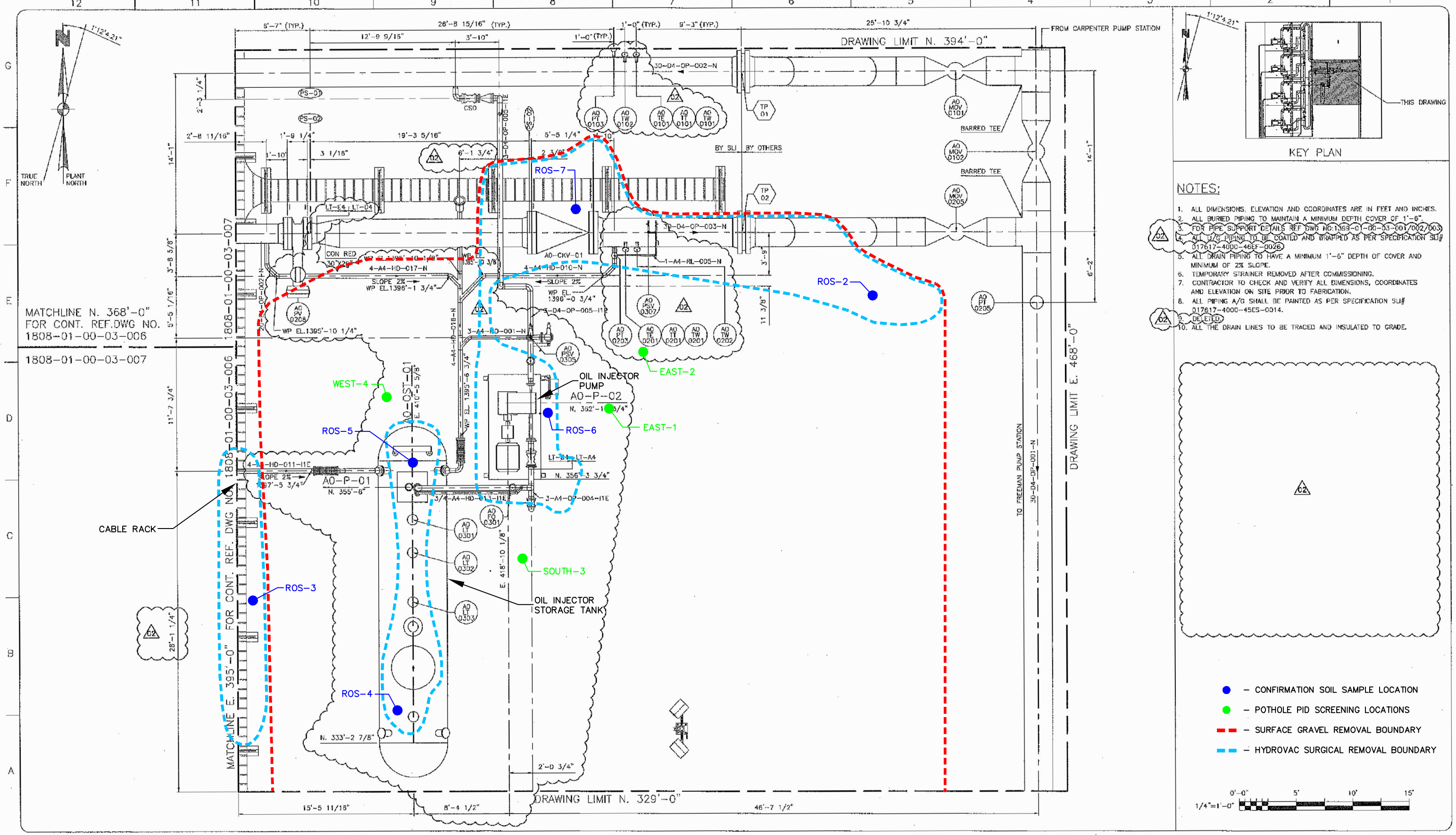
LEGEND:

- ▲ – RADIO TOWER
- ● – LIGHT POLE
- □ – ELECTRICAL EQUIPMENT
- ● – CONFIRMATION SOIL SAMPLE LOCATION
- – – – SURFACE GRAVEL REMOVAL

PLOT PLAN
SOIL SAMPLING LOCATIONS & YARD REMOVAL AREA
TRANSCANADA KEYSTONE PIPELINE
ROSWELL, SOUTH DAKOTA

URS
FIFTH STREET TOWERS
100 SOUTH FIFTH STREET
SUITE 1500
MINNEAPOLIS, MINNESOTA 55402
612.370.0700 TEL
612.370.1378 FAX
URSCORP.COM

DRN BY:	TS	DATE:	7/15/10	PROJECT NO.	FIG NO.
CHK'D BY:	HH	DATE:	7/15/10	31810187	2



NOTES:

1. ALL DIMENSIONS, ELEVATION AND COORDINATES ARE IN FEET AND INCHES.
2. ALL BURIED PIPING TO MAINTAIN A MINIMUM DEPTH COVER OF 1'-6".
3. FOR PIPE SUPPORT DETAILS REF DWG NO:1393-01-00-03-001/002/003
4. ALL U/G PIPING TO BE COATED AND WRAPPED AS PER SPECIFICATION SLI# 017617-4000-46EF-0026
5. ALL DRAIN PIPING TO HAVE A MINIMUM 1'-6" DEPTH OF COVER AND MINIMUM OF 2% SLOPE.
6. TEMPORARY STRAINER REMOVED AFTER COMMISSIONING.
7. CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS, COORDINATES AND ELEVATION ON SITE PRIOR TO FABRICATION.
8. ALL PIPING A/G SHALL BE PAINTED AS PER SPECIFICATION SLI# 017617-4000-45ES-0014.
9. DELETED
10. ALL THE DRAIN LINES TO BE TRACED AND INSULATED TO GRADE.

- – CONFIRMATION SOIL SAMPLE LOCATION
- – POTHOLE PID SCREENING LOCATIONS
- – SURFACE GRAVEL REMOVAL BOUNDARY
- – HYDROVAC SURGICAL REMOVAL BOUNDARY

1/4"=1'-0" 0'-0" 5' 10' 15'

PLOT DATE: Nov 26, 2007 2:22pm DISK FILE NAME: (15.06) V:\Envir Mngt\Projects\TransCanada\Roswell, SD\Technical\CADD\Figure3.dwg

URS

FIFTH STREET TOWERS
100 SOUTH FIFTH STREET
SUITE 1500
MINNEAPOLIS, MINNESOTA 55402
612.370.0700 TEL
612.370.1378 FAX
URSCORP.COM

PUMPING STATION PLAN
SOIL SAMPLING, PID SCREENING LOCATIONS & EXCAVATION AREAS
TRANSCANADA KEYSTONE PIPELINE
ROSWELL, SOUTH DAKOTA

DRN BY: TS	DATE: 7/15/10	PROJECT NO.	FIG NO.
CHK'D BY: HH	DATE: 7/15/10	31810187	3

NOTICE: This report is required by 49 CFR Part 195. Failure to report can result in a civil penalty not to exceed $100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122.	OMB NO: 2137-0047 EXPIRATION DATE: 01/31/2014

U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	**Original Report Date:**	09/16/2010
	No.	20100200 - 17789 --- (DOT Use Only)

ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS

INSTRUCTIONS

Important: *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline.*

PART A - KEY REPORT INFORMATION

Report Type: *(select all that apply)*	**Original:**	**Supplemental:**	**Final:**
		Yes	**Yes**

Last Revision Date:	04/03/2013
1. Operator's OPS-issued Operator Identification Number (OPID):	32334
2. Name of Operator	TC OIL PIPELINE OPERATIONS INC
3. Address of Operator:	
3a. Street Address	717 TEXAS AVE
3b. City	HOUSTON
3c. State	Texas
3d. Zip Code	77002
4. Local time *(24-hr clock)* and date of the Accident:	08/19/2010 08:30
5. Location of Accident:	
Latitude:	42.63521
Longitude:	-97.3371
6. National Response Center Report Number (if applicable):	951480
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	08/19/2010 12:30
8. Commodity released: *(select only one, based on predominant volume released)*	Crude Oil
- Specify Commodity Subtype:	
- If "Other" Subtype, Describe:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Ethanol Blend, then % Ethanol Blend: %:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Biodiesel, then Biodiesel Blend (e.g. B2, B20, B100): B	
9. Estimated volume of commodity released unintentionally (Barrels):	.24
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):	
11. Estimated volume of commodity recovered (Barrels):	.24
12. Were there fatalities?	No
- If Yes, specify the number in each category:	
12a. Operator employees	
12b. Contractor employees working for the Operator	
12c. Non-Operator emergency responders	
12d. Workers working on the right-of-way, but NOT associated with this Operator	
12e. General public	
12f. Total fatalities (sum of above)	
13. Were there injuries requiring inpatient hospitalization?	No
- If Yes, specify the number in each category:	
13a. Operator employees	
13b. Contractor employees working for the Operator	
13c. Non-Operator emergency responders	

13d. Workers working on the right-of-way, but NOT associated with this Operator	
13e. General public	
13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	No
- If No, Explain:	Pump station off line during release.
- If Yes, complete Questions 14a and 14b: *(use local time, 24-hr clock)*	
14a. Local time and date of shutdown:	
14b. Local time pipeline/facility restarted:	
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	No
16. Did the commodity explode?	No
17. Number of general public evacuated:	0
18. Time sequence *(use local time, 24-hour clock)*:	
18a. Local time Operator identified Accident:	08/19/2010 08:30
18b. Local time Operator resources arrived on site:	08/19/2010 08:30

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the origin of Accident onshore?	Yes
If Yes, Complete Questions (2-12)	
If No, Complete Questions (13-15)	
- If Onshore:	
2. State:	Nebraska
3. Zip Code:	68739
4. City	Hartington
5. County or Parish	Cedar
6. Operator-designated location:	Milepost/Valve Station
Specify:	454.9
7. Pipeline/Facility name:	Hartington Pump Station
8. Segment name/ID:	Glacial Lakes
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Totally contained on Operator-controlled property
11. Area of Accident (as found):	Aboveground
Specify:	Typical aboveground facility piping or appurtenance
- If Other, Describe:	
Depth-of-Cover (in):	
12. Did Accident occur in a crossing?	No
- If Yes, specify below:	
- If Bridge crossing –	
Cased/ Uncased:	
- If Railroad crossing –	
Cased/ Uncased/ Bored/drilled	
- If Road crossing –	
Cased/ Uncased/ Bored/drilled	
- If Water crossing –	
Cased/ Uncased	
- Name of body of water, if commonly known:	
- Approx. water depth (ft) at the point of the Accident:	
- Select:	
- If Offshore:	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- On the Outer Continental Shelf (OCS) - Specify:	
- Area:	
- Block #:	
15. Area of Accident:	

PART C - ADDITIONAL FACILITY INFORMATION

1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Pump/Meter Station Equipment and Piping
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	
3. Item involved in Accident:	Instrumentation

- If Pipe, specify:	
3a. Nominal diameter of pipe (in):	
3b. Wall thickness (in):	
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	
3d. Pipe specification:	
3e. Pipe Seam , specify:	
- If Other, Describe:	
3f. Pipe manufacturer:	
3g. Year of manufacture:	
3h. Pipeline coating type at point of Accident, specify:	
- If Other, Describe:	
- If Weld, including heat-affected zone, specify:	
- If Other, Describe:	
- If Valve, specify:	
- If Mainline, specify:	
- If Other, Describe:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	
- If Other - Describe:	
- If Other, describe:	
4. Year item involved in Accident was installed:	2009
5. Material involved in Accident:	Carbon Steel
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Leak
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	Seal or Packing
- If Other, Describe:	
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	

PART D - ADDITIONAL CONSEQUENCE INFORMATION

1. Wildlife impact:	No
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	Yes
3. Long term impact assessment performed or planned:	No
4. Anticipated remediation:	Yes
4a. If Yes, specify all that apply:	
- Surface water	
- Groundwater	
- Soil	Yes
- Vegetation	
- Wildlife	
5. Water contamination:	No
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	
- Groundwater	
- Drinking water: *(Select one or both)*	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	
5c. Name of body of water, if commonly known:	
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	No
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	No
7a. If Yes, specify HCA type(s): *(Select all that apply)*	
- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect"	

determination for this Accident site in the Operator's Integrity Management Program?	
- High Population Area:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Other Populated Area	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Drinking Water	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Ecological	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
8. Estimated Property Damage:	
8a. Estimated cost of public and non-Operator private property damage	$ 0
8b. Estimated cost of commodity lost	$ 18
8c. Estimated cost of Operator's property damage & repairs	$ 0
8d. Estimated cost of Operator's emergency response	$ 5,000
8e. Estimated cost of Operator's environmental remediation	$ 28,000
8f. Estimated other costs	$ 0
Describe:	
8g. Total estimated property damage (sum of above)	$ 33,018

PART E - ADDITIONAL OPERATING INFORMATION

1. Estimated pressure at the point and time of the Accident (psig):	500.00
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	1,440.00
3. Describe the pressure on the system or facility relating to the Accident (psig):	Pressure did not exceed MOP
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	No
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	No
- If Yes - (*Complete 5a. – 5e. below)*	
5a. Type of upstream valve used to initially isolate release source:	
5b. Type of downstream valve used to initially isolate release source:	
5c. Length of segment isolated between valves (ft):	
5d. Is the pipeline configured to accommodate internal inspection tools?	
- If No, Which physical features limit tool accommodation? (*select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	
- If Yes, Which operational factors complicate execution? (*select all that apply*)	
- Excessive debris or scale, wax, or other wall buildup	

- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	> 20% SMYS Regulated Trunkline/Transmission
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	Yes
If Yes -	
6a. Was it operating at the time of the Accident?	Yes
6b. Was it fully functional at the time of the Accident?	Yes
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	No
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	No
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	Yes
- If Yes:	
7a. Was it operating at the time of the Accident?	Yes
7b. Was it fully functional at the time of the Accident?	Yes
7c. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	No
7d. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	No
8. How was the Accident initially identified for the Operator?	Local Operating Personnel, including contractors
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Guard Patrol by Operator or its contractor" is selected in Question 8, specify the following:	Operator employee
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: (provide an explanation for why the Operator did not investigate)
- If No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)*	The pump station was off line at the time of the release and the CPM leak detection system was inactive. The Oil conrol center controllers did not have ermote control of the pump and did not contribute to the release.
- If Yes, specify investigation result(s): *(select all that apply)*	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
Provide an explanation for why not:	
- Investigation identified no control room issues	
- Investigation identified no controller issues	
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above:	
Describe:	

PART F - DRUG & ALCOHOL TESTING INFORMATION

1. As a result of this Accident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
1a. Specify how many were tested:	

1b. Specify how many failed:	
2. As a result of this Accident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
2a. Specify how many were tested:	
2b. Specify how many failed:	

PART G – APPARENT CAUSE

Select only one box from PART G in shaded column on left representing the APPARENT Cause of the Accident, and answer the questions on the right. Describe secondary, contributing or root causes of the Accident in the narrative (PART H).

Apparent Cause:	G6 - Equipment Failure
G1 - Corrosion Failure - only one **sub-cause** can be picked from shaded left-hand column	
External Corrosion:	
Internal Corrosion:	
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground?	
- If Yes :	
4a. Was failed item considered to be under cathodic protection at the time of the Accident?	
If Yes - Year protection started:	
4b. Was shielding, tenting, or disbonding of coating evident at the point of the Accident?	
4c. Has one or more Cathodic Protection Survey been conducted at the point of the Accident?	
If "Yes, CP Annual Survey" – Most recent year conducted:	
If "Yes, Close Interval Survey" – Most recent year conducted:	
If "Yes, Other CP Survey" – Most recent year conducted:	
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	
- If Internal Corrosion:	
6. Results of visual examination:	
- Other:	
7. Type of corrosion *(select all that apply)*: -	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	
- Erosion	
- Other:	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following *(select all that apply)*: -	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
9. Location of corrosion *(select all that apply)*: -	
- Low point in pipe	
- Elbow	

- Other:	
- If Other, Describe:	
10. Was the commodity treated with corrosion inhibitors or biocides?	
11. Was the interior coated or lined with protective coating?	
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	
13. Were corrosion coupons routinely utilized?	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Tank/Vessel.	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
15. Has one or more internal inspection tool collected data at the point of the Accident?	
15a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage Tool	
Most recent year:	
- Ultrasonic	
Most recent year:	
- Geometry	
Most recent year:	
- Caliper	
Most recent year:	
- Crack	
Most recent year:	
- Hard Spot	
Most recent year:	
- Combination Tool	
Most recent year:	
- Transverse Field/Triaxial	
Most recent year:	
- Other	
Most recent year:	
Describe:	
16. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
If Yes -	
Most recent year tested:	
Test pressure:	
17. Has one or more Direct Assessment been conducted on this segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident::	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
18a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G2 - Natural Force Damage - only one **sub-cause** can be picked from shaded left-handed column	
Natural Force Damage – Sub-Cause:	
- If Earth Movement, NOT due to Heavy Rains/Floods:	

1. Specify:	
- If Other, Describe:	
- If Heavy Rains/Floods:	
2. Specify:	
- If Other, Describe:	
- If Lightning:	
3. Specify:	
- If Temperature:	
4. Specify:	
- If Other, Describe:	
- If High Winds:	
- If Other Natural Force Damage:	
5. Describe:	
Complete the following if any Natural Force Damage sub-cause is selected.	
6. Were the natural forces causing the Accident generated in conjunction with an extreme weather event?	
6a. If Yes, specify: *(select all that apply)*	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Describe:	
G3 - Excavation Damage - only one **sub-cause** can be picked from shaded left-hand column	
Excavation Damage – Sub-Cause:	
- If Excavation Damage by Operator (First Party):	
- If Excavation Damage by Operator's Contractor (Second Party):	
- If Excavation Damage by Third Party:	
- If Previous Damage due to Excavation Activity:	
Complete Questions 1-5 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
1. Has one or more internal inspection tool collected data at the point of the Accident?	
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
4. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	

Most recent year conducted:	
5. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
5a. If Yes, for each examination, conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
Complete the following if Excavation Damage by Third Party is selected as the sub-cause.	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from: *(select all that apply)* -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: *(select all that apply)* -	
- Public	
- If "Public", Specify:	
- Private	
- If "Private", Specify:	
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks visible in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption (hours)	
17. Description of the CGA-DIRT Root Cause *(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):*	
Root Cause:	
- If One-Call Notification Practices Not Sufficient, specify:	
- If Locating Practices Not Sufficient, specify:	
- If Excavation Practices Not Sufficient, specify:	
- If Other/None of the Above, explain:	
G4 - Other Outside Force Damage - *only one **sub-cause** can be selected from the shaded left-hand column*	
Other Outside Force Damage – Sub-Cause:	
- If Nearby Industrial, Man-made, or Other Fire/Explosion as Primary Cause of Incident:	
- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:	
1. Vehicle/Equipment operated by:	
- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost	

Their Mooring:	
2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Heavy Rains/Flood	
- Other	
- If Other, Describe:	
- If Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation:	
- If Electrical Arcing from Other Equipment or Facility:	
- If Previous Mechanical Damage NOT Related to Excavation:	
Complete Questions 3-7 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
3. Has one or more internal inspection tool collected data at the point of the Accident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
6. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
7. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
- If Intentional Damage:	
8. Specify:	
- If Other, Describe:	
- If Other Outside Force Damage:	

9. Describe:	
G5 - Material Failure of Pipe or Weld - only one **sub-cause** can be selected from the shaded left-hand column	
Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."	
Material Failure of Pipe or Weld – Sub-Cause:	
1. The sub-cause selected below is based on the following: *(select all that apply)*	
- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Original Manufacturing-related (NOT girth weld or other welds formed in the field):	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related:	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Environmental Cracking-related:	
3. Specify:	
- Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional factors: (*select all that apply*):	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Describe:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	

Most recent year run:	
Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
7. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident -	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site -	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G6 – Equipment Failure - only one **sub-cause** can be selected from the shaded left-hand column	
Equipment Failure – Sub-Cause:	Malfunction of Control/Relief Equipment
- If Malfunction of Control/Relief Equipment:	
1. Specify: *(select all that apply)* -	
- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	Yes
- Relief Valve	
- Power Failure	
- Stopple/Control Fitting	
- ESD System Failure	
- Other	
- If Other – Describe:	
- If Pump or Pump-related Equipment:	
2. Specify:	
- If Other – Describe:	
- If Threaded Connection/Coupling Failure:	
3. Specify:	
- If Other – Describe:	
- If Non-threaded Connection Failure:	
4. Specify:	
- If Other – Describe:	
- If Defective or Loose Tubing or Fitting:	
- If Failure of Equipment Body (except Pump), Tank Plate, or other Material:	
- If Other Equipment Failure:	
5. Describe:	
Complete the following if any Equipment Failure sub-cause is selected.	
6. Additional factors that contributed to the equipment failure: *(select all that apply)*	
- Excessive vibration	
- Overpressurization	
- No support or loss of support	

- Manufacturing defect	
- Loss of electricity	
- Improper installation	
- Mismatched items (different manufacturer for tubing and tubing fittings)	
- Dissimilar metals	
- Breakdown of soft goods due to compatibility issues with transported commodity	
- Valve vault or valve can contributed to the release	
- Alarm/status failure	
- Misalignment	
- Thermal stress	
- Other	Yes
- If Other, Describe:	Debris in the check valve

G7 - Incorrect Operation - only one **sub-cause** can be selected from the shaded left-hand column

Incorrect Operation – Sub-Cause:	
Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage	
Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow	
1. Specify:	
- If Other, Describe:	
Valve Left or Placed in Wrong Position, but NOT Resulting in a Tank, Vessel, or Sump/Separator Overflow or Facility Overpressure	
Pipeline or Equipment Overpressured	
Equipment Not Installed Properly	
Wrong Equipment Specified or Installed	
Other Incorrect Operation	
2. Describe:	
Complete the following if any Incorrect Operation sub-cause is selected.	
3. Was this Accident related to *(select all that apply)*: -	
- Inadequate procedure	
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	

G8 - Other Accident Cause - only one **sub-cause** can be selected from the shaded left-hand column

Other Accident Cause – Sub-Cause:	
- If Miscellaneous:	
1. Describe:	
- If Unknown:	
2. Specify:	

PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT

The 1/2" check valve stuck open on the pressure transmitter on the suction side of the pump resulting in a release of crude oil through the Ralston test port. The threaded dust cap on the check valve was not installed at the time of release. Site remediation completed.

File Full Name

PART I - PREPARER AND AUTHORIZED SIGNATURE

Preparer's Name	Daniel Cerkoney
Preparer's Title	Regulatory Compliance Specialist
Preparer's Telephone Number	7012901176
Preparer's E-mail Address	dan_cerkoney@transcanada.com
Preparer's Facsimile Number	7014831431
Authorized Signature's Name	Daniel Cerkoney
Authorized Signature Title	Regulatory Compiance Specialist
Authorized Signature Telephone Number	7014831434
Authorized Signature Email	dan_cerkoney@transcanada.com
Date	04/03/2013

NOTICE: This report is required by 49 CFR Part 195. Failure to report can result in a civil penalty not to exceed $100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122.	OMB NO: 2137-0047 EXPIRATION DATE: 01/31/2014

U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	**Original Report Date:**	03/01/2011
	No.	20110062 - 17788 --- (DOT Use Only)

ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0047. Public reporting for this collection of information is estimated to be approximately 10 hours per response (5 hours for a small release), including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.

INSTRUCTIONS

Important: *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline.*

PART A - KEY REPORT INFORMATION

Report Type: *(select all that apply)*	**Original:**	**Supplemental:**	**Final:**
		Yes	**Yes**

Last Revision Date:	04/03/2013
1. Operator's OPS-issued Operator Identification Number (OPID):	32334
2. Name of Operator	TC OIL PIPELINE OPERATIONS INC
3. Address of Operator:	
3a. Street Address	717 TEXAS AVE
3b. City	HOUSTON
3c. State	Texas
3d. Zip Code	77002
4. Local time *(24-hr clock)* and date of the Accident:	01/30/2011 19:00
5. Location of Accident:	
Latitude:	39.60887
Longitude:	-94.3214
6. National Response Center Report Number (if applicable):	966126
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	01/31/2011 07:00
8. Commodity released: *(select only one, based on predominant volume released)*	Crude Oil
- Specify Commodity Subtype:	
- If "Other" Subtype, Describe:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Ethanol Blend, then % Ethanol Blend: %:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Biodiesel, then Biodiesel Blend (e.g. B2, B20, B100): B	
9. Estimated volume of commodity released unintentionally (Barrels):	.24
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):	
11. Estimated volume of commodity recovered (Barrels):	.24
12. Were there fatalities?	No
- If Yes, specify the number in each category:	
12a. Operator employees	
12b. Contractor employees working for the Operator	
12c. Non-Operator emergency responders	
12d. Workers working on the right-of-way, but NOT associated with this Operator	
12e. General public	
12f. Total fatalities (sum of above)	
13. Were there injuries requiring inpatient hospitalization?	No
- If Yes, specify the number in each category:	
13a. Operator employees	
13b. Contractor employees working for the Operator	
13c. Non-Operator emergency responders	

13d. Workers working on the right-of-way, but NOT associated with this Operator	
13e. General public	
13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	Yes
- If No, Explain:	
- If Yes, complete Questions 14a and 14b: *(use local time, 24-hr clock)*	
14a. Local time and date of shutdown:	01/30/2011 19:00
14b. Local time pipeline/facility restarted:	01/31/2011 12:00
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	No
16. Did the commodity explode?	No
17. Number of general public evacuated:	0
18. Time sequence *(use local time, 24-hour clock)*:	
18a. Local time Operator identified Accident:	01/30/2011 19:00
18b. Local time Operator resources arrived on site:	01/31/2011 07:00

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the origin of Accident onshore?	Yes
If Yes, Complete Questions (2-12)	
If No, Complete Questions (13-15)	
- If Onshore:	
2. State:	Missouri
3. Zip Code:	64493
4. City	Turney
5. County or Parish	Clinton
6. Operator-designated location:	Milepost/Valve Station
Specify:	787.17
7. Pipeline/Facility name:	Turney Pump Station
8. Segment name/ID:	Gateway
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Totally contained on Operator-controlled property
11. Area of Accident (as found):	Aboveground
Specify:	
- If Other, Describe:	
Depth-of-Cover (in):	
12. Did Accident occur in a crossing?	
- If Yes, specify below:	
- If Bridge crossing –	
Cased/ Uncased:	
- If Railroad crossing –	
Cased/ Uncased/ Bored/drilled	
- If Road crossing –	
Cased/ Uncased/ Bored/drilled	
- If Water crossing –	
Cased/ Uncased	
- Name of body of water, if commonly known:	
- Approx. water depth (ft) at the point of the Accident:	
- Select:	
- If Offshore:	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- On the Outer Continental Shelf (OCS) - Specify:	
- Area:	
- Block #:	
15. Area of Accident:	

PART C - ADDITIONAL FACILITY INFORMATION

1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Pump/Meter Station Equipment and Piping
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	
3. Item involved in Accident:	Pump

- If Pipe, specify:	
3a. Nominal diameter of pipe (in):	
3b. Wall thickness (in):	
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	
3d. Pipe specification:	
3e. Pipe Seam , specify:	
- If Other, Describe:	
3f. Pipe manufacturer:	
3g. Year of manufacture:	
3h. Pipeline coating type at point of Accident, specify:	
- If Other, Describe:	
- If Weld, including heat-affected zone, specify:	
- If Other, Describe:	
- If Valve, specify:	
- If Mainline, specify:	
- If Other, Describe:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	
- If Other - Describe:	
- If Other, describe:	
4. Year item involved in Accident was installed:	
5. Material involved in Accident:	
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Overfill or Overflow
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	
- If Other, Describe:	
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	

PART D - ADDITIONAL CONSEQUENCE INFORMATION

1. Wildlife impact:	
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	
3. Long term impact assessment performed or planned:	
4. Anticipated remediation:	
4a. If Yes, specify all that apply:	
- Surface water	
- Groundwater	
- Soil	
- Vegetation	
- Wildlife	
5. Water contamination:	No
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	
- Groundwater	
- Drinking water: *(Select one or both)*	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	
5c. Name of body of water, if commonly known:	
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	No
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	No
7a. If Yes, specify HCA type(s): *(Select all that apply)*	
- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect"	

determination for this Accident site in the Operator's Integrity Management Program?	
- High Population Area:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Other Populated Area	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Drinking Water	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Ecological	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
8. Estimated Property Damage:	
8a. Estimated cost of public and non-Operator private property damage	$ 0
8b. Estimated cost of commodity lost	$ 45
8c. Estimated cost of Operator's property damage & repairs	$ 0
8d. Estimated cost of Operator's emergency response	$ 5,000
8e. Estimated cost of Operator's environmental remediation	$ 15,000
8f. Estimated other costs	$ 0
Describe:	
8g. Total estimated property damage (sum of above)	$ 20,045

PART E - ADDITIONAL OPERATING INFORMATION

1. Estimated pressure at the point and time of the Accident (psig):	
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	
3. Describe the pressure on the system or facility relating to the Accident (psig):	
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	No
- If Yes - (*Complete 5a. – 5e. below)*	
5a. Type of upstream valve used to initially isolate release source:	
5b. Type of downstream valve used to initially isolate release source:	
5c. Length of segment isolated between valves (ft):	
5d. Is the pipeline configured to accommodate internal inspection tools?	
- If No, Which physical features limit tool accommodation? (*select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	
- If Yes, Which operational factors complicate execution? (*select all that apply*)	
- Excessive debris or scale, wax, or other wall buildup	

- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	> 20% SMYS Regulated Trunkline/Transmission
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	
If Yes -	
6a. Was it operating at the time of the Accident?	
6b. Was it fully functional at the time of the Accident?	
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	
- If Yes:	
7a. Was it operating at the time of the Accident?	
7b. Was it fully functional at the time of the Accident?	
7c. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	
7d. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	
8. How was the Accident initially identified for the Operator?	
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Guard Patrol by Operator or its contractor" is selected in Question 8, specify the following:	
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	
- If No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)*	
- If Yes, specify investigation result(s): *(select all that apply)*	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
Provide an explanation for why not:	
- Investigation identified no control room issues	
- Investigation identified no controller issues	
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above:	
Describe:	

PART F - DRUG & ALCOHOL TESTING INFORMATION

1. As a result of this Accident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
1a. Specify how many were tested:	
1b. Specify how many failed:	

2. As a result of this Accident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
2a. Specify how many were tested:	
2b. Specify how many failed:	

PART G – APPARENT CAUSE

Select only one box from PART G in shaded column on left representing the APPARENT Cause of the Accident, and answer the questions on the right. Describe secondary, contributing or root causes of the Accident in the narrative (PART H).

Apparent Cause:	G6 - Equipment Failure

G1 - Corrosion Failure - only one **sub-cause** can be picked from shaded left-hand column

External Corrosion:	
Internal Corrosion:	
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground?	
- If Yes :	
4a. Was failed item considered to be under cathodic protection at the time of the Accident?	
If Yes - Year protection started:	
4b. Was shielding, tenting, or disbonding of coating evident at the point of the Accident?	
4c. Has one or more Cathodic Protection Survey been conducted at the point of the Accident?	
If "Yes, CP Annual Survey" – Most recent year conducted:	
If "Yes, Close Interval Survey" – Most recent year conducted:	
If "Yes, Other CP Survey" – Most recent year conducted:	
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	
- If Internal Corrosion:	
6. Results of visual examination:	
- Other:	
7. Type of corrosion *(select all that apply)*: -	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	
- Erosion	
- Other:	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following *(select all that apply)*: -	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
9. Location of corrosion *(select all that apply)*: -	
- Low point in pipe	
- Elbow	
- Other:	

- If Other, Describe:	
10. Was the commodity treated with corrosion inhibitors or biocides?	
11. Was the interior coated or lined with protective coating?	
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	
13. Were corrosion coupons routinely utilized?	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Tank/Vessel.	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
15. Has one or more internal inspection tool collected data at the point of the Accident?	
15a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage Tool	
Most recent year:	
- Ultrasonic	
Most recent year:	
- Geometry	
Most recent year:	
- Caliper	
Most recent year:	
- Crack	
Most recent year:	
- Hard Spot	
Most recent year:	
- Combination Tool	
Most recent year:	
- Transverse Field/Triaxial	
Most recent year:	
- Other	
Most recent year:	
Describe:	
16. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
If Yes -	
Most recent year tested:	
Test pressure:	
17. Has one or more Direct Assessment been conducted on this segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident::	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
18a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G2 - Natural Force Damage - only one **sub-cause** can be picked from shaded left-handed column	
Natural Force Damage – Sub-Cause:	
- If Earth Movement, NOT due to Heavy Rains/Floods:	
1. Specify:	

- If Other, Describe:	
- If Heavy Rains/Floods:	
2. Specify:	
- If Other, Describe:	
- If Lightning:	
3. Specify:	
- If Temperature:	
4. Specify:	
- If Other, Describe:	
- If High Winds:	
- If Other Natural Force Damage:	
5. Describe:	
Complete the following if any Natural Force Damage sub-cause is selected.	
6. Were the natural forces causing the Accident generated in conjunction with an extreme weather event?	
6a. If Yes, specify: *(select all that apply)*	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Describe:	
G3 - Excavation Damage - only one **sub-cause** can be picked from shaded left-hand column	
Excavation Damage – Sub-Cause:	
- If Excavation Damage by Operator (First Party):	
- If Excavation Damage by Operator's Contractor (Second Party):	
- If Excavation Damage by Third Party:	
- If Previous Damage due to Excavation Activity:	
Complete Questions 1-5 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
1. Has one or more internal inspection tool collected data at the point of the Accident?	
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
4. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	

5. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
5a. If Yes, for each examination, conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
Complete the following if Excavation Damage by Third Party is selected as the sub-cause.	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from: *(select all that apply)* -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: *(select all that apply)* -	
- Public	
- If "Public", Specify:	
- Private	
- If "Private", Specify:	
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks visible in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption (hours)	
17. Description of the CGA-DIRT Root Cause *(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):*	
Root Cause:	
- If One-Call Notification Practices Not Sufficient, specify:	
- If Locating Practices Not Sufficient, specify:	
- If Excavation Practices Not Sufficient, specify:	
- If Other/None of the Above, explain:	
G4 - Other Outside Force Damage - *only one **sub-cause** can be selected from the shaded left-hand column*	
Other Outside Force Damage – Sub-Cause:	
- If Nearby Industrial, Man-made, or Other Fire/Explosion as Primary Cause of Incident:	
- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:	
1. Vehicle/Equipment operated by:	
- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring:	

2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Heavy Rains/Flood	
- Other	
- If Other, Describe:	
- If Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation:	
- If Electrical Arcing from Other Equipment or Facility:	
- If Previous Mechanical Damage NOT Related to Excavation:	
Complete Questions 3-7 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
3. Has one or more internal inspection tool collected data at the point of the Accident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
6. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
7. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
- If Intentional Damage:	
8. Specify:	
- If Other, Describe:	
- If Other Outside Force Damage:	
9. Describe:	

G5 - Material Failure of Pipe or Weld - only one **sub-cause** can be selected from the shaded left-hand column	
Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."	
Material Failure of Pipe or Weld – Sub-Cause:	
1. The sub-cause selected below is based on the following: *(select all that apply)*	
- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Original Manufacturing-related (NOT girth weld or other welds formed in the field):	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related:	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Environmental Cracking-related:	
3. Specify:	
- Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional factors: (*select all that apply*):	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Describe:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	

Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
7. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident -	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site -	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G6 – Equipment Failure - only one **sub-cause** can be selected from the shaded left-hand column	
Equipment Failure – Sub-Cause:	Pump or Pump-related Equipment
- If Malfunction of Control/Relief Equipment:	
1. Specify: *(select all that apply)* -	
- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	
- Relief Valve	
- Power Failure	
- Stopple/Control Fitting	
- ESD System Failure	
- Other	
- If Other – Describe:	
- If Pump or Pump-related Equipment:	
2. Specify:	
- If Other – Describe:	
- If Threaded Connection/Coupling Failure:	
3. Specify:	
- If Other – Describe:	
- If Non-threaded Connection Failure:	
4. Specify:	
- If Other – Describe:	
- If Defective or Loose Tubing or Fitting:	
- If Failure of Equipment Body (except Pump), Tank Plate, or other Material:	
- If Other Equipment Failure:	
5. Describe:	
Complete the following if any Equipment Failure sub-cause is selected.	
6. Additional factors that contributed to the equipment failure: *(select all that apply)*	
- Excessive vibration	
- Overpressurization	
- No support or loss of support	
- Manufacturing defect	

- Loss of electricity	
- Improper installation	
- Mismatched items (different manufacturer for tubing and tubing fittings)	
- Dissimilar metals	
- Breakdown of soft goods due to compatibility issues with transported commodity	
- Valve vault or valve can contributed to the release	
- Alarm/status failure	
- Misalignment	
- Thermal stress	
- Other	
- If Other, Describe:	

G7 - Incorrect Operation - only one **sub-cause** can be selected from the shaded left-hand column

Incorrect Operation – Sub-Cause:	
Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage	
Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow	
1. Specify:	
- If Other, Describe:	
Valve Left or Placed in Wrong Position, but NOT Resulting in a Tank, Vessel, or Sump/Separator Overflow or Facility Overpressure	
Pipeline or Equipment Overpressured	
Equipment Not Installed Properly	
Wrong Equipment Specified or Installed	
Other Incorrect Operation	
2. Describe:	
Complete the following if any Incorrect Operation sub-cause is selected.	
3. Was this Accident related to *(select all that apply)*: -	
- Inadequate procedure	
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	

G8 - Other Accident Cause - only one **sub-cause** can be selected from the shaded left-hand column

Other Accident Cause – Sub-Cause:	
- If Miscellaneous:	
1. Describe:	
- If Unknown:	
2. Specify:	

PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT

The seal failed on the outboard of unit #2 pump at the Turney Pump Station releasing crude oil which resulted in an over flow of the sump.

File Full Name

File Full Name

PART I - PREPARER AND AUTHORIZED SIGNATURE

Preparer's Name	Daniel C. Cerkoney
Preparer's Title	Compliance Engineer
Preparer's Telephone Number	701-290-1176
Preparer's E-mail Address	dan_cerkoney@transcanada.com
Preparer's Facsimile Number	701-483-1431
Authorized Signature's Name	Daniel C. Cerkoney
Authorized Signature Title	Compliance Engineer
Authorized Signature Telephone Number	701-290-1176
Authorized Signature Email	dan_cerkoney@transcanada.com
Date	04/03/2013

NOTICE: This report is required by 49 CFR Part 195. Failure to report can result in a civil penalty not to exceed $100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122.	OMB NO: 2137-0047 EXPIRATION DATE: 01/31/2014
U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	**Original Report Date:** 03/07/2011 **No.** 20110081 - 19268 --- (DOT Use Only)

ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0047. Public reporting for this collection of information is estimated to be approximately 10 hours per response (5 hours for a small release), including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.

INSTRUCTIONS

Important: *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline.*

PART A - KEY REPORT INFORMATION

Report Type: *(select all that apply)*	**Original:**	**Supplemental:**	**Final:**
		Yes	

Last Revision Date:	04/17/2014
1. Operator's OPS-issued Operator Identification Number (OPID):	32334
2. Name of Operator	TC OIL PIPELINE OPERATIONS INC
3. Address of Operator:	
3a. Street Address	717 TEXAS AVE
3b. City	HOUSTON
3c. State	Texas
3d. Zip Code	77002
4. Local time *(24-hr clock)* and date of the Accident:	02/03/2011 14:10
5. Location of Accident:	
Latitude:	35.9303
Longitude:	-96.7514
6. National Response Center Report Number (if applicable):	966497
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	02/03/2011 16:05
8. Commodity released: *(select only one, based on predominant volume released)*	Crude Oil
- Specify Commodity Subtype:	
- If "Other" Subtype, Describe:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Ethanol Blend, then % Ethanol Blend: %:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Biodiesel, then Biodiesel Blend (e.g. B2, B20, B100): B	
9. Estimated volume of commodity released unintentionally (Barrels):	.36
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):	
11. Estimated volume of commodity recovered (Barrels):	.36
12. Were there fatalities?	No
- If Yes, specify the number in each category:	
12a. Operator employees	
12b. Contractor employees working for the Operator	
12c. Non-Operator emergency responders	
12d. Workers working on the right-of-way, but NOT associated with this Operator	
12e. General public	
12f. Total fatalities (sum of above)	
13. Were there injuries requiring inpatient hospitalization?	No
- If Yes, specify the number in each category:	
13a. Operator employees	
13b. Contractor employees working for the Operator	
13c. Non-Operator emergency responders	

13d. Workers working on the right-of-way, but NOT associated with this Operator	
13e. General public	
13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	Yes
- If No, Explain:	
- If Yes, complete Questions 14a and 14b: *(use local time, 24-hr clock)*	
14a. Local time and date of shutdown:	02/03/2011 14:15
14b. Local time pipeline/facility restarted:	02/06/2011 08:00
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	Yes
16. Did the commodity explode?	No
17. Number of general public evacuated:	0
18. Time sequence *(use local time, 24-hour clock)*:	
18a. Local time Operator identified Accident:	02/03/2011 14:10
18b. Local time Operator resources arrived on site:	02/03/2011 14:10

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the origin of Accident onshore?	Yes
If Yes, Complete Questions (2-12)	
If No, Complete Questions (13-15)	
- If Onshore:	
2. State:	Oklahoma
3. Zip Code:	74032
4. City	Cushing
5. County or Parish	Payne
6. Operator-designated location:	Milepost/Valve Station
Specify:	298.2
7. Pipeline/Facility name:	Cushing Delivery Station
8. Segment name/ID:	Gateway Region - Cushing Extension
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Totally contained on Operator-controlled property
11. Area of Accident (as found):	Aboveground
Specify:	Typical aboveground facility piping or appurtenance
- If Other, Describe:	
Depth-of-Cover (in):	
12. Did Accident occur in a crossing?	No
- If Yes, specify below:	
- If Bridge crossing –	
Cased/ Uncased:	
- If Railroad crossing –	
Cased/ Uncased/ Bored/drilled	
- If Road crossing –	
Cased/ Uncased/ Bored/drilled	
- If Water crossing –	
Cased/ Uncased	
- Name of body of water, if commonly known:	
- Approx. water depth (ft) at the point of the Accident:	
- Select:	
- If Offshore:	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- On the Outer Continental Shelf (OCS) - Specify:	
- Area:	
- Block #:	
15. Area of Accident:	

PART C - ADDITIONAL FACILITY INFORMATION

1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Pump/Meter Station Equipment and Piping
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	
3. Item involved in Accident:	Sump/Separator

- If Pipe, specify:	
3a. Nominal diameter of pipe (in):	
3b. Wall thickness (in):	
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	
3d. Pipe specification:	
3e. Pipe Seam , specify:	
- If Other, Describe:	
3f. Pipe manufacturer:	
3g. Year of manufacture:	
3h. Pipeline coating type at point of Accident, specify:	
- If Other, Describe:	
- If Weld, including heat-affected zone, specify:	
- If Other, Describe:	
- If Valve, specify:	
- If Mainline, specify:	
- If Other, Describe:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	
- If Other - Describe:	
- If Other, describe:	
4. Year item involved in Accident was installed:	2010
5. Material involved in Accident:	Carbon Steel
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Overfill or Overflow
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	
- If Other, Describe:	
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	

PART D - ADDITIONAL CONSEQUENCE INFORMATION

1. Wildlife impact:	No
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	Yes
3. Long term impact assessment performed or planned:	No
4. Anticipated remediation:	No
4a. If Yes, specify all that apply:	
- Surface water	
- Groundwater	
- Soil	
- Vegetation	
- Wildlife	
5. Water contamination:	No
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	
- Groundwater	
- Drinking water: *(Select one or both)*	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	
5c. Name of body of water, if commonly known:	
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	No
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	No
7a. If Yes, specify HCA type(s): *(Select all that apply)*	
- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect"	

determination for this Accident site in the Operator's Integrity Management Program?	
- High Population Area:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Other Populated Area	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Drinking Water	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Ecological	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
8. Estimated Property Damage:	
8a. Estimated cost of public and non-Operator private property damage	$ 0
8b. Estimated cost of commodity lost	$ 65
8c. Estimated cost of Operator's property damage & repairs	$ 0
8d. Estimated cost of Operator's emergency response	$ 5,000
8e. Estimated cost of Operator's environmental remediation	$ 20,000
8f. Estimated other costs	$ 0
Describe:	
8g. Total estimated property damage (sum of above)	$ 25,065

PART E - ADDITIONAL OPERATING INFORMATION

1. Estimated pressure at the point and time of the Accident (psig):	50.00
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	1,440.00
3. Describe the pressure on the system or facility relating to the Accident (psig):	Pressure did not exceed MOP
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	No
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	No
- If Yes - (*Complete 5a. – 5e. below)*	
5a. Type of upstream valve used to initially isolate release source:	
5b. Type of downstream valve used to initially isolate release source:	
5c. Length of segment isolated between valves (ft):	
5d. Is the pipeline configured to accommodate internal inspection tools?	
- If No, Which physical features limit tool accommodation? (*select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	
- If Yes, Which operational factors complicate execution? (*select all that apply*)	
- Excessive debris or scale, wax, or other wall buildup	

- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	> 20% SMYS Regulated Trunkline/Transmission
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	Yes
If Yes -	
6a. Was it operating at the time of the Accident?	Yes
6b. Was it fully functional at the time of the Accident?	Yes
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	No
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	No
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	No
- If Yes:	
7a. Was it operating at the time of the Accident?	
7b. Was it fully functional at the time of the Accident?	
7c. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	
7d. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	
8. How was the Accident initially identified for the Operator?	Local Operating Personnel, including contractors
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Guard Patrol by Operator or its contractor" is selected in Question 8, specify the following:	Operator employee
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	No, the facility was not monitored by a controller(s) at the time of the Accident
- If No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)*	
- If Yes, specify investigation result(s): *(select all that apply)*	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
Provide an explanation for why not:	
- Investigation identified no control room issues	
- Investigation identified no controller issues	
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above:	
Describe:	

PART F - DRUG & ALCOHOL TESTING INFORMATION

1. As a result of this Accident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
1a. Specify how many were tested:	
1b. Specify how many failed:	

2. As a result of this Accident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	Yes
- If Yes:	
2a. Specify how many were tested:	2
2b. Specify how many failed:	0

PART G – APPARENT CAUSE

Select only one box from PART G in shaded column on left representing the APPARENT Cause of the Accident, and answer the questions on the right. Describe secondary, contributing or root causes of the Accident in the narrative (PART H).

Apparent Cause:	G7 - Incorrect Operation

G1 - Corrosion Failure - only one **sub-cause** can be picked from shaded left-hand column

External Corrosion:	
Internal Corrosion:	
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground?	
- If Yes :	
4a. Was failed item considered to be under cathodic protection at the time of the Accident?	
If Yes - Year protection started:	
4b. Was shielding, tenting, or disbonding of coating evident at the point of the Accident?	
4c. Has one or more Cathodic Protection Survey been conducted at the point of the Accident?	
If "Yes, CP Annual Survey" – Most recent year conducted:	
If "Yes, Close Interval Survey" – Most recent year conducted:	
If "Yes, Other CP Survey" – Most recent year conducted:	
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	
- If Internal Corrosion:	
6. Results of visual examination:	
- Other:	
7. Type of corrosion *(select all that apply)*: -	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	
- Erosion	
- Other:	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following *(select all that apply)*: -	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
9. Location of corrosion *(select all that apply)*: -	
- Low point in pipe	
- Elbow	
- Other:	

- If Other, Describe:	
10. Was the commodity treated with corrosion inhibitors or biocides?	
11. Was the interior coated or lined with protective coating?	
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	
13. Were corrosion coupons routinely utilized?	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Tank/Vessel.	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
15. Has one or more internal inspection tool collected data at the point of the Accident?	
15a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage Tool	
Most recent year:	
- Ultrasonic	
Most recent year:	
- Geometry	
Most recent year:	
- Caliper	
Most recent year:	
- Crack	
Most recent year:	
- Hard Spot	
Most recent year:	
- Combination Tool	
Most recent year:	
- Transverse Field/Triaxial	
Most recent year:	
- Other	
Most recent year:	
Describe:	
16. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
If Yes -	
Most recent year tested:	
Test pressure:	
17. Has one or more Direct Assessment been conducted on this segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident::	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
18a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G2 - Natural Force Damage - only one **sub-cause** can be picked from shaded left-handed column	
Natural Force Damage – Sub-Cause:	
- If Earth Movement, NOT due to Heavy Rains/Floods:	
1. Specify:	

- If Other, Describe:	
- If Heavy Rains/Floods:	
2. Specify:	
- If Other, Describe:	
- If Lightning:	
3. Specify:	
- If Temperature:	
4. Specify:	
- If Other, Describe:	
- If High Winds:	
- If Other Natural Force Damage:	
5. Describe:	
Complete the following if any Natural Force Damage sub-cause is selected.	
6. Were the natural forces causing the Accident generated in conjunction with an extreme weather event?	
6a. If Yes, specify: *(select all that apply)*	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Describe:	
G3 - Excavation Damage - only one **sub-cause** can be picked from shaded left-hand column	
Excavation Damage – Sub-Cause:	
- If Excavation Damage by Operator (First Party):	
- If Excavation Damage by Operator's Contractor (Second Party):	
- If Excavation Damage by Third Party:	
- If Previous Damage due to Excavation Activity:	
Complete Questions 1-5 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
1. Has one or more internal inspection tool collected data at the point of the Accident?	
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
4. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	

5. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
5a. If Yes, for each examination, conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
Complete the following if Excavation Damage by Third Party is selected as the sub-cause.	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from: *(select all that apply)* -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: *(select all that apply)* -	
- Public	
- If "Public", Specify:	
- Private	
- If "Private", Specify:	
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks visible in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption (hours)	
17. Description of the CGA-DIRT Root Cause *(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):*	
Root Cause:	
- If One-Call Notification Practices Not Sufficient, specify:	
- If Locating Practices Not Sufficient, specify:	
- If Excavation Practices Not Sufficient, specify:	
- If Other/None of the Above, explain:	
G4 - Other Outside Force Damage - *only one **sub-cause** can be selected from the shaded left-hand column*	
Other Outside Force Damage – Sub-Cause:	
- If Nearby Industrial, Man-made, or Other Fire/Explosion as Primary Cause of Incident:	
- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:	
1. Vehicle/Equipment operated by:	
- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring:	

2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Heavy Rains/Flood	
- Other	
- If Other, Describe:	
- If Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation:	
- If Electrical Arcing from Other Equipment or Facility:	
- If Previous Mechanical Damage NOT Related to Excavation:	
Complete Questions 3-7 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
3. Has one or more internal inspection tool collected data at the point of the Accident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
6. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
7. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
- If Intentional Damage:	
8. Specify:	
- If Other, Describe:	
- If Other Outside Force Damage:	
9. Describe:	

G5 - Material Failure of Pipe or Weld - only one **sub-cause** can be selected from the shaded left-hand column	
Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."	
Material Failure of Pipe or Weld – Sub-Cause:	
1. The sub-cause selected below is based on the following: *(select all that apply)*	
- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Original Manufacturing-related (NOT girth weld or other welds formed in the field):	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related:	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Environmental Cracking-related:	
3. Specify:	
- Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional factors: (*select all that apply*):	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Describe:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	

Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
7. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident -	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site -	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G6 – Equipment Failure - only one **sub-cause** can be selected from the shaded left-hand column	
Equipment Failure – Sub-Cause:	
- If Malfunction of Control/Relief Equipment:	
1. Specify: *(select all that apply)* -	
- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	
- Relief Valve	
- Power Failure	
- Stopple/Control Fitting	
- ESD System Failure	
- Other	
- If Other – Describe:	
- If Pump or Pump-related Equipment:	
2. Specify:	
- If Other – Describe:	
- If Threaded Connection/Coupling Failure:	
3. Specify:	
- If Other – Describe:	
- If Non-threaded Connection Failure:	
4. Specify:	
- If Other – Describe:	
- If Defective or Loose Tubing or Fitting:	
- If Failure of Equipment Body (except Pump), Tank Plate, or other Material:	
- If Other Equipment Failure:	
5. Describe:	
Complete the following if any Equipment Failure sub-cause is selected.	
6. Additional factors that contributed to the equipment failure: *(select all that apply)*	
- Excessive vibration	
- Overpressurization	
- No support or loss of support	
- Manufacturing defect	

- Loss of electricity	
- Improper installation	
- Mismatched items (different manufacturer for tubing and tubing fittings)	
- Dissimilar metals	
- Breakdown of soft goods due to compatibility issues with transported commodity	
- Valve vault or valve can contributed to the release	
- Alarm/status failure	
- Misalignment	
- Thermal stress	
- Other	
- If Other, Describe:	

G7 - Incorrect Operation - only one **sub-cause** can be selected from the shaded left-hand column

Incorrect Operation – Sub-Cause:	
Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage	
Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow	Yes
1. Specify:	
- If Other, Describe:	
Valve Left or Placed in Wrong Position, but NOT Resulting in a Tank, Vessel, or Sump/Separator Overflow or Facility Overpressure	
Pipeline or Equipment Overpressured	
Equipment Not Installed Properly	
Wrong Equipment Specified or Installed	
Other Incorrect Operation	
2. Describe:	
Complete the following if any Incorrect Operation sub-cause is selected.	
3. Was this Accident related to *(select all that apply)*: -	
- Inadequate procedure	Yes
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	Commissioning
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	No
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	

G8 - Other Accident Cause - only one **sub-cause** can be selected from the shaded left-hand column

Other Accident Cause – Sub-Cause:	
- If Miscellaneous:	
1. Describe:	
- If Unknown:	
2. Specify:	

PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT

During commissioning of the 36 inch Cushing Mainline pipeline, the pipeline was being purged by pigging operations. Vapors (mixture of hydrocarbons and nitrogen) in the pipeline were being purged from the pipeline and vented through a series of separators and flared. The separators were for capture of pipeline liquids (crude oil). Liquids filled up the secondary separator and due to incorrect position of the 6 inch outlet valve, an overflow of the secondary separator occurred resulting in crude oil in the flare line, and causing ignition. The overflow of crude oil ignited and spilled on the surface of the ground. Upon discovery by operations personnel and contractors, the source of crude oil was shut in resulting in the product to self extinguish. Crude oil continued

to spray from the flare stack emitting a mist on the location, dimensions of 20 feet by 60 feet. Cleanup of the facility commenced and was completed. Commisioning activities was suspended until a rrt cause analysis was conducted by Keystone.

File Full Name

PART I - PREPARER AND AUTHORIZED SIGNATURE

Preparer's Name	Daniel C. Cerkoney
Preparer's Title	USRC Engineer
Preparer's Telephone Number	701-290-1176
Preparer's E-mail Address	dan_cerkoney@transcanada.com
Preparer's Facsimile Number	701-483-1431
Authorized Signature's Name	Daniel C. Cerkoney
Authorized Signature Title	USRC Engineer
Authorized Signature Telephone Number	701-290-1176
Authorized Signature Email	dan_cerkoney@transcanada.com
Date	04/17/2014

NOTICE: This report is required by 49 CFR Part 195. Failure to report can result in a civil penalty not to exceed $100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122.	OMB NO: 2137-0047 EXPIRATION DATE: 01/31/2014

U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	**Original Report Date:**	06/10/2011
	No.	20110181 - 19269 --- (DOT Use Only)

ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS

INSTRUCTIONS

Important: *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline.*

PART A - KEY REPORT INFORMATION

Report Type: *(select all that apply)*	**Original:**	**Supplemental:**	**Final:**
		Yes	

Last Revision Date:	04/17/2014
1. Operator's OPS-issued Operator Identification Number (OPID):	32334
2. Name of Operator	TC OIL PIPELINE OPERATIONS INC
3. Address of Operator:	
3a. Street Address	717 TEXAS AVE
3b. City	HOUSTON
3c. State	Texas
3d. Zip Code	77002
4. Local time *(24-hr clock)* and date of the Accident:	02/17/2011 15:10
5. Location of Accident:	
Latitude:	37.3612
Longitude:	-97.0539
6. National Response Center Report Number (if applicable):	968357
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	02/23/2011 14:43
8. Commodity released: *(select only one, based on predominant volume released)*	Crude Oil
- Specify Commodity Subtype:	
- If "Other" Subtype, Describe:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Ethanol Blend, then % Ethanol Blend: %:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Biodiesel, then Biodiesel Blend (e.g. B2, B20, B100): B	
9. Estimated volume of commodity released unintentionally (Barrels):	.24
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):	
11. Estimated volume of commodity recovered (Barrels):	.24
12. Were there fatalities?	No
- If Yes, specify the number in each category:	
12a. Operator employees	
12b. Contractor employees working for the Operator	
12c. Non-Operator emergency responders	
12d. Workers working on the right-of-way, but NOT associated with this Operator	
12e. General public	
12f. Total fatalities (sum of above)	
13. Were there injuries requiring inpatient hospitalization?	No
- If Yes, specify the number in each category:	
13a. Operator employees	
13b. Contractor employees working for the Operator	
13c. Non-Operator emergency responders	

13d. Workers working on the right-of-way, but NOT associated with this Operator	
13e. General public	
13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	Yes
- If No, Explain:	
- If Yes, complete Questions 14a and 14b: *(use local time, 24-hr clock)*	
14a. Local time and date of shutdown:	02/17/2011 15:10
14b. Local time pipeline/facility restarted:	02/18/2011 08:00
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	No
16. Did the commodity explode?	No
17. Number of general public evacuated:	0
18. Time sequence *(use local time, 24-hour clock)*:	
18a. Local time Operator identified Accident:	02/17/2011 15:10
18b. Local time Operator resources arrived on site:	02/17/2011 15:10

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the origin of Accident onshore?	Yes
If Yes, Complete Questions (2-12)	
If No, Complete Questions (13-15)	
- If Onshore:	
2. State:	Kansas
3. Zip Code:	67146
4. City	Udall
5. County or Parish	Cowley
6. Operator-designated location:	Milepost/Valve Station
Specify:	193.4
7. Pipeline/Facility name:	Rock Pump Station
8. Segment name/ID:	Gateway
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Totally contained on Operator-controlled property
11. Area of Accident (as found):	Aboveground
Specify:	
- If Other, Describe:	
Depth-of-Cover (in):	
12. Did Accident occur in a crossing?	
- If Yes, specify below:	
- If Bridge crossing –	
Cased/ Uncased:	
- If Railroad crossing –	
Cased/ Uncased/ Bored/drilled	
- If Road crossing –	
Cased/ Uncased/ Bored/drilled	
- If Water crossing –	
Cased/ Uncased	
- Name of body of water, if commonly known:	
- Approx. water depth (ft) at the point of the Accident:	
- Select:	
- If Offshore:	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- On the Outer Continental Shelf (OCS) - Specify:	
- Area:	
- Block #:	
15. Area of Accident:	

PART C - ADDITIONAL FACILITY INFORMATION

1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Pump/Meter Station Equipment and Piping
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	
3. Item involved in Accident:	Valve

- If Pipe, specify:	
3a. Nominal diameter of pipe (in):	
3b. Wall thickness (in):	
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	
3d. Pipe specification:	
3e. Pipe Seam , specify:	
- If Other, Describe:	
3f. Pipe manufacturer:	
3g. Year of manufacture:	
3h. Pipeline coating type at point of Accident, specify:	
- If Other, Describe:	
- If Weld, including heat-affected zone, specify:	
- If Other, Describe:	
- If Valve, specify:	Auxiliary or Other Valve
- If Mainline, specify:	
- If Other, Describe:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	
- If Other - Describe:	
- If Other, describe:	
4. Year item involved in Accident was installed:	
5. Material involved in Accident:	
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Leak
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	Seal or Packing
- If Other, Describe:	
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	

PART D - ADDITIONAL CONSEQUENCE INFORMATION

1. Wildlife impact:	
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	
3. Long term impact assessment performed or planned:	
4. Anticipated remediation:	
4a. If Yes, specify all that apply:	
- Surface water	
- Groundwater	
- Soil	
- Vegetation	
- Wildlife	
5. Water contamination:	No
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	
- Groundwater	
- Drinking water: *(Select one or both)*	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	
5c. Name of body of water, if commonly known:	
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	No
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	No
7a. If Yes, specify HCA type(s): *(Select all that apply)*	
- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect"	

determination for this Accident site in the Operator's Integrity Management Program?	
- High Population Area:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Other Populated Area	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Drinking Water	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Ecological	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
8. Estimated Property Damage:	
8a. Estimated cost of public and non-Operator private property damage	$ 0
8b. Estimated cost of commodity lost	$ 24
8c. Estimated cost of Operator's property damage & repairs	$ 1,500
8d. Estimated cost of Operator's emergency response	$ 1,500
8e. Estimated cost of Operator's environmental remediation	$ 2,500
8f. Estimated other costs	$ 0
Describe:	
8g. Total estimated property damage (sum of above)	$ 5,524

PART E - ADDITIONAL OPERATING INFORMATION

1. Estimated pressure at the point and time of the Accident (psig):	
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	
3. Describe the pressure on the system or facility relating to the Accident (psig):	
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	No
- If Yes - (*Complete 5a. – 5e. below)*	
5a. Type of upstream valve used to initially isolate release source:	
5b. Type of downstream valve used to initially isolate release source:	
5c. Length of segment isolated between valves (ft):	
5d. Is the pipeline configured to accommodate internal inspection tools?	
- If No, Which physical features limit tool accommodation? (*select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	
- If Yes, Which operational factors complicate execution? (*select all that apply*)	
- Excessive debris or scale, wax, or other wall buildup	

- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	> 20% SMYS Regulated Trunkline/Transmission
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	
If Yes -	
6a. Was it operating at the time of the Accident?	
6b. Was it fully functional at the time of the Accident?	
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	
- If Yes:	
7a. Was it operating at the time of the Accident?	
7b. Was it fully functional at the time of the Accident?	
7c. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	
7d. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	
8. How was the Accident initially identified for the Operator?	
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Guard Patrol by Operator or its contractor" is selected in Question 8, specify the following:	
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	
- If No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)*	
- If Yes, specify investigation result(s): *(select all that apply)*	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
Provide an explanation for why not:	
- Investigation identified no control room issues	
- Investigation identified no controller issues	
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above:	
Describe:	

PART F - DRUG & ALCOHOL TESTING INFORMATION

1. As a result of this Accident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
1a. Specify how many were tested:	
1b. Specify how many failed:	

2. As a result of this Accident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
2a. Specify how many were tested:	
2b. Specify how many failed:	

PART G – APPARENT CAUSE

Select only one box from PART G in shaded column on left representing the APPARENT Cause of the Accident, and answer the questions on the right. Describe secondary, contributing or root causes of the Accident in the narrative (PART H).

Apparent Cause:	G6 - Equipment Failure

G1 - Corrosion Failure - only one **sub-cause** can be picked from shaded left-hand column

External Corrosion:	
Internal Corrosion:	
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground?	
- If Yes :	
4a. Was failed item considered to be under cathodic protection at the time of the Accident?	
If Yes - Year protection started:	
4b. Was shielding, tenting, or disbonding of coating evident at the point of the Accident?	
4c. Has one or more Cathodic Protection Survey been conducted at the point of the Accident?	
If "Yes, CP Annual Survey" – Most recent year conducted:	
If "Yes, Close Interval Survey" – Most recent year conducted:	
If "Yes, Other CP Survey" – Most recent year conducted:	
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	
- If Internal Corrosion:	
6. Results of visual examination:	
- Other:	
7. Type of corrosion *(select all that apply)*: -	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	
- Erosion	
- Other:	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following *(select all that apply)*: -	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
9. Location of corrosion *(select all that apply)*: -	
- Low point in pipe	
- Elbow	
- Other:	

- If Other, Describe:	
10. Was the commodity treated with corrosion inhibitors or biocides?	
11. Was the interior coated or lined with protective coating?	
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	
13. Were corrosion coupons routinely utilized?	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Tank/Vessel.	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
15. Has one or more internal inspection tool collected data at the point of the Accident?	
15a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage Tool	
Most recent year:	
- Ultrasonic	
Most recent year:	
- Geometry	
Most recent year:	
- Caliper	
Most recent year:	
- Crack	
Most recent year:	
- Hard Spot	
Most recent year:	
- Combination Tool	
Most recent year:	
- Transverse Field/Triaxial	
Most recent year:	
- Other	
Most recent year:	
Describe:	
16. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
If Yes -	
Most recent year tested:	
Test pressure:	
17. Has one or more Direct Assessment been conducted on this segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident::	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
18a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G2 - Natural Force Damage - only one **sub-cause** can be picked from shaded left-handed column	
Natural Force Damage – Sub-Cause:	
- If Earth Movement, NOT due to Heavy Rains/Floods:	
1. Specify:	

- If Other, Describe:	
- If Heavy Rains/Floods:	
2. Specify:	
- If Other, Describe:	
- If Lightning:	
3. Specify:	
- If Temperature:	
4. Specify:	
- If Other, Describe:	
- If High Winds:	
- If Other Natural Force Damage:	
5. Describe:	
Complete the following if any Natural Force Damage sub-cause is selected.	
6. Were the natural forces causing the Accident generated in conjunction with an extreme weather event?	
6a. If Yes, specify: *(select all that apply)*	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Describe:	
G3 - Excavation Damage - only one **sub-cause** can be picked from shaded left-hand column	
Excavation Damage – Sub-Cause:	
- If Excavation Damage by Operator (First Party):	
- If Excavation Damage by Operator's Contractor (Second Party):	
- If Excavation Damage by Third Party:	
- If Previous Damage due to Excavation Activity:	
Complete Questions 1-5 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
1. Has one or more internal inspection tool collected data at the point of the Accident?	
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
4. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	

5. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
5a. If Yes, for each examination, conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
Complete the following if Excavation Damage by Third Party is selected as the sub-cause.	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from: *(select all that apply)* -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: *(select all that apply)* -	
- Public	
- If "Public", Specify:	
- Private	
- If "Private", Specify:	
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks visible in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption (hours)	
17. Description of the CGA-DIRT Root Cause *(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):*	
Root Cause:	
- If One-Call Notification Practices Not Sufficient, specify:	
- If Locating Practices Not Sufficient, specify:	
- If Excavation Practices Not Sufficient, specify:	
- If Other/None of the Above, explain:	
G4 - Other Outside Force Damage - *only one **sub-cause** can be selected from the shaded left-hand column*	
Other Outside Force Damage – Sub-Cause:	
- If Nearby Industrial, Man-made, or Other Fire/Explosion as Primary Cause of Incident:	
- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:	
1. Vehicle/Equipment operated by:	
- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring:	

2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Heavy Rains/Flood	
- Other	
- If Other, Describe:	
- If Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation:	
- If Electrical Arcing from Other Equipment or Facility:	
- If Previous Mechanical Damage NOT Related to Excavation:	
Complete Questions 3-7 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
3. Has one or more internal inspection tool collected data at the point of the Accident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
6. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
7. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
- If Intentional Damage:	
8. Specify:	
- If Other, Describe:	
- If Other Outside Force Damage:	
9. Describe:	

G5 - Material Failure of Pipe or Weld - only one **sub-cause** can be selected from the shaded left-hand column	
Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."	
Material Failure of Pipe or Weld – Sub-Cause:	
1. The sub-cause selected below is based on the following: *(select all that apply)*	
- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Original Manufacturing-related (NOT girth weld or other welds formed in the field):	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related:	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Environmental Cracking-related:	
3. Specify:	
- Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional factors: (*select all that apply*):	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Describe:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	

Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
7. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident -	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site -	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G6 – Equipment Failure - only one **sub-cause** can be selected from the shaded left-hand column	
Equipment Failure – Sub-Cause:	Non-threaded Connection Failure
- If Malfunction of Control/Relief Equipment:	
1. Specify: *(select all that apply)* -	
- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	
- Relief Valve	
- Power Failure	
- Stopple/Control Fitting	
- ESD System Failure	
- Other	
- If Other – Describe:	
- If Pump or Pump-related Equipment:	
2. Specify:	
- If Other – Describe:	
- If Threaded Connection/Coupling Failure:	
3. Specify:	
- If Other – Describe:	
- If Non-threaded Connection Failure:	
4. Specify:	
- If Other – Describe:	
- If Defective or Loose Tubing or Fitting:	
- If Failure of Equipment Body (except Pump), Tank Plate, or other Material:	
- If Other Equipment Failure:	
5. Describe:	
Complete the following if any Equipment Failure sub-cause is selected.	
6. Additional factors that contributed to the equipment failure: *(select all that apply)*	
- Excessive vibration	
- Overpressurization	
- No support or loss of support	
- Manufacturing defect	

- Loss of electricity	
- Improper installation	
- Mismatched items (different manufacturer for tubing and tubing fittings)	
- Dissimilar metals	
- Breakdown of soft goods due to compatibility issues with transported commodity	
- Valve vault or valve can contributed to the release	
- Alarm/status failure	
- Misalignment	
- Thermal stress	
- Other	
- If Other, Describe:	

G7 - Incorrect Operation - only one **sub-cause** can be selected from the shaded left-hand column

Incorrect Operation – Sub-Cause:	
Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage	
Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow	
1. Specify:	
- If Other, Describe:	
Valve Left or Placed in Wrong Position, but NOT Resulting in a Tank, Vessel, or Sump/Separator Overflow or Facility Overpressure	
Pipeline or Equipment Overpressured	
Equipment Not Installed Properly	
Wrong Equipment Specified or Installed	
Other Incorrect Operation	
2. Describe:	
Complete the following if any Incorrect Operation sub-cause is selected.	
3. Was this Accident related to *(select all that apply)*: -	
- Inadequate procedure	
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	

G8 - Other Accident Cause - only one **sub-cause** can be selected from the shaded left-hand column

Other Accident Cause – Sub-Cause:	
- If Miscellaneous:	
1. Describe:	
- If Unknown:	
2. Specify:	

PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT

A 3¿ flanged drain valve located between the discharge and suction piping of Pump unit #1 experienced a release. The release originated from the valve body o-ring. The cause of the release was due to the bolted ball assembly mid valve, o-ring failure.

File Full Name

PART I - PREPARER AND AUTHORIZED SIGNATURE

Preparer's Name	Daniel C Cerkoney
Preparer's Title	Compliance Engineer
Preparer's Telephone Number	701-483-1434
Preparer's E-mail Address	dan_cerkoney@transcanada.com
Preparer's Facsimile Number	701-483-1431
Authorized Signature's Name	Daniel C Cerkoney
Authorized Signature Title	Compliance Engineer
Authorized Signature Telephone Number	701-290-1176
Authorized Signature Email	dan_cerkoney@transcanada.com
Date	04/17/2014

URS

June 7, 2011

Mr. Kyle Parker
South Central District Office
Kansas Department of Health and Environment
130 South Market Street, 6th Floor
Wichita, KS 67202-3802

Re: Crude Oil Release at TransCanada Rock Pump Station
6347 82nd Street
Udall, Kansas

The purpose of this letter report is to provide you with the details of the cleanup activities that took place in response to a crude oil release at the above referenced property. The spill was reported by Mr. Robert Baumgartner, Environmental Program Manager of TransCanada Keystone US Operations to The Kansas Department of Health and Environment (KDHE) South Central District Office in Wichita, Kansas on February 23, 2011. Spill response activities began immediately by TransCanada personnel and TransCanada spill response contractors. Seneca Waste Solutions provided soil excavation, waste collection and site restoration services. URS Corporation (URS) provided technical oversight for sampling and health and safety monitoring during the portion of the cleanup process that URS was on-site.

As previously noted, the location of the release is a pump station owned and operated by TransCanada Keystone Pipeline, LP (TransCanada). The pump station is in a rural area located at 6347 82nd Street, Udall, Kansas (Figure 1). The site is approximately 3.75 miles southeast of Udall, Kansas. The nearest residence is approximately 0.5 miles from the Site. The release of petroleum was entirely contained on TransCanada property.

The release occurred from the failure of a gasket on a 6 inch flange of a valve on the pipeline drainage system. A total of 30 gallons of crude oil was released. The oil stained surface gravel in a circular area approximately 3 feet in diameter and followed the sand backfill of the pipeline drain system that is used when there are maintenance needs at the Site.

When the release was discovered, TransCanada personnel immediately isolated the leaking valve, removed the faulty gasket and sealed the pipe against further leaks. Due to the relatively small area of stained gravel on the surface, TransCanada personnel began to manually excavate the stained gravel. Once it was determined that the release impacted a larger area than the area stained on the surface, Seneca Waste Solutions was mobilized to the site. A vac truck, skid-steer loader, hydrovac, and other equipment were mobilized to the site on March 4, 2011.

URS Corporation
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Overland Park, KS 66210-2603
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www.urscorp.com

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Soil excavation and oil recovery operations were conducted from February 24 to March 11, 2011. During excavation activities, rainfall would accumulate in the excavation. The area of the spill was de-watered to prevent the spread of product along the ground surface. Collected free product and water was pumped from the excavation and approximately 30 gallons of oil was recovered during response operations. Collected product was transferred to an on-site tank. Oily water was collected via vacuum truck and stored on-site for later transport to a permitted treatment and disposal facility. Approximately 1,625 gallons of oily water was recovered from the excavation area.

Residual oil had accumulated around the drain line backfill sand, electrical conduits, pipeline foundations and other structures (Figure 2). Visually stained soils were excavated around the structures using a hydrovac truck, mini excavator or manual excavation. Impacted soil/gravel was placed in roll-off containers for later transfer to an approved landfill facility. The excavation ranged in thickness from a few inches to eight feet where the drain line entered a sump tank. Groundwater was not encountered during excavation activities.

Soils were screened using a photoionization detector (PID) with 10.6 eV lamp after excavation activities to determine the required limits of excavation. In addition, scraped areas of the surface yard were screened using the PID. The soil samples were collected from native clay soil. A small hole was dug approximately 4 inches into the native soil to collect post-excavation confirmation samples. Confirmation soil samples were collected at 14 locations after excavation was completed. Sampling and PID screening locations and excavation areas are shown in Figures 2.

The field PID screening and laboratory analytical results for benzene, toluene, ethylbenzene, xylenes (BTEX) and diesel range organics (DRO) are summarized on Table 1. Waste soil samples were collected from the roll off containers and analyzed. Laboratory analysis results for waste soils samples are shown in Table 2.

Based on field observations, measurements, and analytical data, the response excavation efforts have mitigated impacts to the surface and subsurface soils to below Kansas Tier 2 Risk Based Screening Levels (RBSL's) for BTEX and DRO. The excavated areas have been backfilled with clean material and no additional work is planned.

A total of 1,625 gallons of oily water was transported on March 25, 2011 by Safety-Kleen Systems for disposal. A total of approximately 165 cubic yards of impacted soil was stockpiled in eleven roll-off containers and was disposed of at Waste Management's Rolling Meadows landfill. Waste manifests and landfill tickets will be sent to KDHE when available from Waste Management.

Laboratory analytical reports and associated chain of custody forms are provided as attachments to this letter report.

URS

Please feel free to contact Robert Baumgartner at 832-320-5538 or myself at 913-344-1023 if you have any questions.

Sincerely,

Rick O. Horner, RG
Senior Project Manager

cc: Robert Baumgartner, TransCanada
Steve McManamon, URS

Tables

Table 1 – Laboratory Analysis Soil Verification
Table 2 – Laboratory Analysis Soil Data for Disposal

Figures

Figure 1 – Site Location Map
Figure 2 – Site Plan

Attachments

Laboratory Data

Table 1 – Laboratory Analysis Soil Verification
TransCanada Keystone Pipeline
Rock Pump Station; Udall, Kansas

Location	Units	F-SE	F-SW	SW-S	SW-W	SW-N	F-MD	SW-S2	SW-N2	Tier 2 Action Level**
Sample Date		3/11/11	3/11/11	3/11/11	3/11/11	3/11/11	3/11/11	3/11/11	3/11/11	
Lithology		Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	
Depth	(feet)	3	3	7	7	7	8	6	7	
PID	(ppm)*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Chemical of Concern										
Benzene	mg/kg	0.614	<0.0626	1.12	0.17	0.343	<0.0679	<0.062	<0.0616	28.2
Toluene	mg/kg	3.17	0.507	3.25	0.515	1.68	<0.136	<0.124	<0.123	29,800
Ethylbenzene	mg/kg	0.836	0.176	0.498	0.143	0.392	<0.0679	<0.062	<0.0616	145
Total Xylenes	mg/kg	10.8	1.29	6.4	1.09	3.97	<0.340	<0.310	<0.308	1,410
Diesel Components	mg/kg	<22.1	<23.6	<23.2	<22.9	<22.4	<27.1	<22.3	<13.2	20,000

NOTES:
mg/kg = Milligrams per kilogram, equivalent to parts per million (ppm) dry weight
µg/kg = Micrograms per kilogram dry weight
<x = Not detected to reporting limits of x
*=Total organic vapors (ppm as benzene)
** = Tier 2 Non Residential Soil Pathway Action Level
COMP = Composite of three samples
< 3 = less than three feet of excavation

Table 1 – Laboratory Analysis Soil Verification
TransCanada Keystone Pipeline
Rock Pump Station; Udall, Kansas

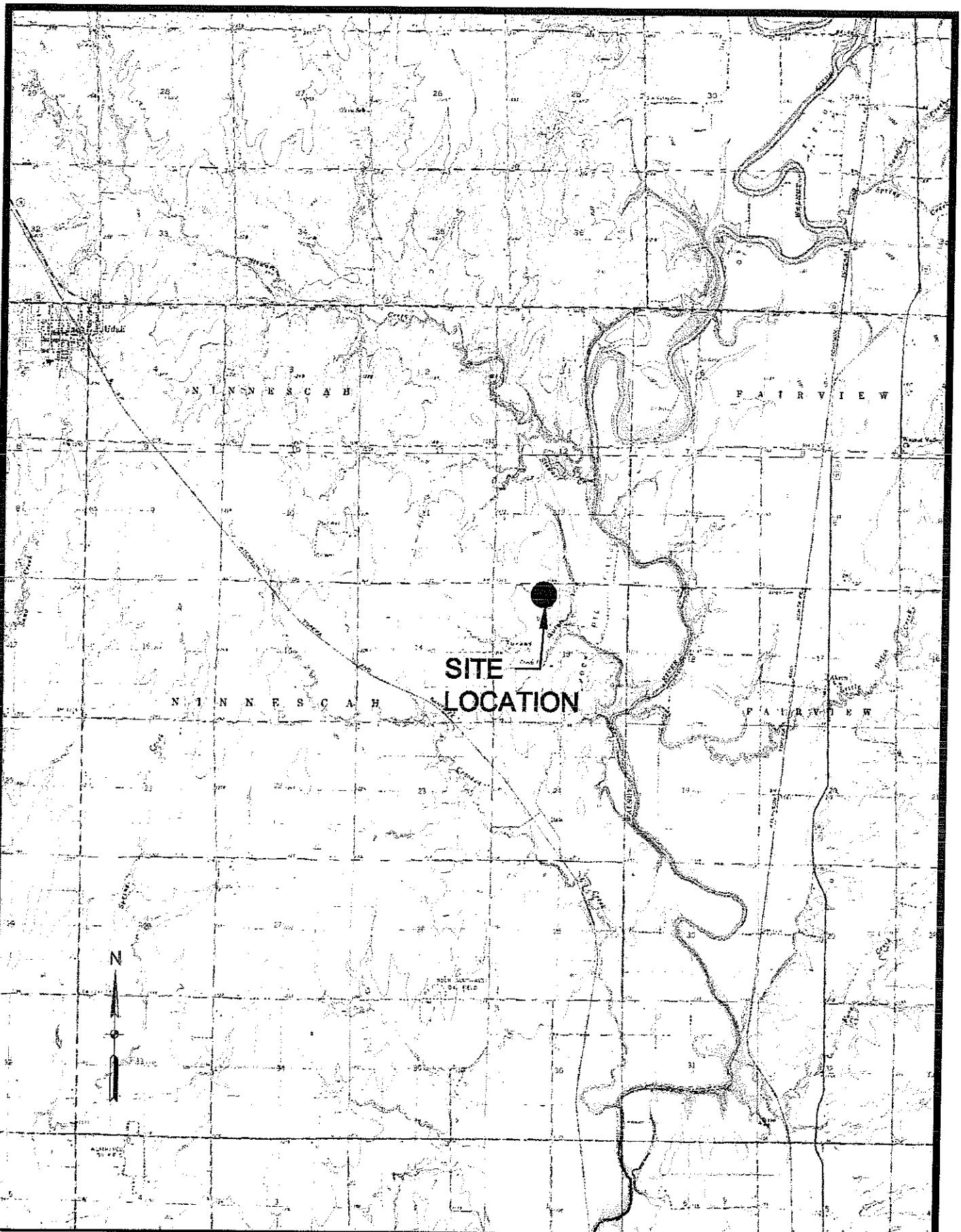
Location	Units	F2-E	F2-E2	F2-W	F2-W2	Tier 2 Action Level**
Sample Date		3/11/11	3/11/11	3/11/11	3/11/11	
Lithology		Clay	Clay	Clay	Clay	
Depth	(feet)	8	8	8	8	
PID	(ppm)*	0.0	0.0	0.0	0.0	
Chemical of Concern						
Benzene	mg/kg	<0.0567	<0.0634	<0.0645	<0.0666	28.2
Toluene	mg/kg	<0.113	<0.127	<0.129	<0.133	29,800
Ethylbenzene	mg/kg	<0.0567	<0.0634	<0.0645	<0.0666	145
Total Xylenes	mg/kg	0.284	<0.317	<0.323	<0.333	1,410
Diesel Components	mg/kg	<22.3	<24.9	<23.5	<25.7	20,000

NOTES:
mg/kg = Milligrams per kilogram, equivalent to parts per million (ppm) dry weight
µg/kg = Micrograms per kilogram dry weight
<x = Not detected to reporting limits of x
*=Total organic vapors (ppm as isobutylene)
** = Tier 2 Non Residential Soil Pathway Action Level

Table 2 – Laboratory Analysis Soil Data for Disposal
TransCanada Keystone Pipeline
Rock Pump Station; Udall, Kansas

Location	Units	RO-795757	RO-247980	RO-494957	RO-79332	RO-7449
Sample Date		3/10/11	3/10/11	3/10/11	3/11/11	3/11/11
Lithology		Gravel	Gravel	Gravel	Gravel	Gravel
PID	(ppm)*	0.00	0.00	0.00	0.00	0.00
Chemical of Concern						
Benzene	mg/kg	0.467	<0.0626	1.57	0.158	0.0878
Toluene	mg/kg	3.12	0.205	5.84	0.54	0.445
Ethylbenzene	mg/kg	0.829	<0.125	1.04	0.18	<0.117
Xylenes	mg/kg	9.24	0.592	10.3	2.24	1.31
Arsenic - TCLP	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Barium- TCLP	mg/L	<2.5	<2.5	3	<2.5	<2.5
Cadmium- TCLP	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-TCLP	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Lead-TCLP	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Selenium-TCLP	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Silver-TCLP	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Mercury-TCLP	µg/L	<2	<2	<2	<2	<2

NOTES: mg/kg = Milligrams per kilogram, equivalent to parts per million (ppm) dry weight
µg/kg = Micrograms per kilogram dry weight
<x = Not detected to reporting limits of x
*= Total organic vapors (ppm as isobutylene)



Project No.	TransCanada
31810923	UDALL, KANSAS

URS 8300 College Blvd., Suite 200 Overland Park, Kansas 66210 TEL: 913-344-1000 FAX: 913-344-1015

SITE LOCATION MAP
MARCH 2011 – TRANS CANADA
ROCK PUMP STATION – UDALL, KANSAS

Figure 1

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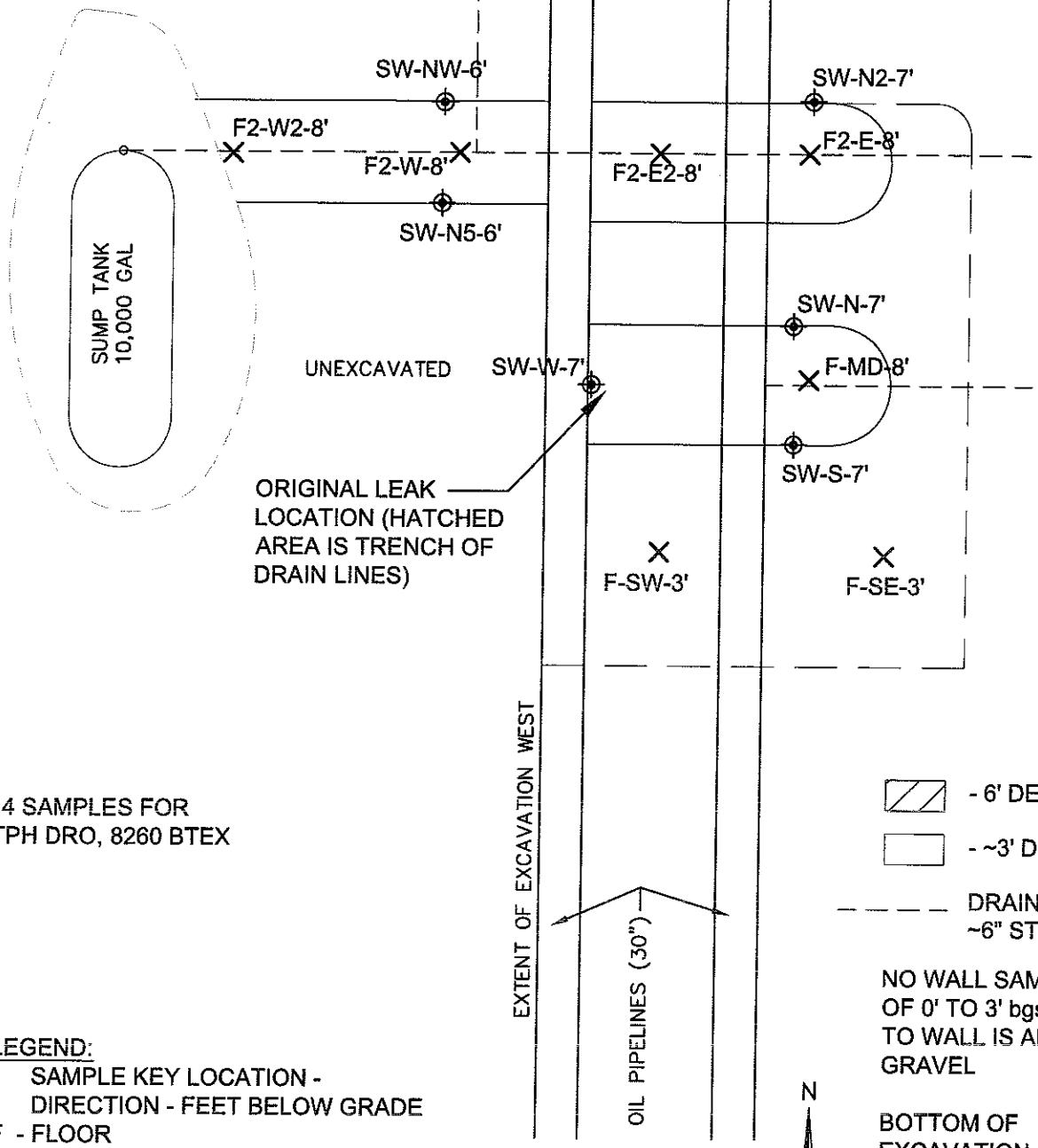

14 SAMPLES FOR
TPH DRO, 8260 BTEX

- 6' DEEP
- ~3' DEEP
DRAIN LINE
~6" STEEL

NO WALL SAMPLES OF 0' TO 3' bgs DUE TO WALL IS ALL GRAVEL

BOTTOM OF EXCAVATION IS CLAY FILL

LEGEND:
SAMPLE KEY LOCATION -
DIRECTION - FEET BELOW GRADE
F - FLOOR
SW - SIDEWALL (LOCATION)
SW - SOUTHWEST (DIRECTION)
NW - NORTHWEST (DIRECTION)
SE - SOUTHEAST (DIRECTION)
N - NORTH (DIRECTION)
E - EAST (DIRECTION)
----- EXTENT OF EXCAVATION
X - FLOOR
⊕ - SIDEWALL

N

10 0 10

SCALE IN FEET
(APPROXIMATE)

Project No. 31810923	TransCanada UDALL, KANSAS	SITE PLAN MARCH 2011 – TRANS CANADA ROCK PUMP STATION – UDALL, KANSAS	Figure 2

URS 8300 College Blvd., Suite 200 Overland Park, Kansas 66210 TEL: 913-344-1000 FAX: 913-344-1016

June 7, 2011 2:21:30 pm (cra)
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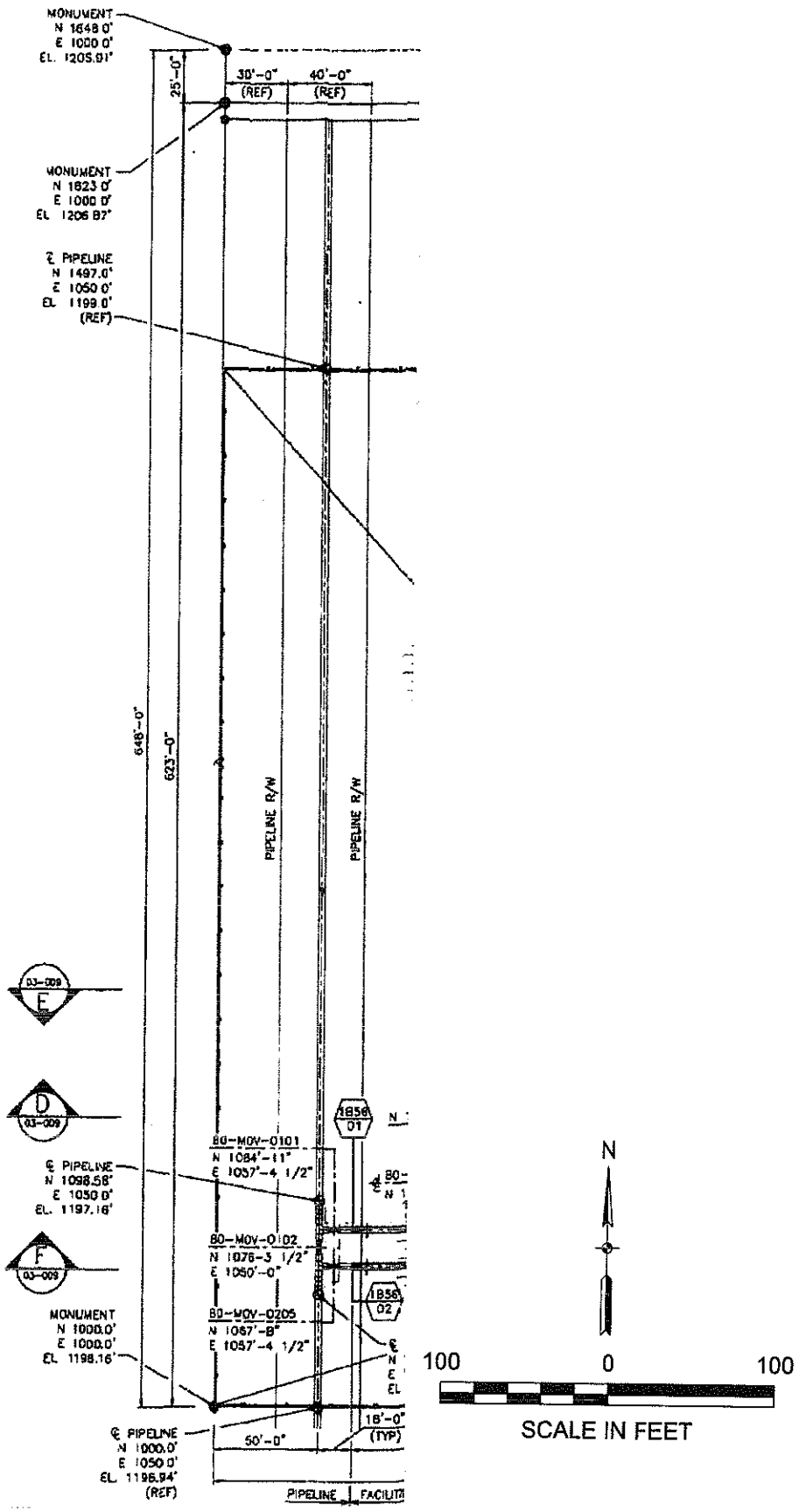

	Project Number	Date
	31810923	APRIL 2011
	Checked by	Figure No.
	RDH	3

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March 28, 2011

Rick Horner
URS Corporation
8300 College Blvd.
Overland Park, KS 66210

RE: Project: UDALL, KS
Pace Project No.: 6095222

Dear Rick Horner:
Enclosed are the analytical results for sample(s) received by the laboratory on March 12, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Sherri Guess

sherri.guess@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: UDALL, KS
Pace Project No.: 6095222

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 05-008-0
Illinois Certification #: 001191
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-08-TX
Utah Certification #: 9135995665

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SAMPLE SUMMARY

Project: UDALL, KS
Pace Project No.: 6095222

Lab ID	Sample ID	Matrix	Date Collected	Date Received
6095222001	F-SE-3'	Solid	03/11/11 09:15	03/12/11 08:43
6095222002	F-SW-3'	Solid	03/11/11 09:25	03/12/11 08:43
6095222003	SW-S-7'	Solid	03/11/11 09:35	03/12/11 08:43
6095222004	SW-W-7'	Solid	03/11/11 09:45	03/12/11 08:43
6095222005	SW-N-7'	Solid	03/11/11 09:55	03/12/11 08:43
6095222006	F-MD-8'	Solid	03/11/11 10:05	03/12/11 08:43
6095222007	SW-S2-6'	Solid	03/11/11 10:35	03/12/11 08:43
6095222008	SW-N2-7'	Solid	03/11/11 10:45	03/12/11 08:43
6095222009	F2-E-8'	Solid	03/11/11 10:55	03/12/11 08:43
6095222010	F2-E2-8'	Solid	03/11/11 11:10	03/12/11 08:43
6095222011	SW-NS-6'	Solid	03/11/11 11:20	03/12/11 08:43
6095222012	F2-W-8'	Solid	03/11/11 11:40	03/12/11 08:43
6095222013	F2-W2-8'	Solid	03/11/11 12:05	03/12/11 08:43
6095222014	TRIP BLANK	Solid	03/11/11 00:00	03/12/11 08:43
6095222015	SWNN-6'	Solid	03/11/11 11:30	03/12/11 08:43

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SAMPLE ANALYTE COUNT

Project: UDALL, KS
Pace Project No.: 6095222

Lab ID	Sample ID	Method	Analysts	Analytes Reported
6095222001	F-SE-3'	OA2	SDR	9
		EPA 8260	JDM	8
		ASTM D2974-87	DWC	1
6095222002	F-SW-3'	OA2	SDR	9
		EPA 8260	JDM	8
		ASTM D2974-87	DWC	1
6095222003	SW-S-7'	OA2	SDR	9
		EPA 8260	JDM	8
		ASTM D2974-87	DWC	1
6095222004	SW-W-7'	OA2	SDR	9
		EPA 8260	JDM	8
		ASTM D2974-87	DWC	1
6095222005	SW-N-7'	OA2	SDR	9
		EPA 8260	JDM	8
		ASTM D2974-87	DWC	1
6095222006	F-MD-8'	OA2	SDR	9
		EPA 8260	JDM	8
		ASTM D2974-87	DWC	1
6095222007	SW-S2-6'	OA2	SDR	9
		EPA 8260	JDM	8
		ASTM D2974-87	DWC	1
6095222008	SW-N2-7'	OA2	SDR	9
		EPA 8260	JDM	8
		ASTM D2974-87	DWC	1
6095222009	F2-E-8'	OA2	SDR	9
		EPA 8260	JDM	8
		ASTM D2974-87	DWC	1
6095222010	F2-E2-8'	OA2	SDR	9
		EPA 8260	JDM	8
		ASTM D2974-87	DWC	1
6095222011	SW-NS-6'	OA2	SDR	9
		EPA 8260	JDM	8
		ASTM D2974-87	DWC	1
6095222012	F2-W-8'	OA2	SDR	9
		EPA 8260	JDM	8
		ASTM D2974-87	DWC	1
6095222013	F2-W2-8'	OA2	SDR	9

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SAMPLE ANALYTE COUNT

Project: UDALL, KS
Pace Project No.: 6095222

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 8260	JDM	8
		ASTM D2974-87	DWC	1
6095222014	TRIP BLANK	EPA 8260	JDM	8
6095222015	SWNN-6'	OA2	SDR	9
		EPA 8260	JDM	8
		ASTM D2974-87	DWC	1

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: F-SE-3' **Lab ID: 6095222001** Collected: 03/11/11 09:15 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	22.1	1	03/15/11 00:00	03/23/11 19:17	68334-30-5	
Fuel Oil	ND	mg/kg	22.1	1	03/15/11 00:00	03/23/11 19:17	68553-00-4	
Jet Fuel	ND	mg/kg	22.1	1	03/15/11 00:00	03/23/11 19:17	94114-58-6	
Kerosene	ND	mg/kg	22.1	1	03/15/11 00:00	03/23/11 19:17	8008-20-6	
Mineral Spirits	ND	mg/kg	22.1	1	03/15/11 00:00	03/23/11 19:17	8030-30-6	
Motor Oil	ND	mg/kg	22.1	1	03/15/11 00:00	03/23/11 19:17	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	22.1	1	03/15/11 00:00	03/23/11 19:17		
n-Tetracosane (S)	82	%	50-137	1	03/15/11 00:00	03/23/11 19:17	646-31-1	
p-Terphenyl (S)	69	%	41-129	1	03/15/11 00:00	03/23/11 19:17	92-94-4	
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	**614**	ug/kg	60.7	1	03/17/11 00:00	03/21/11 21:37	71-43-2	
Ethylbenzene	**836**	ug/kg	60.7	1	03/17/11 00:00	03/21/11 21:37	100-41-4	
Toluene	**3170**	ug/kg	121	1	03/17/11 00:00	03/21/11 21:37	108-88-3	
Xylene (Total)	**10800**	ug/kg	304	1	03/17/11 00:00	03/21/11 21:37	1330-20-7	
Dibromofluoromethane (S)	100	%	85-113	1	03/17/11 00:00	03/21/11 21:37	1868-53-7	
1,2-Dichloroethane-d4 (S)	90	%	75-121	1	03/17/11 00:00	03/21/11 21:37	17060-07-0	
4-Bromofluorobenzene (S)	101	%	79-119	1	03/17/11 00:00	03/21/11 21:37	460-00-4	
Toluene-d8 (S)	107	%	86-119	1	03/17/11 00:00	03/21/11 21:37	2037-26-5	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**18.3**	%	0.50	1		03/21/11 00:00		

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: F-SW-3' **Lab ID: 6095222002** Collected: 03/11/11 09:25 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	23.6	1	03/15/11 00:00	03/23/11 19:26	68334-30-5	
Fuel Oil	ND	mg/kg	23.6	1	03/15/11 00:00	03/23/11 19:26	68553-00-4	
Jet Fuel	ND	mg/kg	23.6	1	03/15/11 00:00	03/23/11 19:26	94114-58-6	
Kerosene	ND	mg/kg	23.6	1	03/15/11 00:00	03/23/11 19:26	8008-20-6	
Mineral Spirits	ND	mg/kg	23.6	1	03/15/11 00:00	03/23/11 19:26	8030-30-6	
Motor Oil	ND	mg/kg	23.6	1	03/15/11 00:00	03/23/11 19:26	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	23.6	1	03/15/11 00:00	03/23/11 19:26		
n-Tetracosane (S)	82	%	50-137	1	03/15/11 00:00	03/23/11 19:26	646-31-1	
p-Terphenyl (S)	68	%	41-129	1	03/15/11 00:00	03/23/11 19:26	92-94-4	
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	ND	ug/kg	62.6	1	03/17/11 00:00	03/21/11 22:22	71-43-2	
Ethylbenzene	**176**	ug/kg	62.6	1	03/17/11 00:00	03/21/11 22:22	100-41-4	
Toluene	**507**	ug/kg	125	1	03/17/11 00:00	03/21/11 22:22	108-88-3	
Xylene (Total)	**1290**	ug/kg	313	1	03/17/11 00:00	03/21/11 22:22	1330-20-7	
Dibromofluoromethane (S)	96	%	85-113	1	03/17/11 00:00	03/21/11 22:22	1868-53-7	
1,2-Dichloroethane-d4 (S)	91	%	75-121	1	03/17/11 00:00	03/21/11 22:22	17060-07-0	
4-Bromofluorobenzene (S)	98	%	79-119	1	03/17/11 00:00	03/21/11 22:22	460-00-4	
Toluene-d8 (S)	100	%	86-119	1	03/17/11 00:00	03/21/11 22:22	2037-26-5	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**20.9**	%	0.50	1		03/21/11 00:00		

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: SW-S-7' **Lab ID: 6095222003** Collected: 03/11/11 09:35 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	23.2	1	03/15/11 00:00	03/23/11 19:35	68334-30-5	
Fuel Oil	ND	mg/kg	23.2	1	03/15/11 00:00	03/23/11 19:35	68553-00-4	
Jet Fuel	ND	mg/kg	23.2	1	03/15/11 00:00	03/23/11 19:35	94114-58-6	
Kerosene	ND	mg/kg	23.2	1	03/15/11 00:00	03/23/11 19:35	8008-20-6	
Mineral Spirits	ND	mg/kg	23.2	1	03/15/11 00:00	03/23/11 19:35	8030-30-6	
Motor Oil	ND	mg/kg	23.2	1	03/15/11 00:00	03/23/11 19:35	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	23.2	1	03/15/11 00:00	03/23/11 19:35		
n-Tetracosane (S)	82	%	50-137	1	03/15/11 00:00	03/23/11 19:35	646-31-1	
p-Terphenyl (S)	68	%	41-129	1	03/15/11 00:00	03/23/11 19:35	92-94-4	
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	**1120**	ug/kg	61.8	1	03/17/11 00:00	03/21/11 22:37	71-43-2	
Ethylbenzene	**498**	ug/kg	61.8	1	03/17/11 00:00	03/21/11 22:37	100-41-4	
Toluene	**3250**	ug/kg	124	1	03/17/11 00:00	03/21/11 22:37	108-88-3	
Xylene (Total)	**6400**	ug/kg	309	1	03/17/11 00:00	03/21/11 22:37	1330-20-7	
Dibromofluoromethane (S)	97	%	85-113	1	03/17/11 00:00	03/21/11 22:37	1868-53-7	
1,2-Dichloroethane-d4 (S)	93	%	75-121	1	03/17/11 00:00	03/21/11 22:37	17060-07-0	
4-Bromofluorobenzene (S)	102	%	79-119	1	03/17/11 00:00	03/21/11 22:37	460-00-4	
Toluene-d8 (S)	106	%	86-119	1	03/17/11 00:00	03/21/11 22:37	2037-26-5	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**19.9**	%	0.50	1		03/21/11 00:00		

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: SW-W-7' **Lab ID: 6095222004** Collected: 03/11/11 09:45 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	22.9	1	03/15/11 00:00	03/23/11 19:45	68334-30-5	
Fuel Oil	ND	mg/kg	22.9	1	03/15/11 00:00	03/23/11 19:45	68553-00-4	
Jet Fuel	ND	mg/kg	22.9	1	03/15/11 00:00	03/23/11 19:45	94114-58-6	
Kerosene	ND	mg/kg	22.9	1	03/15/11 00:00	03/23/11 19:45	8008-20-6	
Mineral Spirits	ND	mg/kg	22.9	1	03/15/11 00:00	03/23/11 19:45	8030-30-6	
Motor Oil	ND	mg/kg	22.9	1	03/15/11 00:00	03/23/11 19:45	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	22.9	1	03/15/11 00:00	03/23/11 19:45		
n-Tetracosane (S)	82	%	50-137	1	03/15/11 00:00	03/23/11 19:45	646-31-1	
p-Terphenyl (S)	68	%	41-129	1	03/15/11 00:00	03/23/11 19:45	92-94-4	
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	**170**	ug/kg	62.9	1	03/17/11 00:00	03/21/11 22:52	71-43-2	
Ethylbenzene	**143**	ug/kg	62.9	1	03/17/11 00:00	03/21/11 22:52	100-41-4	
Toluene	**515**	ug/kg	126	1	03/17/11 00:00	03/21/11 22:52	108-88-3	
Xylene (Total)	**1090**	ug/kg	315	1	03/17/11 00:00	03/21/11 22:52	1330-20-7	
Dibromofluoromethane (S)	98	%	85-113	1	03/17/11 00:00	03/21/11 22:52	1868-53-7	
1,2-Dichloroethane-d4 (S)	90	%	75-121	1	03/17/11 00:00	03/21/11 22:52	17060-07-0	
4-Bromofluorobenzene (S)	102	%	79-119	1	03/17/11 00:00	03/21/11 22:52	460-00-4	
Toluene-d8 (S)	100	%	86-119	1	03/17/11 00:00	03/21/11 22:52	2037-26-5	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**20.7**	%	0.50	1		03/21/11 00:00		

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: SW-N-7' **Lab ID: 6095222005** Collected: 03/11/11 09:55 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	22.4	1	03/15/11 00:00	03/23/11 19:54	68334-30-5	
Fuel Oil	ND	mg/kg	22.4	1	03/15/11 00:00	03/23/11 19:54	68553-00-4	
Jet Fuel	ND	mg/kg	22.4	1	03/15/11 00:00	03/23/11 19:54	94114-58-6	
Kerosene	ND	mg/kg	22.4	1	03/15/11 00:00	03/23/11 19:54	8008-20-6	
Mineral Spirits	ND	mg/kg	22.4	1	03/15/11 00:00	03/23/11 19:54	8030-30-6	
Motor Oil	ND	mg/kg	22.4	1	03/15/11 00:00	03/23/11 19:54	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	22.4	1	03/15/11 00:00	03/23/11 19:54		
n-Tetracosane (S)	77	%	50-137	1	03/15/11 00:00	03/23/11 19:54	646-31-1	
p-Terphenyl (S)	62	%	41-129	1	03/15/11 00:00	03/23/11 19:54	92-94-4	
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	**343**	ug/kg	62.6	1	03/17/11 00:00	03/21/11 23:07	71-43-2	
Ethylbenzene	**392**	ug/kg	62.6	1	03/17/11 00:00	03/21/11 23:07	100-41-4	
Toluene	**1680**	ug/kg	125	1	03/17/11 00:00	03/21/11 23:07	108-88-3	
Xylene (Total)	**3970**	ug/kg	313	1	03/17/11 00:00	03/21/11 23:07	1330-20-7	
Dibromofluoromethane (S)	98	%	85-113	1	03/17/11 00:00	03/21/11 23:07	1868-53-7	
1,2-Dichloroethane-d4 (S)	91	%	75-121	1	03/17/11 00:00	03/21/11 23:07	17060-07-0	
4-Bromofluorobenzene (S)	106	%	79-119	1	03/17/11 00:00	03/21/11 23:07	460-00-4	
Toluene-d8 (S)	104	%	86-119	1	03/17/11 00:00	03/21/11 23:07	2037-26-5	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**21.0**	%	0.50	1		03/21/11 00:00		

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: F-MD-8' **Lab ID: 6095222006** Collected: 03/11/11 10:05 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	27.1	1	03/15/11 00:00	03/23/11 20:03	68334-30-5	
Fuel Oil	ND	mg/kg	27.1	1	03/15/11 00:00	03/23/11 20:03	68553-00-4	
Jet Fuel	ND	mg/kg	27.1	1	03/15/11 00:00	03/23/11 20:03	94114-58-6	
Kerosene	ND	mg/kg	27.1	1	03/15/11 00:00	03/23/11 20:03	8008-20-6	
Mineral Spirits	ND	mg/kg	27.1	1	03/15/11 00:00	03/23/11 20:03	8030-30-6	
Motor Oil	ND	mg/kg	27.1	1	03/15/11 00:00	03/23/11 20:03	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	27.1	1	03/15/11 00:00	03/23/11 20:03		
n-Tetracosane (S)	82	%	50-137	1	03/15/11 00:00	03/23/11 20:03	646-31-1	
p-Terphenyl (S)	68	%	41-129	1	03/15/11 00:00	03/23/11 20:03	92-94-4	
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	ND	ug/kg	67.9	1	03/17/11 00:00	03/21/11 23:22	71-43-2	
Ethylbenzene	ND	ug/kg	67.9	1	03/17/11 00:00	03/21/11 23:22	100-41-4	
Toluene	ND	ug/kg	136	1	03/17/11 00:00	03/21/11 23:22	108-88-3	
Xylene (Total)	ND	ug/kg	340	1	03/17/11 00:00	03/21/11 23:22	1330-20-7	
Dibromofluoromethane (S)	100	%	85-113	1	03/17/11 00:00	03/21/11 23:22	1868-53-7	
1,2-Dichloroethane-d4 (S)	91	%	75-121	1	03/17/11 00:00	03/21/11 23:22	17060-07-0	
4-Bromofluorobenzene (S)	98	%	79-119	1	03/17/11 00:00	03/21/11 23:22	460-00-4	
Toluene-d8 (S)	96	%	86-119	1	03/17/11 00:00	03/21/11 23:22	2037-26-5	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**26.4**	%	0.50	1		03/21/11 00:00		

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: SW-S2-6' **Lab ID: 6095222007** Collected: 03/11/11 10:35 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	22.3	1	03/15/11 00:00	03/23/11 20:13	68334-30-5	
Fuel Oil	ND	mg/kg	22.3	1	03/15/11 00:00	03/23/11 20:13	68553-00-4	
Jet Fuel	ND	mg/kg	22.3	1	03/15/11 00:00	03/23/11 20:13	94114-58-6	
Kerosene	ND	mg/kg	22.3	1	03/15/11 00:00	03/23/11 20:13	8008-20-6	
Mineral Spirits	ND	mg/kg	22.3	1	03/15/11 00:00	03/23/11 20:13	8030-30-6	
Motor Oil	ND	mg/kg	22.3	1	03/15/11 00:00	03/23/11 20:13	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	22.3	1	03/15/11 00:00	03/23/11 20:13		
n-Tetracosane (S)	82	%	50-137	1	03/15/11 00:00	03/23/11 20:13	646-31-1	
p-Terphenyl (S)	68	%	41-129	1	03/15/11 00:00	03/23/11 20:13	92-94-4	
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	ND	ug/kg	62.0	1	03/17/11 00:00	03/21/11 23:37	71-43-2	
Ethylbenzene	ND	ug/kg	62.0	1	03/17/11 00:00	03/21/11 23:37	100-41-4	
Toluene	ND	ug/kg	124	1	03/17/11 00:00	03/21/11 23:37	108-88-3	
Xylene (Total)	ND	ug/kg	310	1	03/17/11 00:00	03/21/11 23:37	1330-20-7	
Dibromofluoromethane (S)	98	%	85-113	1	03/17/11 00:00	03/21/11 23:37	1868-53-7	
1,2-Dichloroethane-d4 (S)	95	%	75-121	1	03/17/11 00:00	03/21/11 23:37	17060-07-0	
4-Bromofluorobenzene (S)	99	%	79-119	1	03/17/11 00:00	03/21/11 23:37	460-00-4	
Toluene-d8 (S)	97	%	86-119	1	03/17/11 00:00	03/21/11 23:37	2037-26-5	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**19.7**	%	0.50	1		03/21/11 00:00		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: SW-N2-7' **Lab ID: 6095222008** Collected: 03/11/11 10:45 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	23.0	1	03/15/11 00:00	03/23/11 20:22	68334-30-5	
Fuel Oil	ND	mg/kg	23.0	1	03/15/11 00:00	03/23/11 20:22	68553-00-4	
Jet Fuel	ND	mg/kg	23.0	1	03/15/11 00:00	03/23/11 20:22	94114-58-6	
Kerosene	ND	mg/kg	23.0	1	03/15/11 00:00	03/23/11 20:22	8008-20-6	
Mineral Spirits	ND	mg/kg	23.0	1	03/15/11 00:00	03/23/11 20:22	8030-30-6	
Motor Oil	ND	mg/kg	23.0	1	03/15/11 00:00	03/23/11 20:22	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	23.0	1	03/15/11 00:00	03/23/11 20:22		
n-Tetracosane (S)	85	%	50-137	1	03/15/11 00:00	03/23/11 20:22	646-31-1	
p-Terphenyl (S)	69	%	41-129	1	03/15/11 00:00	03/23/11 20:22	92-94-4	
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	ND	ug/kg	61.6	1	03/17/11 00:00	03/21/11 23:52	71-43-2	
Ethylbenzene	ND	ug/kg	61.6	1	03/17/11 00:00	03/21/11 23:52	100-41-4	
Toluene	ND	ug/kg	123	1	03/17/11 00:00	03/21/11 23:52	108-88-3	
Xylene (Total)	ND	ug/kg	308	1	03/17/11 00:00	03/21/11 23:52	1330-20-7	
Dibromofluoromethane (S)	96	%	85-113	1	03/17/11 00:00	03/21/11 23:52	1868-53-7	
1,2-Dichloroethane-d4 (S)	92	%	75-121	1	03/17/11 00:00	03/21/11 23:52	17060-07-0	
4-Bromofluorobenzene (S)	101	%	79-119	1	03/17/11 00:00	03/21/11 23:52	460-00-4	
Toluene-d8 (S)	96	%	86-119	1	03/17/11 00:00	03/21/11 23:52	2037-26-5	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**19.6**	%	0.50	1		03/21/11 00:00		

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: F2-E-8' **Lab ID: 6095222009** Collected: 03/11/11 10:55 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	22.3	1	03/15/11 00:00	03/23/11 20:32	68334-30-5	
Fuel Oil	ND	mg/kg	22.3	1	03/15/11 00:00	03/23/11 20:32	68553-00-4	
Jet Fuel	ND	mg/kg	22.3	1	03/15/11 00:00	03/23/11 20:32	94114-58-6	
Kerosene	ND	mg/kg	22.3	1	03/15/11 00:00	03/23/11 20:32	8008-20-6	
Mineral Spirits	ND	mg/kg	22.3	1	03/15/11 00:00	03/23/11 20:32	8030-30-6	
Motor Oil	ND	mg/kg	22.3	1	03/15/11 00:00	03/23/11 20:32	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	22.3	1	03/15/11 00:00	03/23/11 20:32		
n-Tetracosane (S)	81	%	50-137	1	03/15/11 00:00	03/23/11 20:32	646-31-1	
p-Terphenyl (S)	66	%	41-129	1	03/15/11 00:00	03/23/11 20:32	92-94-4	
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	ND	ug/kg	56.7	1	03/17/11 00:00	03/22/11 00:07	71-43-2	
Ethylbenzene	ND	ug/kg	56.7	1	03/17/11 00:00	03/22/11 00:07	100-41-4	
Toluene	ND	ug/kg	113	1	03/17/11 00:00	03/22/11 00:07	108-88-3	
Xylene (Total)	ND	ug/kg	284	1	03/17/11 00:00	03/22/11 00:07	1330-20-7	
Dibromofluoromethane (S)	95	%	85-113	1	03/17/11 00:00	03/22/11 00:07	1868-53-7	
1,2-Dichloroethane-d4 (S)	89	%	75-121	1	03/17/11 00:00	03/22/11 00:07	17060-07-0	
4-Bromofluorobenzene (S)	99	%	79-119	1	03/17/11 00:00	03/22/11 00:07	460-00-4	
Toluene-d8 (S)	97	%	86-119	1	03/17/11 00:00	03/22/11 00:07	2037-26-5	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**11.8**	%	0.50	1		03/21/11 00:00		

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: F2-E2-8' **Lab ID: 6095222010** Collected: 03/11/11 11:10 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	24.9	1	03/15/11 00:00	03/23/11 20:41	68334-30-5	
Fuel Oil	ND	mg/kg	24.9	1	03/15/11 00:00	03/23/11 20:41	68553-00-4	
Jet Fuel	ND	mg/kg	24.9	1	03/15/11 00:00	03/23/11 20:41	94114-58-6	
Kerosene	ND	mg/kg	24.9	1	03/15/11 00:00	03/23/11 20:41	8008-20-6	
Mineral Spirits	ND	mg/kg	24.9	1	03/15/11 00:00	03/23/11 20:41	8030-30-6	
Motor Oil	ND	mg/kg	24.9	1	03/15/11 00:00	03/23/11 20:41	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	24.9	1	03/15/11 00:00	03/23/11 20:41		
n-Tetracosane (S)	83	%	50-137	1	03/15/11 00:00	03/23/11 20:41	646-31-1	
p-Terphenyl (S)	70	%	41-129	1	03/15/11 00:00	03/23/11 20:41	92-94-4	
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	ND	ug/kg	63.4	1	03/17/11 00:00	03/22/11 00:22	71-43-2	
Ethylbenzene	ND	ug/kg	63.4	1	03/17/11 00:00	03/22/11 00:22	100-41-4	
Toluene	ND	ug/kg	127	1	03/17/11 00:00	03/22/11 00:22	108-88-3	
Xylene (Total)	ND	ug/kg	317	1	03/17/11 00:00	03/22/11 00:22	1330-20-7	
Dibromofluoromethane (S)	96	%	85-113	1	03/17/11 00:00	03/22/11 00:22	1868-53-7	
1,2-Dichloroethane-d4 (S)	92	%	75-121	1	03/17/11 00:00	03/22/11 00:22	17060-07-0	
4-Bromofluorobenzene (S)	100	%	79-119	1	03/17/11 00:00	03/22/11 00:22	460-00-4	
Toluene-d8 (S)	97	%	86-119	1	03/17/11 00:00	03/22/11 00:22	2037-26-5	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	21.1	%	0.50	1		03/21/11 00:00		

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: SW-NS-6' **Lab ID: 6095222011** Collected: 03/11/11 11:20 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	24.9	1	03/15/11 00:00	03/23/11 20:50	68334-30-5	
Fuel Oil	ND	mg/kg	24.9	1	03/15/11 00:00	03/23/11 20:50	68553-00-4	
Jet Fuel	ND	mg/kg	24.9	1	03/15/11 00:00	03/23/11 20:50	94114-58-6	
Kerosene	ND	mg/kg	24.9	1	03/15/11 00:00	03/23/11 20:50	8008-20-6	
Mineral Spirits	ND	mg/kg	24.9	1	03/15/11 00:00	03/23/11 20:50	8030-30-6	
Motor Oil	ND	mg/kg	24.9	1	03/15/11 00:00	03/23/11 20:50	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	24.9	1	03/15/11 00:00	03/23/11 20:50		
n-Tetracosane (S)	81	%	50-137	1	03/15/11 00:00	03/23/11 20:50	646-31-1	
p-Terphenyl (S)	67	%	41-129	1	03/15/11 00:00	03/23/11 20:50	92-94-4	
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	ND	ug/kg	62.8	1	03/17/11 00:00	03/22/11 00:37	71-43-2	
Ethylbenzene	ND	ug/kg	62.8	1	03/17/11 00:00	03/22/11 00:37	100-41-4	
Toluene	ND	ug/kg	126	1	03/17/11 00:00	03/22/11 00:37	108-88-3	
Xylene (Total)	ND	ug/kg	314	1	03/17/11 00:00	03/22/11 00:37	1330-20-7	
Dibromofluoromethane (S)	96	%	85-113	1	03/17/11 00:00	03/22/11 00:37	1868-53-7	
1,2-Dichloroethane-d4 (S)	90	%	75-121	1	03/17/11 00:00	03/22/11 00:37	17060-07-0	
4-Bromofluorobenzene (S)	97	%	79-119	1	03/17/11 00:00	03/22/11 00:37	460-00-4	
Toluene-d8 (S)	97	%	86-119	1	03/17/11 00:00	03/22/11 00:37	2037-26-5	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**21.2**	%	0.50	1		03/21/11 00:00		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: F2-W-8' **Lab ID: 6095222012** Collected: 03/11/11 11:40 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	23.5	1	03/15/11 00:00	03/23/11 21:00	68334-30-5	
Fuel Oil	ND	mg/kg	23.5	1	03/15/11 00:00	03/23/11 21:00	68553-00-4	
Jet Fuel	ND	mg/kg	23.5	1	03/15/11 00:00	03/23/11 21:00	94114-58-6	
Kerosene	ND	mg/kg	23.5	1	03/15/11 00:00	03/23/11 21:00	8008-20-6	
Mineral Spirits	ND	mg/kg	23.5	1	03/15/11 00:00	03/23/11 21:00	8030-30-6	
Motor Oil	ND	mg/kg	23.5	1	03/15/11 00:00	03/23/11 21:00	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	23.5	1	03/15/11 00:00	03/23/11 21:00		
n-Tetracosane (S)	83	%	50-137	1	03/15/11 00:00	03/23/11 21:00	646-31-1	
p-Terphenyl (S)	71	%	41-129	1	03/15/11 00:00	03/23/11 21:00	92-94-4	
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	ND	ug/kg	64.5	1	03/17/11 00:00	03/22/11 00:52	71-43-2	
Ethylbenzene	ND	ug/kg	64.5	1	03/17/11 00:00	03/22/11 00:52	100-41-4	
Toluene	ND	ug/kg	129	1	03/17/11 00:00	03/22/11 00:52	108-88-3	
Xylene (Total)	ND	ug/kg	323	1	03/17/11 00:00	03/22/11 00:52	1330-20-7	
Dibromofluoromethane (S)	97	%	85-113	1	03/17/11 00:00	03/22/11 00:52	1868-53-7	
1,2-Dichloroethane-d4 (S)	92	%	75-121	1	03/17/11 00:00	03/22/11 00:52	17060-07-0	
4-Bromofluorobenzene (S)	100	%	79-119	1	03/17/11 00:00	03/22/11 00:52	460-00-4	
Toluene-d8 (S)	97	%	86-119	1	03/17/11 00:00	03/22/11 00:52	2037-26-5	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**22.9**	%	0.50	1		03/21/11 00:00		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: F2-W2-8' **Lab ID: 6095222013** Collected: 03/11/11 12:05 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	25.7	1	03/15/11 00:00	03/23/11 21:09	68334-30-5	
Fuel Oil	ND	mg/kg	25.7	1	03/15/11 00:00	03/23/11 21:09	68553-00-4	
Jet Fuel	ND	mg/kg	25.7	1	03/15/11 00:00	03/23/11 21:09	94114-58-6	
Kerosene	ND	mg/kg	25.7	1	03/15/11 00:00	03/23/11 21:09	8008-20-6	
Mineral Spirits	ND	mg/kg	25.7	1	03/15/11 00:00	03/23/11 21:09	8030-30-6	
Motor Oil	ND	mg/kg	25.7	1	03/15/11 00:00	03/23/11 21:09	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	25.7	1	03/15/11 00:00	03/23/11 21:09		
n-Tetracosane (S)	88	%	50-137	1	03/15/11 00:00	03/23/11 21:09	646-31-1	
p-Terphenyl (S)	74	%	41-129	1	03/15/11 00:00	03/23/11 21:09	92-94-4	
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	ND	ug/kg	66.6	1	03/17/11 00:00	03/22/11 01:07	71-43-2	
Ethylbenzene	ND	ug/kg	66.6	1	03/17/11 00:00	03/22/11 01:07	100-41-4	
Toluene	ND	ug/kg	133	1	03/17/11 00:00	03/22/11 01:07	108-88-3	
Xylene (Total)	ND	ug/kg	333	1	03/17/11 00:00	03/22/11 01:07	1330-20-7	
Dibromofluoromethane (S)	97	%	85-113	1	03/17/11 00:00	03/22/11 01:07	1868-53-7	
1,2-Dichloroethane-d4 (S)	93	%	75-121	1	03/17/11 00:00	03/22/11 01:07	17060-07-0	
4-Bromofluorobenzene (S)	98	%	79-119	1	03/17/11 00:00	03/22/11 01:07	460-00-4	
Toluene-d8 (S)	96	%	86-119	1	03/17/11 00:00	03/22/11 01:07	2037-26-5	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**25.0**	%	0.50	1		03/21/11 00:00		

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: TRIP BLANK **Lab ID: 6095222014** Collected: 03/11/11 00:00 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	ND	ug/kg	50.0	1	03/17/11 00:00	03/22/11 01:22	71-43-2	
Ethylbenzene	ND	ug/kg	50.0	1	03/17/11 00:00	03/22/11 01:22	100-41-4	
Toluene	ND	ug/kg	100	1	03/17/11 00:00	03/22/11 01:22	108-88-3	
Xylene (Total)	ND	ug/kg	250	1	03/17/11 00:00	03/22/11 01:22	1330-20-7	
Dibromofluoromethane (S)	95	%	85-113	1	03/17/11 00:00	03/22/11 01:22	1868-53-7	
1,2-Dichloroethane-d4 (S)	92	%	75-121	1	03/17/11 00:00	03/22/11 01:22	17060-07-0	
4-Bromofluorobenzene (S)	96	%	79-119	1	03/17/11 00:00	03/22/11 01:22	460-00-4	
Toluene-d8 (S)	98	%	86-119	1	03/17/11 00:00	03/22/11 01:22	2037-26-5	

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095222

Sample: SWNN-6' **Lab ID: 6095222015** Collected: 03/11/11 11:30 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	25.0	1	03/15/11 00:00	03/23/11 21:19	68334-30-5	
Fuel Oil	ND	mg/kg	25.0	1	03/15/11 00:00	03/23/11 21:19	68553-00-4	
Jet Fuel	ND	mg/kg	25.0	1	03/15/11 00:00	03/23/11 21:19	94114-58-6	
Kerosene	ND	mg/kg	25.0	1	03/15/11 00:00	03/23/11 21:19	8008-20-6	
Mineral Spirits	ND	mg/kg	25.0	1	03/15/11 00:00	03/23/11 21:19	8030-30-6	
Motor Oil	ND	mg/kg	25.0	1	03/15/11 00:00	03/23/11 21:19	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	25.0	1	03/15/11 00:00	03/23/11 21:19		
n-Tetracosane (S)	86	%	50-137	1	03/15/11 00:00	03/23/11 21:19	646-31-1	
p-Terphenyl (S)	70	%	41-129	1	03/15/11 00:00	03/23/11 21:19	92-94-4	
8260 MSV UST 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Benzene	ND	ug/kg	64.6	1	03/17/11 00:00	03/22/11 01:37	71-43-2	
Ethylbenzene	ND	ug/kg	64.6	1	03/17/11 00:00	03/22/11 01:37	100-41-4	
Toluene	ND	ug/kg	129	1	03/17/11 00:00	03/22/11 01:37	108-88-3	
Xylene (Total)	ND	ug/kg	323	1	03/17/11 00:00	03/22/11 01:37	1330-20-7	
Dibromofluoromethane (S)	96	%	85-113	1	03/17/11 00:00	03/22/11 01:37	1868-53-7	
1,2-Dichloroethane-d4 (S)	90	%	75-121	1	03/17/11 00:00	03/22/11 01:37	17060-07-0	
4-Bromofluorobenzene (S)	98	%	79-119	1	03/17/11 00:00	03/22/11 01:37	460-00-4	
Toluene-d8 (S)	98	%	86-119	1	03/17/11 00:00	03/22/11 01:37	2037-26-5	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**22.8**	%	0.50	1		03/21/11 00:00		

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QUALITY CONTROL DATA

Project: UDALL, KS
Pace Project No.: 6095222

QC Batch: OEXT/27794 Analysis Method: OA2
QC Batch Method: OA2 Analysis Description: OA2 GCS
Associated Lab Samples: 6095222001, 6095222002, 6095222003, 6095222004, 6095222005, 6095222006, 6095222007, 6095222008, 6095222009, 6095222010, 6095222011, 6095222012, 6095222013, 6095222015

METHOD BLANK: 784139 Matrix: Solid
Associated Lab Samples: 6095222001, 6095222002, 6095222003, 6095222004, 6095222005, 6095222006, 6095222007, 6095222008, 6095222009, 6095222010, 6095222011, 6095222012, 6095222013, 6095222015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Diesel Fuel	mg/kg	ND	20.0	03/18/11 02:50	
Fuel Oil	mg/kg	ND	20.0	03/18/11 02:50	
Jet Fuel	mg/kg	ND	20.0	03/18/11 02:50	
Kerosene	mg/kg	ND	20.0	03/18/11 02:50	
Mineral Spirits	mg/kg	ND	20.0	03/18/11 02:50	
Motor Oil	mg/kg	ND	20.0	03/18/11 02:50	
Total Petroleum Hydrocarbons	mg/kg	ND	20.0	03/18/11 02:50	
n-Tetracosane (S)	%	74	50-137	03/18/11 02:50	
p-Terphenyl (S)	%	66	41-129	03/18/11 02:50	

LABORATORY CONTROL SAMPLE: 784140

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Diesel Fuel	mg/kg	486	525	108	66-138	
n-Tetracosane (S)	%			79	50-137	
p-Terphenyl (S)	%			79	41-129	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 784141 784142

Parameter	Units	6095049042 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Diesel Fuel	mg/kg	4600	600	615	5710	5900	186	211	56-154	3	27	M3
n-Tetracosane (S)	%						100	103	50-137			
p-Terphenyl (S)	%						165	169	41-129			S2

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QUALITY CONTROL DATA

Project: UDALL, KS
Pace Project No.: 6095222

QC Batch: MSV/35774 Analysis Method: EPA 8260
QC Batch Method: EPA 5035/5030B Analysis Description: 8260 MSV 5030 Med
Associated Lab Samples: 6095222001, 6095222002, 6095222003, 6095222004, 6095222005, 6095222006, 6095222007, 6095222008, 6095222009, 6095222010, 6095222011, 6095222012, 6095222013, 6095222014, 6095222015

METHOD BLANK: 785833 Matrix: Solid
Associated Lab Samples: 6095222001, 6095222002, 6095222003, 6095222004, 6095222005, 6095222006, 6095222007, 6095222008, 6095222009, 6095222010, 6095222011, 6095222012, 6095222013, 6095222014, 6095222015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/kg	ND	50.0	03/21/11 21:07	
Ethylbenzene	ug/kg	ND	50.0	03/21/11 21:07	
Toluene	ug/kg	ND	100	03/21/11 21:07	
Xylene (Total)	ug/kg	ND	250	03/21/11 21:07	
1,2-Dichloroethane-d4 (S)	%	92	75-121	03/21/11 21:07	
4-Bromofluorobenzene (S)	%	97	79-119	03/21/11 21:07	
Dibromofluoromethane (S)	%	100	85-113	03/21/11 21:07	
Toluene-d8 (S)	%	96	86-119	03/21/11 21:07	

LABORATORY CONTROL SAMPLE: 785834

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/kg	2000	2240	112	70-128	
Ethylbenzene	ug/kg	2000	2130	106	78-121	
Toluene	ug/kg	2000	2120	106	68-128	
Xylene (Total)	ug/kg	6000	6520	109	76-124	
1,2-Dichloroethane-d4 (S)	%			93	75-121	
4-Bromofluorobenzene (S)	%			97	79-119	
Dibromofluoromethane (S)	%			98	85-113	
Toluene-d8 (S)	%			99	86-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 785835 785836

Parameter	Units	6095222001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/kg	614	2420	2420	3050	3000	100	98	60-132	2	25	
Ethylbenzene	ug/kg	836	2420	2420	3360	3270	104	100	66-128	3	24	
Toluene	ug/kg	3170	2420	2420	5570	5400	99	92	51-136	3	27	
Xylene (Total)	ug/kg	10800	7290	7290	18100	17600	99	93	62-130	3	26	
1,2-Dichloroethane-d4 (S)	%						91	93	75-121			
4-Bromofluorobenzene (S)	%						101	113	79-119			
Dibromofluoromethane (S)	%						101	99	85-113			
Toluene-d8 (S)	%						109	109	86-119			

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QUALITY CONTROL DATA

Project: UDALL, KS
Pace Project No.: 6095222

QC Batch: PMST/5981 Analysis Method: ASTM D2974-87
QC Batch Method: ASTM D2974-87 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 6095222001, 6095222002, 6095222003, 6095222004, 6095222005, 6095222006, 6095222007, 6095222008

METHOD BLANK: 786848 Matrix: Solid
Associated Lab Samples: 6095222001, 6095222002, 6095222003, 6095222004, 6095222005, 6095222006, 6095222007, 6095222008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Percent Moisture	%	ND	0.50	03/21/11 00:00	

SAMPLE DUPLICATE: 786849

Parameter	Units	6095220004 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	20.8	20.2	3	20	

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QUALITY CONTROL DATA

Project: UDALL, KS
Pace Project No.: 6095222

QC Batch: PMST/5982 Analysis Method: ASTM D2974-87
QC Batch Method: ASTM D2974-87 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 6095222009, 6095222010, 6095222011, 6095222012, 6095222013, 6095222015

METHOD BLANK: 786854 Matrix: Solid
Associated Lab Samples: 6095222009, 6095222010, 6095222011, 6095222012, 6095222013, 6095222015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Percent Moisture	%	ND	0.50	03/21/11 00:00	

SAMPLE DUPLICATE: 786855

Parameter	Units	6095222009 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	11.8	13.4	12	20	

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QUALIFIERS

Project: UDALL, KS
Pace Project No.: 6095222

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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ANALYTE QUALIFIERS

M3	Matrix spike recovery was outside laboratory control limits due to matrix interferences.
S2	Surrogate recovery outside laboratory control limits due to matrix interferences (confirmed by similar results from sample re-analysis).

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UDALL, KS
Pace Project No.: 6095222

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
6095222001	F-SE-3'	OA2	OEXT/27794	OA2	GCSV/10259
6095222002	F-SW-3'	OA2	OEXT/27794	OA2	GCSV/10259
6095222003	SW-S-7'	OA2	OEXT/27794	OA2	GCSV/10259
6095222004	SW-W-7'	OA2	OEXT/27794	OA2	GCSV/10259
6095222005	SW-N-7'	OA2	OEXT/27794	OA2	GCSV/10259
6095222006	F-MD-8'	OA2	OEXT/27794	OA2	GCSV/10259
6095222007	SW-S2-6'	OA2	OEXT/27794	OA2	GCSV/10259
6095222008	SW-N2-7'	OA2	OEXT/27794	OA2	GCSV/10259
6095222009	F2-E-8'	OA2	OEXT/27794	OA2	GCSV/10259
6095222010	F2-E2-8'	OA2	OEXT/27794	OA2	GCSV/10259
6095222011	SW-NS-6'	OA2	OEXT/27794	OA2	GCSV/10259
6095222012	F2-W-8'	OA2	OEXT/27794	OA2	GCSV/10259
6095222013	F2-W2-8'	OA2	OEXT/27794	OA2	GCSV/10259
6095222015	SWNN-6'	OA2	OEXT/27794	OA2	GCSV/10259
6095222001	F-SE-3'	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222002	F-SW-3'	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222003	SW-S-7'	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222004	SW-W-7'	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222005	SW-N-7'	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222006	F-MD-8'	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222007	SW-S2-6'	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222008	SW-N2-7'	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222009	F2-E-8'	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222010	F2-E2-8'	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222011	SW-NS-6'	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222012	F2-W-8'	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222013	F2-W2-8'	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222014	TRIP BLANK	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222015	SWNN-6'	EPA 5035/5030B	MSV/35774	EPA 8260	MSV/35812
6095222001	F-SE-3'	ASTM D2974-87	PMST/5981		
6095222002	F-SW-3'	ASTM D2974-87	PMST/5981		
6095222003	SW-S-7'	ASTM D2974-87	PMST/5981		
6095222004	SW-W-7'	ASTM D2974-87	PMST/5981		
6095222005	SW-N-7'	ASTM D2974-87	PMST/5981		
6095222006	F-MD-8'	ASTM D2974-87	PMST/5981		
6095222007	SW-S2-6'	ASTM D2974-87	PMST/5981		
6095222008	SW-N2-7'	ASTM D2974-87	PMST/5981		
6095222009	F2-E-8'	ASTM D2974-87	PMST/5982		
6095222010	F2-E2-8'	ASTM D2974-87	PMST/5982		
6095222011	SW-NS-6'	ASTM D2974-87	PMST/5982		
6095222012	F2-W-8'	ASTM D2974-87	PMST/5982		
6095222013	F2-W2-8'	ASTM D2974-87	PMST/5982		
6095222015	SWNN-6'	ASTM D2974-87	PMST/5982		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 2

Section A Required Client Information:
Company: URS Corp.
Address: 8300 College Blvd, Suite 200
Overland Park, KS 66210
Email To:
Phone: 913-344-1023 Fax:
Requested Due Date/TAT: 24 hr test Standard

Section B Required Project Information:
Report To: Rick Horner
Copy To: Brian Meyer
Purchase Order No.:
Project Name: Udall, KS
Project Number: 31810923

Section C Invoice Information:
Attention: Rick Horner
Company Name: URS Corp
Address: 8300 College Blvd Ste 200
Pace Quote Reference:
Pace Project Manager: Sherri Guess
Pace Profile #:

REGULATORY AGENCY: NPDES, GROUND WATER, DRINKING WATER, UST, RCRA, OTHER
Site Location STATE: KS

Section D Required Client Information:

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	BTEX	GRO (TVPH)	DRO 042	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	F-SE-3'	SL	G	3/10/11	0915				2	X								X	X	X	X		2(WGFU) 001
2	F-SW-3'	SL	G	3/10/11	0925				2	X								X	X	X	X		002
3	SW-S-7'	SL	G	3/10/11	0835				2	X								X	X	X	X		003
4	SW-W-7'	SL	G	3/10/11	945				2	X								X	X	X	X		004
5	SW-N-7'	SL	G	3/10/11	0955				2	X								X	X	X	X		005
6	F-MD-8'	SL	G	3/10/11	1005				2	X								X	X	X	X		006
7	SW-S2-6'	SL	G	3/10/11	1035				2	X								X	X	X	X		007
8	SW-N2-7'	SL	G	3/10/11	1045				2	X								X	X	X	X		008
9	F2-E-8'	SL	G	3/10/11	1055				2	X								X	X	X	X		009
10	F2-E2-8'	SL	G	3/10/11	1110				2	X								X	X	X	X		010
11	SW-NS-6'	SL	G	3/10/11	1120				2	X								X	X	X	X		011
12	SW-NW-6' SW-NN-6'	SL	G	3/10/11	1130				2	X								X	X	X	X		012

Requested Analysis Filtered (Y/N)

6095222

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
		3/12/11	0843		3/12/11	0843	05	Y	N	Y

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Brian Meyer
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 03/11/11

Temp In °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.08, 12-Oct-2007

017396

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of 2

Section A
Required Client Information:

Company:	URS Corp.
Address:	8300 College Blvd, Suite 200, Overland Park, KS 66210
Email To:	
Phone:	913-344-1023
Fax:	913-344-1011
Requested Due Date/TAT:	24 hr tat / Std Turn

Section B
Required Project Information:

Report To:	Rick Horner
Copy To:	Brian Meyer
Purchase Order No.:	
Project Name:	Udall, KS
Project Number:	3180923

Section C
Invoice Information:

Attention:	Rick Horner
Company Name:	URS Corp
Address:	8300 College Blvd Ste 200
Pace Quote Reference:	
Pace Project Manager:	Sherri Guess
Pace Profile #:	

REGULATORY AGENCY

- [ ] NPDES
- [ ] GROUND WATER
- [ ] DRINKING WATER
- [ ] UST
- [ ] RCRA
- [ ] OTHER

Site Location STATE: KS

Section D
Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

Coc 95222

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	TIME	COMPOSITE END/GRAB DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	BTEX,	GRO (TVPH)	DRO 0+2	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	F2-~~W2-8'~~ W-8'	SL	G	3/11/11	1140				2	X									X		X		2(WGFU) 013
2	F2-W2-8'	SL	G	3/11/11	1205				2	X									X		X		014
3	Trip Blank		G	3/11/11	0915				2										X				2(VGU) TB 015
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

3/11/11

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	[signature]	3/12/11	0843	[signature]	3/12/11	0843	0.5	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Brian Meyer

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 03/11/11

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

017397

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.08, 12-Oct-2007

Sample Condition Upon Receipt

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Client Name: URS Corp Project # 6095222

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other _____

Tracking #: _____ Pace Shipping Label Used? ☐ Yes ☐ No

Custody Seal on Cooler/Box Present: ☐ Yes ☑ No Seals intact: ☐ Yes ☑ No

Optional
Proj. Due Date: 3/28
Proj. Name:

Packing Material: ☑ Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☐ Other _____

Thermometer Used: T-191 / T-194 Type of Ice: (Wet) Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature: 0.5

Temperature should be above freezing to 6°C

Date and Initials of person examining contents: 3/12/11 MJ

		Comments:
Chain of Custody present:	☑ Yes ☐ No ☐ N/A	1.
Chain of Custody filled out:	☑ Yes ☐ No ☐ N/A	2.
Chain of Custody relinquished:	☑ Yes ☐ No ☐ N/A	3.
Sampler name & signature on COC:	☑ Yes ☐ No ☐ N/A	4.
Samples arrived within holding time:	☑ Yes ☐ No ☐ N/A	5.
Short Hold Time analyses (<72hr):	☐ Yes ☑ No ☐ N/A	6.
Rush Turn Around Time requested:	☐ Yes ☑ No ☐ N/A	7.
Sufficient volume:	☑ Yes ☐ No ☐ N/A	8.
Correct containers used:	☑ Yes ☐ No ☐ N/A	9.
-Pace containers used:	☑ Yes ☐ No ☐ N/A	
Containers intact:	☑ Yes ☐ No ☐ N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐ Yes ☐ No ☑ N/A	11.
Filtered volume received for dissolved tests	☐ Yes ☐ No ☑ N/A	12.
Sample labels match COC:	☑ Yes ☐ No ☐ N/A	13.
-Includes date/time/ID/analyses Matrix: SL		
All containers needing preservation have been checked.	☐ Yes ☐ No ☑ N/A	14.
All containers needing preservation are found to be in compliance with EPA recommendation.	☐ Yes ☐ No ☑ N/A	
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☑ Yes ☐ No	Initial when completed: ___ Lot # of added preservative: ___
Trip Blank present:	☑ Yes ☐ No ☐ N/A	15.
Pace Trip Blank lot # (if purchased): ___		
Headspace in VOA vials (>6mm):	☐ Yes ☐ No ☑ N/A	16.
Project sampled in USDA Regulated Area:	☐ Yes ☑ No ☐ N/A	17. List State: KS

Client Notification/ Resolution: Copy COC to Client? (Y) / N Field Data Required? Y / (N)

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ Date: 3.14.11

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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March 28, 2011

Rick Horner
URS Corporation
8300 College Blvd.
Overland Park, KS 66210

RE: Project: UDALL, KS
Pace Project No.: 6095220

Dear Rick Horner:
Enclosed are the analytical results for sample(s) received by the laboratory on March 12, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Sherri Guess

sherri.guess@pacelabs.com
Project Manager

Enclosures

REPORT OF LABORATORY ANALYSIS

ACCREDITED IN ACCORDANCE WITH nelac

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CERTIFICATIONS

Project: UDALL, KS
Pace Project No.: 6095220

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 05-008-0
Illinois Certification #: 001191
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-08-TX
Utah Certification #: 9135995665

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SAMPLE SUMMARY

Project: UDALL, KS
Pace Project No.: 6095220

Lab ID	Sample ID	Matrix	Date Collected	Date Received
6095220001	RO-795757	Solid	03/10/11 14:00	03/12/11 08:43
6095220002	RO-247980	Solid	03/10/11 14:25	03/12/11 08:43
6095220003	RO-494957	Solid	03/10/11 16:00	03/12/11 08:43
6095220004	RO-79332	Solid	03/11/11 12:20	03/12/11 08:43
6095220005	RO-7449	Solid	03/11/11 14:20	03/12/11 08:43

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SAMPLE ANALYTE COUNT

Project: UDALL, KS
Pace Project No.: 6095220

Lab ID	Sample ID	Method	Analysts	Analytes Reported
6095220001	RO-795757	EPA 6010	JDH	7
		EPA 7470	SMW	1
		EPA 8260/OA1	JDM	8
		ASTM D2974-87	DWC	1
6095220002	RO-247980	EPA 6010	JDH	7
		EPA 7470	SMW	1
		EPA 8260/OA1	JDM	8
		ASTM D2974-87	DWC	1
6095220003	RO-494957	EPA 6010	JDH	7
		EPA 7470	SMW	1
		EPA 8260/OA1	JDM	8
		ASTM D2974-87	DWC	1
6095220004	RO-79332	EPA 6010	JDH	7
		EPA 7470	SMW	1
		EPA 8260/OA1	JDM	8
		ASTM D2974-87	DWC	1
6095220005	RO-7449	EPA 6010	JDH	7
		EPA 7470	SMW	1
		EPA 8260/OA1	JDM	8
		ASTM D2974-87	DWC	1

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095220

Sample: RO-795757 **Lab ID: 6095220001** Collected: 03/10/11 14:00 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
	Leachate Method/Date: EPA 1311; 03/23/11 00:00							
Arsenic	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 12:01	7440-38-2	
Barium	ND	mg/L	2.5	1	03/24/11 16:22	03/25/11 12:01	7440-39-3	
Cadmium	ND	mg/L	0.050	1	03/24/11 16:22	03/25/11 12:01	7440-43-9	
Chromium	ND	mg/L	0.10	1	03/24/11 16:22	03/25/11 12:01	7440-47-3	
Lead	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 12:01	7439-92-1	
Selenium	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 12:01	7782-49-2	
Silver	ND	mg/L	0.10	1	03/24/11 16:22	03/25/11 12:01	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
	Leachate Method/Date: EPA 1311; 03/23/11 00:00							
Mercury	ND	ug/L	2.0	1	03/28/11 10:52	03/28/11 15:16	7439-97-6	
8260/OA1 UST	Analytical Method: EPA 8260/OA1 Preparation Method: EPA 8260/OA1							
Benzene	**467**	ug/kg	62.1	1	03/15/11 00:00	03/17/11 06:59	71-43-2	
Toluene	**3120**	ug/kg	124	1	03/15/11 00:00	03/17/11 06:59	108-88-3	
Ethylbenzene	**829**	ug/kg	124	1	03/15/11 00:00	03/17/11 06:59	100-41-4	
Xylene (Total)	**9240**	ug/kg	311	1	03/15/11 00:00	03/17/11 06:59	1330-20-7	
Dibromofluoromethane (S)	94	%	85-113	1	03/15/11 00:00	03/17/11 06:59	1868-53-7	
Toluene-d8 (S)	106	%	86-119	1	03/15/11 00:00	03/17/11 06:59	2037-26-5	
1,2-Dichloroethane-d4 (S)	94	%	75-121	1	03/15/11 00:00	03/17/11 06:59	17060-07-0	
4-Bromofluorobenzene (S)	105	%	79-119	1	03/15/11 00:00	03/17/11 06:59	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**19.5**	%	0.50	1		03/21/11 00:00		

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095220

Sample: RO-247980 **Lab ID: 6095220002** Collected: 03/10/11 14:25 **Received:** 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
	Leachate Method/Date: EPA 1311; 03/23/11 00:00							
Arsenic	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 12:11	7440-38-2	
Barium	ND	mg/L	2.5	1	03/24/11 16:22	03/25/11 12:11	7440-39-3	
Cadmium	ND	mg/L	0.050	1	03/24/11 16:22	03/25/11 12:11	7440-43-9	
Chromium	ND	mg/L	0.10	1	03/24/11 16:22	03/25/11 12:11	7440-47-3	
Lead	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 12:11	7439-92-1	
Selenium	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 12:11	7782-49-2	
Silver	ND	mg/L	0.10	1	03/24/11 16:22	03/25/11 12:11	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
	Leachate Method/Date: EPA 1311; 03/23/11 00:00							
Mercury	ND	ug/L	2.0	1	03/28/11 10:52	03/28/11 15:22	7439-97-6	
8260/OA1 UST	Analytical Method: EPA 8260/OA1 Preparation Method: EPA 8260/OA1							
Benzene	ND	ug/kg	62.6	1	03/15/11 00:00	03/17/11 07:14	71-43-2	
Toluene	**205**	ug/kg	125	1	03/15/11 00:00	03/17/11 07:14	108-88-3	
Ethylbenzene	ND	ug/kg	125	1	03/15/11 00:00	03/17/11 07:14	100-41-4	
Xylene (Total)	**592**	ug/kg	313	1	03/15/11 00:00	03/17/11 07:14	1330-20-7	
Dibromofluoromethane (S)	95	%	85-113	1	03/15/11 00:00	03/17/11 07:14	1868-53-7	
Toluene-d8 (S)	101	%	86-119	1	03/15/11 00:00	03/17/11 07:14	2037-26-5	
1,2-Dichloroethane-d4 (S)	95	%	75-121	1	03/15/11 00:00	03/17/11 07:14	17060-07-0	
4-Bromofluorobenzene (S)	103	%	79-119	1	03/15/11 00:00	03/17/11 07:14	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**20.6**	%	0.50	1		03/21/11 00:00		

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095220

Sample: RO-494957 **Lab ID: 6095220003** Collected: 03/10/11 16:00 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
	Leachate Method/Date: EPA 1311; 03/23/11 00:00							
Arsenic	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 12:20	7440-38-2	
Barium	**3.0**	mg/L	2.5	1	03/24/11 16:22	03/25/11 12:20	7440-39-3	
Cadmium	ND	mg/L	0.050	1	03/24/11 16:22	03/25/11 12:20	7440-43-9	
Chromium	ND	mg/L	0.10	1	03/24/11 16:22	03/25/11 12:20	7440-47-3	
Lead	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 12:20	7439-92-1	
Selenium	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 12:20	7782-49-2	
Silver	ND	mg/L	0.10	1	03/24/11 16:22	03/25/11 12:20	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
	Leachate Method/Date: EPA 1311; 03/23/11 00:00							
Mercury	ND	ug/L	2.0	1	03/28/11 10:52	03/28/11 15:24	7439-97-6	
8260/OA1 UST	Analytical Method: EPA 8260/OA1 Preparation Method: EPA 8260/OA1							
Benzene	**1570**	ug/kg	57.5	1	03/15/11 00:00	03/17/11 07:29	71-43-2	
Toluene	**5840**	ug/kg	115	1	03/15/11 00:00	03/17/11 07:29	108-88-3	
Ethylbenzene	**1040**	ug/kg	115	1	03/15/11 00:00	03/17/11 07:29	100-41-4	
Xylene (Total)	**10300**	ug/kg	288	1	03/15/11 00:00	03/17/11 07:29	1330-20-7	
Dibromofluoromethane (S)	93	%	85-113	1	03/15/11 00:00	03/17/11 07:29	1868-53-7	
Toluene-d8 (S)	108	%	86-119	1	03/15/11 00:00	03/17/11 07:29	2037-26-5	
1,2-Dichloroethane-d4 (S)	94	%	75-121	1	03/15/11 00:00	03/17/11 07:29	17060-07-0	
4-Bromofluorobenzene (S)	115	%	79-119	1	03/15/11 00:00	03/17/11 07:29	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**13.3**	%	0.50	1		03/21/11 00:00		

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Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095220

Sample: RO-79332 **Lab ID: 6095220004** Collected: 03/11/11 12:20 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
	Leachate Method/Date: EPA 1311; 03/23/11 00:00							
Arsenic	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 12:24	7440-38-2	
Barium	ND	mg/L	2.5	1	03/24/11 16:22	03/25/11 12:24	7440-39-3	
Cadmium	ND	mg/L	0.050	1	03/24/11 16:22	03/25/11 12:24	7440-43-9	
Chromium	ND	mg/L	0.10	1	03/24/11 16:22	03/25/11 12:24	7440-47-3	
Lead	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 12:24	7439-92-1	
Selenium	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 12:24	7782-49-2	
Silver	ND	mg/L	0.10	1	03/24/11 16:22	03/25/11 12:24	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
	Leachate Method/Date: EPA 1311; 03/23/11 00:00							
Mercury	ND	ug/L	2.0	1	03/28/11 10:52	03/28/11 15:26	7439-97-6	
8260/OA1 UST	Analytical Method: EPA 8260/OA1 Preparation Method: EPA 8260/OA1							
Benzene	**158**	ug/kg	62.7	1	03/15/11 00:00	03/17/11 07:44	71-43-2	
Toluene	**540**	ug/kg	125	1	03/15/11 00:00	03/17/11 07:44	108-88-3	
Ethylbenzene	**180**	ug/kg	125	1	03/15/11 00:00	03/17/11 07:44	100-41-4	
Xylene (Total)	**2240**	ug/kg	314	1	03/15/11 00:00	03/17/11 07:44	1330-20-7	
Dibromofluoromethane (S)	94	%	85-113	1	03/15/11 00:00	03/17/11 07:44	1868-53-7	
Toluene-d8 (S)	104	%	86-119	1	03/15/11 00:00	03/17/11 07:44	2037-26-5	
1,2-Dichloroethane-d4 (S)	93	%	75-121	1	03/15/11 00:00	03/17/11 07:44	17060-07-0	
4-Bromofluorobenzene (S)	106	%	79-119	1	03/15/11 00:00	03/17/11 07:44	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**20.8**	%	0.50	1		03/21/11 00:00		

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ANALYTICAL RESULTS

Project: UDALL, KS
Pace Project No.: 6095220

Sample: RO-7449 **Lab ID: 6095220005** Collected: 03/11/11 14:20 Received: 03/12/11 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
	Leachate Method/Date: EPA 1311; 03/23/11 00:00							
Arsenic	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 11:13	7440-38-2	
Barium	ND	mg/L	2.5	1	03/24/11 16:22	03/25/11 11:13	7440-39-3	
Cadmium	ND	mg/L	0.050	1	03/24/11 16:22	03/25/11 11:13	7440-43-9	
Chromium	ND	mg/L	0.10	1	03/24/11 16:22	03/25/11 11:13	7440-47-3	
Lead	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 11:13	7439-92-1	
Selenium	ND	mg/L	0.50	1	03/24/11 16:22	03/25/11 11:13	7782-49-2	
Silver	ND	mg/L	0.10	1	03/24/11 16:22	03/25/11 11:13	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
	Leachate Method/Date: EPA 1311; 03/23/11 00:00							
Mercury	ND	ug/L	2.0	1	03/28/11 10:52	03/28/11 15:37	7439-97-6	
8260/OA1 UST	Analytical Method: EPA 8260/OA1 Preparation Method: EPA 8260/OA1							
Benzene	**87.8**	ug/kg	58.7	1	03/15/11 00:00	03/17/11 07:59	71-43-2	
Toluene	**445**	ug/kg	117	1	03/15/11 00:00	03/17/11 07:59	108-88-3	
Ethylbenzene	ND	ug/kg	117	1	03/15/11 00:00	03/17/11 07:59	100-41-4	
Xylene (Total)	**1310**	ug/kg	293	1	03/15/11 00:00	03/17/11 07:59	1330-20-7	
Dibromofluoromethane (S)	94	%	85-113	1	03/15/11 00:00	03/17/11 07:59	1868-53-7	
Toluene-d8 (S)	106	%	86-119	1	03/15/11 00:00	03/17/11 07:59	2037-26-5	
1,2-Dichloroethane-d4 (S)	90	%	75-121	1	03/15/11 00:00	03/17/11 07:59	17060-07-0	
4-Bromofluorobenzene (S)	105	%	79-119	1	03/15/11 00:00	03/17/11 07:59	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**15.0**	%	0.50	1		03/21/11 00:00		

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QUALITY CONTROL DATA

Project: UDALL, KS
Pace Project No.: 6095220

QC Batch: MPRP/13781 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET TCLP
Associated Lab Samples: 6095220001, 6095220002, 6095220003, 6095220004

METHOD BLANK: 788932 Matrix: Water
Associated Lab Samples: 6095220001, 6095220002, 6095220003, 6095220004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.50	03/25/11 11:55	
Barium	mg/L	ND	2.5	03/25/11 11:55	
Cadmium	mg/L	ND	0.050	03/25/11 11:55	
Chromium	mg/L	ND	0.10	03/25/11 11:55	
Lead	mg/L	ND	0.50	03/25/11 11:55	
Selenium	mg/L	ND	0.50	03/25/11 11:55	
Silver	mg/L	ND	0.10	03/25/11 11:55	

LABORATORY CONTROL SAMPLE: 788933

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	1	0.98	98	80-120	
Barium	mg/L	1	1.1	107	80-120	
Cadmium	mg/L	1	0.99	99	80-120	
Chromium	mg/L	1	1.0	103	80-120	
Lead	mg/L	1	1.0	105	80-120	
Selenium	mg/L	1	0.98	98	80-120	
Silver	mg/L	.5	0.49	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 788934 788935

Parameter	Units	6095220001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	10	10	7.9	10.2	79	102	75-125	26	20	M0,R1
Barium	mg/L	ND	10	10	8.6	12.1	73	108	75-125	34	20	M0,R1
Cadmium	mg/L	ND	10	10	8.0	10.2	80	102	75-125	24	20	M0,R1
Chromium	mg/L	ND	10	10	8.0	10.2	80	102	75-125	24	20	M0,R1
Lead	mg/L	ND	10	10	8.2	10.0	81	100	75-125	21	20	M0,R1
Selenium	mg/L	ND	10	10	7.9	10.2	79	102	75-125	26	20	M0,R1
Silver	mg/L	ND	5	5	4.0	5.1	79	101	75-125	25	20	M0,R1

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QUALITY CONTROL DATA

Project: UDALL, KS
Pace Project No.: 6095220

QC Batch: MPRP/13782
QC Batch Method: EPA 3010
Analysis Method: EPA 6010
Analysis Description: 6010 MET TCLP
Associated Lab Samples: 6095220005

METHOD BLANK: 788939
Matrix: Water
Associated Lab Samples: 6095220005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.50	03/25/11 11:06	
Barium	mg/L	ND	2.5	03/25/11 11:06	
Cadmium	mg/L	ND	0.050	03/25/11 11:06	
Chromium	mg/L	ND	0.10	03/25/11 11:06	
Lead	mg/L	ND	0.50	03/25/11 11:06	
Selenium	mg/L	ND	0.50	03/25/11 11:06	
Silver	mg/L	ND	0.10	03/25/11 11:06	

LABORATORY CONTROL SAMPLE: 788940

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	1	0.96	96	80-120	
Barium	mg/L	1	1.0	103	80-120	
Cadmium	mg/L	1	0.97	97	80-120	
Chromium	mg/L	1	1.0	102	80-120	
Lead	mg/L	1	1.0	104	80-120	
Selenium	mg/L	1	0.96	96	80-120	
Silver	mg/L	.5	0.49	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 788941 788942

Parameter	Units	6095220005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	10	10	10.1	10.1	101	101	75-125	0	20	
Barium	mg/L	ND	10	10	11.5	11.5	102	101	75-125	0	20	
Cadmium	mg/L	ND	10	10	9.9	9.9	99	99	75-125	0	20	
Chromium	mg/L	ND	10	10	10.1	10.1	101	101	75-125	0	20	
Lead	mg/L	ND	10	10	9.8	9.8	98	98	75-125	0	20	
Selenium	mg/L	ND	10	10	10.2	10.1	102	101	75-125	1	20	
Silver	mg/L	ND	5	5	5.0	5.0	100	100	75-125	0	20	

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QUALITY CONTROL DATA

Project: UDALL, KS
Pace Project No.: 6095220

QC Batch: MERP/5056 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury TCLP
Associated Lab Samples: 6095220001, 6095220002, 6095220003, 6095220004

METHOD BLANK: 790909 Matrix: Water
Associated Lab Samples: 6095220001, 6095220002, 6095220003, 6095220004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	2.0	03/28/11 15:14	

LABORATORY CONTROL SAMPLE: 790910

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.6	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 790911 790912

Parameter	Units	6095220001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	15	15	13.3	13.2	89	88	75-125	1	19	

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QUALITY CONTROL DATA

Project: UDALL, KS
Pace Project No.: 6095220

QC Batch: MERP/5057
QC Batch Method: EPA 7470
Analysis Method: EPA 7470
Analysis Description: 7470 Mercury TCLP
Associated Lab Samples: 6095220005

METHOD BLANK: 790913 Matrix: Water
Associated Lab Samples: 6095220005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	2.0	03/28/11 15:35	

LABORATORY CONTROL SAMPLE: 790914

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.4	89	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 790915 790916

Parameter	Units	6095220005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	15	15	13.0	13.6	86	90	75-125	5	19	

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QUALITY CONTROL DATA

Project: UDALL, KS
Pace Project No.: 6095220

QC Batch: MSV/35708 Analysis Method: EPA 8260/OA1
QC Batch Method: EPA 8260/OA1 Analysis Description: 8260/OA1 UST
Associated Lab Samples: 6095220001, 6095220002, 6095220003, 6095220004, 6095220005

METHOD BLANK: 784510 Matrix: Solid
Associated Lab Samples: 6095220001, 6095220002, 6095220003, 6095220004, 6095220005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/kg	ND	50.0	03/17/11 04:44	
Ethylbenzene	ug/kg	ND	100	03/17/11 04:44	
Toluene	ug/kg	ND	100	03/17/11 04:44	
Xylene (Total)	ug/kg	ND	250	03/17/11 04:44	
1,2-Dichloroethane-d4 (S)	%	97	75-121	03/17/11 04:44	
4-Bromofluorobenzene (S)	%	100	79-119	03/17/11 04:44	
Dibromofluoromethane (S)	%	98	85-113	03/17/11 04:44	
Toluene-d8 (S)	%	100	86-119	03/17/11 04:44	

LABORATORY CONTROL SAMPLE: 784511

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/kg	2000	2090	104	70-128	
Ethylbenzene	ug/kg	2000	2090	105	78-121	
Toluene	ug/kg	2000	2060	103	68-128	
Xylene (Total)	ug/kg	6000	6240	104	76-124	
1,2-Dichloroethane-d4 (S)	%			96	75-121	
4-Bromofluorobenzene (S)	%			99	79-119	
Dibromofluoromethane (S)	%			96	85-113	
Toluene-d8 (S)	%			101	86-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 784512 784513

Parameter	Units	6095043035 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/kg	ND	2440	2440	2650	2600	109	106	60-132	2	25	
Ethylbenzene	ug/kg	ND	2440	2440	2660	2650	109	108	66-128	0	24	
Toluene	ug/kg	ND	2440	2440	2570	2500	105	102	51-136	3	27	
Xylene (Total)	ug/kg	ND	7340	7340	7780	7610	106	104	62-130	2	26	
1,2-Dichloroethane-d4 (S)	%						97	95	75-121			
4-Bromofluorobenzene (S)	%						100	98	79-119			
Dibromofluoromethane (S)	%						99	97	85-113			
Toluene-d8 (S)	%						100	99	86-119			

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QUALITY CONTROL DATA

Project: UDALL, KS
Pace Project No.: 6095220

QC Batch: PMST/5981 Analysis Method: ASTM D2974-87
QC Batch Method: ASTM D2974-87 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 6095220001, 6095220002, 6095220003, 6095220004, 6095220005

METHOD BLANK: 786848 Matrix: Solid
Associated Lab Samples: 6095220001, 6095220002, 6095220003, 6095220004, 6095220005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Percent Moisture	%	ND	0.50	03/21/11 00:00	

SAMPLE DUPLICATE: 786849

Parameter	Units	6095220004 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	20.8	20.2	3	20	

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: UDALL, KS
Pace Project No.: 6095220

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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ANALYTE QUALIFIERS

M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: UDALL, KS
Pace Project No.: 6095220

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
6095220001	RO-795757	EPA 3010	MPRP/13781	EPA 6010	ICP/11972
6095220002	RO-247980	EPA 3010	MPRP/13781	EPA 6010	ICP/11972
6095220003	RO-494957	EPA 3010	MPRP/13781	EPA 6010	ICP/11972
6095220004	RO-79332	EPA 3010	MPRP/13781	EPA 6010	ICP/11972
6095220005	RO-7449	EPA 3010	MPRP/13782	EPA 6010	ICP/11971
6095220001	RO-795757	EPA 7470	MERP/5056	EPA 7470	MERC/5027
6095220002	RO-247980	EPA 7470	MERP/5056	EPA 7470	MERC/5027
6095220003	RO-494957	EPA 7470	MERP/5056	EPA 7470	MERC/5027
6095220004	RO-79332	EPA 7470	MERP/5056	EPA 7470	MERC/5027
6095220005	RO-7449	EPA 7470	MERP/5057	EPA 7470	MERC/5028
6095220001	RO-795757	EPA 8260/OA1	MSV/35708	EPA 8260/OA1	MSV/35728
6095220002	RO-247980	EPA 8260/OA1	MSV/35708	EPA 8260/OA1	MSV/35728
6095220003	RO-494957	EPA 8260/OA1	MSV/35708	EPA 8260/OA1	MSV/35728
6095220004	RO-79332	EPA 8260/OA1	MSV/35708	EPA 8260/OA1	MSV/35728
6095220005	RO-7449	EPA 8260/OA1	MSV/35708	EPA 8260/OA1	MSV/35728
6095220001	RO-795757	ASTM D2974-87	PMST/5981		
6095220002	RO-247980	ASTM D2974-87	PMST/5981		
6095220003	RO-494957	ASTM D2974-87	PMST/5981		
6095220004	RO-79332	ASTM D2974-87	PMST/5981		
6095220005	RO-7449	ASTM D2974-87	PMST/5981		

REPORT OF LABORATORY ANALYSIS

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A Required Client Information:

Company: URS Corp.
Address: 8300 College Blvd, Suite 200
Overland Park, KS 66210
Email To:
Phone: 913-344-1023 Fax: 913-344-1011
Requested Due Date/TAT: Std

Section B Required Project Information:

Report To: Rick Horner
Copy To: Brian Meyer
Purchase Order No.:
Project Name: Udall, KS
Project Number: 31816923

Section C Invoice Information:

Attention: Rick Horner
Company Name: URS Corp
Address: 8300 College Blvd Ste 200
Pace Quote Reference:
Pace Project Manager: Sherri Guess
Pace Profile #:

REGULATORY AGENCY
- NPDES
- GROUND WATER
- DRINKING WATER
- UST
- RCRA
- OTHER

Site Location STATE: KS

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

60 95220

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	TIME	COMPOSITE END/GRAB DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test	BTEX	DRO	TCLP RCRA 8 Metals		Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	RO-795757	SL	C	3/10/11	1400				2	X									X		X	2 wk PU		001
2	RO-747980	SL	C	3/10/11	1435				2	X									X		X			002
3	RO-494957	SL	C	3/10/11	1600				2	X									X		X			003
4	~~RO~~	~~SL~~	~~C~~	~~3/11/11~~	~~0930~~				~~2~~	~~X~~									~~X~~		~~X~~			
5	RO-79332	SL	C	3/11/11	1220				2	X									X		X	2 wk PU		004
6	RO-7449	SL	C	3/11/11	1420				2	X									X		X			005
7																								
8																								
9																								
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	[signature]	3/12/11	0843	[signature]	3/12/11	0843	1.6	Y	N	Y
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Brian Meyer
SIGNATURE of SAMPLER: [signature]
DATE Signed (MM/DD/YY): 3/10/11

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.08, 12-Oct-2007

017416

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

Client Name: URS Corp Project # 60952220

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other _____
Tracking #: _____ Pace Shipping Label Used? ☐ Yes ☑ No
Custody Seal on Cooler/Box Present: ☐ Yes ☑ No Seals intact: ☐ Yes ☑ No

Optional
Proj. Due Date: 3/21
Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other _____
Thermometer Used: T-191 / T-194 Type of Ice: Wet Blue None ☐ Samples on ice, cooling process has begun
Cooler Temperature: 1.6
Temperature should be above freezing to 6°C

Date and initials of person examining contents: 3/12/11 AD

		Comments:
Chain of Custody present:	☑ Yes ☐ No ☐ N/A	1.
Chain of Custody filled out:	☑ Yes ☐ No ☐ N/A	2.
Chain of Custody relinquished:	☑ Yes ☐ No ☐ N/A	3.
Sampler name & signature on COC:	☑ Yes ☐ No ☐ N/A	4.
Samples arrived within holding time:	☑ Yes ☐ No ☐ N/A	5.
Short Hold Time analyses (<72hr):	☐ Yes ☑ No ☐ N/A	6.
Rush Turn Around Time requested:	☐ Yes ☑ No ☐ N/A	7.
Sufficient volume:	☑ Yes ☐ No ☐ N/A	8.
Correct containers used:	☑ Yes ☐ No ☐ N/A	9.
-Pace containers used:	☑ Yes ☐ No ☐ N/A	
Containers intact:	☑ Yes ☐ No ☐ N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐ Yes ☐ No ☑ N/A	11.
Filtered volume received for dissolved tests	☐ Yes ☐ No ☑ N/A	12.
Sample labels match COC:	☑ Yes ☐ No ☐ N/A	13.
-Includes date/time/ID/analyses Matrix: S		
All containers needing preservation have been checked.	☐ Yes ☐ No ☑ N/A	14.
All containers needing preservation are found to be in compliance with EPA recommendation.	☐ Yes ☐ No ☑ N/A	
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☐ Yes ☑ No	Initial when completed AD Lot # of added preservative
Trip Blank present:	☐ Yes ☐ No ☑ N/A	15.
Pace Trip Blank lot # (if purchased):		
Headspace in VOA vials (>6mm):	☐ Yes ☐ No ☑ N/A	16.
Project sampled in USDA Regulated Area:	☐ Yes ☐ No ☑ N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? (Y) N Field Data Required? Y (N)
Person Contacted: _____ Date/Time: _____
Comments/ Resolution: _____

Project Manager Review: _____ Date: 3.14.11

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

NOTICE: This report is required by 49 CFR Part 195. Failure to report can result in a civil penalty not to exceed $100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122.	OMB NO: 2137-0047 EXPIRATION DATE: 01/31/2014

U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	**Original Report Date:**	04/28/2011
	No.	20110129 - 17793 --- (DOT Use Only)

ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0047. Public reporting for this collection of information is estimated to be approximately 10 hours per response (5 hours for a small release), including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.

INSTRUCTIONS

Important: *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline.*

PART A - KEY REPORT INFORMATION

Report Type: *(select all that apply)*	**Original:**	**Supplemental:**	**Final:**
		Yes	**Yes**

Last Revision Date:	04/03/2013
1. Operator's OPS-issued Operator Identification Number (OPID):	32334
2. Name of Operator	TC OIL PIPELINE OPERATIONS INC
3. Address of Operator:	
3a. Street Address	717 TEXAS AVE
3b. City	HOUSTON
3c. State	Texas
3d. Zip Code	77002
4. Local time *(24-hr clock)* and date of the Accident:	03/16/2011 09:45
5. Location of Accident:	
Latitude:	39.86822
Longitude:	-96.0534
6. National Response Center Report Number (if applicable):	970232
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	03/16/2011 11:11
8. Commodity released: *(select only one, based on predominant volume released)*	Crude Oil
- Specify Commodity Subtype:	
- If "Other" Subtype, Describe:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Ethanol Blend, then % Ethanol Blend: %:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Biodiesel, then Biodiesel Blend (e.g. B2, B20, B100): B	
9. Estimated volume of commodity released unintentionally (Barrels):	15.00
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):	
11. Estimated volume of commodity recovered (Barrels):	15.00
12. Were there fatalities?	No
- If Yes, specify the number in each category:	
12a. Operator employees	
12b. Contractor employees working for the Operator	
12c. Non-Operator emergency responders	
12d. Workers working on the right-of-way, but NOT associated with this Operator	
12e. General public	
12f. Total fatalities (sum of above)	
13. Were there injuries requiring inpatient hospitalization?	No
- If Yes, specify the number in each category:	
13a. Operator employees	
13b. Contractor employees working for the Operator	
13c. Non-Operator emergency responders	

13d. Workers working on the right-of-way, but NOT associated with this Operator	
13e. General public	
13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	
- If No, Explain:	
- If Yes, complete Questions 14a and 14b: *(use local time, 24-hr clock)*	
14a. Local time and date of shutdown:	
14b. Local time pipeline/facility restarted:	
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	No
16. Did the commodity explode?	No
17. Number of general public evacuated:	0
18. Time sequence *(use local time, 24-hour clock)*:	
18a. Local time Operator identified Accident:	03/16/2011 09:45
18b. Local time Operator resources arrived on site:	03/16/2011 09:45

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the origin of Accident onshore?	Yes
If Yes, Complete Questions (2-12)	
If No, Complete Questions (13-15)	
- If Onshore:	
2. State:	Kansas
3. Zip Code:	66538
4. City	Seneca
5. County or Parish	Nemaha
6. Operator-designated location:	Milepost/Valve Station
Specify:	691.9
7. Pipeline/Facility name:	Seneca Pump Station
8. Segment name/ID:	
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Totally contained on Operator-controlled property
11. Area of Accident (as found):	Aboveground
Specify:	Typical aboveground facility piping or appurtenance
- If Other, Describe:	
Depth-of-Cover (in):	
12. Did Accident occur in a crossing?	No
- If Yes, specify below:	
- If Bridge crossing –	
Cased/ Uncased:	
- If Railroad crossing –	
Cased/ Uncased/ Bored/drilled	
- If Road crossing –	
Cased/ Uncased/ Bored/drilled	
- If Water crossing –	
Cased/ Uncased	
- Name of body of water, if commonly known:	
- Approx. water depth (ft) at the point of the Accident:	
- Select:	
- If Offshore:	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- On the Outer Continental Shelf (OCS) - Specify:	
- Area:	
- Block #:	
15. Area of Accident:	

PART C - ADDITIONAL FACILITY INFORMATION

1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Pump/Meter Station Equipment and Piping
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	
3. Item involved in Accident:	Pump

- If Pipe, specify:	
3a. Nominal diameter of pipe (in):	
3b. Wall thickness (in):	
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	
3d. Pipe specification:	
3e. Pipe Seam , specify:	
- If Other, Describe:	
3f. Pipe manufacturer:	
3g. Year of manufacture:	
3h. Pipeline coating type at point of Accident, specify:	
- If Other, Describe:	
- If Weld, including heat-affected zone, specify:	
- If Other, Describe:	
- If Valve, specify:	
- If Mainline, specify:	
- If Other, Describe:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	
- If Other - Describe:	
- If Other, describe:	
4. Year item involved in Accident was installed:	2009
5. Material involved in Accident:	Carbon Steel
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Leak
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	Seal or Packing
- If Other, Describe:	
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	

PART D - ADDITIONAL CONSEQUENCE INFORMATION

1. Wildlife impact:	No
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	Yes
3. Long term impact assessment performed or planned:	No
4. Anticipated remediation:	No
4a. If Yes, specify all that apply:	
- Surface water	
- Groundwater	
- Soil	
- Vegetation	
- Wildlife	
5. Water contamination:	No
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	
- Groundwater	
- Drinking water: *(Select one or both)*	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	
5c. Name of body of water, if commonly known:	
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	No
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	No
7a. If Yes, specify HCA type(s): *(Select all that apply)*	
- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect"	

determination for this Accident site in the Operator's Integrity Management Program?	
- High Population Area:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Other Populated Area	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Drinking Water	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Ecological	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
8. Estimated Property Damage:	
8a. Estimated cost of public and non-Operator private property damage	$ 0
8b. Estimated cost of commodity lost	$ 1,800
8c. Estimated cost of Operator's property damage & repairs	$ 2,500
8d. Estimated cost of Operator's emergency response	$ 85,000
8e. Estimated cost of Operator's environmental remediation	$ 250,000
8f. Estimated other costs	$ 0
Describe:	
8g. Total estimated property damage (sum of above)	$ 339,300

PART E - ADDITIONAL OPERATING INFORMATION

1. Estimated pressure at the point and time of the Accident (psig):	800.00
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	1,440.00
3. Describe the pressure on the system or facility relating to the Accident (psig):	Pressure did not exceed MOP
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	No
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	No
- If Yes - (*Complete 5a. – 5e. below)*	
5a. Type of upstream valve used to initially isolate release source:	
5b. Type of downstream valve used to initially isolate release source:	
5c. Length of segment isolated between valves (ft):	
5d. Is the pipeline configured to accommodate internal inspection tools?	
- If No, Which physical features limit tool accommodation? (*select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	
- If Yes, Which operational factors complicate execution? (*select all that apply*)	
- Excessive debris or scale, wax, or other wall buildup	

- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	> 20% SMYS Regulated Trunkline/Transmission
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	Yes
If Yes -	
6a. Was it operating at the time of the Accident?	Yes
6b. Was it fully functional at the time of the Accident?	Yes
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	Yes
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	Yes
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	Yes
- If Yes:	
7a. Was it operating at the time of the Accident?	Yes
7b. Was it fully functional at the time of the Accident?	Yes
7c. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	No
7d. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	No
8. How was the Accident initially identified for the Operator?	CPM leak detection system or SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations)
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Guard Patrol by Operator or its contractor" is selected in Question 8, specify the following:	
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	Yes, specify investigation result(s): (select all that apply)
- If No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)*	
- If Yes, specify investigation result(s): *(select all that apply)*	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
Provide an explanation for why not:	
- Investigation identified no control room issues	Yes
- Investigation identified no controller issues	Yes
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above:	
Describe:	

PART F - DRUG & ALCOHOL TESTING INFORMATION

1. As a result of this Accident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
1a. Specify how many were tested:	

1b. Specify how many failed:	
2. As a result of this Accident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
2a. Specify how many were tested:	
2b. Specify how many failed:	

PART G – APPARENT CAUSE

Select only one box from PART G in shaded column on left representing the APPARENT Cause of the Accident, and answer the questions on the right. Describe secondary, contributing or root causes of the Accident in the narrative (PART H).

Apparent Cause:	G6 - Equipment Failure
G1 - Corrosion Failure - only one **sub-cause** can be picked from shaded left-hand column	
External Corrosion:	
Internal Corrosion:	
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground?	
- If Yes :	
4a. Was failed item considered to be under cathodic protection at the time of the Accident?	
If Yes - Year protection started:	
4b. Was shielding, tenting, or disbonding of coating evident at the point of the Accident?	
4c. Has one or more Cathodic Protection Survey been conducted at the point of the Accident?	
If "Yes, CP Annual Survey" – Most recent year conducted:	
If "Yes, Close Interval Survey" – Most recent year conducted:	
If "Yes, Other CP Survey" – Most recent year conducted:	
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	
- If Internal Corrosion:	
6. Results of visual examination:	
- Other:	
7. Type of corrosion *(select all that apply)*: -	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	
- Erosion	
- Other:	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following *(select all that apply)*: -	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
9. Location of corrosion *(select all that apply)*: -	
- Low point in pipe	
- Elbow	

- Other:	
- If Other, Describe:	
10. Was the commodity treated with corrosion inhibitors or biocides?	
11. Was the interior coated or lined with protective coating?	
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	
13. Were corrosion coupons routinely utilized?	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Tank/Vessel.	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
15. Has one or more internal inspection tool collected data at the point of the Accident?	
15a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage Tool	
Most recent year:	
- Ultrasonic	
Most recent year:	
- Geometry	
Most recent year:	
- Caliper	
Most recent year:	
- Crack	
Most recent year:	
- Hard Spot	
Most recent year:	
- Combination Tool	
Most recent year:	
- Transverse Field/Triaxial	
Most recent year:	
- Other	
Most recent year:	
Describe:	
16. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
If Yes -	
Most recent year tested:	
Test pressure:	
17. Has one or more Direct Assessment been conducted on this segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident::	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
18a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G2 - Natural Force Damage - only one **sub-cause** can be picked from shaded left-handed column	
Natural Force Damage – Sub-Cause:	
- If Earth Movement, NOT due to Heavy Rains/Floods:	

1. Specify:	
- If Other, Describe:	
- If Heavy Rains/Floods:	
2. Specify:	
- If Other, Describe:	
- If Lightning:	
3. Specify:	
- If Temperature:	
4. Specify:	
- If Other, Describe:	
- If High Winds:	
- If Other Natural Force Damage:	
5. Describe:	
Complete the following if any Natural Force Damage sub-cause is selected.	
6. Were the natural forces causing the Accident generated in conjunction with an extreme weather event?	
6a. If Yes, specify: *(select all that apply)*	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Describe:	
G3 - Excavation Damage - only one **sub-cause** can be picked from shaded left-hand column	
Excavation Damage – Sub-Cause:	
- If Excavation Damage by Operator (First Party):	
- If Excavation Damage by Operator's Contractor (Second Party):	
- If Excavation Damage by Third Party:	
- If Previous Damage due to Excavation Activity:	
Complete Questions 1-5 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
1. Has one or more internal inspection tool collected data at the point of the Accident?	
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
4. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	

Most recent year conducted:	
5. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
5a. If Yes, for each examination, conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
Complete the following if Excavation Damage by Third Party is selected as the sub-cause.	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from: *(select all that apply)* -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: *(select all that apply)* -	
- Public	
- If "Public", Specify:	
- Private	
- If "Private", Specify:	
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks visible in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption (hours)	
17. Description of the CGA-DIRT Root Cause *(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):*	
Root Cause:	
- If One-Call Notification Practices Not Sufficient, specify:	
- If Locating Practices Not Sufficient, specify:	
- If Excavation Practices Not Sufficient, specify:	
- If Other/None of the Above, explain:	
G4 - Other Outside Force Damage - *only one **sub-cause** can be selected from the shaded left-hand column*	
Other Outside Force Damage – Sub-Cause:	
- If Nearby Industrial, Man-made, or Other Fire/Explosion as Primary Cause of Incident:	
- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:	
1. Vehicle/Equipment operated by:	
- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost	

Their Mooring:	
2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Heavy Rains/Flood	
- Other	
- If Other, Describe:	
- If Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation:	
- If Electrical Arcing from Other Equipment or Facility:	
- If Previous Mechanical Damage NOT Related to Excavation:	
Complete Questions 3-7 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
3. Has one or more internal inspection tool collected data at the point of the Accident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
6. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
7. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
- If Intentional Damage:	
8. Specify:	
- If Other, Describe:	
- If Other Outside Force Damage:	

9. Describe:	
G5 - Material Failure of Pipe or Weld - only one **sub-cause** can be selected from the shaded left-hand column	
Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."	
Material Failure of Pipe or Weld – Sub-Cause:	
1. The sub-cause selected below is based on the following: *(select all that apply)*	
- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Original Manufacturing-related (NOT girth weld or other welds formed in the field):	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related:	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Environmental Cracking-related:	
3. Specify:	
- Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional factors: (*select all that apply*):	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Describe:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	

Most recent year run:	
Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
7. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident -	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site -	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G6 – Equipment Failure - only one **sub-cause** can be selected from the shaded left-hand column	
Equipment Failure – Sub-Cause:	Pump or Pump-related Equipment
- If Malfunction of Control/Relief Equipment:	
1. Specify: *(select all that apply)* -	
- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	
- Relief Valve	
- Power Failure	
- Stopple/Control Fitting	
- ESD System Failure	
- Other	
- If Other – Describe:	
- If Pump or Pump-related Equipment:	
2. Specify:	Seal/Packing Failure
- If Other – Describe:	
- If Threaded Connection/Coupling Failure:	
3. Specify:	
- If Other – Describe:	
- If Non-threaded Connection Failure:	
4. Specify:	
- If Other – Describe:	
- If Defective or Loose Tubing or Fitting:	
- If Failure of Equipment Body (except Pump), Tank Plate, or other Material:	
- If Other Equipment Failure:	
5. Describe:	
Complete the following if any Equipment Failure sub-cause is selected.	
6. Additional factors that contributed to the equipment failure: *(select all that apply)*	
- Excessive vibration	
- Overpressurization	
- No support or loss of support	

- Manufacturing defect	Yes
- Loss of electricity	
- Improper installation	
- Mismatched items (different manufacturer for tubing and tubing fittings)	
- Dissimilar metals	
- Breakdown of soft goods due to compatibility issues with transported commodity	
- Valve vault or valve can contributed to the release	
- Alarm/status failure	
- Misalignment	
- Thermal stress	
- Other	
- If Other, Describe:	

G7 - Incorrect Operation - only one **sub-cause** can be selected from the shaded left-hand column

Incorrect Operation – Sub-Cause:	
Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage	
Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow	
1. Specify:	
- If Other, Describe:	
Valve Left or Placed in Wrong Position, but NOT Resulting in a Tank, Vessel, or Sump/Separator Overflow or Facility Overpressure	
Pipeline or Equipment Overpressured	
Equipment Not Installed Properly	
Wrong Equipment Specified or Installed	
Other Incorrect Operation	
2. Describe:	
Complete the following if any Incorrect Operation sub-cause is selected.	
3. Was this Accident related to *(select all that apply)*: -	
- Inadequate procedure	
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	

G8 - Other Accident Cause - only one **sub-cause** can be selected from the shaded left-hand column

Other Accident Cause – Sub-Cause:	
- If Miscellaneous:	
1. Describe:	
- If Unknown:	
2. Specify:	

PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT

The Keystone Seneca Pump station, Unit 4 experienced a failure of the pump seal resulting in a release of crude oil. The Oil control center received a high pump case alarm on unit 4. Personel were dispatched to the facility by the Oil Control center to investigate the high pump case alarm. The techncian discovered that a release of crude oil had occurred from the pump seal of unit 4 at the facility. The release was contained on site and cleaned up

commenced. Cleanup has been completed.

File Full Name

PART I - PREPARER AND AUTHORIZED SIGNATURE

Preparer's Name	Daniel Cerkoney
Preparer's Title	Compliance Engineer
Preparer's Telephone Number	701-483-1434
Preparer's E-mail Address	dan_cerkoney@transcanda.com
Preparer's Facsimile Number	701-483-1431
Authorized Signature's Name	Daniel Cerkoney
Authorized Signature Title	Compliance Engineer
Authorized Signature Telephone Number	701-483-1434
Authorized Signature Email	dan_cerkoney@transcanada.com
Date	04/03/2013

URS

June 7, 2011

Mr. Tom Winn
Northeast District Office
Kansas Department of Health and Environment
800 West 24th Street
Lawrence, KS 66046-4417

Re: Crude Oil Spill at TransCanada Seneca Pump Station
2189 State Highway 63
Seneca, Kansas

The purpose of this letter report is to provide you with the details of the cleanup activities that took place in response to a crude oil release at the above referenced property. The spill was reported by Robert Baumgartner of TransCanada to The Kansas Department of Health and Environment (KDHE) Northeast District Office in Lawrence, Kansas on March 16, 2011. Spill response activities began immediately by TransCanada personnel and the spill response contractors. Seneca Waste Solutions provided soil excavation, waste collection and site restoration services. URS Corporation (URS) personnel provided technical oversight for sampling and health and safety monitoring during the length of the cleanup process.

As previously noted the location of the release is a pump station owned and operated by TransCanada Keystone Pipeline, LP (TransCanada). The pump station is in a rural area located at 2189 State Highway 63, Seneca, Kansas (Figure 1). The site is located approximately 2 miles north of Seneca, Kansas on state highway 63. The release of petroleum was entirely contained on TransCanada property.

The release occurred from the failure of the outboard bearing on pump number 4. The malfunctioning pump was detected by TransCanada's control center and shutdown remotely. An estimated 12 barrels of oil was released over an area of approximately 150 feet by 20 feet within the pump station location.

Upon arrival at the Site by TransCanada personnel, containment and recovery activities initiated. A maintenance team mobilized to the site upon notification of the release on March 16, 2011 at 12 noon CDT. A vac truck, skid-steer loader, hydrovac, and other equipment were mobilized to the site along with qualified response team personnel.

Beginning on March 16, 2011, a vacuum truck was used to collect free oil from the gravel surface of the station and to prevent oil from migrating off TransCanada property. Manual excavation around pump 4 commenced the next day. Free product was continually recovered from the excavation throughout the cleanup. On March 18, 2011,

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8300 College Boulevard, Suite 200
Overland Park, KS 66210-2603
Tel: 913.344.1000
Fax: 913.344.1011
www.urscorp.com

mechanical excavation commenced with the use of a mini excavator and Toro™ Dingo™ front loader. Approximately 2 barrels of oil were recovered during initial response operations. A total of 10 barrels of oil was recovered through the life of the cleanup. Twelve drums of oily water from cleaning the vac truck and recovered from the excavation were transported for off-site disposal by Safety-Kleen.

Residual oil had accumulated around pipelines, cable racks, pump foundations and other structures, and over a portion of the gravel covered pump station yard (Figure 2). Visually stained gravels were excavated around the structures using manual excavation and the stained gravel yard area was scraped using the mini excavator and Dingo™. Impacted soil and gravel was placed in roll-off containers for later transfer to an approved landfill facility. Depths of the excavation varied across the site, ranging from several inches to approximately 3 feet. Groundwater was not encountered during excavation activities.

Soils were screened using a photoionization detector (PID) with 10.6 eV lamp and visually after excavation activities to determine the required limits of excavation. In addition, the scraped area of the surface yard was screened using the PID. The soil samples were collected from native soil. A small hole was dug approximately 4 inches into the native soil to collect post-excavation confirmation samples. Confirmation soil samples were collected at six locations after excavation was completed. Sampling and PID screening locations and excavation areas are shown in Figures 2.

The field PID screening and laboratory analytical results for benzene, toluene, ethylbenzene, xylenes (BTEX) and diesel range organics (DRO) are summarized on Table 1. Waste soil samples were collected from the roll off containers and analyzed. Laboratory analysis results are shown in Table 2.

Based on field observations, measurements, and analytical data, the response excavation efforts have mitigated impacts to the surface and subsurface soils to below Kansas Tier 2 Risk Based Screening Levels (RBSL's) for BTEX and DRO for non-residential scenarios, soil pathway. The excavated areas have been backfilled with clean material and no additional work is planned.

A total of 12 drums of oily water were transported by Safety-Kleen Systems for disposal. Recovered free oil was placed into TransCanada sump tank for injection into the pipeline. A total of approximately 315 cubic yards of impacted soil was stockpiled in 21 roll-off containers and was disposed of at Waste Management's Rolling Meadows landfill. Waste manifests and landfill tickets will be sent to KDHE when available from Waste Management.

URS

Please feel free to contact Robert Baumgartner at 832-320-5538 or myself at 913-344-1023 if you have any questions.

Sincerely,

Rick O. Horner RG
Senior Project Manager

cc: Robert Baumgartner, TransCanada
Steve McManamon, URS

Tables

Table 1 – Laboratory Analysis Soil Verification
Table 2 – Laboratory Analysis Soil Data for Disposal

Figures

Figure 1 – Site Location Map
Figure 2 – Site Plan

Attachment

Laboratory Data

Table 1 – Laboratory Analysis Soil Verification
TransCanada Keystone Pipeline
Seneca Pump Station; Seneca, Kansas

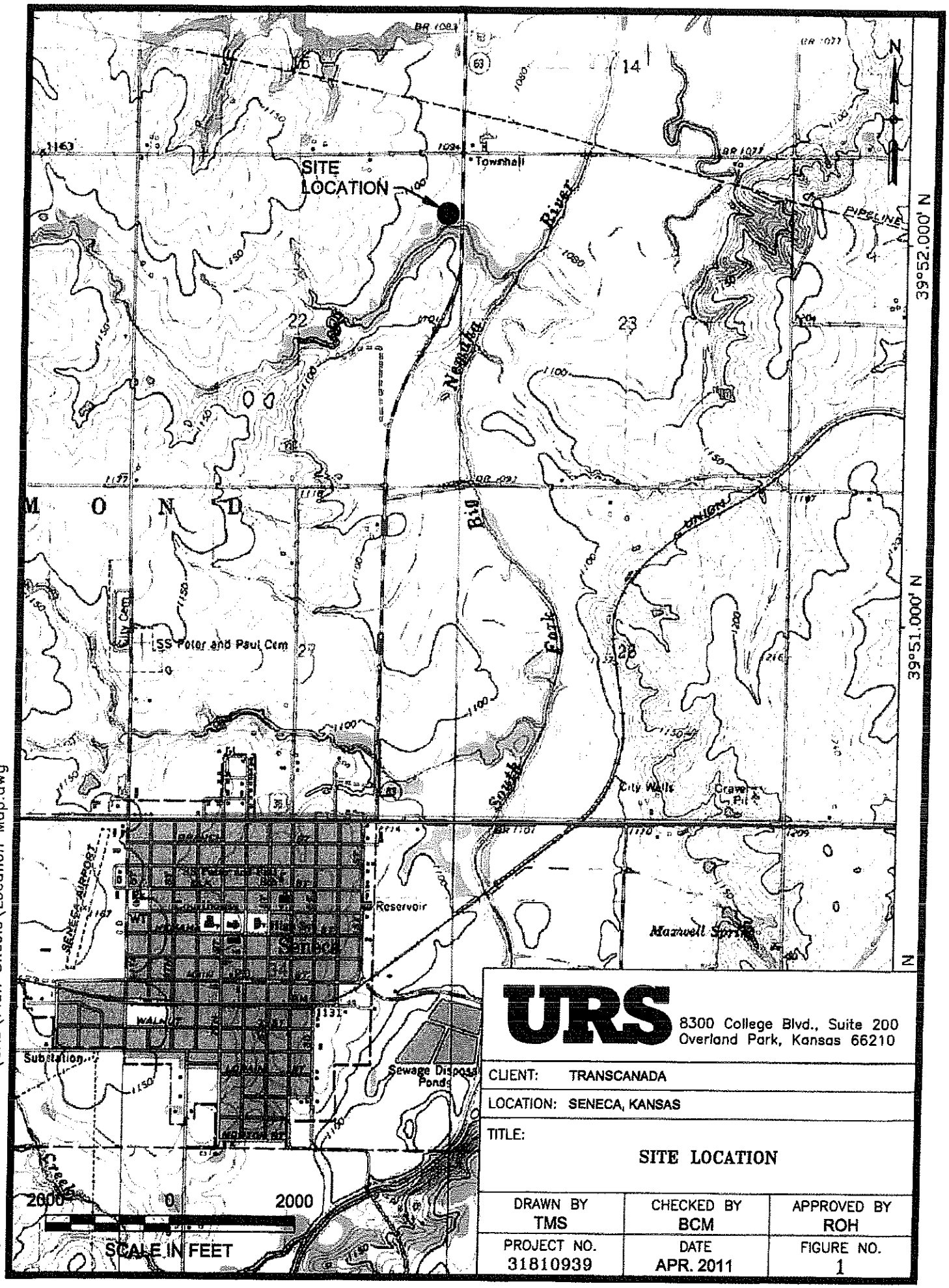
Location	Units	F-MS	F-MN	F-E1	F-E2	F-SE	F-W	Tier 2 Action Level
Sample Date		3/23/11	3/23/11	3/23/11	3/23/11	3/23/11	3/11/11	
Lithology		Clay	Clay	Clay	Clay	Clay	Clay	
Depth	(feet)	1	2	1	1	1	2	
PID	(ppm)*	0.0	0.0	0.0	0.0	0.0	0.0	
Chemical of Concern								
Benzene	mg/kg	<0.055	<0.0575	<0.0541	<0.0593	<0.0591	<0.0543	28.2
Toluene	mg/kg	<0.11	<0.115	<0.108	<0.119	<0.118	<0.109	29,800
Ethylbenzene	mg/kg	<0.11	<0.115	<0.0108	<0.119	<0.118	<0.109	145
Total Xylenes	mg/kg	<0.275	<0.289	<0.271	<0.296	<0.295	<0.272	1,410
Diesel Range Organics (DRO)	mg/kg	<19.9	<22.9	158 (TPH)	<23.2	<22.7	144 (TPH)	20,000

NOTES: mg/kg = Milligrams per kilogram, equivalent to parts per million (ppm) dry weight
µg/kg = Micrograms per kilogram dry weight
<x = Not detected to reporting limits of x
*=Total organic vapors (ppm as isobutylene)
** = Tier 2 Non Residential Action Level
TPH = total petroleum hydrocarbons.
158 (TPH) = Detection was in the total petroleum hydrocarbons fraction

Table 2 – Laboratory Analysis Soil Data for Disposal
TransCanada Keystone Pipeline
Seneca Pump Station; Seneca, Kansas

Location	Units	RO-746218	RO-563249	RO-013503	RO-478136	RO-023333	RO-749577	RO-892134	RO-914697	RO-8959
Sample Date		3/22/11	3/22/11	3/22/11	3/22/11	3/24/11	3/22/11	3/22/11	3/23/11	3/22/11
Lithology		Gravel/sand	Gravel/sand	Gravel/sand	Gravel/sand	Gravel/sand	Gravel/sand	Gravel/sand	Gravel/sand	Gravel/sand
PID	(ppm)*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chemical of Concern										
Benzene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic - TCLP	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Barium- TCLP	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Cadmium- TCLP	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-TCLP	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lead-TCLP	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Selenium-TCLP	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Silver-TCLP	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mercury-TCLP	µg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2

NOTES: mg/kg = Milligrams per kilogram, equivalent to parts per million (ppm) dry weight
µg/kg = Micrograms per kilogram dry weight
<x = Not detected to reporting limits of x
*= Total organic vapors (ppm as isobutylene)



URS 8300 College Blvd., Suite 200 Overland Park, Kansas 66210

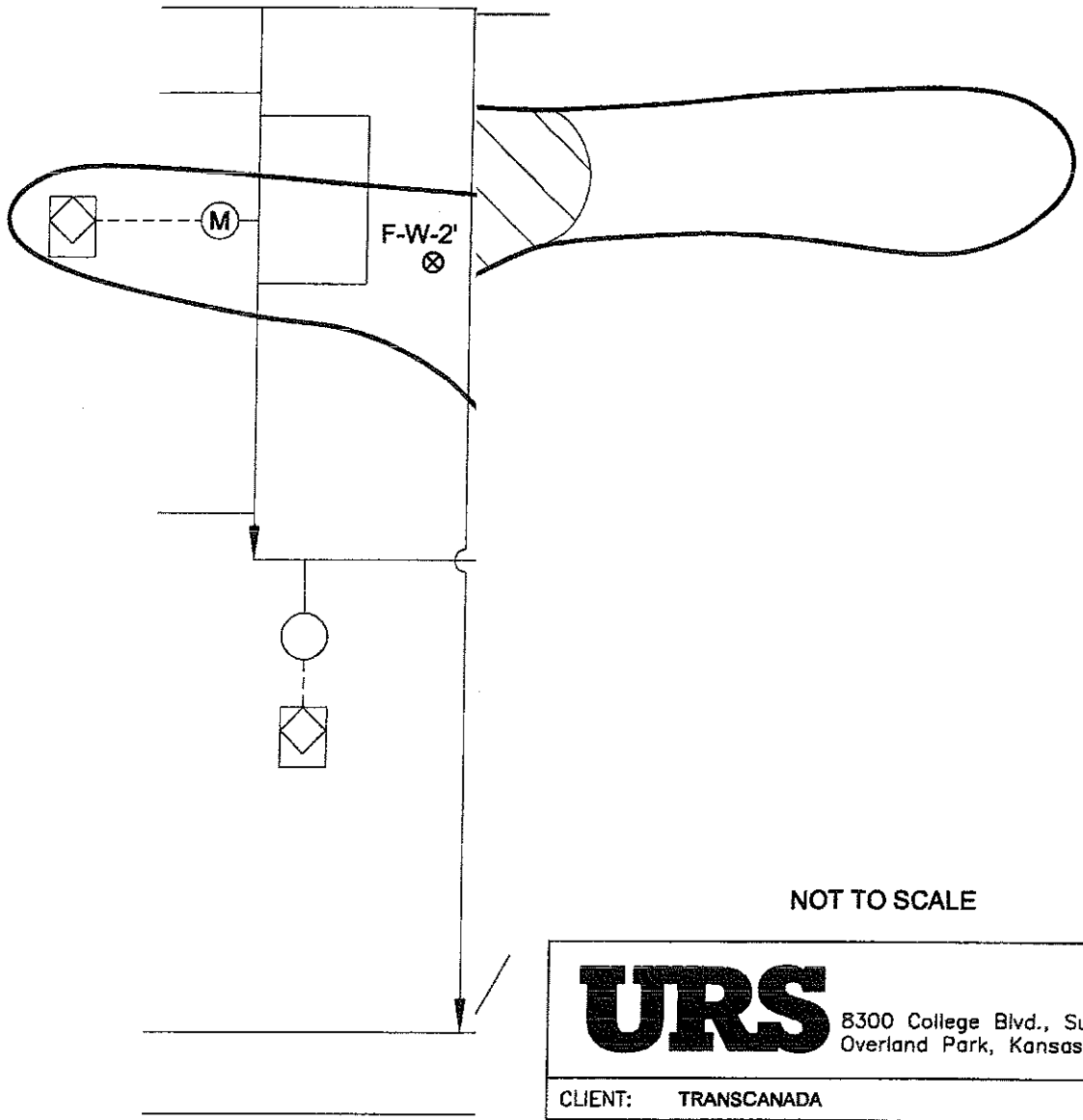
CLIENT: TRANSCANADA		
LOCATION: SENECA, KANSAS		
TITLE: SITE LOCATION		
DRAWN BY TMS	CHECKED BY BCM	APPROVED BY ROH
PROJECT NO. 31810939	DATE APR. 2011	FIGURE NO. 1

April 15, 2011 10:30.30 am (mik)
J:\TransCanada Seneca\CAD\Plan Sheets\Location Map.dwg

017437

LEGEND

⊗ SAMPLE LOCATION



NOT TO SCALE

URS 8300 College Blvd., Suite 200 Overland Park, Kansas 66210		
CLIENT: TRANSCANADA		
LOCATION: SENECA, KANSAS		
TITLE: TRANSCANADA SENECA PUMP STATION SITE PLAN		
DRAWN BY TMS	CHECKED BY BCM	APPROVED BY ROH
PROJECT NO. 31810939	DATE APR. 2011	FIGURE NO. 2

April 15, 2011 9:43.34 am (mik)
J:\TransCanada Seneca\CAD\Plan Sheets\Spill Plan.dwg

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

April 04, 2011

Rick Horner
URS Corporation
8300 College Blvd.
Overland Park, KS 66210

RE: Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

Dear Rick Horner:
Enclosed are the analytical results for sample(s) received by the laboratory on March 24, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Sherri Guess

sherri.guess@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 05-008-0
Illinois Certification #: 001191
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-08-TX
Utah Certification #: 9135995665

Pace Analytical Services, Inc.
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SAMPLE SUMMARY

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

Lab ID	Sample ID	Matrix	Date Collected	Date Received
6095945001	F-MS-1'	Solid	03/23/11 10:55	03/24/11 08:30
6095945002	F-MN-2'	Solid	03/23/11 11:10	03/24/11 08:30
6095945003	F-E1-1'	Solid	03/23/11 11:20	03/24/11 08:30
6095945004	F-E2-1'	Solid	03/23/11 11:30	03/24/11 08:30
6095945005	F-SE-1'	Solid	03/23/11 12:00	03/24/11 08:30
6095945006	F-W-2'	Solid	03/23/11 13:20	03/24/11 08:30
6095945007	TRIP BLANK	Solid	03/23/11 00:00	03/24/11 08:30

Pace Analytical Services, Inc.
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SAMPLE ANALYTE COUNT

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

Lab ID	Sample ID	Method	Analysts	Analytes Reported
6095945001	F-MS-1'	OA2	SDR	9
		EPA 8260/OA1	ZNF	8
		ASTM D2974-87	DWC	1
6095945002	F-MN-2'	OA2	SDR	9
		EPA 8260/OA1	ZNF	8
		ASTM D2974-87	DWC	1
6095945003	F-E1-1'	OA2	SDR	9
		EPA 8260/OA1	ZNF	8
		ASTM D2974-87	DWC	1
6095945004	F-E2-1'	OA2	SDR	9
		EPA 8260/OA1	ZNF	8
		ASTM D2974-87	DWC	1
6095945005	F-SE-1'	OA2	SDR	9
		EPA 8260/OA1	ZNF	8
		ASTM D2974-87	DWC	1
6095945006	F-W-2'	OA2	SDR	9
		EPA 8260/OA1	ZNF	8
		ASTM D2974-87	DWC	1
6095945007	TRIP BLANK	EPA 8260/OA1	ZNF	8

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

Sample: F-MS-1' **Lab ID: 6095945001** Collected: 03/23/11 10:55 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	19.9	1	03/28/11 00:00	03/28/11 21:39	68334-30-5	
Fuel Oil	ND	mg/kg	19.9	1	03/28/11 00:00	03/28/11 21:39	68553-00-4	
Jet Fuel	ND	mg/kg	19.9	1	03/28/11 00:00	03/28/11 21:39	94114-58-6	
Kerosene	ND	mg/kg	19.9	1	03/28/11 00:00	03/28/11 21:39	8008-20-6	
Mineral Spirits	ND	mg/kg	19.9	1	03/28/11 00:00	03/28/11 21:39	8030-30-6	
Motor Oil	ND	mg/kg	19.9	1	03/28/11 00:00	03/28/11 21:39	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	19.9	1	03/28/11 00:00	03/28/11 21:39		
n-Tetracosane (S)	75	%	50-137	1	03/28/11 00:00	03/28/11 21:39	646-31-1	
p-Terphenyl (S)	64	%	41-129	1	03/28/11 00:00	03/28/11 21:39	92-94-4	
8260/OA1 UST	Analytical Method: EPA 8260/OA1 Preparation Method: EPA 8260/OA1							
Benzene	ND	ug/kg	55.0	1	03/25/11 15:45	03/29/11 01:25	71-43-2	
Toluene	ND	ug/kg	110	1	03/25/11 15:45	03/29/11 01:25	108-88-3	
Ethylbenzene	ND	ug/kg	110	1	03/25/11 15:45	03/29/11 01:25	100-41-4	
Xylene (Total)	ND	ug/kg	275	1	03/25/11 15:45	03/29/11 01:25	1330-20-7	
Dibromofluoromethane (S)	99	%	85-113	1	03/25/11 15:45	03/29/11 01:25	1868-53-7	
Toluene-d8 (S)	98	%	86-119	1	03/25/11 15:45	03/29/11 01:25	2037-26-5	
1,2-Dichloroethane-d4 (S)	98	%	75-121	1	03/25/11 15:45	03/29/11 01:25	17060-07-0	
4-Bromofluorobenzene (S)	100	%	79-119	1	03/25/11 15:45	03/29/11 01:25	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**9.6**	%	0.50	1		03/28/11 00:00		

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

Sample: F-MN-2' **Lab ID: 6095945002** Collected: 03/23/11 11:10 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	22.9	1	03/28/11 00:00	03/28/11 21:49	68334-30-5	
Fuel Oil	ND	mg/kg	22.9	1	03/28/11 00:00	03/28/11 21:49	68553-00-4	
Jet Fuel	ND	mg/kg	22.9	1	03/28/11 00:00	03/28/11 21:49	94114-58-6	
Kerosene	ND	mg/kg	22.9	1	03/28/11 00:00	03/28/11 21:49	8008-20-6	
Mineral Spirits	ND	mg/kg	22.9	1	03/28/11 00:00	03/28/11 21:49	8030-30-6	
Motor Oil	ND	mg/kg	22.9	1	03/28/11 00:00	03/28/11 21:49	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	22.9	1	03/28/11 00:00	03/28/11 21:49		
n-Tetracosane (S)	79	%	50-137	1	03/28/11 00:00	03/28/11 21:49	646-31-1	
p-Terphenyl (S)	69	%	41-129	1	03/28/11 00:00	03/28/11 21:49	92-94-4	
8260/OA1 UST	Analytical Method: EPA 8260/OA1 Preparation Method: EPA 8260/OA1							
Benzene	ND	ug/kg	57.7	1	03/25/11 15:45	03/29/11 01:40	71-43-2	
Toluene	ND	ug/kg	115	1	03/25/11 15:45	03/29/11 01:40	108-88-3	
Ethylbenzene	ND	ug/kg	115	1	03/25/11 15:45	03/29/11 01:40	100-41-4	
Xylene (Total)	ND	ug/kg	289	1	03/25/11 15:45	03/29/11 01:40	1330-20-7	
Dibromofluoromethane (S)	101	%	85-113	1	03/25/11 15:45	03/29/11 01:40	1868-53-7	
Toluene-d8 (S)	95	%	86-119	1	03/25/11 15:45	03/29/11 01:40	2037-26-5	
1,2-Dichloroethane-d4 (S)	98	%	75-121	1	03/25/11 15:45	03/29/11 01:40	17060-07-0	
4-Bromofluorobenzene (S)	101	%	79-119	1	03/25/11 15:45	03/29/11 01:40	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	13.4	%	0.50	1		03/28/11 00:00		

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

Sample: F-E1-1' **Lab ID: 6095945003** Collected: 03/23/11 11:20 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	20.9	1	03/28/11 00:00	03/28/11 21:58	68334-30-5	
Fuel Oil	ND	mg/kg	20.9	1	03/28/11 00:00	03/28/11 21:58	68553-00-4	
Jet Fuel	ND	mg/kg	20.9	1	03/28/11 00:00	03/28/11 21:58	94114-58-6	
Kerosene	ND	mg/kg	20.9	1	03/28/11 00:00	03/28/11 21:58	8008-20-6	
Mineral Spirits	ND	mg/kg	20.9	1	03/28/11 00:00	03/28/11 21:58	8030-30-6	
Motor Oil	ND	mg/kg	20.9	1	03/28/11 00:00	03/28/11 21:58	64742-65-0	
Total Petroleum Hydrocarbons	**158**	mg/kg	20.9	1	03/28/11 00:00	03/28/11 21:58		2e
n-Tetracosane (S)	99	%	50-137	1	03/28/11 00:00	03/28/11 21:58	646-31-1	
p-Terphenyl (S)	84	%	41-129	1	03/28/11 00:00	03/28/11 21:58	92-94-4	
8260/OA1 UST	Analytical Method: EPA 8260/OA1 Preparation Method: EPA 8260/OA1							
Benzene	ND	ug/kg	54.1	1	03/25/11 15:45	03/29/11 01:54	71-43-2	
Toluene	ND	ug/kg	108	1	03/25/11 15:45	03/29/11 01:54	108-88-3	
Ethylbenzene	ND	ug/kg	108	1	03/25/11 15:45	03/29/11 01:54	100-41-4	
Xylene (Total)	ND	ug/kg	271	1	03/25/11 15:45	03/29/11 01:54	1330-20-7	
Dibromofluoromethane (S)	100	%	85-113	1	03/25/11 15:45	03/29/11 01:54	1868-53-7	
Toluene-d8 (S)	97	%	86-119	1	03/25/11 15:45	03/29/11 01:54	2037-26-5	
1,2-Dichloroethane-d4 (S)	97	%	75-121	1	03/25/11 15:45	03/29/11 01:54	17060-07-0	
4-Bromofluorobenzene (S)	101	%	79-119	1	03/25/11 15:45	03/29/11 01:54	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**8.4**	%	0.50	1		03/28/11 00:00		

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

Sample: F-E2-1' **Lab ID: 6095945004** Collected: 03/23/11 11:30 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	23.2	1	03/28/11 00:00	03/28/11 22:07	68334-30-5	
Fuel Oil	ND	mg/kg	23.2	1	03/28/11 00:00	03/28/11 22:07	68553-00-4	
Jet Fuel	ND	mg/kg	23.2	1	03/28/11 00:00	03/28/11 22:07	94114-58-6	
Kerosene	ND	mg/kg	23.2	1	03/28/11 00:00	03/28/11 22:07	8008-20-6	
Mineral Spirits	ND	mg/kg	23.2	1	03/28/11 00:00	03/28/11 22:07	8030-30-6	
Motor Oil	ND	mg/kg	23.2	1	03/28/11 00:00	03/28/11 22:07	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	23.2	1	03/28/11 00:00	03/28/11 22:07		
n-Tetracosane (S)	82	%	50-137	1	03/28/11 00:00	03/28/11 22:07	646-31-1	
p-Terphenyl (S)	72	%	41-129	1	03/28/11 00:00	03/28/11 22:07	92-94-4	
8260/OA1 UST	Analytical Method: EPA 8260/OA1 Preparation Method: EPA 8260/OA1							
Benzene	ND	ug/kg	59.3	1	03/25/11 15:45	03/29/11 02:09	71-43-2	
Toluene	ND	ug/kg	119	1	03/25/11 15:45	03/29/11 02:09	108-88-3	
Ethylbenzene	ND	ug/kg	119	1	03/25/11 15:45	03/29/11 02:09	100-41-4	
Xylene (Total)	ND	ug/kg	296	1	03/25/11 15:45	03/29/11 02:09	1330-20-7	
Dibromofluoromethane (S)	99	%	85-113	1	03/25/11 15:45	03/29/11 02:09	1868-53-7	
Toluene-d8 (S)	102	%	86-119	1	03/25/11 15:45	03/29/11 02:09	2037-26-5	
1,2-Dichloroethane-d4 (S)	98	%	75-121	1	03/25/11 15:45	03/29/11 02:09	17060-07-0	
4-Bromofluorobenzene (S)	104	%	79-119	1	03/25/11 15:45	03/29/11 02:09	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**15.8**	%	0.50	1		03/28/11 00:00		

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

Sample: F-SE-1' **Lab ID: 6095945005** Collected: 03/23/11 12:00 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	22.7	1	03/28/11 00:00	03/28/11 22:17	68334-30-5	
Fuel Oil	ND	mg/kg	22.7	1	03/28/11 00:00	03/28/11 22:17	68553-00-4	
Jet Fuel	ND	mg/kg	22.7	1	03/28/11 00:00	03/28/11 22:17	94114-58-6	
Kerosene	ND	mg/kg	22.7	1	03/28/11 00:00	03/28/11 22:17	8008-20-6	
Mineral Spirits	ND	mg/kg	22.7	1	03/28/11 00:00	03/28/11 22:17	8030-30-6	
Motor Oil	ND	mg/kg	22.7	1	03/28/11 00:00	03/28/11 22:17	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	22.7	1	03/28/11 00:00	03/28/11 22:17		
n-Tetracosane (S)	80	%	50-137	1	03/28/11 00:00	03/28/11 22:17	646-31-1	
p-Terphenyl (S)	69	%	41-129	1	03/28/11 00:00	03/28/11 22:17	92-94-4	
8260/OA1 UST	Analytical Method: EPA 8260/OA1 Preparation Method: EPA 8260/OA1							
Benzene	ND	ug/kg	59.1	1	03/25/11 15:45	03/29/11 02:23	71-43-2	
Toluene	ND	ug/kg	118	1	03/25/11 15:45	03/29/11 02:23	108-88-3	
Ethylbenzene	ND	ug/kg	118	1	03/25/11 15:45	03/29/11 02:23	100-41-4	
Xylene (Total)	ND	ug/kg	295	1	03/25/11 15:45	03/29/11 02:23	1330-20-7	
Dibromofluoromethane (S)	100	%	85-113	1	03/25/11 15:45	03/29/11 02:23	1868-53-7	
Toluene-d8 (S)	97	%	86-119	1	03/25/11 15:45	03/29/11 02:23	2037-26-5	
1,2-Dichloroethane-d4 (S)	98	%	75-121	1	03/25/11 15:45	03/29/11 02:23	17060-07-0	
4-Bromofluorobenzene (S)	102	%	79-119	1	03/25/11 15:45	03/29/11 02:23	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**15.5**	%	0.50	1		03/28/11 00:00		

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

Sample: F-W-2' **Lab ID: 6095945006** Collected: 03/23/11 13:20 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	21.2	1	03/28/11 00:00	03/28/11 22:26	68334-30-5	
Fuel Oil	ND	mg/kg	21.2	1	03/28/11 00:00	03/28/11 22:26	68553-00-4	
Jet Fuel	ND	mg/kg	21.2	1	03/28/11 00:00	03/28/11 22:26	94114-58-6	
Kerosene	ND	mg/kg	21.2	1	03/28/11 00:00	03/28/11 22:26	8008-20-6	
Mineral Spirits	ND	mg/kg	21.2	1	03/28/11 00:00	03/28/11 22:26	8030-30-6	
Motor Oil	ND	mg/kg	21.2	1	03/28/11 00:00	03/28/11 22:26	64742-65-0	
Total Petroleum Hydrocarbons	144	mg/kg	21.2	1	03/28/11 00:00	03/28/11 22:26		1e
n-Tetracosane (S)	93	%	50-137	1	03/28/11 00:00	03/28/11 22:26	646-31-1	
p-Terphenyl (S)	83	%	41-129	1	03/28/11 00:00	03/28/11 22:26	92-94-4	
8260/OA1 UST	Analytical Method: EPA 8260/OA1 Preparation Method: EPA 8260/OA1							
Benzene	ND	ug/kg	54.3	1	03/25/11 15:45	03/29/11 02:38	71-43-2	
Toluene	ND	ug/kg	109	1	03/25/11 15:45	03/29/11 02:38	108-88-3	
Ethylbenzene	ND	ug/kg	109	1	03/25/11 15:45	03/29/11 02:38	100-41-4	
Xylene (Total)	ND	ug/kg	272	1	03/25/11 15:45	03/29/11 02:38	1330-20-7	
Dibromofluoromethane (S)	98	%	85-113	1	03/25/11 15:45	03/29/11 02:38	1868-53-7	
Toluene-d8 (S)	99	%	86-119	1	03/25/11 15:45	03/29/11 02:38	2037-26-5	
1,2-Dichloroethane-d4 (S)	98	%	75-121	1	03/25/11 15:45	03/29/11 02:38	17060-07-0	
4-Bromofluorobenzene (S)	103	%	79-119	1	03/25/11 15:45	03/29/11 02:38	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	8.9	%	0.50	1		03/28/11 00:00		

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

Sample: TRIP BLANK **Lab ID: 6095945007** Collected: 03/23/11 00:00 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260/OA1 UST	Analytical Method: EPA 8260/OA1 Preparation Method: EPA 8260/OA1							
Benzene	ND	ug/kg	50.0	1	03/25/11 15:45	03/29/11 02:52	71-43-2	
Toluene	ND	ug/kg	100	1	03/25/11 15:45	03/29/11 02:52	108-88-3	
Ethylbenzene	ND	ug/kg	100	1	03/25/11 15:45	03/29/11 02:52	100-41-4	
Xylene (Total)	ND	ug/kg	250	1	03/25/11 15:45	03/29/11 02:52	1330-20-7	
Dibromofluoromethane (S)	102	%	85-113	1	03/25/11 15:45	03/29/11 02:52	1868-53-7	
Toluene-d8 (S)	100	%	86-119	1	03/25/11 15:45	03/29/11 02:52	2037-26-5	
1,2-Dichloroethane-d4 (S)	100	%	75-121	1	03/25/11 15:45	03/29/11 02:52	17060-07-0	
4-Bromofluorobenzene (S)	103	%	79-119	1	03/25/11 15:45	03/29/11 02:52	460-00-4	

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QUALITY CONTROL DATA

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

QC Batch: OEXT/27920 Analysis Method: OA2
QC Batch Method: OA2 Analysis Description: OA2 GCS
Associated Lab Samples: 6095945001, 6095945002, 6095945003, 6095945004, 6095945005, 6095945006

METHOD BLANK: 790813 Matrix: Solid
Associated Lab Samples: 6095945001, 6095945002, 6095945003, 6095945004, 6095945005, 6095945006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Diesel Fuel	mg/kg	ND	18.7	03/28/11 19:28	
Fuel Oil	mg/kg	ND	18.7	03/28/11 19:28	
Jet Fuel	mg/kg	ND	18.7	03/28/11 19:28	
Kerosene	mg/kg	ND	18.7	03/28/11 19:28	
Mineral Spirits	mg/kg	ND	18.7	03/28/11 19:28	
Motor Oil	mg/kg	ND	18.7	03/28/11 19:28	
Total Petroleum Hydrocarbons	mg/kg	ND	18.7	03/28/11 19:28	
n-Tetracosane (S)	%	77	50-137	03/28/11 19:28	
p-Terphenyl (S)	%	66	41-129	03/28/11 19:28	

LABORATORY CONTROL SAMPLE: 790814

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Diesel Fuel	mg/kg	473	519	110	66-138	
n-Tetracosane (S)	%			80	50-137	
p-Terphenyl (S)	%			82	41-129	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 790815 790816

Parameter	Units	6095945002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Diesel Fuel	mg/kg	ND	554	559	596	600	108	107	56-154	1	27	
n-Tetracosane (S)	%						80	77	50-137			
p-Terphenyl (S)	%						82	78	41-129			

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

QC Batch: MSV/35965 Analysis Method: EPA 8260/OA1
QC Batch Method: EPA 8260/OA1 Analysis Description: 8260/OA1 UST
Associated Lab Samples: 6095945001, 6095945002, 6095945003, 6095945004, 6095945005, 6095945006, 6095945007

METHOD BLANK: 790182 Matrix: Solid
Associated Lab Samples: 6095945001, 6095945002, 6095945003, 6095945004, 6095945005, 6095945006, 6095945007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/kg	ND	50.0	03/28/11 23:30	
Ethylbenzene	ug/kg	ND	100	03/28/11 23:30	
Toluene	ug/kg	ND	100	03/28/11 23:30	
Xylene (Total)	ug/kg	ND	250	03/28/11 23:30	
1,2-Dichloroethane-d4 (S)	%	100	75-121	03/28/11 23:30	
4-Bromofluorobenzene (S)	%	103	79-119	03/28/11 23:30	
Dibromofluoromethane (S)	%	100	85-113	03/28/11 23:30	
Toluene-d8 (S)	%	100	86-119	03/28/11 23:30	

LABORATORY CONTROL SAMPLE: 790183

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/kg	2000	2120	106	70-128	
Ethylbenzene	ug/kg	2000	2170	109	78-121	
Toluene	ug/kg	2000	2140	107	68-128	
Xylene (Total)	ug/kg	6000	6220	104	76-124	
1,2-Dichloroethane-d4 (S)	%			100	75-121	
4-Bromofluorobenzene (S)	%			99	79-119	
Dibromofluoromethane (S)	%			97	85-113	
Toluene-d8 (S)	%			98	86-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 790184 790185

Parameter	Units	6095873001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/kg	ND	2560	2560	2510	2400	98	94	60-132	4	25	
Ethylbenzene	ug/kg	ND	2560	2560	2600	2520	102	98	66-128	3	24	
Toluene	ug/kg	ND	2560	2560	2620	2400	101	93	51-136	9	27	
Xylene (Total)	ug/kg	ND	7680	7680	7420	7160	96	93	62-130	4	26	
1,2-Dichloroethane-d4 (S)	%						94	100	75-121			
4-Bromofluorobenzene (S)	%						104	103	79-119			
Dibromofluoromethane (S)	%						94	99	85-113			
Toluene-d8 (S)	%						100	100	86-119			

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QUALITY CONTROL DATA

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

QC Batch: PMST/5997 Analysis Method: ASTM D2974-87
QC Batch Method: ASTM D2974-87 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 6095945001, 6095945002, 6095945003, 6095945004, 6095945005, 6095945006

METHOD BLANK: 790881 Matrix: Solid
Associated Lab Samples: 6095945001, 6095945002, 6095945003, 6095945004, 6095945005, 6095945006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Percent Moisture	%	ND	0.50	03/28/11 00:00	

SAMPLE DUPLICATE: 790882

Parameter	Units	6095907001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	18.3	17.6	4	20	

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QUALIFIERS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is NELAP accredited. Contact your Pace PM for the current list of accredited analytes.

ANALYTE QUALIFIERS

1e	The sample does not match a profile of laboratory standards. Hydrocarbon fractions are present from the early diesel fuel to late motor oil range. Quantitation achieved using diesel fuel as a reference standard.
2e	The sample does not match a profile of laboratory standards. Hydrocarbon fractions are present from the mid diesel fuel to late motor oil range. Quantitation achieved using diesel fuel as a reference standard.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095945

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
6095945001	F-MS-1'	OA2	OEXT/27920	OA2	GCSV/10301
6095945002	F-MN-2'	OA2	OEXT/27920	OA2	GCSV/10301
6095945003	F-E1-1'	OA2	OEXT/27920	OA2	GCSV/10301
6095945004	F-E2-1'	OA2	OEXT/27920	OA2	GCSV/10301
6095945005	F-SE-1'	OA2	OEXT/27920	OA2	GCSV/10301
6095945006	F-W-2'	OA2	OEXT/27920	OA2	GCSV/10301
6095945001	F-MS-1'	EPA 8260/OA1	MSV/35965	EPA 8260/OA1	MSV/36008
6095945002	F-MN-2'	EPA 8260/OA1	MSV/35965	EPA 8260/OA1	MSV/36008
6095945003	F-E1-1'	EPA 8260/OA1	MSV/35965	EPA 8260/OA1	MSV/36008
6095945004	F-E2-1'	EPA 8260/OA1	MSV/35965	EPA 8260/OA1	MSV/36008
6095945005	F-SE-1'	EPA 8260/OA1	MSV/35965	EPA 8260/OA1	MSV/36008
6095945006	F-W-2'	EPA 8260/OA1	MSV/35965	EPA 8260/OA1	MSV/36008
6095945007	TRIP BLANK	EPA 8260/OA1	MSV/35965	EPA 8260/OA1	MSV/36008
6095945001	F-MS-1'	ASTM D2974-87	PMST/5997		
6095945002	F-MN-2'	ASTM D2974-87	PMST/5997		
6095945003	F-E1-1'	ASTM D2974-87	PMST/5997		
6095945004	F-E2-1'	ASTM D2974-87	PMST/5997		
6095945005	F-SE-1'	ASTM D2974-87	PMST/5997		
6095945006	F-W-2'	ASTM D2974-87	PMST/5997		

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April 05, 2011

Rick Horner
URS Corporation
8300 College Blvd.
Overland Park, KS 66210

RE: Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

Dear Rick Horner:
Enclosed are the analytical results for sample(s) received by the laboratory on March 24, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Sherri Guess

sherri.guess@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 05-008-0
Illinois Certification #: 001191
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-08-TX
Utah Certification #: 9135995665

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SAMPLE SUMMARY

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

Lab ID	Sample ID	Matrix	Date Collected	Date Received
6095946001	RO-746218	Solid	03/22/11 13:15	03/24/11 08:30
6095946002	RO-563249	Solid	03/22/11 13:35	03/24/11 08:30
6095946003	RO-013503	Solid	03/22/11 13:45	03/24/11 08:30
6095946004	RO-478136	Solid	03/22/11 13:55	03/24/11 08:30
6095946005	RO-023333	Solid	03/22/11 14:00	03/24/11 08:30
6095946006	RO-749577	Solid	03/22/11 14:10	03/24/11 08:30
6095946007	RO-892134	Solid	03/22/11 14:20	03/24/11 08:30
6095946008	RO-914697	Solid	03/23/11 13:45	03/24/11 08:30
6095946009	RO-8959	Solid	03/22/11 14:00	03/24/11 08:30

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SAMPLE ANALYTE COUNT

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

Lab ID	Sample ID	Method	Analysts	Analytes Reported
6095946001	RO-746218	EPA 6010	JDH	7
		EPA 7470	SMW	1
		EPA 8260	RAB	5
6095946002	RO-563249	EPA 6010	JDH	7
		EPA 7470	SMW	1
		EPA 8260	RAB	5
6095946003	RO-013503	EPA 6010	JDH	7
		EPA 7470	SMW	1
		EPA 8260	RAB	5
6095946004	RO-478136	EPA 6010	JDH	7
		EPA 7470	SMW	1
		EPA 8260	RAB	5
6095946005	RO-023333	EPA 6010	JDH	7
		EPA 7470	SMW	1
		EPA 8260	RAB	5
6095946006	RO-749577	EPA 6010	JDH	7
		EPA 7470	SMW	1
		EPA 8260	RAB	5
6095946007	RO-892134	EPA 6010	JDH	7
		EPA 7470	SMW	1
		EPA 8260	RAB	5
6095946008	RO-914697	EPA 6010	JDH	7
		EPA 7470	SMW	1
		EPA 8260	RAB	5
6095946009	RO-8959	EPA 6010	JDH	7
		EPA 7470	SMW	1
		EPA 8260	RAB	5

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

Sample: RO-746218 **Lab ID: 6095946001** Collected: 03/22/11 13:15 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	Reg. Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
	Leachate Method/Date: EPA 1311; 03/28/11 00:00								
Arsenic	ND	mg/L	0.50	5	1	03/29/11 10:28	03/30/11 12:46	7440-38-2	
Barium	ND	mg/L	2.5	100	1	03/29/11 10:28	03/30/11 12:46	7440-39-3	
Cadmium	ND	mg/L	0.050	1	1	03/29/11 10:28	03/30/11 12:46	7440-43-9	
Chromium	ND	mg/L	0.10	5	1	03/29/11 10:28	03/30/11 12:46	7440-47-3	
Lead	ND	mg/L	0.50	5	1	03/29/11 10:28	03/30/11 12:46	7439-92-1	
Selenium	ND	mg/L	0.50	1	1	03/29/11 10:28	03/30/11 12:46	7782-49-2	
Silver	ND	mg/L	0.10	5	1	03/29/11 10:28	03/30/11 12:46	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
	Leachate Method/Date: EPA 1311; 03/28/11 00:00								
Mercury	ND	ug/L	2.0	200	1	03/30/11 10:46	03/30/11 15:52	7439-97-6	
8260 MSV TCLP	Analytical Method: EPA 8260 Leachate Method/Date: EPA 1311; 03/28/11 00:00								
Benzene	ND	ug/L	50.0	500	1		03/29/11 17:54	71-43-2	
1,2-Dichloroethane-d4 (S)	104	%	83-120		1		03/29/11 17:54	17060-07-0	
Toluene-d8 (S)	97	%	81-117		1		03/29/11 17:54	2037-26-5	
4-Bromofluorobenzene (S)	101	%	82-121		1		03/29/11 17:54	460-00-4	
Dibromofluoromethane (S)	104	%	85-113		1		03/29/11 17:54	1868-53-7	

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

Sample: RO-563249 **Lab ID: 6095946002** Collected: 03/22/11 13:35 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	Reg. Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
	Leachate Method/Date: EPA 1311; 03/28/11 00:00								
Arsenic	ND	mg/L	0.50	5	1	03/29/11 10:28	03/30/11 12:56	7440-38-2	
Barium	ND	mg/L	2.5	100	1	03/29/11 10:28	03/30/11 12:56	7440-39-3	
Cadmium	ND	mg/L	0.050	1	1	03/29/11 10:28	03/30/11 12:56	7440-43-9	
Chromium	ND	mg/L	0.10	5	1	03/29/11 10:28	03/30/11 12:56	7440-47-3	
Lead	ND	mg/L	0.50	5	1	03/29/11 10:28	03/30/11 12:56	7439-92-1	
Selenium	ND	mg/L	0.50	1	1	03/29/11 10:28	03/30/11 12:56	7782-49-2	
Silver	ND	mg/L	0.10	5	1	03/29/11 10:28	03/30/11 12:56	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
	Leachate Method/Date: EPA 1311; 03/28/11 00:00								
Mercury	ND	ug/L	2.0	200	1	03/30/11 10:46	03/30/11 16:02	7439-97-6	
8260 MSV TCLP	Analytical Method: EPA 8260 Leachate Method/Date: EPA 1311; 03/28/11 00:00								
Benzene	ND	ug/L	50.0	500	1		03/29/11 18:11	71-43-2	
1,2-Dichloroethane-d4 (S)	106	%	83-120		1		03/29/11 18:11	17060-07-0	
Toluene-d8 (S)	96	%	81-117		1		03/29/11 18:11	2037-26-5	
4-Bromofluorobenzene (S)	101	%	82-121		1		03/29/11 18:11	460-00-4	
Dibromofluoromethane (S)	101	%	85-113		1		03/29/11 18:11	1868-53-7	

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

Sample: RO-013503 **Lab ID: 6095946003** Collected: 03/22/11 13:45 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	Reg. Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
	Leachate Method/Date: EPA 1311; 03/28/11 00:00								
Arsenic	ND	mg/L	0.50	5	1	03/29/11 10:28	03/30/11 10:24	7440-38-2	
Barium	ND	mg/L	2.5	100	1	03/29/11 10:28	03/30/11 10:24	7440-39-3	
Cadmium	ND	mg/L	0.050	1	1	03/29/11 10:28	03/30/11 10:24	7440-43-9	
Chromium	ND	mg/L	0.10	5	1	03/29/11 10:28	03/30/11 10:24	7440-47-3	
Lead	ND	mg/L	0.50	5	1	03/29/11 10:28	03/30/11 10:24	7439-92-1	
Selenium	ND	mg/L	0.50	1	1	03/29/11 10:28	03/30/11 10:24	7782-49-2	
Silver	ND	mg/L	0.10	5	1	03/29/11 10:28	03/30/11 10:24	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
	Leachate Method/Date: EPA 1311; 03/28/11 00:00								
Mercury	ND	ug/L	2.0	200	1	03/30/11 10:46	03/30/11 15:48	7439-97-6	
8260 MSV TCLP	Analytical Method: EPA 8260 Leachate Method/Date: EPA 1311; 03/28/11 00:00								
Benzene	ND	ug/L	50.0	500	1		03/29/11 18:27	71-43-2	
1,2-Dichloroethane-d4 (S)	101	%	83-120		1		03/29/11 18:27	17060-07-0	
Toluene-d8 (S)	97	%	81-117		1		03/29/11 18:27	2037-26-5	
4-Bromofluorobenzene (S)	98	%	82-121		1		03/29/11 18:27	460-00-4	
Dibromofluoromethane (S)	101	%	85-113		1		03/29/11 18:27	1868-53-7	

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

Sample: RO-478136 **Lab ID: 6095946004** Collected: 03/22/11 13:55 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	Reg. Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
	Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Arsenic	ND	mg/L	0.50	5	1	03/31/11 12:00	03/31/11 18:36	7440-38-2	
Barium	ND	mg/L	2.5	100	1	03/31/11 12:00	03/31/11 18:36	7440-39-3	
Cadmium	ND	mg/L	0.050	1	1	03/31/11 12:00	03/31/11 18:36	7440-43-9	
Chromium	ND	mg/L	0.10	5	1	03/31/11 12:00	03/31/11 18:36	7440-47-3	
Lead	ND	mg/L	0.50	5	1	03/31/11 12:00	03/31/11 18:36	7439-92-1	
Selenium	ND	mg/L	0.50	1	1	03/31/11 12:00	03/31/11 18:36	7782-49-2	
Silver	ND	mg/L	0.10	5	1	03/31/11 12:00	03/31/11 18:36	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
	Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Mercury	ND	ug/L	2.0	200	1	04/01/11 11:02	04/01/11 14:22	7439-97-6	
8260 MSV TCLP	Analytical Method: EPA 8260 Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Benzene	ND	ug/L	50.0	500	1		04/01/11 15:23	71-43-2	
1,2-Dichloroethane-d4 (S)	106	%	83-120		1		04/01/11 15:23	17060-07-0	
Toluene-d8 (S)	97	%	81-117		1		04/01/11 15:23	2037-26-5	
4-Bromofluorobenzene (S)	102	%	82-121		1		04/01/11 15:23	460-00-4	
Dibromofluoromethane (S)	105	%	85-113		1		04/01/11 15:23	1868-53-7	

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

Sample: RO-023333 **Lab ID: 6095946005** Collected: 03/22/11 14:00 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	Reg. Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
	Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Arsenic	ND	mg/L	0.50	5	1	03/31/11 12:00	03/31/11 18:40	7440-38-2	
Barium	ND	mg/L	2.5	100	1	03/31/11 12:00	03/31/11 18:40	7440-39-3	
Cadmium	ND	mg/L	0.050	1	1	03/31/11 12:00	03/31/11 18:40	7440-43-9	
Chromium	ND	mg/L	0.10	5	1	03/31/11 12:00	03/31/11 18:40	7440-47-3	
Lead	ND	mg/L	0.50	5	1	03/31/11 12:00	03/31/11 18:40	7439-92-1	
Selenium	ND	mg/L	0.50	1	1	03/31/11 12:00	03/31/11 18:40	7782-49-2	
Silver	ND	mg/L	0.10	5	1	03/31/11 12:00	03/31/11 18:40	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
	Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Mercury	ND	ug/L	2.0	200	1	04/01/11 11:02	04/01/11 14:24	7439-97-6	
8260 MSV TCLP	Analytical Method: EPA 8260 Leachate Method/Date: EPA 1311; 04/01/11 00:00								
Benzene	ND	ug/L	50.0	500	1		04/04/11 11:11	71-43-2	
1,2-Dichloroethane-d4 (S)	104	%	83-120		1		04/04/11 11:11	17060-07-0	
Toluene-d8 (S)	95	%	81-117		1		04/04/11 11:11	2037-26-5	
4-Bromofluorobenzene (S)	101	%	82-121		1		04/04/11 11:11	460-00-4	
Dibromofluoromethane (S)	101	%	85-113		1		04/04/11 11:11	1868-53-7	

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

Sample: RO-749577 **Lab ID: 6095946006** Collected: 03/22/11 14:10 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	Reg. Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
	Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Arsenic	ND	mg/L	0.50	5	1	03/31/11 12:00	03/31/11 18:08	7440-38-2	
Barium	ND	mg/L	2.5	100	1	03/31/11 12:00	03/31/11 18:08	7440-39-3	
Cadmium	ND	mg/L	0.050	1	1	03/31/11 12:00	03/31/11 18:08	7440-43-9	
Chromium	ND	mg/L	0.10	5	1	03/31/11 12:00	03/31/11 18:08	7440-47-3	
Lead	ND	mg/L	0.50	5	1	03/31/11 12:00	03/31/11 18:08	7439-92-1	
Selenium	ND	mg/L	0.50	1	1	03/31/11 12:00	03/31/11 18:08	7782-49-2	
Silver	ND	mg/L	0.10	5	1	03/31/11 12:00	03/31/11 18:08	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
	Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Mercury	ND	ug/L	2.0	200	1	04/01/11 11:02	04/01/11 15:31	7439-97-6	
8260 MSV TCLP	Analytical Method: EPA 8260 Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Benzene	ND	ug/L	50.0	500	1		04/01/11 15:39	71-43-2	
1,2-Dichloroethane-d4 (S)	103	%	83-120		1		04/01/11 15:39	17060-07-0	
Toluene-d8 (S)	95	%	81-117		1		04/01/11 15:39	2037-26-5	
4-Bromofluorobenzene (S)	101	%	82-121		1		04/01/11 15:39	460-00-4	
Dibromofluoromethane (S)	102	%	85-113		1		04/01/11 15:39	1868-53-7	

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

Sample: RO-892134 **Lab ID: 6095946007** Collected: 03/22/11 14:20 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	Reg. Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
	Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Arsenic	ND	mg/L	0.50	5	1	03/31/11 12:00	03/31/11 18:11	7440-38-2	
Barium	ND	mg/L	2.5	100	1	03/31/11 12:00	03/31/11 18:11	7440-39-3	
Cadmium	ND	mg/L	0.050	1	1	03/31/11 12:00	03/31/11 18:11	7440-43-9	
Chromium	ND	mg/L	0.10	5	1	03/31/11 12:00	03/31/11 18:11	7440-47-3	
Lead	ND	mg/L	0.50	5	1	03/31/11 12:00	03/31/11 18:11	7439-92-1	
Selenium	ND	mg/L	0.50	1	1	03/31/11 12:00	03/31/11 18:11	7782-49-2	
Silver	ND	mg/L	0.10	5	1	03/31/11 12:00	03/31/11 18:11	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
	Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Mercury	ND	ug/L	2.0	200	1	04/01/11 11:02	04/01/11 15:33	7439-97-6	
8260 MSV TCLP	Analytical Method: EPA 8260 Leachate Method/Date: EPA 1311; 04/01/11 00:00								
Benzene	ND	ug/L	50.0	500	1		04/04/11 11:28	71-43-2	
1,2-Dichloroethane-d4 (S)	103	%	83-120		1		04/04/11 11:28	17060-07-0	
Toluene-d8 (S)	94	%	81-117		1		04/04/11 11:28	2037-26-5	
4-Bromofluorobenzene (S)	103	%	82-121		1		04/04/11 11:28	460-00-4	
Dibromofluoromethane (S)	103	%	85-113		1		04/04/11 11:28	1868-53-7	

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

Sample: RO-914697 **Lab ID: 6095946008** Collected: 03/23/11 13:45 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	Reg. Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
	Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Arsenic	ND	mg/L	0.50	5	1	03/31/11 12:00	03/31/11 18:43	7440-38-2	
Barium	ND	mg/L	2.5	100	1	03/31/11 12:00	03/31/11 18:43	7440-39-3	
Cadmium	ND	mg/L	0.050	1	1	03/31/11 12:00	03/31/11 18:43	7440-43-9	
Chromium	ND	mg/L	0.10	5	1	03/31/11 12:00	03/31/11 18:43	7440-47-3	
Lead	ND	mg/L	0.50	5	1	03/31/11 12:00	03/31/11 18:43	7439-92-1	
Selenium	ND	mg/L	0.50	1	1	03/31/11 12:00	03/31/11 18:43	7782-49-2	
Silver	ND	mg/L	0.10	5	1	03/31/11 12:00	03/31/11 18:43	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
	Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Mercury	ND	ug/L	2.0	200	1	04/01/11 11:02	04/01/11 14:26	7439-97-6	
8260 MSV TCLP	Analytical Method: EPA 8260 Leachate Method/Date: EPA 1311; 04/01/11 00:00								
Benzene	ND	ug/L	50.0	500	1		04/04/11 11:44	71-43-2	
1,2-Dichloroethane-d4 (S)	104	%	83-120		1		04/04/11 11:44	17060-07-0	
Toluene-d8 (S)	95	%	81-117		1		04/04/11 11:44	2037-26-5	
4-Bromofluorobenzene (S)	101	%	82-121		1		04/04/11 11:44	460-00-4	
Dibromofluoromethane (S)	97	%	85-113		1		04/04/11 11:44	1868-53-7	

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ANALYTICAL RESULTS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

Sample: RO-8959 **Lab ID: 6095946009** Collected: 03/22/11 14:00 Received: 03/24/11 08:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	Reg. Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
	Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Arsenic	ND	mg/L	0.50	5	1	03/31/11 12:00	03/31/11 18:46	7440-38-2	
Barium	ND	mg/L	2.5	100	1	03/31/11 12:00	03/31/11 18:46	7440-39-3	
Cadmium	ND	mg/L	0.050	1	1	03/31/11 12:00	03/31/11 18:46	7440-43-9	
Chromium	ND	mg/L	0.10	5	1	03/31/11 12:00	03/31/11 18:46	7440-47-3	
Lead	ND	mg/L	0.50	5	1	03/31/11 12:00	03/31/11 18:46	7439-92-1	
Selenium	ND	mg/L	0.50	1	1	03/31/11 12:00	03/31/11 18:46	7782-49-2	
Silver	ND	mg/L	0.10	5	1	03/31/11 12:00	03/31/11 18:46	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
	Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Mercury	ND	ug/L	2.0	200	1	04/01/11 11:02	04/01/11 14:28	7439-97-6	
8260 MSV TCLP	Analytical Method: EPA 8260 Leachate Method/Date: EPA 1311; 03/30/11 00:00								
Benzene	ND	ug/L	50.0	500	1		04/01/11 15:55	71-43-2	
1,2-Dichloroethane-d4 (S)	103	%	83-120		1		04/01/11 15:55	17060-07-0	
Toluene-d8 (S)	96	%	81-117		1		04/01/11 15:55	2037-26-5	
4-Bromofluorobenzene (S)	102	%	82-121		1		04/01/11 15:55	460-00-4	
Dibromofluoromethane (S)	101	%	85-113		1		04/01/11 15:55	1868-53-7	

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QUALITY CONTROL DATA

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

QC Batch: MPRP/13805
QC Batch Method: EPA 3010
Analysis Method: EPA 6010
Analysis Description: 6010 MET TCLP
Associated Lab Samples: 6095946001, 6095946002

METHOD BLANK: 791244 Matrix: Water
Associated Lab Samples: 6095946001, 6095946002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.50	03/30/11 12:40	
Barium	mg/L	ND	2.5	03/30/11 12:40	
Cadmium	mg/L	ND	0.050	03/30/11 12:40	
Chromium	mg/L	ND	0.10	03/30/11 12:40	
Lead	mg/L	ND	0.50	03/30/11 12:40	
Selenium	mg/L	ND	0.50	03/30/11 12:40	
Silver	mg/L	ND	0.10	03/30/11 12:40	

LABORATORY CONTROL SAMPLE: 791245

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	1	1.0	102	80-120	
Barium	mg/L	1	0.81	81	80-120	
Cadmium	mg/L	1	1.0	103	80-120	
Chromium	mg/L	1	1.0	105	80-120	
Lead	mg/L	1	1.1	110	80-120	
Selenium	mg/L	1	1.0	103	80-120	
Silver	mg/L	.5	0.51	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 791246 791247

Parameter	Units	6095946001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	10	10	9.9	9.7	99	97	75-125	2	20	
Barium	mg/L	ND	10	10	11.1	11.0	108	106	75-125	2	20	
Cadmium	mg/L	ND	10	10	9.8	9.7	98	97	75-125	1	20	
Chromium	mg/L	ND	10	10	9.5	9.4	95	94	75-125	1	20	
Lead	mg/L	ND	10	10	9.7	9.6	97	96	75-125	1	20	
Selenium	mg/L	ND	10	10	10.0	10	100	100	75-125	1	20	
Silver	mg/L	ND	5	5	5.0	5.0	100	99	75-125	1	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

QC Batch: MPRP/13806
QC Batch Method: EPA 3010
Associated Lab Samples: 6095946003

Analysis Method: EPA 6010
Analysis Description: 6010 MET TCLP

METHOD BLANK: 791248
Matrix: Water
Associated Lab Samples: 6095946003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.50	03/30/11 10:01	
Barium	mg/L	ND	2.5	03/30/11 10:01	
Cadmium	mg/L	ND	0.050	03/30/11 10:01	
Chromium	mg/L	ND	0.10	03/30/11 10:01	
Lead	mg/L	ND	0.50	03/30/11 10:01	
Selenium	mg/L	ND	0.50	03/30/11 10:01	
Silver	mg/L	ND	0.10	03/30/11 10:01	

LABORATORY CONTROL SAMPLE: 791249

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	1	0.95	95	80-120	
Barium	mg/L	1	1.0	101	80-120	
Cadmium	mg/L	1	0.96	96	80-120	
Chromium	mg/L	1	0.98	98	80-120	
Lead	mg/L	1	1.0	101	80-120	
Selenium	mg/L	1	0.94	94	80-120	
Silver	mg/L	.5	0.48	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 791250 791251

Parameter	Units	6095451001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	10	10	10.0	10.0	100	100	75-125	0	20	
Barium	mg/L	ND	10	10	11.5	11.6	98	99	75-125	1	20	
Cadmium	mg/L	0.11	10	10	9.9	9.9	98	98	75-125	0	20	
Chromium	mg/L	ND	10	10	9.7	9.7	97	97	75-125	0	20	
Lead	mg/L	ND	10	10	9.7	9.6	95	95	75-125	0	20	
Selenium	mg/L	ND	10	10	10.0	10.1	100	101	75-125	0	20	
Silver	mg/L	ND	5	5	5.0	5.0	99	100	75-125	0	20	

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QUALITY CONTROL DATA

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

QC Batch: MPRP/13833
QC Batch Method: EPA 3010
Analysis Method: EPA 6010
Analysis Description: 6010 MET TCLP
Associated Lab Samples: 6095946006, 6095946007

METHOD BLANK: 792558 Matrix: Water
Associated Lab Samples: 6095946006, 6095946007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.50	03/31/11 17:58	
Barium	mg/L	ND	2.5	03/31/11 17:58	
Cadmium	mg/L	ND	0.050	03/31/11 17:58	
Chromium	mg/L	ND	0.10	03/31/11 17:58	
Lead	mg/L	ND	0.50	03/31/11 17:58	
Selenium	mg/L	ND	0.50	03/31/11 17:58	
Silver	mg/L	ND	0.10	03/31/11 17:58	

LABORATORY CONTROL SAMPLE: 792559

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	1	0.91	91	80-120	
Barium	mg/L	1	0.99	99	80-120	
Cadmium	mg/L	1	0.92	92	80-120	
Chromium	mg/L	1	0.99	99	80-120	
Lead	mg/L	1	0.99	99	80-120	
Selenium	mg/L	1	0.92	92	80-120	
Silver	mg/L	.5	0.48	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 792560 792561

Parameter	Units	6095946007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	10	10	9.6	9.7	96	97	75-125	1	20	
Barium	mg/L	ND	10	10	10	10.0	98	98	75-125	0	20	
Cadmium	mg/L	ND	10	10	9.4	9.3	94	93	75-125	0	20	
Chromium	mg/L	ND	10	10	9.7	9.7	97	97	75-125	0	20	
Lead	mg/L	ND	10	10	9.4	9.4	94	94	75-125	0	20	
Selenium	mg/L	ND	10	10	9.7	9.8	97	98	75-125	1	20	
Silver	mg/L	ND	5	5	4.9	4.8	97	97	75-125	0	20	

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QUALITY CONTROL DATA

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

QC Batch: MPRP/13834 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET TCLP
Associated Lab Samples: 6095946004, 6095946005, 6095946008, 6095946009

METHOD BLANK: 792564 Matrix: Water
Associated Lab Samples: 6095946004, 6095946005, 6095946008, 6095946009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.50	03/31/11 18:27	
Barium	mg/L	ND	2.5	03/31/11 18:27	
Cadmium	mg/L	ND	0.050	03/31/11 18:27	
Chromium	mg/L	ND	0.10	03/31/11 18:27	
Lead	mg/L	ND	0.50	03/31/11 18:27	
Selenium	mg/L	ND	0.50	03/31/11 18:27	
Silver	mg/L	ND	0.10	03/31/11 18:27	

LABORATORY CONTROL SAMPLE: 792565

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	1	0.90	90	80-120	
Barium	mg/L	1	0.98	98	80-120	
Cadmium	mg/L	1	0.91	91	80-120	
Chromium	mg/L	1	0.98	98	80-120	
Lead	mg/L	1	0.98	98	80-120	
Selenium	mg/L	1	0.92	92	80-120	
Silver	mg/L	.5	0.47	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 792566 792567

Parameter	Units	6096070001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	10	10	9.3	9.3	93	93	75-125	0	20	
Barium	mg/L	ND	10	10	10.4	10.4	99	99	75-125	0	20	
Cadmium	mg/L	3.4	10	10	12.5	12.4	90	90	75-125	0	20	
Chromium	mg/L	0.74	10	10	10.5	10.6	97	98	75-125	1	20	
Lead	mg/L	ND	10	10	10.0	10.0	97	97	75-125	0	20	
Selenium	mg/L	ND	10	10	9.4	9.4	94	93	75-125	1	20	
Silver	mg/L	ND	5	5	4.7	4.7	94	95	75-125	0	20	

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QUALITY CONTROL DATA

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

QC Batch: MERP/5062
QC Batch Method: EPA 7470
Analysis Method: EPA 7470
Analysis Description: 7470 Mercury TCLP
Associated Lab Samples: 6095946003

METHOD BLANK: 791672
Matrix: Water
Associated Lab Samples: 6095946003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	2.0	03/30/11 15:40	

LABORATORY CONTROL SAMPLE: 791673

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.1	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 791674 791675

Parameter	Units	6095451001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	15	15	15.0	15.3	100	102	75-125	2	19	

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QUALITY CONTROL DATA

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

QC Batch: MERP/5063
QC Batch Method: EPA 7470
Analysis Method: EPA 7470
Analysis Description: 7470 Mercury TCLP
Associated Lab Samples: 6095946001, 6095946002

METHOD BLANK: 791676
Matrix: Water
Associated Lab Samples: 6095946001, 6095946002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	0.67	03/30/11 15:50	

LABORATORY CONTROL SAMPLE: 791677

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	15	15.2	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 791678 791679

Parameter	Units	6095946001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	15	15	14.9	15.2	99	101	75-125	2	19	

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QUALITY CONTROL DATA

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

QC Batch: MERP/5069
QC Batch Method: EPA 7470
Analysis Method: EPA 7470
Analysis Description: 7470 Mercury TCLP
Associated Lab Samples: 6095946004, 6095946005, 6095946008, 6095946009

METHOD BLANK: 792925
Matrix: Water
Associated Lab Samples: 6095946004, 6095946005, 6095946008, 6095946009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	2.0	04/01/11 14:16	

LABORATORY CONTROL SAMPLE: 792926

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.7	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 792927 792928

Parameter	Units	6096070001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	15	15	14.2	14.5	95	96	75-125	2	19	

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QUALITY CONTROL DATA

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

QC Batch: MERP/5070
QC Batch Method: EPA 7470
Analysis Method: EPA 7470
Analysis Description: 7470 Mercury TCLP
Associated Lab Samples: 6095946006, 6095946007

METHOD BLANK: 792932
Matrix: Water
Associated Lab Samples: 6095946006, 6095946007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	2.0	04/01/11 15:27	

LABORATORY CONTROL SAMPLE: 792933

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.7	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 792934 792935

Parameter	Units	6095946007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	15	15	14.8	14.4	99	96	75-125	3	19	

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QUALITY CONTROL DATA

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

QC Batch: MSV/36018 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV TCLP
Associated Lab Samples: 6095946001, 6095946002, 6095946003

METHOD BLANK: 791217 Matrix: Water
Associated Lab Samples: 6095946001, 6095946002, 6095946003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	50.0	03/29/11 17:22	
1,2-Dichloroethane-d4 (S)	%	104	83-120	03/29/11 17:22	
4-Bromofluorobenzene (S)	%	102	82-121	03/29/11 17:22	
Dibromofluoromethane (S)	%	101	85-113	03/29/11 17:22	
Toluene-d8 (S)	%	95	81-117	03/29/11 17:22	

LABORATORY CONTROL SAMPLE: 791218

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	1000	938	94	81-120	
1,2-Dichloroethane-d4 (S)	%			104	83-120	
4-Bromofluorobenzene (S)	%			100	82-121	
Dibromofluoromethane (S)	%			105	85-113	
Toluene-d8 (S)	%			100	81-117	

MATRIX SPIKE SAMPLE: 791219

Parameter	Units	6095946003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	ND	1000	1070	103	53-130	
1,2-Dichloroethane-d4 (S)	%				102	83-120	
4-Bromofluorobenzene (S)	%				99	82-121	
Dibromofluoromethane (S)	%				105	85-113	
Toluene-d8 (S)	%				98	81-117	

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QUALITY CONTROL DATA

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

QC Batch: MSV/36112
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV TCLP
Associated Lab Samples: 6095946004, 6095946006, 6095946009

METHOD BLANK: 793055 Matrix: Water
Associated Lab Samples: 6095946004, 6095946006, 6095946009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	50.0	04/01/11 15:07	
1,2-Dichloroethane-d4 (S)	%	102	83-120	04/01/11 15:07	
4-Bromofluorobenzene (S)	%	99	82-121	04/01/11 15:07	
Dibromofluoromethane (S)	%	103	85-113	04/01/11 15:07	
Toluene-d8 (S)	%	95	81-117	04/01/11 15:07	

LABORATORY CONTROL SAMPLE: 793056

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	1000	924	92	81-120	
1,2-Dichloroethane-d4 (S)	%			104	83-120	
4-Bromofluorobenzene (S)	%			101	82-121	
Dibromofluoromethane (S)	%			106	85-113	
Toluene-d8 (S)	%			98	81-117	

MATRIX SPIKE SAMPLE: 793057

Parameter	Units	6095946009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	ND	1000	930	91	53-130	
1,2-Dichloroethane-d4 (S)	%				102	83-120	
4-Bromofluorobenzene (S)	%				102	82-121	
Dibromofluoromethane (S)	%				106	85-113	
Toluene-d8 (S)	%				95	81-117	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

QC Batch: MSV/36156 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV TCLP
Associated Lab Samples: 6095946005, 6095946007, 6095946008

METHOD BLANK: 793957 Matrix: Water
Associated Lab Samples: 6095946005, 6095946007, 6095946008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	50.0	04/04/11 10:55	
1,2-Dichloroethane-d4 (S)	%	108	83-120	04/04/11 10:55	
4-Bromofluorobenzene (S)	%	100	82-121	04/04/11 10:55	
Dibromofluoromethane (S)	%	102	85-113	04/04/11 10:55	
Toluene-d8 (S)	%	96	81-117	04/04/11 10:55	

LABORATORY CONTROL SAMPLE: 793958

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	1000	977	98	81-120	
1,2-Dichloroethane-d4 (S)	%			109	83-120	
4-Bromofluorobenzene (S)	%			101	82-121	
Dibromofluoromethane (S)	%			109	85-113	
Toluene-d8 (S)	%			98	81-117	

MATRIX SPIKE SAMPLE: 793959

Parameter	Units	6095946008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	ND	1000	961	96	53-130	
1,2-Dichloroethane-d4 (S)	%				104	83-120	
4-Bromofluorobenzene (S)	%				101	82-121	
Dibromofluoromethane (S)	%				106	85-113	
Toluene-d8 (S)	%				97	81-117	

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(913)599-5665

QUALIFIERS

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is NELAP accredited. Contact your Pace PM for the current list of accredited analytes.

Pace Analytical Services, Inc.
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(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: TRANS CANADA SENECA, KS
Pace Project No.: 6095946

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
6095946001	RO-746218	EPA 3010	MPRP/13805	EPA 6010	ICP/11999
6095946002	RO-563249	EPA 3010	MPRP/13805	EPA 6010	ICP/11999
6095946003	RO-013503	EPA 3010	MPRP/13806	EPA 6010	ICP/12000
6095946004	RO-478136	EPA 3010	MPRP/13834	EPA 6010	ICP/12019
6095946005	RO-023333	EPA 3010	MPRP/13834	EPA 6010	ICP/12019
6095946006	RO-749577	EPA 3010	MPRP/13833	EPA 6010	ICP/12018
6095946007	RO-892134	EPA 3010	MPRP/13833	EPA 6010	ICP/12018
6095946008	RO-914697	EPA 3010	MPRP/13834	EPA 6010	ICP/12019
6095946009	RO-8959	EPA 3010	MPRP/13834	EPA 6010	ICP/12019
6095946001	RO-746218	EPA 7470	MERP/5063	EPA 7470	MERC/5034
6095946002	RO-563249	EPA 7470	MERP/5063	EPA 7470	MERC/5034
6095946003	RO-013503	EPA 7470	MERP/5062	EPA 7470	MERC/5033
6095946004	RO-478136	EPA 7470	MERP/5069	EPA 7470	MERC/5040
6095946005	RO-023333	EPA 7470	MERP/5069	EPA 7470	MERC/5040
6095946006	RO-749577	EPA 7470	MERP/5070	EPA 7470	MERC/5041
6095946007	RO-892134	EPA 7470	MERP/5070	EPA 7470	MERC/5041
6095946008	RO-914697	EPA 7470	MERP/5069	EPA 7470	MERC/5040
6095946009	RO-8959	EPA 7470	MERP/5069	EPA 7470	MERC/5040
6095946001	RO-746218	EPA 8260	MSV/36018		
6095946002	RO-563249	EPA 8260	MSV/36018		
6095946003	RO-013503	EPA 8260	MSV/36018		
6095946004	RO-478136	EPA 8260	MSV/36112		
6095946005	RO-023333	EPA 8260	MSV/36156		
6095946006	RO-749577	EPA 8260	MSV/36112		
6095946007	RO-892134	EPA 8260	MSV/36156		
6095946008	RO-914697	EPA 8260	MSV/36156		
6095946009	RO-8959	EPA 8260	MSV/36112		

NOTICE: This report is required by 49 CFR Part 195. Failure to report can result in a civil penalty not to exceed $100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122.	OMB NO: 2137-0047 EXPIRATION DATE: 01/31/2014

U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	**Original Report Date:**	06/08/2011
	No.	20110171 - 16159 --- (DOT Use Only)

ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS

INSTRUCTIONS

Important: *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline.*

PART A - KEY REPORT INFORMATION

Report Type: *(select all that apply)*	**Original:**	**Supplemental:**	**Final:**
		Yes	**Yes**

Last Revision Date:	11/02/2011
1. Operator's OPS-issued Operator Identification Number (OPID):	32334
2. Name of Operator	TC OIL PIPELINE OPERATIONS INC
3. Address of Operator:	
3a. Street Address	717 TEXAS AVE
3b. City	HOUSTON
3c. State	Texas
3d. Zip Code	77002
4. Local time *(24-hr clock)* and date of the Accident:	05/07/2011 06:20
5. Location of Accident:	
Latitude:	45.95307
Longitude:	-97.9057
6. National Response Center Report Number (if applicable):	975573
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	05/07/2011 09:55
8. Commodity released: *(select only one, based on predominant volume released)*	Crude Oil
- Specify Commodity Subtype:	
- If "Other" Subtype, Describe:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Ethanol Blend, then % Ethanol Blend: %:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Biodiesel, then Biodiesel Blend (e.g. B2, B20, B100): B	
9. Estimated volume of commodity released unintentionally (Barrels):	400.00
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):	
11. Estimated volume of commodity recovered (Barrels):	400.00
12. Were there fatalities?	No
- If Yes, specify the number in each category:	
12a. Operator employees	
12b. Contractor employees working for the Operator	
12c. Non-Operator emergency responders	
12d. Workers working on the right-of-way, but NOT associated with this Operator	
12e. General public	
12f. Total fatalities (sum of above)	
13. Were there injuries requiring inpatient hospitalization?	No
- If Yes, specify the number in each category:	
13a. Operator employees	
13b. Contractor employees working for the Operator	
13c. Non-Operator emergency responders	

13d. Workers working on the right-of-way, but NOT associated with this Operator	
13e. General public	
13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	
- If No, Explain:	
- If Yes, complete Questions 14a and 14b: *(use local time, 24-hr clock)*	
14a. Local time and date of shutdown:	
14b. Local time pipeline/facility restarted:	
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	No
16. Did the commodity explode?	No
17. Number of general public evacuated:	0
18. Time sequence *(use local time, 24-hour clock)*:	
18a. Local time Operator identified Accident:	05/07/2011 09:00
18b. Local time Operator resources arrived on site:	05/07/2011 09:00

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the origin of Accident onshore?	Yes
If Yes, Complete Questions (2-12)	
If No, Complete Questions (13-15)	
- If Onshore:	
2. State:	North Dakota
3. Zip Code:	58017
4. City	Brampton
5. County or Parish	Sargent
6. Operator-designated location:	Milepost/Valve Station
Specify:	MP ND 216.7
7. Pipeline/Facility name:	Ludden Pump Station
8. Segment name/ID:	Glacial Lakes
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Originated on Operator-controlled property, but then flowed or migrated off the property
11. Area of Accident (as found):	Aboveground
Specify:	Typical aboveground facility piping or appurtenance
- If Other, Describe:	
Depth-of-Cover (in):	
12. Did Accident occur in a crossing?	No
- If Yes, specify below:	
- If Bridge crossing –	
Cased/ Uncased:	
- If Railroad crossing –	
Cased/ Uncased/ Bored/drilled	
- If Road crossing –	
Cased/ Uncased/ Bored/drilled	
- If Water crossing –	
Cased/ Uncased	
- Name of body of water, if commonly known:	
- Approx. water depth (ft) at the point of the Accident:	
- Select:	
- If Offshore:	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- On the Outer Continental Shelf (OCS) - Specify:	
- Area:	
- Block #:	
15. Area of Accident:	

PART C - ADDITIONAL FACILITY INFORMATION

1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Pump/Meter Station Equipment and Piping
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	

3. Item involved in Accident:	Relief Line
- If Pipe, specify:	
3a. Nominal diameter of pipe (in):	
3b. Wall thickness (in):	
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	
3d. Pipe specification:	
3e. Pipe Seam , specify:	
- If Other, Describe:	
3f. Pipe manufacturer:	
3g. Year of manufacture:	
3h. Pipeline coating type at point of Accident, specify:	
- If Other, Describe:	
- If Weld, including heat-affected zone, specify:	
- If Other, Describe:	
- If Valve, specify:	
- If Mainline, specify:	
- If Other, Describe:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	
- If Other - Describe:	
- If Other, describe:	
4. Year item involved in Accident was installed:	2009
5. Material involved in Accident:	Carbon Steel
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Leak
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	Connection Failure
- If Other, Describe:	
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	

PART D - ADDITIONAL CONSEQUENCE INFORMATION

1. Wildlife impact:	No
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	Yes
3. Long term impact assessment performed or planned:	No
4. Anticipated remediation:	Yes
4a. If Yes, specify all that apply:	
- Surface water	Yes
- Groundwater	
- Soil	Yes
- Vegetation	
- Wildlife	
5. Water contamination:	Yes
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	Yes
- Groundwater	Yes
- Drinking water: *(Select one or both)*	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	5.00
5c. Name of body of water, if commonly known:	Unknown, swamp area in close proximity to the pump station
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	No
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	No
7a. If Yes, specify HCA type(s): *(Select all that apply)*	

- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- High Population Area:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Other Populated Area	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Drinking Water	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Ecological	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
8. Estimated Property Damage:	
8a. Estimated cost of public and non-Operator private property damage	$ 1,000
8b. Estimated cost of commodity lost	$ 40,000
8c. Estimated cost of Operator's property damage & repairs	$ 25,000
8d. Estimated cost of Operator's emergency response	$ 250,000
8e. Estimated cost of Operator's environmental remediation	$ 750,000
8f. Estimated other costs	$ 250,000
Describe:	Repair costs to the faclity and other facilities
8g. Total estimated property damage (sum of above)	$ 1,316,000

PART E - ADDITIONAL OPERATING INFORMATION

1. Estimated pressure at the point and time of the Accident (psig):	1,097.00
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	1,440.00
3. Describe the pressure on the system or facility relating to the Accident (psig):	Pressure did not exceed MOP
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	No
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	No
- If Yes - (*Complete 5a. – 5e. below)*	
5a. Type of upstream valve used to initially isolate release source:	
5b. Type of downstream valve used to initially isolate release source:	
5c. Length of segment isolated between valves (ft):	
5d. Is the pipeline configured to accommodate internal inspection tools?	
- If No, Which physical features limit tool accommodation? (*select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	

- If Yes, Which operational factors complicate execution? (*select all that apply*)	
- Excessive debris or scale, wax, or other wall buildup	
- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	Yes
If Yes -	
6a. Was it operating at the time of the Accident?	Yes
6b. Was it fully functional at the time of the Accident?	Yes
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	Yes
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	Yes
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	Yes
- If Yes:	
7a. Was it operating at the time of the Accident?	Yes
7b. Was it fully functional at the time of the Accident?	Yes
7c. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	Yes
7d. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	Yes
8. How was the Accident initially identified for the Operator?	Controller
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Guard Patrol by Operator or its contractor" is selected in Question 8, specify the following:	Operator employee
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: (provide an explanation for why the Operator did not investigate)
- If No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)*	due to the cause of the release resulted from a broken fitting on the thermal relief valve, the controlled did not contrubute to the release.
- If Yes, specify investigation result(s): *(select all that apply)*	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
Provide an explanation for why not:	
- Investigation identified no control room issues	
- Investigation identified no controller issues	
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above:	
Describe:	

PART F - DRUG & ALCOHOL TESTING INFORMATION

1. As a result of this Accident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
1a. Specify how many were tested:	
1b. Specify how many failed:	
2. As a result of this Accident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
2a. Specify how many were tested:	
2b. Specify how many failed:	

PART G – APPARENT CAUSE

Select only one box from PART G in shaded column on left representing the APPARENT Cause of the Accident, and answer the questions on the right. Describe secondary, contributing or root causes of the Accident in the narrative (PART H).

Apparent Cause:	G6 - Equipment Failure
G1 - Corrosion Failure - only one **sub-cause** can be picked from shaded left-hand column	
External Corrosion:	
Internal Corrosion:	
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground?	
- If Yes :	
4a. Was failed item considered to be under cathodic protection at the time of the Accident?	
If Yes - Year protection started:	
4b. Was shielding, tenting, or disbonding of coating evident at the point of the Accident?	
4c. Has one or more Cathodic Protection Survey been conducted at the point of the Accident?	
If "Yes, CP Annual Survey" – Most recent year conducted:	
If "Yes, Close Interval Survey" – Most recent year conducted:	
If "Yes, Other CP Survey" – Most recent year conducted:	
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	
- If Internal Corrosion:	
6. Results of visual examination:	
- Other:	
7. Type of corrosion *(select all that apply)*: -	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	
- Erosion	
- Other:	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following *(select all that apply)*: -	
- Field examination	
- Determined by metallurgical analysis	

- Other:	
- If Other, Describe:	
9. Location of corrosion *(select all that apply)*: -	
- Low point in pipe	
- Elbow	
- Other:	
- If Other, Describe:	
10. Was the commodity treated with corrosion inhibitors or biocides?	
11. Was the interior coated or lined with protective coating?	
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	
13. Were corrosion coupons routinely utilized?	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Tank/Vessel.	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
15. Has one or more internal inspection tool collected data at the point of the Accident?	
15a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage Tool	
Most recent year:	
- Ultrasonic	
Most recent year:	
- Geometry	
Most recent year:	
- Caliper	
Most recent year:	
- Crack	
Most recent year:	
- Hard Spot	
Most recent year:	
- Combination Tool	
Most recent year:	
- Transverse Field/Triaxial	
Most recent year:	
- Other	
Most recent year:	
Describe:	
16. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
If Yes -	
Most recent year tested:	
Test pressure:	
17. Has one or more Direct Assessment been conducted on this segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident::	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
18a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	

G2 - Natural Force Damage - only one **sub-cause** can be picked from shaded left-handed column	
Natural Force Damage – Sub-Cause:	
- If Earth Movement, NOT due to Heavy Rains/Floods:	
1. Specify:	
- If Other, Describe:	
- If Heavy Rains/Floods:	
2. Specify:	
- If Other, Describe:	
- If Lightning:	
3. Specify:	
- If Temperature:	
4. Specify:	
- If Other, Describe:	
- If High Winds:	
- If Other Natural Force Damage:	
5. Describe:	
Complete the following if any Natural Force Damage sub-cause is selected.	
6. Were the natural forces causing the Accident generated in conjunction with an extreme weather event?	
6a. If Yes, specify: *(select all that apply)*	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Describe:	
G3 - Excavation Damage - only one **sub-cause** can be picked from shaded left-hand column	
Excavation Damage – Sub-Cause:	
- If Excavation Damage by Operator (First Party):	
- If Excavation Damage by Operator's Contractor (Second Party):	
- If Excavation Damage by Third Party:	
- If Previous Damage due to Excavation Activity:	
Complete Questions 1-5 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
1. Has one or more internal inspection tool collected data at the point of the Accident?	
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	

4. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
5. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
5a. If Yes, for each examination, conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
Complete the following if Excavation Damage by Third Party is selected as the sub-cause.	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from: *(select all that apply)* -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: *(select all that apply)* -	
- Public	
- If "Public", Specify:	
- Private	
- If "Private", Specify:	
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks visible in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption (hours)	
17. Description of the CGA-DIRT Root Cause *(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):*	
Root Cause:	
- If One-Call Notification Practices Not Sufficient, specify:	
- If Locating Practices Not Sufficient, specify:	
- If Excavation Practices Not Sufficient, specify:	
- If Other/None of the Above, explain:	
G4 - Other Outside Force Damage - *only one **sub-cause** can be selected from the shaded left-hand column*	
Other Outside Force Damage – Sub-Cause:	

- If Nearby Industrial, Man-made, or Other Fire/Explosion as Primary Cause of Incident:	
- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:	
1. Vehicle/Equipment operated by:	
- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring:	
2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Heavy Rains/Flood	
- Other	
- If Other, Describe:	
- If Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation:	
- If Electrical Arcing from Other Equipment or Facility:	
- If Previous Mechanical Damage NOT Related to Excavation:	
Complete Questions 3-7 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
3. Has one or more internal inspection tool collected data at the point of the Accident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
6. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
7. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	

Describe:	
- If Intentional Damage:	
8. Specify:	
- If Other, Describe:	
- If Other Outside Force Damage:	
9. Describe:	

G5 - Material Failure of Pipe or Weld - only one **sub-cause** can be selected from the shaded left-hand column

Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."

Material Failure of Pipe or Weld – Sub-Cause:	
1. The sub-cause selected below is based on the following: *(select all that apply)*	
- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Original Manufacturing-related (NOT girth weld or other welds formed in the field):	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related:	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Environmental Cracking-related:	
3. Specify:	
- Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional factors: (*select all that apply*):	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Describe:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	

- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	
Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
7. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident -	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site -	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G6 – Equipment Failure - only one **sub-cause** can be selected from the shaded left-hand column	
Equipment Failure – Sub-Cause:	Threaded Connection/Coupling Failure
- If Malfunction of Control/Relief Equipment:	
1. Specify: *(select all that apply)* -	
- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	
- Relief Valve	
- Power Failure	
- Stopple/Control Fitting	
- ESD System Failure	
- Other	
- If Other – Describe:	
- If Pump or Pump-related Equipment:	
2. Specify:	
- If Other – Describe:	
- If Threaded Connection/Coupling Failure:	
3. Specify:	Threaded Fitting
- If Other – Describe:	
- If Non-threaded Connection Failure:	
4. Specify:	
- If Other – Describe:	
- If Defective or Loose Tubing or Fitting:	
- If Failure of Equipment Body (except Pump), Tank Plate, or other Material:	
- If Other Equipment Failure:	
5. Describe:	

Complete the following if any Equipment Failure sub-cause is selected.	
6. Additional factors that contributed to the equipment failure: *(select all that apply)*	
- Excessive vibration	Yes
- Overpressurization	
- No support or loss of support	
- Manufacturing defect	
- Loss of electricity	
- Improper installation	
- Mismatched items (different manufacturer for tubing and tubing fittings)	
- Dissimilar metals	
- Breakdown of soft goods due to compatibility issues with transported commodity	
- Valve vault or valve can contributed to the release	
- Alarm/status failure	
- Misalignment	
- Thermal stress	
- Other	
- If Other, Describe:	

G7 - Incorrect Operation - only one **sub-cause** can be selected from the shaded left-hand column	
Incorrect Operation – Sub-Cause:	
Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage	
Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow	
1. Specify:	
- If Other, Describe:	
Valve Left or Placed in Wrong Position, but NOT Resulting in a Tank, Vessel, or Sump/Separator Overflow or Facility Overpressure	
Pipeline or Equipment Overpressured	
Equipment Not Installed Properly	
Wrong Equipment Specified or Installed	
Other Incorrect Operation	
2. Describe:	
Complete the following if any Incorrect Operation sub-cause is selected.	
3. Was this Accident related to *(select all that apply)*: -	
- Inadequate procedure	
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	

G8 - Other Accident Cause - only one **sub-cause** can be selected from the shaded left-hand column	
Other Accident Cause – Sub-Cause:	
- If Miscellaneous:	
1. Describe:	
- If Unknown:	

2. Specify:	

PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT

A release occurred at the Ludden Pump Station on the ¾" pipe nipple under the thermal relief valve located on the facility discharge piping. A root cause analysis has been conducted and the failed fitting investigation performed. The fatique failure of the 3/4" pipe nipple occurred as a result of excessive vibratio. Results have been provided to PHMSA.

File Full Name

PART I - PREPARER AND AUTHORIZED SIGNATURE

Preparer's Name	Daniel C Cerkoney
Preparer's Title	Compliance Engineer
Preparer's Telephone Number	701-483-1434
Preparer's E-mail Address	dan_cerkoney@transcanada.com
Preparer's Facsimile Number	701-483-1431
Authorized Signature's Name	Daniel C Cerkoney
Authorized Signature Title	Compliance Engineer
Authorized Signature Telephone Number	701-290-1176
Authorized Signature Email	dan_cerkoney@transcanada.com
Date	11/02/2011

URS

November 18, 2011

Mr. Kris Roberts
North Dakota Department of Health
918 E. Divide Avenue, 4th Floor
Bismarck, North Dakota 58501-1947

Subject: Release Progress Report – Ludden Pump Station
TransCanada – Keystone Pipeline, LP
Brampton, North Dakota

Dear Mr. Roberts:

This report transmits the results of the October 2011 sampling of the land farmed area and surface water in the wetlands at the TransCanada Keystone Pipeline, LP Ludden Pump Station site near Brampton, North Dakota. This report is submitted in reference to your October 26, 2011 correspondence and the finalization of cleanup actions by TransCanada at this site.

Sampling and Analysis Results

Soil Sampling

The land farmed area was resampled on October 20, 2011. The sample locations are shown on Figure 1 and the results are summarized on Table 1. Analytical results continued to show total extractable hydrocarbon (TEH) concentrations in soils below North Dakota Department of Health (NDDH) clean-up levels at all sampling locations.

Water Sampling

The majority of the wetlands previously sampled were found to have no standing water on October 20, 2011, with the exception of the background sample location ¼ mile north of the pump station. The sample location is shown on Figure 2 and the results are summarized on Table 2.

Observed Site Conditions

The crops in the farmed area had been destroyed prior to the October 20, 2011 site visit and the field had been tilled. See attached aerial photograph from October 5, 2011 (Figure 3) showing site and land farm restoration condition.

Recommendation

Based on current conditions at the TransCanada Ludden Pump Station site and your correspondence dated October 26, 2011, we request that no further investigation or remediation be required and that the site be considered for closure.

URS Corporation
Fifth Street Towers
100 South Fifth Street, Suite 1500
Minneapolis, MN 55402
612.370.0700 Tel
612.370.1378 Fax

If you have any questions, please contact Robert Baumgartner of TransCanada Keystone Pipeline at (832) 320-5538 or myself at (612) 373-6849.

Sincerely,

Bruce R. Galer, PG
Senior Geologist

cc: Robert Baumgartner, TransCanada Keystone Pipeline

Table 1
Summary of Laboratory Analysis-Wetland Water Samples
Ludden Pump Station, Brampton, ND-October 20, 2011

Location	Units	WTLD-025	WTLD-26-N	WTLD-026-S	WTLD-026-Trench	WTLD-027	1/2 Mi-WILD	1/4 MI-N-WTLD	PS-ADJ-WTLD	Human Health Limit Class III Water
Sample Date		10/20/11	10/20/11	10/20/11	10/20/11	10/20/11	10/20/11	10/20/11	10/20/11	
Type		NA	NA	NA	NA	NA	NA	Background-Grab	NA	
Analyte										
TEH(C09-C40)	mg/L	NA	NA	NA	NA	NA	NA	0.11	NA	---
TEM (C09-C40)	mg/L	NA	NA	NA	NA	NA	NA	0.11	NA	---
Benzene	µg/L	NA	NA	NA	NA	NA	NA	<1	NA	71
Ethylbenzene	µg/L	NA	NA	NA	NA	NA	NA	<1	NA	2,900
Toluene	µg/L	NA	NA	NA	NA	NA	NA	<1	NA	200,000
Xylene (Total)	µg/L	NA	NA	NA	NA	NA	NA	<3	NA	10,000*

NOTES: mg/L=Milligrams per liter
µg/L= Micrograms per liter
<x = Not detected to reporting limits of x
TEM=total extractable range hydrocarbons without silica gel preparation
TEH=total extractable range hydrocarbons with silica gel preparation
* None listed for Class III water, value represents Class II water, wetlands unlisted are considered Class III waters
--- = No applicable standard
NA = No surface water present at sample location

Location	Units	WTLD-25	WTLD-26-N	WTLD-26-S	WTLD-26-Trench	WTLD-27	1/2 Mi-WILD	1/4 MI-N-WTLD	PS-ADJ-WTLD	Aquatic Life Value Acute ***	Aquatic Life Value Chronic ***
Sample Date		10/20/11	10/20/11	10/20/11	10/20/11	10/20/11	10/20/11	10/20/11	10/20/11		
Type		NA	NA	NA	NA	NA	NA	Background-Grab	NA		
Analyte											
Aluminum, dissolved	µg/L	NA	NA	NA	NA	NA	NA	<200	NA	---	---
Antimony, dissolved	µg/L	NA	NA	NA	NA	NA	NA	<10	NA	---	640**
Arsenic, dissolved	µg/L	NA	NA	NA	NA	NA	NA	<10	NA	340	150
Barium, dissolved	µg/L	NA	NA	NA	NA	NA	NA	56.5	NA	---	---
Beryllium, dissolved	µg/L	NA	NA	NA	NA	NA	NA	<5.0	NA	---	---
Boron, dissolved	µg/L	NA	NA	NA	NA	NA	NA	<150	NA	---	---
Cadminum, dissolved	µg/L	NA	NA	NA	NA	NA	NA	<1	NA	2.1	0.27
Chromium, dissolved	µg/L	NA	NA	NA	NA	NA	NA	<10	NA	1,800	86
Copper, dissolved	µg/L	NA	NA	NA	NA	NA	NA	<10	NA	14.0	9.3
Lead, dissolved	µg/L	NA	NA	NA	NA	NA	NA	<3	NA	82	3.2
Nickel, dissolved	µg/L	NA	NA	NA	NA	NA	NA	<20	NA	470	52
Selenium, dissolved	µg/L	NA	NA	NA	NA	NA	NA	<15	NA	20	5.0
Silver, dissolved	µg/L	NA	NA	NA	NA	NA	NA	<10	NA	3.8	---
Thallium, dissolved	µg/L	NA	NA	NA	NA	NA	NA	<15	NA	---	0.47**
Zinc, dissolved	µg/L	NA	NA	NA	NA	NA	NA	<20	NA	120	120
Ammonia Nitrogen	mg/L	NA	NA	NA	NA	NA	NA	0.13	NA	---	---

NOTES: mg/L=Milligrams per liter
µg/L= Micrograms per liter
<x = Not detected to reporting limits of x
** Class III Steam Human Health Standard, no aquatic standard listed
*** Some values may be adjusted based on hardness and pH.
NA = No surface water present at sample location

Table 2
Summary of Laboratory Analysis-Land Farming
Ludden Pump Station, Brampton, ND

May 15, 2011

Location	Units	LF-A	LF-B	LF-C	LF-D	LF-BKG-A	LF-BKG-B	Clean-up Level
Sample Date		5/15/11	5/15/11	5/15/11	5/15/11	5/15/11	5/15/11	
Sample Type		Composite	Composite	Composite	Composite	Composite	Composite	
Chemical of Concern								
% Moisture	%	29.3	28	21.6	18.9	20.7	20.7	
TEH(C09-C40)	mg/kg	228	3.1	4.9	143	3.0	3.5	100
TEM(C09-C40)	mg/kg	214	13	10.7	198	13.7	9.2	100
pH	Std. Units	7.2	5.4	7.1	7.1	5.6	5.9	
Nitrate as N	mg/kg	<5.7	9.4	5.1	<4.9	8.1	7.2	
Total Phosphorus	mg/kg	348	388	349	332	428	337	
Total Organic Carbon	mg/kg	3530	5630	6980	10300	4070	4140	

August 2, 2011

Location	Units	LF-A	LF-B	LF-C	LF-D	LF-E*	LF-BKG-A	LF-BKG-B	Clean-up Level
Sample Date		8/2/11	8/2/11	8/2/11	8/2/11	8/2/11	8/2/11	8/2/11	
Sample Type		Composite	Composite	Composite	Composite	Composite	Composite	Composite	
Chemical of Concern									
% Moisture	%	6.4	12.4	21.1	11.8	23.4	36.2	10.1	
TEH(C09-C40)	mg/kg	4.6	4.2	4.1	5.6	7.7	6.8	4.3	100
TEM(C09-C40)	mg/kg	8.8	9.1	5.3	15.2	11.2	10.3	8.9	100
pH	Std. Units	5.3	5.2	5.5	5.0	7.5	7.7	8.2	
Nitrate as N	mg/kg	<4.3	4.6	<5.1	5.9	<5.2	<6.3	<4.5	
Total Phosphorus	mg/kg	274	287	329	340	273	404	307	
Total Organic Carbon	mg/kg	3810	7300	6670	4810	2810	8670	2870	

October 20, 2011

Location	Units	LF-A	LF-B	LF-C	LF-D	LF-BKG-A	LF-BKG-B	Clean-up Level
Sample Date		10/20/11	10/20/11	10/20/11	10/20/11	10/20/11	10/20/11	
Sample Type		Composite	Composite	Composite	Composite	Composite	Composite	
Chemical of Concern								
% Moisture	%	14.4	7	12.6	9.5	17.5	8.7	
TEH(C09-C40)	mg/kg	8.6	4.1	8.4	74.2	6.2	5.6	100
TEM(C09-C40)	mg/kg	14.2	6.5	10.8	87.4	6.8	9.7	100
pH	Std. Units	7	5	6.3	6.0	8.3	7.9	
Nitrate as N	mg/kg	18.6	10.2	31.2	12.4	6.7	4.3	
Total Phosphorus	mg/kg	347	344	363	327	406	348	
Total Organic Carbon	mg/kg	12100	8030	7040	5640	7100	6690	

NOTES:

TEM=total extractable range hydrocarbons without silica gel preparation

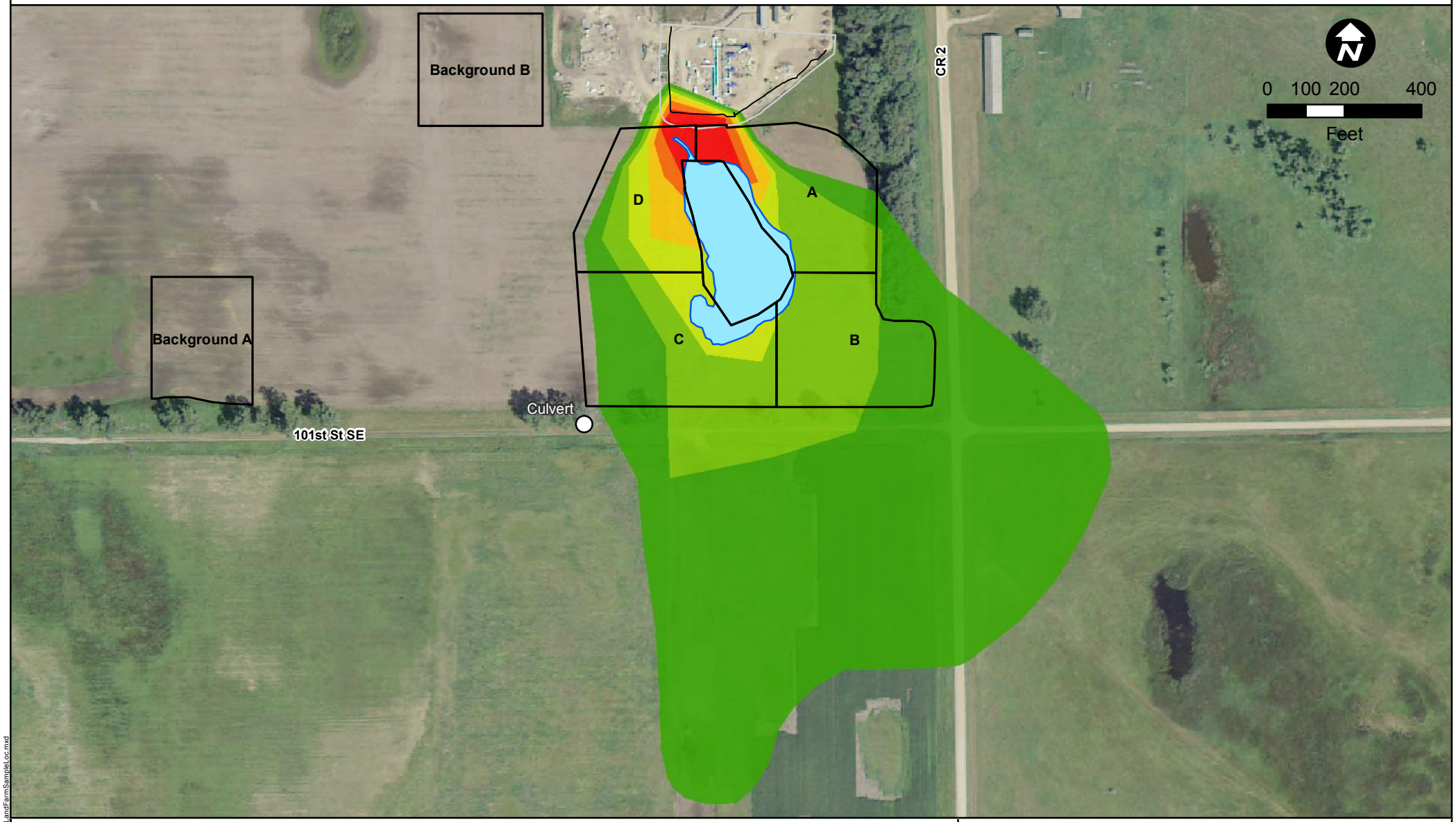
TEH=total extractable range hydrocarbons with silica gel preparation

* In August 2 sampling, the portion of the field that was scraped to remove surficial oil was separated from sample areas LF-A and LF-B and sampled as sample LF-E.

TransCanada Ludden Pump Station

Figure 1. Land Farm Sample Locations - October 20, 2011

URS
Fifth Street Towers
100 South Fifth Street, Suite 1500
Minneapolis, MN 55402
612.370.0700 Tel
612.370.1378 Fax

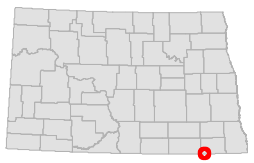


Fence
Toe of Slope
Pond

Misted Areas
Continuous = 91-100% coverage
Broken = 51-90% coverage
Patchy = 11-50% coverage
Sporadic-High = 6-10% coverage
Sporadic-Low = 1-5% coverage
Trace = <1% coverage

Data:
SCAT areas collected by GPS in May 2011.

Projection:
NAD83 UTM Zone 14N



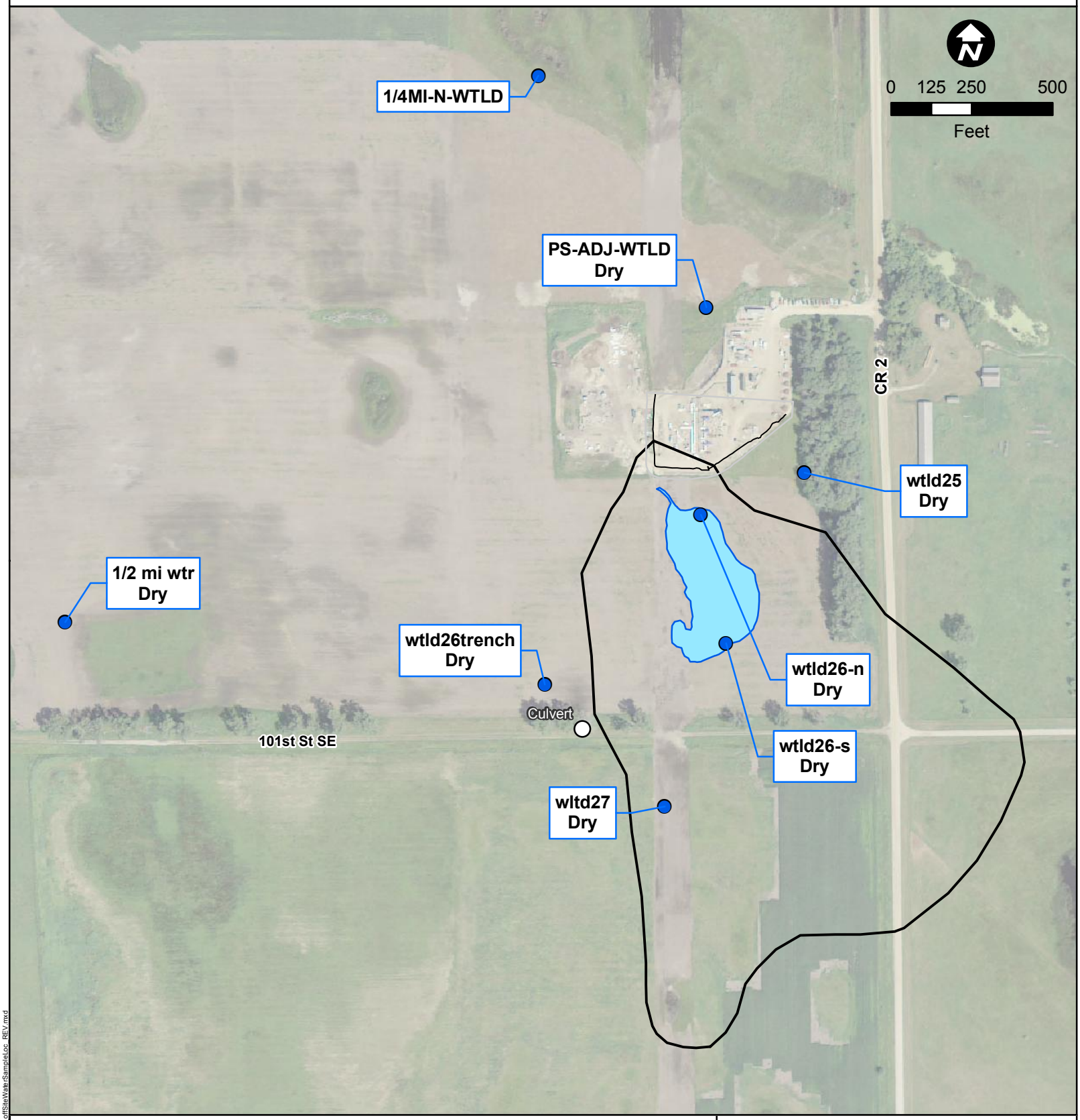
017499

Q:\31810\056\06_GIS\Data\08312011\Fig1_LandFarmSampleLoc.mxd

TransCanada Ludden Pump Station

Figure 2. Off-Site Water Sampling Locations - October 20, 2011

URS
Fifth Street Towers
100 South Fifth Street, Suite 1500
Minneapolis, MN 55402
612.370.0700 Tel
612.370.1378 Fax

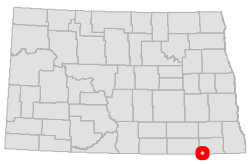


Fence
Toe of Slope
Pond
Off-Site Water Sample
Misted Spray Area

Data:
SCAT areas collected by GPS in May 2011.

Projection:
NAD83 UTM Zone 14N

017500



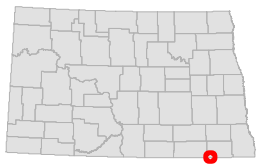
Q:\31810958.06_GIS\Data\08312011\Fig2_offSiteWaterSampleLoc_REV.mxd

TransCanada Ludden Pump Station

Figure 3. Site Restoration as of October 5, 2011

URS
Fifth Street Towers
100 South Fifth Street, Suite 1500
Minneapolis, MN 55402
612.370.0700 Tel
612.370.1378 Fax

017501



Environmental Incident Report

This report has been submitted.

North Dakota Department of Health
Environmental Health Section
1.701.328.5210 or 1.701.328.5166

North Dakota Department of Emergency Services
1.701.328.8100
1.800.472.2121 State Radio 24-Hour Hotline

If this is an emergency, or for additional assistance, please call the Health or Emergency Services Department at the numbers shown above

This form is NOT for RCRA-exempt oilfield related incidents
(for RCRA-exempt oilfield incidents click here)
(if you are not sure which form to use click here)

Fill out information as completely as possible
Error messages appear to the right of the field
Use the Tab key or mouse to move between fields
Pressing the Enter key while in the form will submit the report
Required fields are shown in Red

Location Information:

County	Sargent
Township	129
Range	58
Section	26
Quarter	
QQSection	
QQQSection	

Location Description (911 address or location from nearest town)

10075 119th Ave SE
Brampton, ND 58017

Distance to Nearest Residence or Occupied Building 1.3 Units Miles

Incident Information:

Date 5/7/2011
(mm/dd/yyyy) If unknown, enter date of discovery
Time

0605

hhmm 24-hour time, no colon

Type: Other (fill in box)

Pipeline Pump Station Equipment

Estimated Duration	30	Units	minutes
Estimated Volume	500	Units	barrels

Substance released or of concern (include trade and/or chemical name if applicable)

Crude Oil

Agriculture Related? No

Is this substance on EPA's Extremely Hazardous Substance list? No

To find out if this substance is on the EHS list, Click Here

Describe Cause

Small diameter piping failure.

Action Taken and Recommended/Planned Future Action
(how spill was contained, soil excavated, emergency approval to burn contaminant, evacuation of nearby personnel, etc.)

Pipeline system shutdown and pump station isolated.
Company and contractor spill response crews mobilized to the facility.
Oil contained and controlled onsite by earthen berm. Offsite oil mist delineated. Absorbent boom and earthen dam were used to collect sheen and control flow from ponded water on adjacent property to the

Where will recovered wastes be disposed?

Recovered crude oil/water mix transported to LePier Oil, Fosston, MN for recycling.
Excavated oil impacted gravel/soil will be transported to Veolia LF, Buffalo MN

Impact Information:

Fatalities	0
Injuries	0
Medium affected	04 - water and soil

Immediate Risk Evaluation (explosive atmosphere, immediate health hazards, etc.)

NA - work conditions were monitored throughout response/cleanup activities.

Potential Environmental Impacts

(describe impacts to, or likelihood of impacts, to surface water, ground water, soils, etc.)

Soils - oil saturated soils were excavated as described above. Residual oil impacts will be treated using insitu landfarming techniques.
Surface water - oil sheen was collected utilizing absorbent boom. Potential dissolved impacts are being monitored.

Responsible Party Information:

Responsible Party	TransCanada
Address (Line 1)	13710 FNB Parkway
Address (Line 2)	Suite 300
City	Omaha
State/Province	NE - Nebraska
Zip	68154
Contact First Name	Robert
Contact Last Name	Baumgartner
Contact Telephone	832-320-5538
Contact Email	robert_baumgartner@tra

Property Owner if not the Responsible Party

Has or will the incident be reported to property owner? Unknown

Reporting Information:

First Name	Robert
Last Name	Baumgartner
Date Reported (mm/dd/yyyy)	5/7/2011
Time Reported	1015

hhmm 24-hour time, no colon

Other agencies that have or will be notified

- [ ] NDDES
- [ ] State Fire Marshal
- [ ] State Highway Patrol
- [x] Local Fire Department
- [x] Local Law Enforcement
- [x] Local Emergency Manager

Other

To see if this incident is required to be reported to the National Response Center (NRC) Click Here

Has or will the incident be reported to the NRC ?? 1-800-424-8802 Yes

Additional E-Mail Recipients to send report to

robert_baumgartner@transcanada

Official Use Only:

State Agency Person Who Received Call First Name

Last Name

Department of Emergency Services Incident Number

Send this email to Department of Mineral Resources No

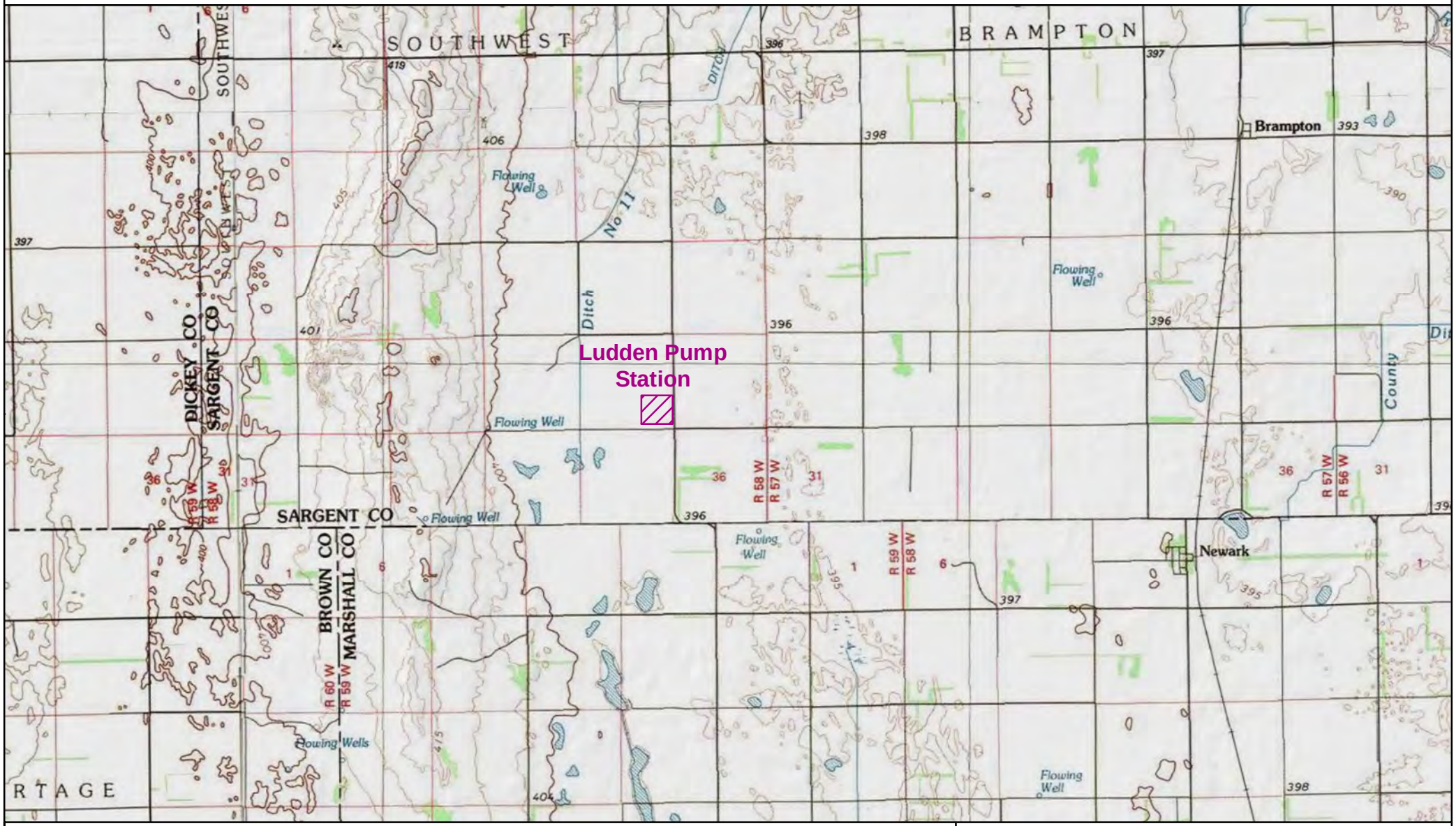
Pressing the submit button will send an E-Mail version of this completed Environmental Incident Report to NDDH Environmental Health Section and ND Dept. of Emergency Services personnel

Submit

TransCanada Ludden Pump Station

Figure 1. Site Location Map

URS
Fifth Street Towers
100 South Fifth Street, Suite 1500
Minneapolis, MN 55402
612.370.0700 Tel
612.370.1378 Fax

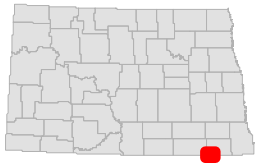


0 0.5 1 2

Miles

Data:
USGS 7.5" topographic basemap.

Projection:
NAD83 UTM Zone 14N

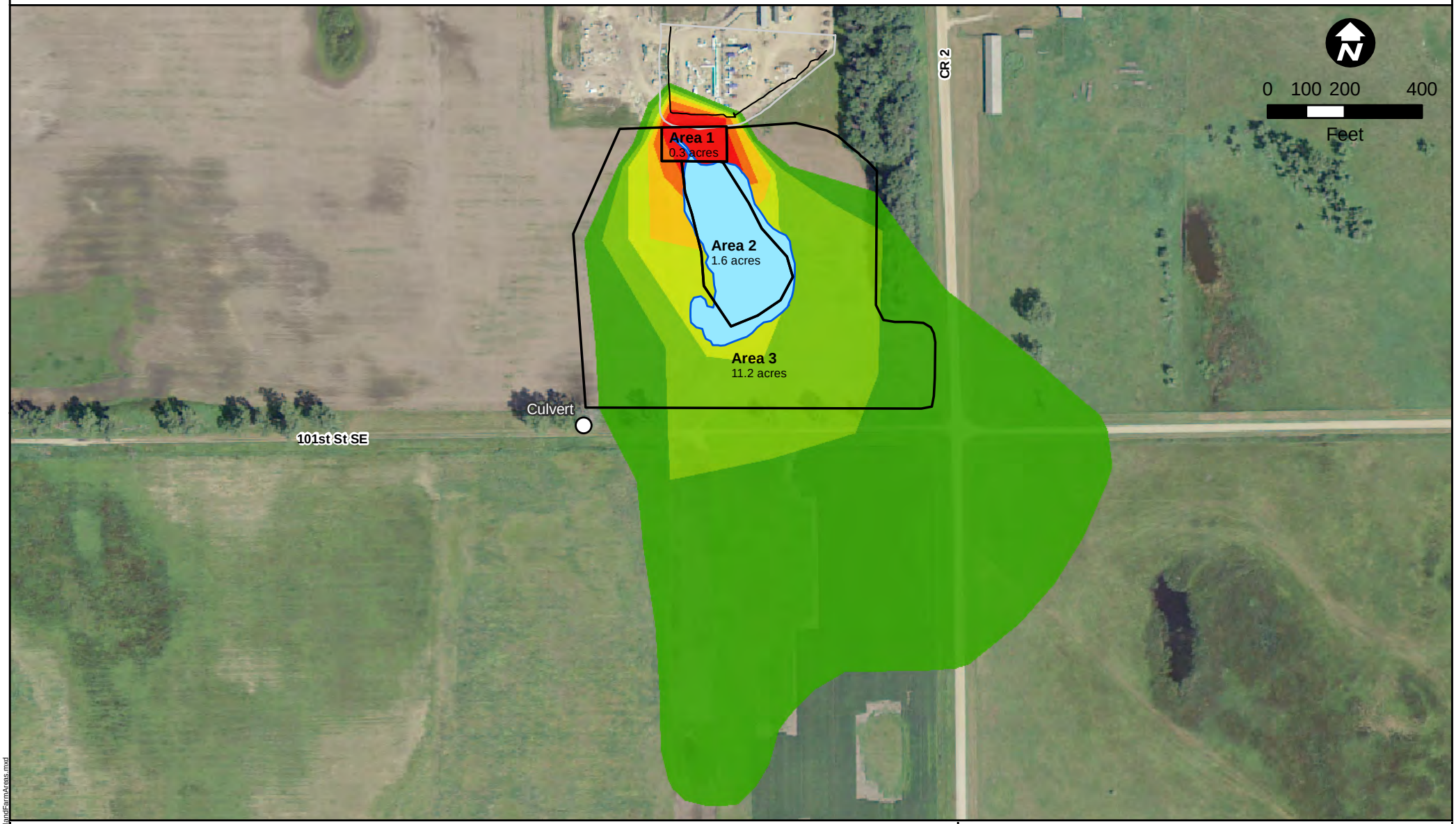


017506

TransCanada Ludden Pump Station

Figure 7. Land Farm Areas

URS
Fifth Street Towers
100 South Fifth Street, Suite 1500
Minneapolis, MN 55402
612.370.0700 Tel
612.370.1378 Fax

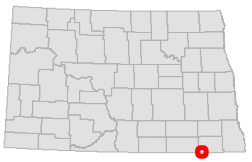


Fence
Toe of Slope
Pond

Misted Areas
Continuous = 91-100% coverage
Broken = 51-90% coverage
Patchy = 11-50% coverage
Sporadic-High = 6-10% coverage
Sporadic-Low = 1-5% coverage
Trace = <1% coverage

Data:
SCAT areas collected by GPS in May 2011.

Projection:
NAD83 UTM Zone 14N



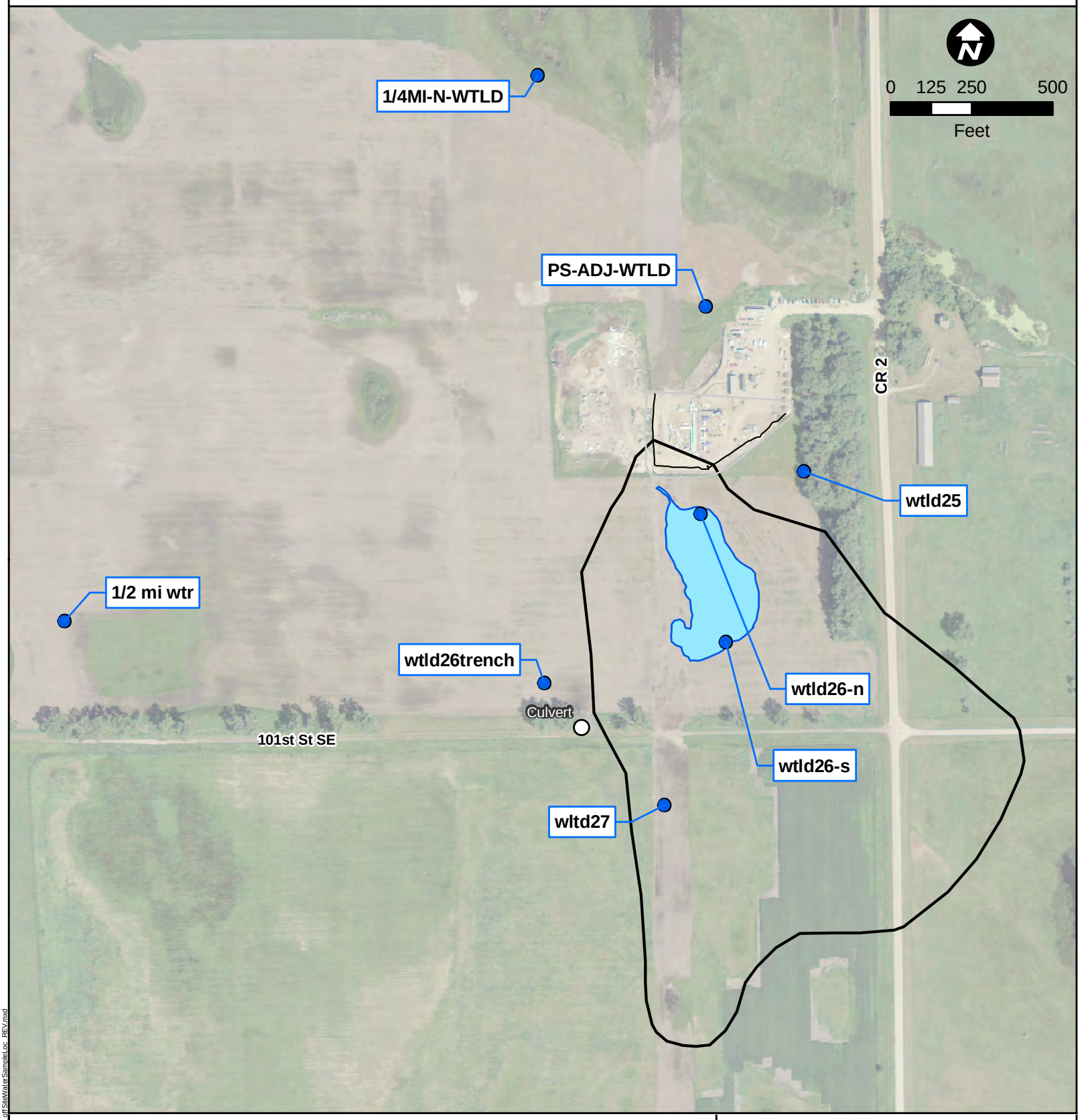
017507

Q:\31810\958\06_GIS\Data\08312011\Fig7_LandFarmAreas.mxd

TransCanada Ludden Pump Station

Figure 6. Off-Site Water Sampling Locations

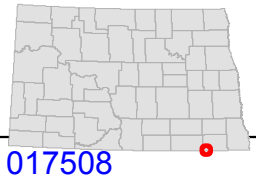
URS
Fifth Street Towers
100 South Fifth Street, Suite 1500
Minneapolis, MN 55402
612.370.0700 Tel
612.370.1378 Fax



Fence
Toe of Slope
Pond
Off-Site Water Sample
Misted Spray Area

Data:
SCAT areas collected by GPS in May 2011.

Projection:
NAD83 UTM Zone 14N



017508

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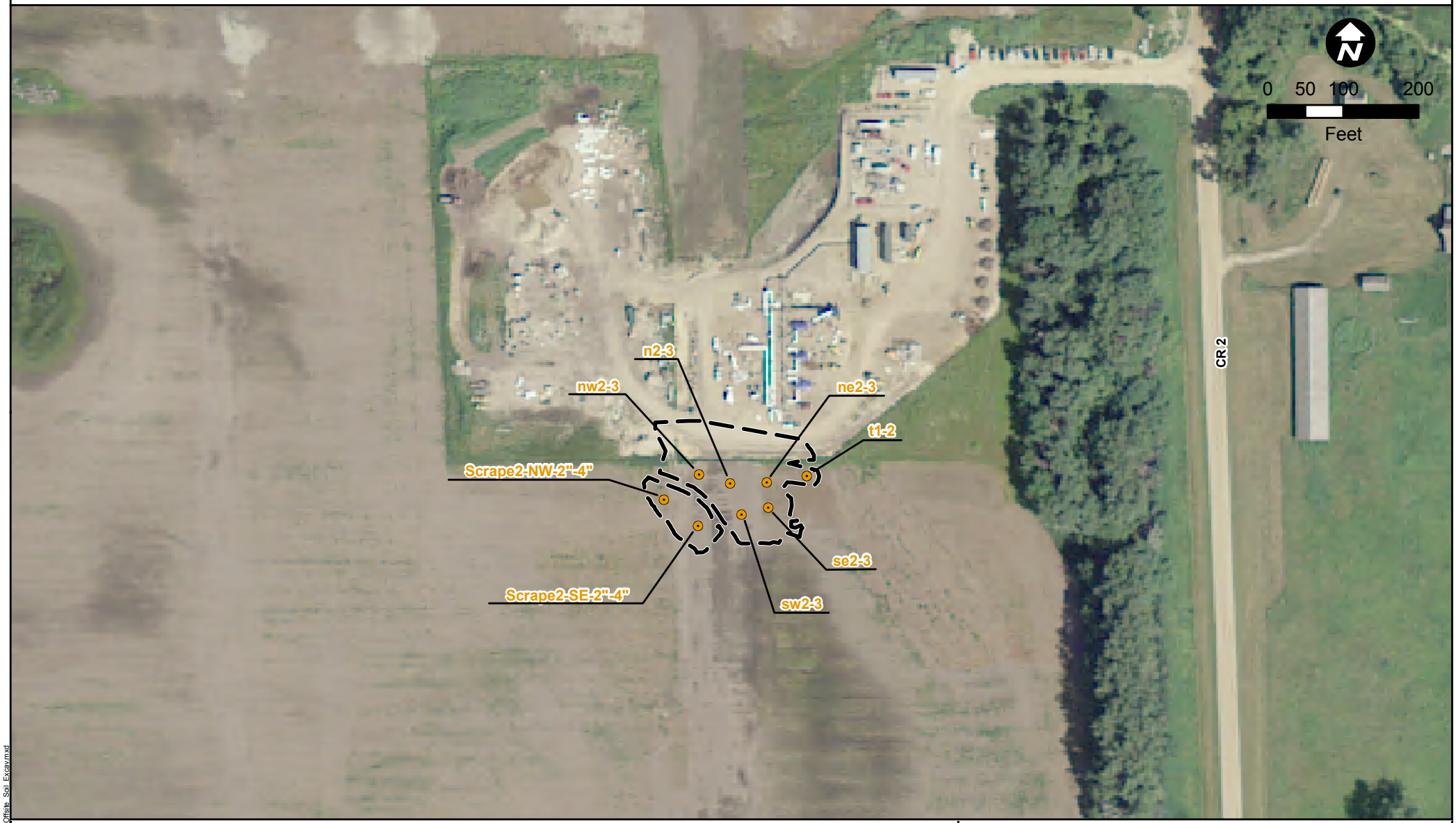
TransCanada Ludden Pump Station

Figure 5. Off-Site Soil Excavation

URS
Fifth Street Towers
100 South Fifth Street, Suite 1500
Minneapolis, MN 55402
612.370.0700 Tel
612.370.1378 Fax

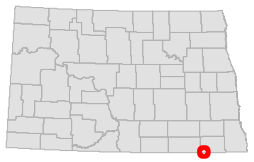


Off-Site Excavation Areas

Soil Sample Locations

Data:
SCAT areas collected by GPS in May 2011.

Projection:
NAD83 UTM Zone 14N



017509

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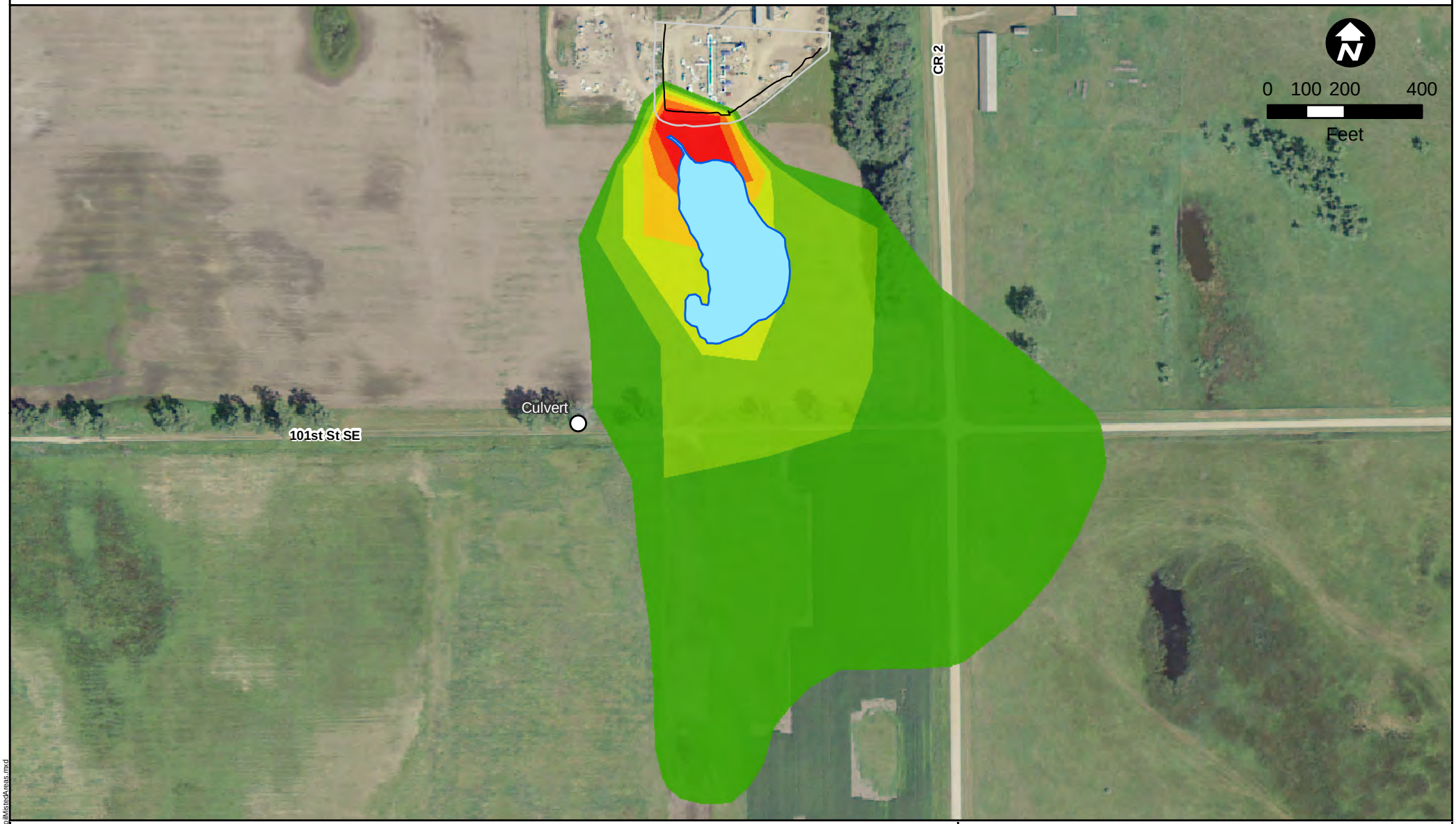
TransCanada Ludden Pump Station

Figure 4. Oil Misted Areas

URS
Fifth Street Towers
100 South Fifth Street, Suite 1500
Minneapolis, MN 55402
612.370.0700 Tel
612.370.1378 Fax

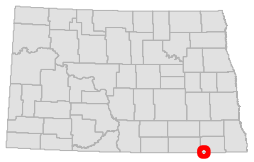


Fence
Toe of Slope
Pond

Misted Areas
Continuous = 91-100% coverage
Broken = 51-90% coverage
Patchy = 11-50% coverage
Sporadic-High = 6-10% coverage
Sporadic-Low = 1-5% coverage
Trace = <1% coverage

Data:
SCAT areas collected by GPS in May 2011.

Projection:
NAD83 UTM Zone 14N



017510

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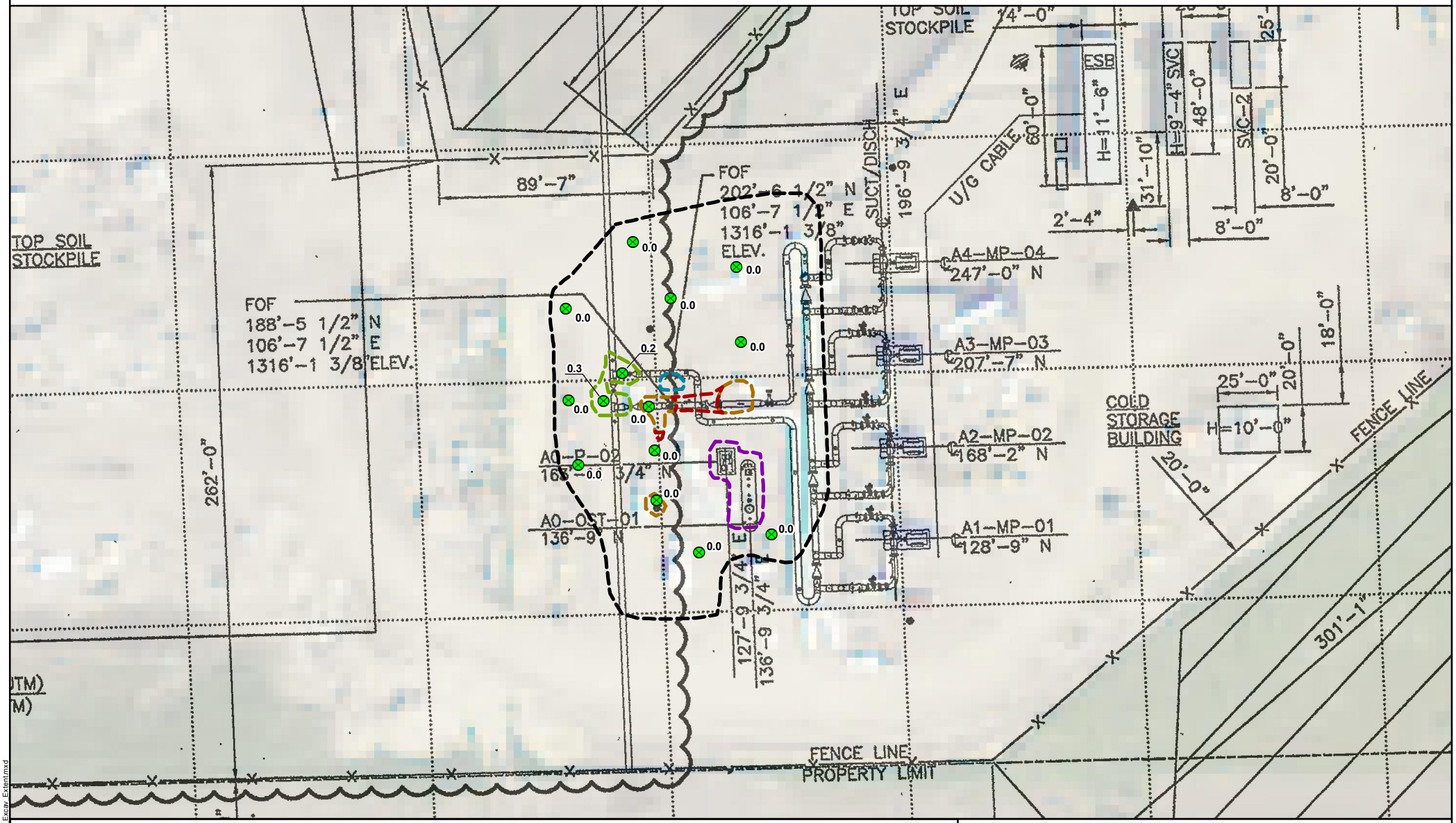
TransCanada Ludden Pump Station

Figure 3. On-Site Excavation Extent

URS
Fifth Street Towers
100 South Fifth Street, Suite 1500
Minneapolis, MN 55402
612.370.0700 Tel
612.370.1378 Fax



Excavation Depth

-1'
-2'
-3'
-4'
-5'
-6' to -8'

PID Reading in PPM

0 15 30 60
Feet

Projection:
NAD83 UTM Zone 14N

017511

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TransCanada Ludden Pump Station

Figure 2. Site Plan with Pump Station

URS
Fifth Street Towers
100 South Fifth Street, Suite 1500
Minneapolis, MN 55402
612.370.0700 Tel
612.370.1378 Fax

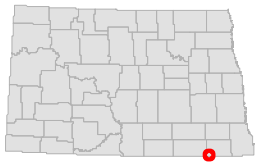
N

0 75 150 300

Feet

Data:
SCAT areas collected by GPS in May 2011.

Projection:
NAD83 UTM Zone 14N



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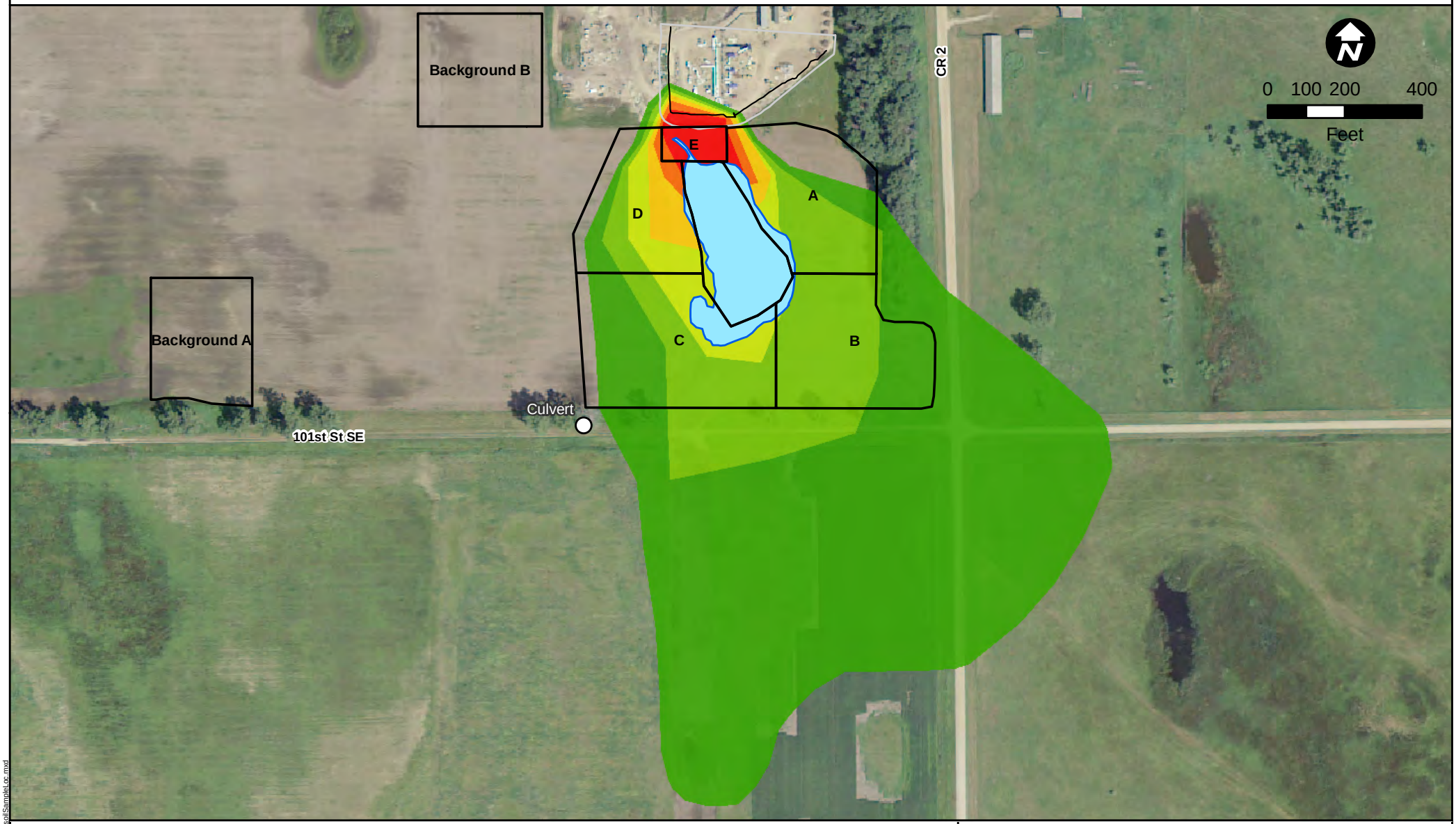
TransCanada Ludden Pump Station

Figure 8. Land Farm Sample Locations

URS
Fifth Street Towers
100 South Fifth Street, Suite 1500
Minneapolis, MN 55402
612.370.0700 Tel
612.370.1378 Fax

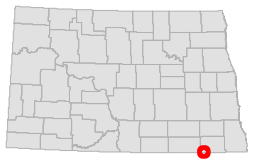


Fence
Toe of Slope
Pond

Misted Areas
Continuous = 91-100% coverage
Broken = 51-90% coverage
Patchy = 11-50% coverage
Sporadic-High = 6-10% coverage
Sporadic-Low = 1-5% coverage
Trace = <1% coverage

Data:
SCAT areas collected by GPS in May 2011.

Projection:
NAD83 UTM Zone 14N



017513

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Fifth Street Towers
100 South Fifth Street, Suite 1500
Minneapolis, Minnesota 55402
612 370 0700 Tel
612 370 1378 Fax

RELEASE PROGRESS REPORT
Ludden Pump Station
Brampton, ND

Prepared For: TransCanada
Keystone Pipeline, LP

Date: September 20, 2011

URS Project No. 31810958

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Overview

TransCanada Keystone Pipeline, LP (TransCanada) has prepared this *Release Progress Report* (Report) in response to a May 7, 2011 crude oil spill at its Ludden Pump Station near Brampton, North Dakota. The objective of this Report is to communicate TransCanada's interim actions to mitigate residual on-site crude oil impacts and off-site crude oil impacts to agricultural property located directly south of the Ludden Pump Station.

1.2 Site History

On Saturday, May 7, 2011, at 6:05 am local time, TransCanada oil control centre detected a drop in pressure at Ludden pump station in Sargent County, approximately six miles southwest of Brampton, North Dakota. Shortly after an initial investigation began, TransCanada received a call from a nearby resident indicating there was an incident at the pump station. Within minutes, TransCanada isolated the pump station by remotely closing the valves both up and down stream from the site. The first technician on site reported back that there was a release of oil from the pump station and the majority of it was contained on TransCanada's property. Some mist travelled outside of the TransCanada site and settled on neighboring agricultural land.

1.3 Site Description

The Ludden Pump Station site is located on 119th Avenue SE, Cogswell, North Dakota **(Figure 1).** The location is T129N, R58W, Section 26, SE Quarter.

The pump station is an approximate 8 acre facility utilized to pump crude oil through the Keystone Pipeline in a southerly direction. The pump station was constructed in 2009 and is equipped with secondary containment structures and remote control and shutdown capabilities. The location of the release was from a pressure relief valve fitting on the western side of the facility. The site plan is shown in **Figure 2**.

1.4 General Area Environment

The site is located in a very low population density area of southeastern North Dakota. The nearest residence to the site is over 1.3 miles to the north-northwest. Primary land use in the area is agricultural production to include hay, corn, soybean, and grazing. Primary land types include agriculture and wetlands. The nearest major surface water body is Lake Taayer approximately 12 miles from the site (**Figure 1**).

2.0 ON-SITE RESPONSE ACTIONS

2.1 Oil Recovery

The bulk of the released oil was contained by earthen dikes located on the southern, western, and northern perimeters of the pump station property. Between May 7 and 16, 2011, vac trucks and a hydrovac were used to recover 345 barrels of crude oil and 24 barrels of oil/water mixture. All oil and water were recycled with LePier Oil Company in Fosston, Minnesota. Manifests are included in **Appendix A**.

Between May 9 and 16, 2011, Seneca Companies cleaned pump station piping with Citrol (citrus cleaner and degreaser) and absorbents. Spent absorbents were contained in garbage bags and placed in a lined roll off dumpster. Approximately 100 linear feet of chain link fencing, barb wire fence, and fence posts that were partially covered with misted crude oil were removed and placed in a lined roll off dumpster.

2.2 Soil Excavation

Between May 11 and 16, 2011, a backhoe and hydrovacs were utilized to excavate approximately 1,250 tons of site gravel/soil from the pump station property within the area shown in **Figure 3**. Excavation limits were typically less than one foot deep, except in areas with underground piping. In those areas, excavation depths ranged from three to eight feet below grade. In addition to visual inspection, soil was screened with a photoionization detector (PID) with a 10.6 eV lamp to segregate impacted soil and determine limits of excavation. The limited to no availability of sample media, because pump station surface cover material is gravel, prohibited the collection of confirmation soil samples from the pump station property. Crude oil impacts, both visual and those detected with the PID, were excavated, with the exception of a residual amount of minor oil stained gravel that could not be removed from the sidewalls beneath a concrete pad to avoid undermining the pad.

Excavated soil was stored within a bermed area lined and covered with visqueen at the southwest corner of the pump station property.

Spent absorbents from pipe cleaning, oil-coated fencing, absorbent booms used in wetlands (discussed below), excavated off-site soil (discussed below), and excavated on-site soil were combined, for a total of 1,441 tons. The combined waste was transferred to the Veolia Environmental Services – Rolling Hills Landfill, Inc. in Buffalo, Minnesota on July 25-29, 2011. Manifests and scale tickets are included in **Appendix B**.

Pump station restoration was completed in August 2011.

3.0 OFF-SITE RESPONSE ACTIONS

The off-site area has been designated as the farmed agricultural property to the south of the pump station which was impacted by residual oil mist from the release (**Figure 4**).

3.1 Absorbents and Sheen Recovery

During the initial response on May 7, 2011, absorbent boom was used to contain the sheen on the ponded water in the wetland to the south of the pump station from a drainage trench dug by the property owner. Additional boom was placed further downstream in the trench as secondary and tertiary containment measures. The drainage trench was blocked with permission of the property owner to further contain sheen in the event of heavy rain. After the drainage trench was blocked and with a prevailing wind from the south, absorbent boom was pulled across the ponded water from south to north to contain sheen to the north end of the pond, adjacent to the pump station. Additional boom was used to replace the boom at the south end of the wetland. The absorbent boom was inspected and replaced as needed on May 23, June 1, June 16, June 30, July 14, and July 28.

On June 1, 2011, to reduce scattered petroleum sheen, DeAngelo Brothers, Inc. applied a 10 percent solution of Micro-Blaze® Emergency Liquid Spill Control (Micro-Blaze) at a rate of one gallon of concentrate per 10 cubic yards to the water surface of the wetland south of the pump station. Follow-up applications of Micro-Blaze were used to periodically spot treat scattered sheen observed during absorbent boom inspections. After the initial application of Micro-Blaze, a silvery sheen was occasionally observed in an area at the north end of the wetland varying from 100 to 500 square feet. Micro-Blaze was applied to spot treat the sheen on June 16 (one gallon of concentrate with three gallons of water, June 30 (two gallons of concentrate in two gallons of water), and July 14 (2.5 gallons of concentrate in 1.5 gallons of water).

3.2 Soil Excavation

During the initial response, on May 13 and 15, 2011, a backhoe was used to remove a two inch layer of soil in the field to the south of the pump station that was covered with crude oil (**Figure 5**). The excavation resulted in the removal of approximately 175 tons of oily soil. A narrow trench was also dug in the bottom of the excavation in an area where there was rainbow sheen observed and shallow pooling of oil in a relic tracker track.

A total of nine confirmation samples were collected and analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) and Total Extractable Materials (TEM). Two of the confirmation samples were also analyzed for Total Extractable Hydrocarbons (TEH). All analytical results are summarized in **Table 1** and complete analytical reports are provided in **Appendix C**. All analytical results were below regulatory action levels.

3.3 SCAT Assessment

On May 11, 2011, a modified application of the National Oceanic and Atmospheric Administration (NOAA) Shoreline Clean-Up Assessment Technique (SCAT) outlined in the *Shoreline Assessment Manual, Third Edition* (NOAA, 2000) was used to delineate the degrees of oil coverage in the off-site agricultural land that was sprayed with oil.

SCAT Category	Percent Oil Coverage
Continuous	91-100
Broken	51-90
Patchy	11-50
Sporadic-High	6-10
Sporadic-Low	1-5
Trace	<1

The term "Sporadic" as used by NOAA covers a percentage range from 1 to 10 percent. For the purposes of this project, "Sporadic" was split into "Sporadic-Low" (1-5%) and "Sporadic-High (6-10%). The results of the SCAT Assessment are presented in **Figure 4**.

3.4 Wetland Surface Water Sampling

Surface water samples were collected from three downwind wetlands and two potential downstream drainage locations on May 13, 2011 for BTEX and TEM. The same locations were resampled on May 16, 2011 for ammonia nitrogen and a suite of metals requested by North Dakota Department of Health (NDDH), which included aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, and zinc (Metals Suite). Two upwind wetlands were also sampled for background purposes on May 16, 2011 for BTEX, TEM, ammonia nitrogen, and the Metals Suite. All sample locations are presented in **Figure 6**. The wetland immediately south of the pump station that received oil misting was also sampled for total suspended solids, pH, and total phosphorus. All surface water sample locations were resampled on June 30, 2011 and August 2, 2011 for BTEX, TEH, TEM, and the Metals Suite. The analytical results are summarized in **Table 2A, 2B, 2C,** respectively and complete analytical reports are provided in **Appendix C**.

All detections were below applicable Human Health Limits for Class III Waters or Aquatic Life Values (Acute).

3.5 Off-Site In-Situ Land Farm

In accordance with the May 19, 2011 *Draft Interim Off-Site Area Clean-up Plan* (URS, 2011), the portions of the agricultural field to the south of the pump station property that were lightly impacted by crude oil mist on the soil surface were treated as an in-situ land farm. Following NDDH guidance documents, the volume of impacted soil was calculated, nutrient needs were calculated, initial soil samples were collected and analyzed, soil amendments were applied, tilling occurred (with minor adjustments), and follow-up monitoring was conducted.

For treatment calculations, the off-site area is divided into three areas as shown in **Figure 7**. Areas 1 and 3 are the non-flooded areas that have oil impacts and decreasing amounts of oil toward the south of Area 3. Area 2 is impacted and ponded water exists in this lower wetland area of the south field. Area 2 is included for in-situ treatment of the water. Based on the areas outlined in **Figure 7** the following are the associated contaminated volumes assuming a 2 inch depth for Area #1 and 1 inch depth for Areas #2 and #3:

- Area #1 - 93 cubic yards (CY)
- Area #2 - 217 CY
- Area #3 - 1,509 CY

Based on total volume, the land farm area was divided into four parts (**Figure 8**) and sampled on May 15, 2011 for TEH, TEM, pH, nitrate nitrogen, total phosphorus, and total organic carbon. For the May 15, 2011 land farm soil samples, the excavated area that is labeled as Area E in Figure 8 was divided equally between Areas A and D. Two background area samples were also collected. Each area included four to six discrete samples that were composited to represent each area. Analytical results are summarized in **Table 3** and complete analytical results are included in **Appendix C**.

Based on nitrate nitrogen and TEM results, Area A required the application of nine pounds per acre of nitrogen and Area D required the application of eight pounds per acre. Areas B and C contained sufficient nitrate nitrogen in the soil for treatment of the levels of TEM present.

On May 31-June 1, 2011, DeAngelo Bros. Inc. applied a 10 percent solution of Micro-Blaze to the land farm area at a rate of one gallon of concentrate per 10 cubic yards of impacted soil. Prior to this application, the dry portions of Areas C and D were tilled and planted in corn and fertilized with anhydrous ammonia at planting time. On June 1, Kris Roberts with NDDH toured the site and recommended that the vegetated areas around the wetland, that were too wet to till, did not need to be tilled after the Micro-Blaze was applied.

During a June 16, 2011 site visit with the property owner, it was determined that the accessible portions of Areas A and B had been planted in narrow row soybeans with no-till methods. After speaking with the land owner, it was determined that his contracts with Natural Resource Conservation Service (NRCS) require minimum till in the soil types present in Areas A and B due to soil types present are listed as NRCS Wind Erodibility Group 1 and 2. As such, tilling is not recommended. The soybeans would also be a nitrogen fixing crop, so additional fertilizer was not applied to this area.

On July 1, 2011, the area labeled as Area E on **Figure 8** was fertilized with 20-0-0 lawn fertilizer at a rate of 1.2 pounds per 1,000 square feet and tilled using a rear tine garden tiller.

On August 2, 2011, the land farm and background locations were resampled for TEH, TEM, pH, nitrate nitrogen, total phosphorus, and total organic carbon. Soil samples were collected from a depth of four to six inches in the treatment area using NDDH "Procedures for the collection of soil samples at underground storage tank (UST) sites". The results are summarized in **Table 3** and complete analytical report is provided in **Appendix C**. The TEH and TEM results are below the regulatory limit of 100 mg/kg.

4.0 SUMMARY AND RECOMMENDATIONS

On May 7, 2011, a crude oil release occurred on the TransCanada Keystone Pipeline at the Ludden Pump Station near Brampton, North Dakota. The majority of the release was contained on the Ludden Pump Station property. Some mist travelled outside of the TransCanada site and settled on neighboring agricultural land. Liquid recovery consisted of 345 barrels of crude oil and 24 barrels of oil/water mixture. Soil excavation resulted in the removal and disposal of 1,441 tons of crude oil impacted site gravel/soil, absorbent boom, and fencing. Prior to in-situ treatment, TEM results of soil samples collected from the agricultural field to the south of the Ludden Pump Station property exceeded the 100 part per million (ppm) clean-up goal. The agricultural field and wetland to the south of the Ludden Pump Station property were treated with Micro-Blaze ® Emergency Liquid Spill Control on May 31 and June 1, 2011. Spot treatments to control a small area of silvery sheen occurred in June and July. The agricultural field was treated as an in-situ land farm and resampled on August 2, 2011. All soil sample results for TEM were below the 100 ppm clean-up goal.

Surface water samples were collected on May 13-16, June 30, and August 2, 2011 from wetlands that were upwind (background) and downwind at the time of the release. All detections are below applicable regulatory limits. Absorbent booms have been maintained on the wetland to the south of the Ludden Pump Station property since the release as a protective measure.

Based on current conditions at the TransCanada Ludden Pump Station site, the following activities are planned in October:

- Remove all remaining absorbent booms.
- Re-sample wetland surface water.
- Re-sample land farm.
- Neighboring property owner will till under cover crops.

Analytical results from the above activities will be forwarded to the NDDH, along with a request for closure.

5.0 REFERENCES

NOAA. 2000. *Shoreline Assessment Manual, Third Edition*. National Oceanic and Atmospheric Administration. 2000.

URS. 2011. *Draft Interim Off-Site Area Clean-up Plan.* URS Corporation. May 19, 2011.

APPENDIX A

Oil and Water Recycling Manifests

APPENDIX B

Soil Disposal Manifests and Scale Tickets

APPENDIX C

Analytical Reports

NOTICE: This report is required by 49 CFR Part 195. Failure to report can result in a civil penalty not to exceed $100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122.	OMB NO: 2137-0047 EXPIRATION DATE: 01/31/2014
U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	**Original Report Date:** 06/28/2011 **No.** 20110208 - 16160 ---------- (DOT Use Only)

ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0047. Public reporting for this collection of information is estimated to be approximately 10 hours per response (5 hours for a small release), including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.

INSTRUCTIONS

Important: *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline.*

PART A - KEY REPORT INFORMATION

Report Type: *(select all that apply)*	**Original:**	**Supplemental:**	**Final:**
		Yes	

Last Revision Date:	11/02/2011
1. Operator's OPS-issued Operator Identification Number (OPID):	32334
2. Name of Operator	TC OIL PIPELINE OPERATIONS INC
3. Address of Operator:	
3a. Street Address	717 TEXAS AVE
3b. City	HOUSTON
3c. State	Texas
3d. Zip Code	77002
4. Local time *(24-hr clock)* and date of the Accident:	05/29/2011 02:00
5. Location of Accident:	
Latitude:	39.71864
Longitude:	-95.135
6. National Response Center Report Number (if applicable):	977695
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	05/29/2011 03:12
8. Commodity released: *(select only one, based on predominant volume released)*	Crude Oil
- Specify Commodity Subtype:	
- If "Other" Subtype, Describe:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Ethanol Blend, then % Ethanol Blend: %:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Biodiesel, then Biodiesel Blend (e.g. B2, B20, B100): B	
9. Estimated volume of commodity released unintentionally (Barrels):	8.50
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):	
11. Estimated volume of commodity recovered (Barrels):	8.50
12. Were there fatalities?	No
- If Yes, specify the number in each category:	
12a. Operator employees	
12b. Contractor employees working for the Operator	
12c. Non-Operator emergency responders	
12d. Workers working on the right-of-way, but NOT associated with this Operator	
12e. General public	
12f. Total fatalities (sum of above)	
13. Were there injuries requiring inpatient hospitalization?	No
- If Yes, specify the number in each category:	
13a. Operator employees	
13b. Contractor employees working for the Operator	
13c. Non-Operator emergency responders	

13d. Workers working on the right-of-way, but NOT associated with this Operator	
13e. General public	
13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	
- If No, Explain:	
- If Yes, complete Questions 14a and 14b: *(use local time, 24-hr clock)*	
14a. Local time and date of shutdown:	
14b. Local time pipeline/facility restarted:	
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	No
16. Did the commodity explode?	No
17. Number of general public evacuated:	0
18. Time sequence *(use local time, 24-hour clock)*:	
18a. Local time Operator identified Accident:	05/29/2011 02:00
18b. Local time Operator resources arrived on site:	05/29/2011 03:00

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the origin of Accident onshore?	Yes
If Yes, Complete Questions (2-12)	
If No, Complete Questions (13-15)	
- If Onshore:	
2. State:	Kansas
3. Zip Code:	66538
4. City	Bendena
5. County or Parish	Doniphan
6. Operator-designated location:	Milepost/Valve Station
Specify:	MP742.2
7. Pipeline/Facility name:	Severance Pump Station
8. Segment name/ID:	Glacial Lakes
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Totally contained on Operator-controlled property
11. Area of Accident (as found):	Aboveground
Specify:	Typical aboveground facility piping or appurtenance
- If Other, Describe:	
Depth-of-Cover (in):	
12. Did Accident occur in a crossing?	No
- If Yes, specify below:	
- If Bridge crossing –	
Cased/ Uncased:	
- If Railroad crossing –	
Cased/ Uncased/ Bored/drilled	
- If Road crossing –	
Cased/ Uncased/ Bored/drilled	
- If Water crossing –	
Cased/ Uncased	
- Name of body of water, if commonly known:	
- Approx. water depth (ft) at the point of the Accident:	
- Select:	
- If Offshore:	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- On the Outer Continental Shelf (OCS) - Specify:	
- Area:	
- Block #:	
15. Area of Accident:	

PART C - ADDITIONAL FACILITY INFORMATION

1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Pump/Meter Station Equipment and Piping
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	
3. Item involved in Accident:	Instrumentation

- If Pipe, specify:	
3a. Nominal diameter of pipe (in):	
3b. Wall thickness (in):	
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	
3d. Pipe specification:	
3e. Pipe Seam , specify:	
- If Other, Describe:	
3f. Pipe manufacturer:	
3g. Year of manufacture:	
3h. Pipeline coating type at point of Accident, specify:	
- If Other, Describe:	
- If Weld, including heat-affected zone, specify:	
- If Other, Describe:	
- If Valve, specify:	
- If Mainline, specify:	
- If Other, Describe:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	
- If Other - Describe:	
- If Other, describe:	
4. Year item involved in Accident was installed:	2009
5. Material involved in Accident:	Carbon Steel
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Leak
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	Crack
- If Other, Describe:	
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	

PART D - ADDITIONAL CONSEQUENCE INFORMATION

1. Wildlife impact:	No
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	Yes
3. Long term impact assessment performed or planned:	No
4. Anticipated remediation:	No
4a. If Yes, specify all that apply:	
- Surface water	
- Groundwater	
- Soil	
- Vegetation	
- Wildlife	
5. Water contamination:	No
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	
- Groundwater	
- Drinking water: *(Select one or both)*	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	
5c. Name of body of water, if commonly known:	
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	Yes
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	No
7a. If Yes, specify HCA type(s): *(Select all that apply)*	
- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect"	

determination for this Accident site in the Operator's Integrity Management Program?	
- High Population Area:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Other Populated Area	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Drinking Water	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Ecological	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
8. Estimated Property Damage:	
8a. Estimated cost of public and non-Operator private property damage	$ 0
8b. Estimated cost of commodity lost	$ 8,500
8c. Estimated cost of Operator's property damage & repairs	$ 25,000
8d. Estimated cost of Operator's emergency response	$ 120,000
8e. Estimated cost of Operator's environmental remediation	$ 180,000
8f. Estimated other costs	$ 0
Describe:	
8g. Total estimated property damage (sum of above)	$ 333,500

PART E - ADDITIONAL OPERATING INFORMATION

1. Estimated pressure at the point and time of the Accident (psig):	1,100.00
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	1,297.00
3. Describe the pressure on the system or facility relating to the Accident (psig):	Pressure did not exceed MOP
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	No
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	No
- If Yes - (*Complete 5a. – 5e. below)*	
5a. Type of upstream valve used to initially isolate release source:	
5b. Type of downstream valve used to initially isolate release source:	
5c. Length of segment isolated between valves (ft):	
5d. Is the pipeline configured to accommodate internal inspection tools?	
- If No, Which physical features limit tool accommodation? (*select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	
- If Yes, Which operational factors complicate execution? (*select all that apply*)	
- Excessive debris or scale, wax, or other wall buildup	

- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	Yes
If Yes -	
6a. Was it operating at the time of the Accident?	Yes
6b. Was it fully functional at the time of the Accident?	Yes
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	Yes
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	Yes
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	Yes
- If Yes:	
7a. Was it operating at the time of the Accident?	Yes
7b. Was it fully functional at the time of the Accident?	Yes
7c. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	No
7d. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	No
8. How was the Accident initially identified for the Operator?	Controller
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Guard Patrol by Operator or its contractor" is selected in Question 8, specify the following:	Operator employee
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: (provide an explanation for why the Operator did not investigate)
- If No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)*	The Oil Control Center identified a pressure drop at the pump station.
- If Yes, specify investigation result(s): *(select all that apply)*	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
Provide an explanation for why not:	
- Investigation identified no control room issues	
- Investigation identified no controller issues	
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above:	
Describe:	

PART F - DRUG & ALCOHOL TESTING INFORMATION

1. As a result of this Accident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
1a. Specify how many were tested:	
1b. Specify how many failed:	

2. As a result of this Accident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
2a. Specify how many were tested:	
2b. Specify how many failed:	

PART G – APPARENT CAUSE

Select only one box from PART G in shaded column on left representing the APPARENT Cause of the Accident, and answer the questions on the right. Describe secondary, contributing or root causes of the Accident in the narrative (PART H).

Apparent Cause:	G6 - Equipment Failure

G1 - Corrosion Failure - only one **sub-cause** can be picked from shaded left-hand column

External Corrosion:	
Internal Corrosion:	
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground?	
- If Yes :	
4a. Was failed item considered to be under cathodic protection at the time of the Accident?	
If Yes - Year protection started:	
4b. Was shielding, tenting, or disbonding of coating evident at the point of the Accident?	
4c. Has one or more Cathodic Protection Survey been conducted at the point of the Accident?	
If "Yes, CP Annual Survey" – Most recent year conducted:	
If "Yes, Close Interval Survey" – Most recent year conducted:	
If "Yes, Other CP Survey" – Most recent year conducted:	
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	
- If Internal Corrosion:	
6. Results of visual examination:	
- Other:	
7. Type of corrosion *(select all that apply)*: -	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	
- Erosion	
- Other:	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following *(select all that apply)*: -	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
9. Location of corrosion *(select all that apply)*: -	
- Low point in pipe	
- Elbow	
- Other:	

- If Other, Describe:	
10. Was the commodity treated with corrosion inhibitors or biocides?	
11. Was the interior coated or lined with protective coating?	
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	
13. Were corrosion coupons routinely utilized?	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Tank/Vessel.	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
15. Has one or more internal inspection tool collected data at the point of the Accident?	
15a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage Tool	
Most recent year:	
- Ultrasonic	
Most recent year:	
- Geometry	
Most recent year:	
- Caliper	
Most recent year:	
- Crack	
Most recent year:	
- Hard Spot	
Most recent year:	
- Combination Tool	
Most recent year:	
- Transverse Field/Triaxial	
Most recent year:	
- Other	
Most recent year:	
Describe:	
16. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
If Yes -	
Most recent year tested:	
Test pressure:	
17. Has one or more Direct Assessment been conducted on this segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident::	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
18a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G2 - Natural Force Damage - only one **sub-cause** can be picked from shaded left-handed column	
Natural Force Damage – Sub-Cause:	
- If Earth Movement, NOT due to Heavy Rains/Floods:	
1. Specify:	

- If Other, Describe:	
- If Heavy Rains/Floods:	
2. Specify:	
- If Other, Describe:	
- If Lightning:	
3. Specify:	
- If Temperature:	
4. Specify:	
- If Other, Describe:	
- If High Winds:	
- If Other Natural Force Damage:	
5. Describe:	
Complete the following if any Natural Force Damage sub-cause is selected.	
6. Were the natural forces causing the Accident generated in conjunction with an extreme weather event?	
6a. If Yes, specify: *(select all that apply)*	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Describe:	
G3 - Excavation Damage - only one **sub-cause** can be picked from shaded left-hand column	
Excavation Damage – Sub-Cause:	
- If Excavation Damage by Operator (First Party):	
- If Excavation Damage by Operator's Contractor (Second Party):	
- If Excavation Damage by Third Party:	
- If Previous Damage due to Excavation Activity:	
Complete Questions 1-5 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
1. Has one or more internal inspection tool collected data at the point of the Accident?	
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
4. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	

5. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
5a. If Yes, for each examination, conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
Complete the following if Excavation Damage by Third Party is selected as the sub-cause.	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from: *(select all that apply)* -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: *(select all that apply)* -	
- Public	
- If "Public", Specify:	
- Private	
- If "Private", Specify:	
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks visible in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption (hours)	
17. Description of the CGA-DIRT Root Cause *(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):*	
Root Cause:	
- If One-Call Notification Practices Not Sufficient, specify:	
- If Locating Practices Not Sufficient, specify:	
- If Excavation Practices Not Sufficient, specify:	
- If Other/None of the Above, explain:	
G4 - Other Outside Force Damage *- only one **sub-cause** can be selected from the shaded left-hand column*	
Other Outside Force Damage – Sub-Cause:	
- If Nearby Industrial, Man-made, or Other Fire/Explosion as Primary Cause of Incident:	
- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:	
1. Vehicle/Equipment operated by:	
- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring:	

2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Heavy Rains/Flood	
- Other	
- If Other, Describe:	
- If Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation:	
- If Electrical Arcing from Other Equipment or Facility:	
- If Previous Mechanical Damage NOT Related to Excavation:	
Complete Questions 3-7 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
3. Has one or more internal inspection tool collected data at the point of the Accident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
6. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
7. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
- If Intentional Damage:	
8. Specify:	
- If Other, Describe:	
- If Other Outside Force Damage:	
9. Describe:	

G5 - Material Failure of Pipe or Weld - only one **sub-cause** can be selected from the shaded left-hand column	
Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."	
Material Failure of Pipe or Weld – Sub-Cause:	
1. The sub-cause selected below is based on the following: *(select all that apply)*	
- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Original Manufacturing-related (NOT girth weld or other welds formed in the field):	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related:	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Environmental Cracking-related:	
3. Specify:	
- Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional factors: (*select all that apply*):	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Describe:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	

Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
7. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident -	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site -	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G6 – Equipment Failure - only one **sub-cause** can be selected from the shaded left-hand column	
Equipment Failure – Sub-Cause:	Threaded Connection/Coupling Failure
- If Malfunction of Control/Relief Equipment:	
1. Specify: *(select all that apply)* -	
- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	
- Relief Valve	
- Power Failure	
- Stopple/Control Fitting	
- ESD System Failure	
- Other	
- If Other – Describe:	
- If Pump or Pump-related Equipment:	
2. Specify:	
- If Other – Describe:	
- If Threaded Connection/Coupling Failure:	
3. Specify:	Pipe Nipple
- If Other – Describe:	
- If Non-threaded Connection Failure:	
4. Specify:	
- If Other – Describe:	
- If Defective or Loose Tubing or Fitting:	
- If Failure of Equipment Body (except Pump), Tank Plate, or other Material:	
- If Other Equipment Failure:	
5. Describe:	
Complete the following if any Equipment Failure sub-cause is selected.	
6. Additional factors that contributed to the equipment failure: *(select all that apply)*	
- Excessive vibration	Yes
- Overpressurization	
- No support or loss of support	
- Manufacturing defect	

- Loss of electricity	
- Improper installation	
- Mismatched items (different manufacturer for tubing and tubing fittings)	
- Dissimilar metals	
- Breakdown of soft goods due to compatibility issues with transported commodity	
- Valve vault or valve can contributed to the release	
- Alarm/status failure	
- Misalignment	
- Thermal stress	
- Other	
- If Other, Describe:	

G7 - Incorrect Operation - only one **sub-cause** can be selected from the shaded left-hand column

Incorrect Operation – Sub-Cause:	
Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage	
Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow	
1. Specify:	
- If Other, Describe:	
Valve Left or Placed in Wrong Position, but NOT Resulting in a Tank, Vessel, or Sump/Separator Overflow or Facility Overpressure	
Pipeline or Equipment Overpressured	
Equipment Not Installed Properly	
Wrong Equipment Specified or Installed	
Other Incorrect Operation	
2. Describe:	
Complete the following if any Incorrect Operation sub-cause is selected.	
3. Was this Accident related to *(select all that apply)*: -	
- Inadequate procedure	
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	

G8 - Other Accident Cause - only one **sub-cause** can be selected from the shaded left-hand column

Other Accident Cause – Sub-Cause:	
- If Miscellaneous:	
1. Describe:	
- If Unknown:	
2. Specify:	

PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT

Pressure transmitter PT 201 at the Severance Pump Station experienced a failure of the threaded 3/4 inch fitting. The failure of the 3/4" fitting failure occurred as a result of excessive vibration. The pump station was shutdown by Oil Control and isolated when pressure transmitter PT 201 began reading 4000 KPa less than station discharge pressure transmitter PT 203.The failed fitting resulted in the release of oil.

File Full Name

PART I - PREPARER AND AUTHORIZED SIGNATURE

Preparer's Name	Daniel C. Cerkoney
Preparer's Title	Compliance Engineer
Preparer's Telephone Number	7014831434
Preparer's E-mail Address	dan_cerkoney@transcanada.com
Preparer's Facsimile Number	7014831431
Authorized Signature's Name	Daniel C. Cerkoney
Authorized Signature Title	Compliance Engineer
Authorized Signature Telephone Number	7012901176
Authorized Signature Email	dan_cerkoney@transcanada.com
Date	11/02/2011

From:	Robert Baumgartner
To:	twinn@kdheks.gov
Cc:	Robert Baumgartner
Subject:	KDHE Spill Report #32936
Date:	Wednesday, March 16, 2011 2:56:00 PM
Attachments:	TransCanada - Severance Waste Profile & KDHE Disposal Request - Spill Report #32936.pdf TransCanada - Severance Manifest _LF ticket - Spill Report #32936.pdf

---

Tom,

Find attached the waste disposal profile and receipt for the cleanup activities conducted in response to the small crude oil leak that occurred at TransCanada's valve site located on Last Chance Rd. (south of 150th Rd.) near Severance, KS. I am providing this as follow up to the spill report (KDHE Spill Report #32936) submitted by TransCanada on January 8, 2011 in order to close out the incident.

Cleanup activities were conducted from January 7 – 11, 2011 by TransCanada and our subcontractor Seneca Waste Solutions. Oil impacted site gravel and some minor amount of soil underlying the site gravel were excavated and placed in a 20 yd^3 roll-off. This material, totaling 10.06 tons, was disposed of on March 9, 2011 at Rolling Meadows RDF in Topeka, KS.

Please contact me if you have any questions.

Thank you,

Robert M. Baumgartner
Environmental Program Manager
TransCanada Keystone US Operations
717 Texas St.
Houston, Texas 77002
832.320.5538 office
402.960.0483 cell
robert_baumgartner@transcanada.com

Driver s Signature

WASTE MANAGEMENT

6467039

ROLLING MEADOWS RDF
7351 NW HWY 75
TOPEKA, KS, 66618
Ph: 785-246-0305

Original
Ticket# 886599

Customer Name WMLFSTREAMJENNIFERBATES WM LF
Ticket Date 03/09/2011
Payment Type Credit Account
Manual Ticket#
Hauling Ticket#
Route
State Waste Code
Manifest 1
Destination
PO
Profile 110211KS (PETROLEUM CONT SOIL)
Generator 140-TRANSCANADAANRPIPELINE TRANSCANADA ANR PIPELINE

Carrier HAZAMATRESPONSEINC *
Vehicle# T182
Container
Driver
Check#
Billing # 0000749
Gen EPA ID
Grid

Volume

	Time	Scale	Operator	Inbound		
In	03/09/2011 15:04:41	Scale 1 (in)	LD		Gross	64700 lb*
Out	03/09/2011 15:04:51	Scale 2 (out)	LD		Tare	44580 lb*
			* Manual Weight		Net	20120 lb
					Tons	10.06

Comments

WEIGHTS ARE IN TONS

	Product	LD%	Qty	UOM	Rate	Tax	Amount	Origin
1	Cont Soil Sp. W.-T	100	10.06	Tons	37.64		$378.66	KS
2	COU-COUNTY HOST FE	100	10.06	Tons	1.50		$15.09	KS
3	STA-STATE SURCHARG	100	10.06	Tons	1.00		$10.06	KS

Total Tax
Total Ticket $403.81

402WM-N

Rm Copy

WASTE MANAGEMENT, INC.

Special Waste Manifest Disposal Ticket

Disposal Site: Rolling Meadows RDF

Bill To: WM UPSTREAM

Transporter: Hazmat T-182

Generator: TransCanada/Keystone Pipeline-Severance

Location: 1010 150th Road, Bendena, KS 66538

Generator's Signature or Designee: John White

Waste Description: Crude Oil Impacted Soil & Gravel

Profile Number: 100971KS 110211KS

Accepted By: John White Date: 3/7/11

Driver's Signature: Paul Martin Date: 3-7-11

Truck # T-182
TR # 104
R/O Box 74635

Gross: 64,700
Tare 44,580

10.06 Tons

017544

Generator's Non-hazardous Waste Profile Sheet

Requested Disposal Facility: Rolling Meadows LF Profile Number:

☐ Renewal for Profile Number: Waste Approval Expiration Date:

☐ Check here if there are multiple generating locations for this waste. Attach additional locations.

A. Waste Generator Facility Information (must reflect location of waste generation/origin)

1. Generator Name: TransCanada / Keystone Pipeline (Severance)
2. Site Address: 1010 150th Road
3. City/ZIP: Bendena / 66538
4. State: Kansas
5. County:
6. Contact Name/Title: Rob Lindisch
7. Email Address: rlindisch@wm.com
8. Phone: 888-239-6205 9. FAX: 866-674-1202
10. NAICS Code:
11. Generator USEPA ID #:
12. State ID# (if applicable):

B. Customer Information ☐ same as above

P. O. Number:

1. Customer Name: WM-Upstream
2. Billing Address: 16468 Sugar Maple Drive
3. City, State and ZIP: Brownstown, MI 48173
4. Contact Name: Rob Lindisch
5. Contact Email: rlindisch@wm.com
6. Phone: 888-239-6205 FAX: 866-674-1202
7. Transporter Name: Various
8. Transporter ID # (if appl.):
9. Transporter Address:
10. City, State and ZIP:

C. Waste Stream Information

1. DESCRIPTION

a. Common Waste Name: Crude Oil Impacted Soil & Gravel
State Waste Code(s):

b. Describe Process Generating Waste or Source of Contamination:

Crude Oil Spill Cleanup

c. Typical Color(s): any and all

d. Strong Odor? ☐ Yes ☑ No Describe:

e. Physical State at 70°F: ☑ Solid ☐ Liquid ☐ Powder ☐ Semi-Solid or Sludge ☐ Other:

f. Layers? ☑ Single layer ☐ Multi- layer ☐ NA

g. Water Reactive? ☐ Yes ☑ No If Yes, Describe:

h. Free Liquid Range (%): _____ to _____ ☑ NA(solid)

i. pH Range: _____ to _____ ☑ NA(solid)

j. Liquid Flash Point: ☐ < 140°F ☐ 140°- 199°F ☐ ≥ 200°F ☑ NA(solid)

k. Flammable Solid: ☐ Yes ☑ No

l. Physical Constituents: List all constituents of waste stream - (e.g. Soil 0-80%, Wood 0-20%): ☐ (See Attached)

Constituents (Total Composition Must be ≥ 100%)	Lower Range	Unit of Measure	Upper Range	Unit of Measure
1. Soil contaminated with crude oil	0	%	100	%
2. Gravel contaminated with crude oil	0	%	100	%
3.				
4.				
5.				
6.				

2. ESTIMATED QUANTITY OF WASTE AND SHIPPING INFORMATION

a. ☐ One Time Event ☑ Base ☐ Repeat Event

b. Estimated Annual Quantity: 20 ☐ Tons ☑ Cubic Yards ☐ Drums ☐ Gallons ☐ Other (specify):

c. Shipping Frequency: 1 Units per ☐ Month ☐ Quarter ☑ Year ☐ One Time ☐ Other

d. Is this a U.S. Department of Transportation (USDOT) Hazardous Material? (If yes, answer e.) ☐ Yes ☑ No

e. USDOT Shipping Description (if applicable): Non-Regulated Material

3. SAFETY REQUIREMENTS (Handling, PPE, etc.): Normal Landfill PPE

WASTE MANAGEMENT

Generator's Non-hazardous Waste Profile Sheet

D. Regulatory Status (Please check appropriate responses)

1. Waste Identification:
   a. Does the waste meet the definition of a USEPA listed or characteristic hazardous waste as defined by 40 CFR Part 261? ☐ Yes ☑ No
      1. If yes, please complete a hazardous waste profile.
   b. Does the waste meet the definition of a state hazardous waste other than identified in D.1.a? ☐ Yes ☑ No
      1. If yes, please complete a hazardous waste profile.
2. Is this waste included in one or more of categories below (Check all that apply)? If yes, attach supporting documentation. ☐ Yes ☑ No
   ☐ Delisted Hazardous Waste ☐ Excluded Wastes Under 40CFR 261.4
   ☐ Treated Hazardous Waste Debris ☐ Treated Characteristic Hazardous Waste
3. Is the waste from a Federal (40 CFR 300, Appendix B) or state mandated clean-up? If yes, see instructions. ☐ Yes ☑ No
4. Does the waste represented by this waste profile sheet contain radioactive material? ☐ Yes ☑ No
   a. If yes, is disposal regulated by the Nuclear Regulatory Commission? ☐ Yes ☐ No
   b. If yes, is disposal regulated by a State Agency for radioactive waste/NORM? ☐ Yes ☐ No
5. Does the waste represented by this waste profile sheet contain Polychlorinated Biphenyls (PCBs)? ☐ Yes ☑ No
   (If yes, list in Chemical Composition - C.1.l)
   a. If yes, are the PCBs regulated by 40 CFR 761? ☐ Yes ☐ No
   b. If yes, is it remediation waste from a project being performed under the Self-Implementing option provided in 40 CFR 761.61(a)? ☐ Yes ☐ No
   c. If yes, were the PCBs imported into the US? ☐ Yes ☐ No
6. Does the waste contain untreated, regulated medical or infectious waste? ☐ Yes ☑ No
7. Does the waste contain asbestos? ☐ Yes ☑ No
   a. If Yes, ☐ Friable ☐ Non Friable
8. Is this profile for remediation waste from a facility that is a major source of Hazardous Air Pollutants (Site Remediation NESHAP, 40 CFR 63 subpart GGGGG)? ☐ Yes ☑ No
   a. If yes, does the waste contain <500 ppmw VOHAPs at the point of determination? ☐ Yes ☐ No

E. Generator Certifcation (Please read and certify by signature below)

By signing this Generator's Waste Profile Sheet, I hereby certify that all:

1. Information submitted in this profile and all attached documents contain true and accurate descriptions of the waste material;
2. Relevant information within the possession of the Generator regarding known or suspected hazards pertaining to this waste has been disclosed to WM/the Contractor;
3. Analytical data attached pertaining to the profiled waste was derived from testing a representative sample in accordance with 40 CFR 261.20(c) or equivalent rules; and
4. Changes that occur in the character of the waste (i.e. changes in the process or new analytical) will be identified by the Generator and disclosed to WM (and the Contractor if applicable) prior to providing the waste to WM (and the contractor if applicable).
5. Check all that apply:
   ☑ a. Attached analytical pertains to the waste. Identify laboratory & sample ID #'s and parameters tested: Pace Analytical/ TC Severance/ TCLP metals & Benzene # Pages: 13
   ☐ b. Only the analysis identified on the attachment pertain to the waste (identify by laboratory & sample ID #'s and parameters tested). Attachment #: _____
   ☐ c. Additional information necessary to characterize the profiled waste has been attached (other then analytical, such as MSDS). Indicate the number of attached pages: _____
   ☐ d. I am an agent signing on behalf of the Generator, and the delegation of authority to me from the Generator for this signature is available upon request.

Certification Signature: _____ Title: Environmental Manager

Company Name: TransCanada Name (Print): Robert Baumgartner

Date: 02/24/2011

Special Waste Disposal Request

Kansas Department of Health and Environment

Bureau of Waste Management
Waste Reduction, Compliance and Enforcement Section
1000 SW Jackson, Suite 320, Topeka, Kansas 66612-1366

Please type or clearly print - See page 2 for instructions

I. REQUESTER INFORMATION (***This is where the Disposal Authorization letter will be sent.***)

Name: TransCanada

Address: 717 Texas Street

City: Houston State: TX Zip Code: 77002

Contact Person: Robert Baumgartner Telephone Number: 832-320-5538

E-Mail Address, if applicable: Robert_baumgartner@transcanada.com Fax Number:

II. POINT OF GENERATION INFORMATION *(only if different from the information in Section I above)*

Name: TransCanada / Keystone (Severance)

Address: 1010 150th Road

City: Bendena State: KS Zip Code: 66538

Contact Person: Robert Baumgartner Telephone Number: 402-792-7464

III. WASTE INFORMATION - *Use back of form if additional space is required*

Waste Description: Non-Regulated Soil & Gravel Contaminated with Crude Oil

Process Producing Waste: Crude Oil Spill Cleanup

Physical Characteristics of Waste: Solid contaminated with Crude Oil

Quantity for Disposal: 20 (Please Select One) __Lbs. __Tons ✓Cubic Yards __Containers __Bags

Frequency (Select One): __One Time __Week __Month ✓Year

Laboratory Analyses Attached: ✓Yes __No Material Safety Data Sheets (MSDS) Attached: __Yes __No

Renewal of Previous Authorization: Previous Authorization No: N/A Date Issued:

IV. DISPOSAL INFORMATION

Landfill Proposed for Disposal: Rolling Meadows LF -7351 NW Hwy 75 Topeka, KS 66618

Solid Waste Transfer Station Proposed:

V. CERTIFICATION

I hereby certify that I am a duly authorized representative of the generator identified above. I further certify that, to the best of my knowledge, the following items are true:

1. The waste identified for disposal is not a hazardous waste as defined by K.A.R. 28-31-3.
2. All analytical analyses provided are from a Kansas Department of Health and Environment (KDHE) certified laboratory and are representative of the waste identified for disposal.
3. All information provided in any attached profile, re-certification, or other document completed by the authorized representative accurately characterizes the waste.
4. If this is a renewal, the materials and processes that generate the waste have not changed since the last disposal authorization indicated above, and the information previously provided to KDHE is still valid.

Signature | Robert Baumgartner (Printed Name) | 02/24/2011 (Date)

017547

From:	Robert Baumgartner
To:	"Tom Winn"
Subject:	RE: KDHE Spill Report #32936
Date:	Wednesday, March 16, 2011 5:07:00 PM
Attachments:	IMG00675-20110111-0922.jpg IMG00005-20110107-1709.jpg IMG00674-20110111-0922.jpg Severance Valve Site.jpg

---

Tom,
Find attached before and after photos of the cleanup.

The site coordinates are: 39.71112, -95.096716. I've attached a Google Earth map for reference.

Thank you,

Robert M. Baumgartner
Environmental Program Manager
TransCanada Keystone US Operations
832.320.5538 office
402.960.0483 cell
robert_baumgartner@transcanada.com

From: Tom Winn [mailto:twinn@kdheks.gov]
Sent: Wednesday, March 16, 2011 3:57 PM
To: Robert Baumgartner
Subject: RE: KDHE Spill Report #32936

Robert: Thank you for the documentation. Do you have any photographs of the activities? Also: I failed to locate Last Chance Road - I'll need to locate the site on a map to determine coordinates before I can close the file.

Tom Winn
Bureau of Environmental Field Services
Northeast District
785-842-4600

From: Robert Baumgartner [mailto:robert_baumgartner@transcanada.com]
Sent: Wednesday, March 16, 2011 2:56 PM
To: Tom Winn
Cc: Robert Baumgartner
Subject: KDHE Spill Report #32936

Tom,
Find attached the waste disposal profile and receipt for the cleanup activities conducted in response to the small crude oil leak that occurred at TransCanada's valve site located on Last Chance Rd. (south of 150th Rd.) near Severance, KS. I am providing this as follow up to the spill report (KDHE Spill Report #32936) submitted by TransCanada on January 8, 2011 in order to close out the incident.

Cleanup activities were conducted from January 7 – 11, 2011 by TransCanada and our subcontractor Seneca Waste Solutions. Oil impacted site gravel and some minor amount of soil underlying the site gravel were excavated and placed in a 20 yd^3 roll-off. This material, totaling 10.06 tons, was disposed of on March 9, 2011 at Rolling Meadows RDF in Topeka, KS.

Please contact me if you have any questions.

Thank you,

Robert M. Baumgartner
Environmental Program Manager
TransCanada Keystone US Operations
717 Texas St.
Houston, Texas 77002
832.320.5538 office
402.960.0483 cell
robert_baumgartner@transcanada.com


017550


150th Rd
Larkinburg
Last Chance Rd
39.71112, -95.096716
© 2011 Google
©2009 Google
1841 ft
Imagery Date: Aug 28, 2010
39°43'01.51" N
95°05'51.23" W
elev 1053 ft
Eye alt 7342 ft

URS

July 20, 2011

Mr. Tom Winn
Northeast District Office
Kansas Department of Health and Environment
800 West 24th Street
Lawrence, KS 66046-4417

Re: Crude Oil Release at TransCanada Severence Pump Station
One Half Mile East of Kansas Highway 7
Doniphan County, Kansas
URS Project No. 31810971

Dear Mr. Winn,

The purpose of this letter report is to provide the details of cleanup activities that took place in response to a crude oil release at the above referenced property. The spill was reported by Robert Baumgartner of TransCanada to the Kansas Department of Health and Environment (KDHE) Northeast District Office in Lawrence, Kansas on May 29, 2011. Spill response activities began immediately by TransCanada personnel and TransCanada spill response contractors. Seneca Waste Solutions provided soil excavation, waste collection, and site restoration services. URS Corporation (URS) personnel provided technical guidance for media sampling and air monitoring during the duration of the cleanup process.

As previously noted, the location of the release is a pump station owned and operated by TransCanada Keystone Pipeline, LP (TransCanada). The pump station is in a rural area located south and east of the intersection of Kansas 7 Highway and 150th Road in Doniphan County, Kansas (Figure 1). The site is located approximately 10 miles north of Atchison, Kansas.

The release occurred from the failure of a pressure gauge seal. The malfunctioning sensor gauge was detected by TransCanada's control center and shutdown remotely. An estimated 10 barrels of crude oil was released.

Upon arrival at the site by TransCanada personnel, containment and recovery activities were initiated. A maintenance team mobilized to the site upon notification of the release on May 29, 2011. A vacuum truck, skid-steer loader, hydrovac, and other equipment were mobilized to the site along with qualified response team personnel.

Beginning on May 29, 2011, a vacuum truck was used to collect free oil from the gravel surface of the pump station and to prevent oil from migrating off site. Free product was recovered from the excavation throughout the cleanup. Approximately 2 barrels of oil were recovered during initial response operations. Also on May 29, 2011, mechanical excavation commenced with the

URS Corporation
8300 College Blvd.
Suite 200
Overland Park, KS 66210
Tel: 913.344.1000
Fax: 913.344.1011

use of a Super Sucker Vac. Truck, mini excavator and Toro™ Dingo™ front loader. An agricultural mower was used to remove oil-stained vegetation from off-site adjacent property. The grass clippings were bagged and placed in a roll off container for off-site disposal. Oil stained chain link fence was removed and placed in a roll off container for off-site disposal. The fence posts associated with the chain link fence were cleaned. Approximately 200 gallons of oily/water was recovered during the cleanup. The oily/water is being characterized and will be transported for off-site disposal by Safety-Kleen. Oily/water disposal paperwork will be provided separately.

Residual oil accumulated around pipelines, cable racks, pump foundations, other structures, and over a portion of the gravel covered pump station yard (Figure 2). Visually stained gravel was manually excavated around the structures and the stained gravel yard area was scraped using the mini excavator and Dingo™. Impacted soil and gravel were placed in stock piles on site for later transfer to an approved landfill facility. Depths of the excavation varied across the site, ranging from surficial to several inches. Groundwater was not encountered during excavation activities. A total of approximately 300 cubic yards of excavated soil was stockpiled on-site and covered with plastic. The excavated soil was transported on June 20 and June 21, 2011 and disposed of at Waste Management's Rolling Meadows landfill in Topeka, Kansas. Waste manifests and landfill tickets will be provided to KDHE when they become available from Waste Management.

Soils were visually inspected and then screened using a photoionization detector (PID) with 10.6 eV lamp after excavation activities to determine the limits of excavation. In addition, the scraped area of the surface yard was screened using the PID. The field PID screening results are summarized in Table 1. Native soil was not encountered during excavation activities in the gravel layer at the surface yard. Since PID readings in the excavated gravel layer were non-detect, no soil samples were collected. Confirmation soil samples were collected at five locations off-site and two locations on- site where crude oil mist had been observed. Soil confirmation samples were submitted to Pace Analytical (Pace) of Lenexa, Kansas for benzene, toluene, ethylbenzene, and xylenes (BTEX) and diesel range organics (DRO) analyses. Confirmation soil sampling locations are shown on Figure 2. Confirmation soil sampling analytical results are summarized in Table 2 and provided as an attachment.

Water samples were collected from the off-site pond, pond effluent, and the on-site containment ditch to determine potential impact from the crude oil release. The water samples were submitted to Pace for BTEX and DRO analyses. Water sampling locations are shown on Figure 2. Water sample analytical results are summarized in Table 2 and provided as an attachment. Waste soil samples were collected from the excavated gravel stock piles and analyzed for benzene and RCRA 8 metals under the Toxicity Characteristic Leaching Procedure (TCLP). Laboratory analytical results for the waste soil samples are provided in Table 3.

Based on field observations, measurements, and analytical data, the response excavation efforts have mitigated impacts of BTEX and DRO to the surface and subsurface soils to below Kansas

Tier 2 Risk Based Screening Levels (RBSLs) for non-residential soil pathway scenarios. The excavated areas have been backfilled. No additional work is planned for the site.

This letter report is provided on behalf of TransCanada. If you have any questions regarding this letter report, please feel free to contact Robert Baumgartner, Environmental Program Manager for TransCanada, at 832-320-5538 or me at 913-344-1023.

Sincerely,

Rick O. Horner RG
Senior Project Manager

cc: Robert Baumgartner, TransCanada
Steve McManamon, URS

Enclosures:

Tables

Table 1 – Laboratory Analysis Soil Verification
Table 2 – Laboratory Analysis Water Verification
Table 3 – Laboratory Analysis Soil Data for Disposal

Figures

Figure 1 – Site Location
Figure 2 – Soil and Water Sample Locations

Attachment

Laboratory Data

Table 1 – Laboratory Analysis Soil Verification
TransCanada Keystone Pipeline
Severence Pump Station; Severence, Kansas

Location	Unit	OFF-1	OFF-2	OFF-3	OFF-4	OFF-5	ON-1	ON-2	Tier 2 Action Level**
Sample Date		5/31/11	5/31/11	5/31/11	5/31/11	5/31/11	5/31/11	5/31/11	
Lithology		Clay	Clay	Clay	Clay	Clay	Clay	Clay	
Depth	(feet)	Surface	Surface	Surface	Surface	Surface	Surface	Surface	
PID	(ppm)*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Chemical of Concern									
Benzene	mg/kg	<0.0064	<0.0062	<0.0063	<0.0057	<0.0063	<0.0057	<0.0058	28.2
Toluene	mg/kg	<0.0064	<0.0062	<0.0063	<0.0057	<0.0063	<0.0057	<0.0058	29,800
Ethylbenzene	mg/kg	<0.0064	<0.0062	<0.0063	<0.0057	<0.0063	<0.0057	<0.0058	145
Total Xylenes	mg/kg	<0.0064	<0.0062	<0.0063	<0.057	<0.0063	<0.0057	<0.0058	1,410
Total Petroleum Hydrocarbons (OA-2)	mg/kg	<24.8	<23.2	<24.1	<21.5	<25.2	<21.4	<23.3	20,000

NOTES:
mg/kg = Milligrams per kilogram, equivalent to parts per million (ppm) dry weight
<x = Not detected to reporting limits of x
*=Total organic vapors (ppm as isobutylene)
** = Tier 2 Non Residential Soil Pathway Action Level

Table 2 – Laboratory Analysis Water Verification
TransCanada Keystone Pipeline
Severence Pump Station; Severence, Kansas

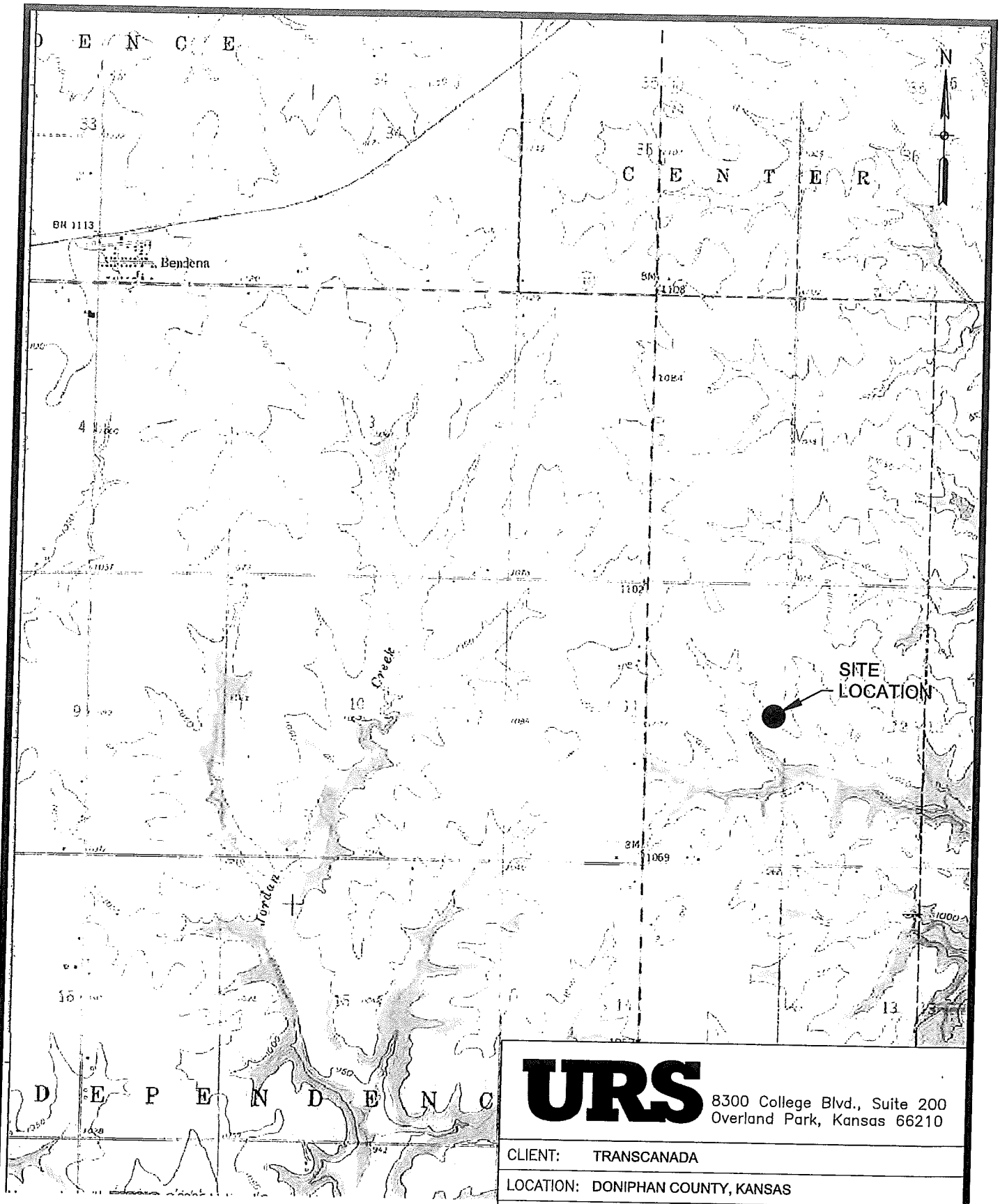
Location	Unit	Severence Pond	Severence Outfall	Severence Ditch	Tier 2 Action Level**
Sample Date		5/31/11	5/31/11	5/31/11	
Media		Water	Water	Water	
Chemical of Concern					
Benzene	µg/l	<1.0	<1.0	<1.0	5.0
Toluene	µg/l	<1.0	<1.0	<1.0	1,000
Ethylbenzene	µg/l	<1.0	<1.0	<1.0	700
Total Xylenes	µg/l	<3.0	<3.0	<3.0	10,000
Total Petroleum Hydrocarbons (OA-2)	mg/l	<0.22	<0.21	<0.21	720

NOTES:
µg/L = Micrograms per liter, equivalent to parts per billion (ppb)
<x = Not detected to reporting limits of x
*=Total organic vapors (ppm as isobutylene)
** = Tier 2 Non Residential Groundwater Pathway Action Level

Table 3– Laboratory Analysis Soil Data for Disposal
TransCanada Keystone Pipeline
Severence Pump Station; Severence, Kansas

Location	Units	Waste
Sample Date		5/31/11
Lithology		Gravel
PID	(ppm)*	0.00
Chemical of Concern		
Benzene – TCLP	µg/l	<50.0
Arsenic - TCLP	mg/L	<0.50
Barium- TCLP	mg/L	<2.5
Cadmium- TCLP	mg/L	<0.050
Chromium-TCLP	mg/L	<0.10
Lead-TCLP	mg/L	<0.50
Selenium-TCLP	mg/L	<0.50
Silver-TCLP	mg/L	<0.10
Mercury-TCLP	µg/L	<2.0

NOTES:
µg/L = Micrograms per liter, equivalent to parts per billion (ppb)
mg/L = Milligrams per liter, equivalent to parts per million (ppm)
<x = Not detected to reporting limits of x
*= Total organic vapors (ppm as isobutylene)



2500 0 2500

SCALE IN FEET

URS 8300 College Blvd., Suite 200 Overland Park, Kansas 66210

CLIENT:	TRANSCANADA
LOCATION:	DONIPHAN COUNTY, KANSAS
TITLE:	SITE LOCATION

DRAWN BY	CHECKED BY	APPROVED BY
TMS	ROH	ALS
PROJECT NO.	DATE	FIGURE NO.
31810971	JULY 2011	1

July 14, 2011 6:42.59 am (cra)
J:\TransCanada Severence\CAD\Plan Sheets\Location Map.dwg

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LEGEND:

- SOIL SAMPLE
- WATER SAMPLE

N

NOT TO SCALE

URS 8300 College Blvd., Suite 200 Overland Park, Kansas 66210

CLIENT: TRANSCANADA SEVERENCE STATION

LOCATION: DONIPHAN COUNTY, KANSAS

TITLE: SOIL AND WATER SAMPLE LOCATIONS

DRAWN BY	CHECKED BY	APPROVED BY
TMS	ROH	ALS
PROJECT NO.	DATE	FIGURE NO.
31810971	JULY 2011	2

July 13, 2011 2:06:36 pm (cra)
J:\TransCanada Severence\CAD\Plan Sheets\Sample Locations.dwg

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June 07, 2011

Rick Horner
URS Corporation
8300 College Blvd.
Overland Park, KS 66210

RE: Project: SEVERANCE STATION
Pace Project No.: 6099915

Dear Rick Horner:
Enclosed are the analytical results for sample(s) received by the laboratory on June 01, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Sherri Guess

sherri.guess@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: SEVERANCE STATION
Pace Project No.: 6099915

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 05-008-0
Illinois Certification #: 001191
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-08-TX
Utah Certification #: 9135995665

ACCREDITED IN ACCORDANCE WITH nelac

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SAMPLE SUMMARY

Project: SEVERANCE STATION
Pace Project No.: 6099915

Lab ID	Sample ID	Matrix	Date Collected	Date Received
6099915001	OFF-1	Solid	05/31/11 15:30	06/01/11 07:33
6099915002	OFF-2	Solid	05/31/11 15:45	06/01/11 07:33
6099915003	OFF-3	Solid	05/31/11 16:00	06/01/11 07:33
6099915004	OFF-4	Solid	05/31/11 16:10	06/01/11 07:33
6099915005	OFF-5	Solid	05/31/11 16:20	06/01/11 07:33
6099915006	ON-1	Solid	05/31/11 16:30	06/01/11 07:33
6099915007	ON-2	Solid	05/31/11 16:40	06/01/11 07:33
6099915009	SEVERANCE POND	Water	05/31/11 13:30	06/01/11 07:33
6099915010	SEVERANCE OUTFALL	Water	05/31/11 14:30	06/01/11 07:33
6099915011	SEVERANCE DITCH	Water	05/31/11 14:00	06/01/11 07:33
6099915012	TRIP BLANK	Water	05/31/11 15:30	06/01/11 07:33

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SAMPLE ANALYTE COUNT

Project: SEVERANCE STATION
Pace Project No.: 6099915

Lab ID	Sample ID	Method	Analysts	Analytes Reported
6099915001	OFF-1	OA2	SDR	9
		EPA 8260	RAB	8
		ASTM D2974-87	DWC	1
6099915002	OFF-2	OA2	SDR	9
		EPA 8260	RAB	8
		ASTM D2974-87	DWC	1
6099915003	OFF-3	OA2	SDR	9
		EPA 8260	RAB	8
		ASTM D2974-87	DWC	1
6099915004	OFF-4	OA2	SDR	9
		EPA 8260	RAB	8
		ASTM D2974-87	DWC	1
6099915005	OFF-5	OA2	SDR	9
		EPA 8260	RAB	8
		ASTM D2974-87	DWC	1
6099915006	ON-1	OA2	SDR	9
		EPA 8260	RAB	8
		ASTM D2974-87	DWC	1
6099915007	ON-2	OA2	SDR	9
		EPA 8260	RAB	8
		ASTM D2974-87	DWC	1
6099915009	SEVERANCE POND	OA2	SDR	9
		EPA 8260	BRM	9
6099915010	SEVERANCE OUTFALL	OA2	SDR	9
		EPA 8260	BRM	9
6099915011	SEVERANCE DITCH	OA2	SDR	9
		EPA 8260	BRM	9
6099915012	TRIP BLANK	EPA 8260	PRG	9

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ANALYTICAL RESULTS

Project: SEVERANCE STATION
Pace Project No.: 6099915

Sample: OFF-1 **Lab ID: 6099915001** Collected: 05/31/11 15:30 Received: 06/01/11 07:33 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	24.8	1	06/02/11 00:00	06/02/11 20:34	68334-30-5	
Fuel Oil	ND	mg/kg	24.8	1	06/02/11 00:00	06/02/11 20:34	68553-00-4	
Jet Fuel	ND	mg/kg	24.8	1	06/02/11 00:00	06/02/11 20:34	94114-58-6	
Kerosene	ND	mg/kg	24.8	1	06/02/11 00:00	06/02/11 20:34	8008-20-6	
Mineral Spirits	ND	mg/kg	24.8	1	06/02/11 00:00	06/02/11 20:34	8030-30-6	
Motor Oil	ND	mg/kg	24.8	1	06/02/11 00:00	06/02/11 20:34	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	24.8	1	06/02/11 00:00	06/02/11 20:34		
n-Tetracosane (S)	78	%	50-137	1	06/02/11 00:00	06/02/11 20:34	646-31-1	
p-Terphenyl (S)	86	%	41-129	1	06/02/11 00:00	06/02/11 20:34	92-94-4	
8260 MSV 5035A VOA	Analytical Method: EPA 8260							
Benzene	ND	ug/kg	6.4	1		06/04/11 13:45	71-43-2	
Ethylbenzene	ND	ug/kg	6.4	1		06/04/11 13:45	100-41-4	
Toluene	ND	ug/kg	6.4	1		06/04/11 13:45	108-88-3	
Xylene (Total)	ND	ug/kg	6.4	1		06/04/11 13:45	1330-20-7	
Dibromofluoromethane (S)	104	%	68-129	1		06/04/11 13:45	1868-53-7	
Toluene-d8 (S)	101	%	81-121	1		06/04/11 13:45	2037-26-5	
4-Bromofluorobenzene (S)	98	%	75-131	1		06/04/11 13:45	460-00-4	
1,2-Dichloroethane-d4 (S)	107	%	77-131	1		06/04/11 13:45	17060-07-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**22.8**	%	0.50	1		06/02/11 00:00		

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ANALYTICAL RESULTS

Project: SEVERANCE STATION
Pace Project No.: 6099915

Sample: OFF-2 **Lab ID: 6099915002** Collected: 05/31/11 15:45 Received: 06/01/11 07:33 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	23.2	1	06/02/11 00:00	06/02/11 20:58	68334-30-5	
Fuel Oil	ND	mg/kg	23.2	1	06/02/11 00:00	06/02/11 20:58	68553-00-4	
Jet Fuel	ND	mg/kg	23.2	1	06/02/11 00:00	06/02/11 20:58	94114-58-6	
Kerosene	ND	mg/kg	23.2	1	06/02/11 00:00	06/02/11 20:58	8008-20-6	
Mineral Spirits	ND	mg/kg	23.2	1	06/02/11 00:00	06/02/11 20:58	8030-30-6	
Motor Oil	ND	mg/kg	23.2	1	06/02/11 00:00	06/02/11 20:58	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	23.2	1	06/02/11 00:00	06/02/11 20:58		
n-Tetracosane (S)	82	%	50-137	1	06/02/11 00:00	06/02/11 20:58	646-31-1	
p-Terphenyl (S)	88	%	41-129	1	06/02/11 00:00	06/02/11 20:58	92-94-4	
8260 MSV 5035A VOA	Analytical Method: EPA 8260							
Benzene	ND	ug/kg	6.2	1		06/04/11 14:00	71-43-2	
Ethylbenzene	ND	ug/kg	6.2	1		06/04/11 14:00	100-41-4	
Toluene	ND	ug/kg	6.2	1		06/04/11 14:00	108-88-3	
Xylene (Total)	ND	ug/kg	6.2	1		06/04/11 14:00	1330-20-7	
Dibromofluoromethane (S)	104	%	68-129	1		06/04/11 14:00	1868-53-7	
Toluene-d8 (S)	101	%	81-121	1		06/04/11 14:00	2037-26-5	
4-Bromofluorobenzene (S)	98	%	75-131	1		06/04/11 14:00	460-00-4	
1,2-Dichloroethane-d4 (S)	108	%	77-131	1		06/04/11 14:00	17060-07-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**21.3**	%	0.50	1		06/02/11 00:00		

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ANALYTICAL RESULTS

Project: SEVERANCE STATION
Pace Project No.: 6099915

Sample: OFF-3 **Lab ID: 6099915003** Collected: 05/31/11 16:00 Received: 06/01/11 07:33 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	24.1	1	06/02/11 00:00	06/02/11 21:22	68334-30-5	
Fuel Oil	ND	mg/kg	24.1	1	06/02/11 00:00	06/02/11 21:22	68553-00-4	
Jet Fuel	ND	mg/kg	24.1	1	06/02/11 00:00	06/02/11 21:22	94114-58-6	
Kerosene	ND	mg/kg	24.1	1	06/02/11 00:00	06/02/11 21:22	8008-20-6	
Mineral Spirits	ND	mg/kg	24.1	1	06/02/11 00:00	06/02/11 21:22	8030-30-6	
Motor Oil	ND	mg/kg	24.1	1	06/02/11 00:00	06/02/11 21:22	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	24.1	1	06/02/11 00:00	06/02/11 21:22		
n-Tetracosane (S)	78	%	50-137	1	06/02/11 00:00	06/02/11 21:22	646-31-1	
p-Terphenyl (S)	85	%	41-129	1	06/02/11 00:00	06/02/11 21:22	92-94-4	
8260 MSV 5035A VOA	Analytical Method: EPA 8260							
Benzene	ND	ug/kg	6.3	1		06/04/11 14:14	71-43-2	
Ethylbenzene	ND	ug/kg	6.3	1		06/04/11 14:14	100-41-4	
Toluene	ND	ug/kg	6.3	1		06/04/11 14:14	108-88-3	
Xylene (Total)	ND	ug/kg	6.3	1		06/04/11 14:14	1330-20-7	
Dibromofluoromethane (S)	108	%	68-129	1		06/04/11 14:14	1868-53-7	
Toluene-d8 (S)	102	%	81-121	1		06/04/11 14:14	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-131	1		06/04/11 14:14	460-00-4	
1,2-Dichloroethane-d4 (S)	118	%	77-131	1		06/04/11 14:14	17060-07-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**20.2**	%	0.50	1		06/02/11 00:00		

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ANALYTICAL RESULTS

Project: SEVERANCE STATION
Pace Project No.: 6099915

Sample: OFF-4 **Lab ID: 6099915004** Collected: 05/31/11 16:10 Received: 06/01/11 07:33 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	21.5	1	06/02/11 00:00	06/02/11 21:46	68334-30-5	
Fuel Oil	ND	mg/kg	21.5	1	06/02/11 00:00	06/02/11 21:46	68553-00-4	
Jet Fuel	ND	mg/kg	21.5	1	06/02/11 00:00	06/02/11 21:46	94114-58-6	
Kerosene	ND	mg/kg	21.5	1	06/02/11 00:00	06/02/11 21:46	8008-20-6	
Mineral Spirits	ND	mg/kg	21.5	1	06/02/11 00:00	06/02/11 21:46	8030-30-6	
Motor Oil	ND	mg/kg	21.5	1	06/02/11 00:00	06/02/11 21:46	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	21.5	1	06/02/11 00:00	06/02/11 21:46		
n-Tetracosane (S)	79	%	50-137	1	06/02/11 00:00	06/02/11 21:46	646-31-1	
p-Terphenyl (S)	85	%	41-129	1	06/02/11 00:00	06/02/11 21:46	92-94-4	
8260 MSV 5035A VOA	Analytical Method: EPA 8260							
Benzene	ND	ug/kg	5.7	1		06/04/11 14:29	71-43-2	
Ethylbenzene	ND	ug/kg	5.7	1		06/04/11 14:29	100-41-4	
Toluene	ND	ug/kg	5.7	1		06/04/11 14:29	108-88-3	
Xylene (Total)	ND	ug/kg	5.7	1		06/04/11 14:29	1330-20-7	
Dibromofluoromethane (S)	105	%	68-129	1		06/04/11 14:29	1868-53-7	
Toluene-d8 (S)	102	%	81-121	1		06/04/11 14:29	2037-26-5	
4-Bromofluorobenzene (S)	99	%	75-131	1		06/04/11 14:29	460-00-4	
1,2-Dichloroethane-d4 (S)	108	%	77-131	1		06/04/11 14:29	17060-07-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**12.5**	%	0.50	1		06/02/11 00:00		

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ANALYTICAL RESULTS

Project: SEVERANCE STATION
Pace Project No.: 6099915

Sample: OFF-5 **Lab ID: 6099915005** Collected: 05/31/11 16:20 Received: 06/01/11 07:33 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	25.2	1	06/02/11 00:00	06/02/11 22:09	68334-30-5	
Fuel Oil	ND	mg/kg	25.2	1	06/02/11 00:00	06/02/11 22:09	68553-00-4	
Jet Fuel	ND	mg/kg	25.2	1	06/02/11 00:00	06/02/11 22:09	94114-58-6	
Kerosene	ND	mg/kg	25.2	1	06/02/11 00:00	06/02/11 22:09	8008-20-6	
Mineral Spirits	ND	mg/kg	25.2	1	06/02/11 00:00	06/02/11 22:09	8030-30-6	
Motor Oil	ND	mg/kg	25.2	1	06/02/11 00:00	06/02/11 22:09	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	25.2	1	06/02/11 00:00	06/02/11 22:09		
n-Tetracosane (S)	78	%	50-137	1	06/02/11 00:00	06/02/11 22:09	646-31-1	
p-Terphenyl (S)	85	%	41-129	1	06/02/11 00:00	06/02/11 22:09	92-94-4	
8260 MSV 5035A VOA	Analytical Method: EPA 8260							
Benzene	ND	ug/kg	6.3	1		06/04/11 14:43	71-43-2	
Ethylbenzene	ND	ug/kg	6.3	1		06/04/11 14:43	100-41-4	
Toluene	ND	ug/kg	6.3	1		06/04/11 14:43	108-88-3	
Xylene (Total)	ND	ug/kg	6.3	1		06/04/11 14:43	1330-20-7	
Dibromofluoromethane (S)	108	%	68-129	1		06/04/11 14:43	1868-53-7	
Toluene-d8 (S)	102	%	81-121	1		06/04/11 14:43	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-131	1		06/04/11 14:43	460-00-4	
1,2-Dichloroethane-d4 (S)	119	%	77-131	1		06/04/11 14:43	17060-07-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**22.0**	%	0.50	1		06/02/11 00:00		

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ANALYTICAL RESULTS

Project: SEVERANCE STATION
Pace Project No.: 6099915

Sample: ON-1 **Lab ID: 6099915006** Collected: 05/31/11 16:30 Received: 06/01/11 07:33 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	21.4	1	06/02/11 00:00	06/02/11 22:33	68334-30-5	
Fuel Oil	ND	mg/kg	21.4	1	06/02/11 00:00	06/02/11 22:33	68553-00-4	
Jet Fuel	ND	mg/kg	21.4	1	06/02/11 00:00	06/02/11 22:33	94114-58-6	
Kerosene	ND	mg/kg	21.4	1	06/02/11 00:00	06/02/11 22:33	8008-20-6	
Mineral Spirits	ND	mg/kg	21.4	1	06/02/11 00:00	06/02/11 22:33	8030-30-6	
Motor Oil	ND	mg/kg	21.4	1	06/02/11 00:00	06/02/11 22:33	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	21.4	1	06/02/11 00:00	06/02/11 22:33		
n-Tetracosane (S)	78	%	50-137	1	06/02/11 00:00	06/02/11 22:33	646-31-1	
p-Terphenyl (S)	84	%	41-129	1	06/02/11 00:00	06/02/11 22:33	92-94-4	
8260 MSV 5035A VOA	Analytical Method: EPA 8260							
Benzene	ND	ug/kg	5.7	1		06/04/11 14:58	71-43-2	
Ethylbenzene	ND	ug/kg	5.7	1		06/04/11 14:58	100-41-4	
Toluene	ND	ug/kg	5.7	1		06/04/11 14:58	108-88-3	
Xylene (Total)	ND	ug/kg	5.7	1		06/04/11 14:58	1330-20-7	
Dibromofluoromethane (S)	105	%	68-129	1		06/04/11 14:58	1868-53-7	
Toluene-d8 (S)	101	%	81-121	1		06/04/11 14:58	2037-26-5	
4-Bromofluorobenzene (S)	98	%	75-131	1		06/04/11 14:58	460-00-4	
1,2-Dichloroethane-d4 (S)	117	%	77-131	1		06/04/11 14:58	17060-07-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**13.3**	%	0.50	1		06/02/11 00:00		

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ANALYTICAL RESULTS

Project: SEVERANCE STATION
Pace Project No.: 6099915

Sample: ON-2 **Lab ID: 6099915007** Collected: 05/31/11 16:40 Received: 06/01/11 07:33 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/kg	23.3	1	06/02/11 00:00	06/02/11 22:57	68334-30-5	
Fuel Oil	ND	mg/kg	23.3	1	06/02/11 00:00	06/02/11 22:57	68553-00-4	
Jet Fuel	ND	mg/kg	23.3	1	06/02/11 00:00	06/02/11 22:57	94114-58-6	
Kerosene	ND	mg/kg	23.3	1	06/02/11 00:00	06/02/11 22:57	8008-20-6	
Mineral Spirits	ND	mg/kg	23.3	1	06/02/11 00:00	06/02/11 22:57	8030-30-6	
Motor Oil	ND	mg/kg	23.3	1	06/02/11 00:00	06/02/11 22:57	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/kg	23.3	1	06/02/11 00:00	06/02/11 22:57		
n-Tetracosane (S)	77	%	50-137	1	06/02/11 00:00	06/02/11 22:57	646-31-1	
p-Terphenyl (S)	83	%	41-129	1	06/02/11 00:00	06/02/11 22:57	92-94-4	
8260 MSV 5035A VOA	Analytical Method: EPA 8260							
Benzene	ND	ug/kg	5.8	1		06/04/11 15:12	71-43-2	
Ethylbenzene	ND	ug/kg	5.8	1		06/04/11 15:12	100-41-4	
Toluene	ND	ug/kg	5.8	1		06/04/11 15:12	108-88-3	
Xylene (Total)	ND	ug/kg	5.8	1		06/04/11 15:12	1330-20-7	
Dibromofluoromethane (S)	104	%	68-129	1		06/04/11 15:12	1868-53-7	
Toluene-d8 (S)	102	%	81-121	1		06/04/11 15:12	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-131	1		06/04/11 15:12	460-00-4	
1,2-Dichloroethane-d4 (S)	108	%	77-131	1		06/04/11 15:12	17060-07-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**16.1**	%	0.50	1		06/02/11 00:00		

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ANALYTICAL RESULTS

Project: SEVERANCE STATION
Pace Project No.: 6099915

Sample: SEVERANCE POND **Lab ID: 6099915009** Collected: 05/31/11 13:30 Received: 06/01/11 07:33 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/L	0.22	1	06/01/11 00:00	06/02/11 16:59	68334-30-5	
Fuel Oil	ND	mg/L	0.22	1	06/01/11 00:00	06/02/11 16:59	68553-00-4	
Jet Fuel	ND	mg/L	0.22	1	06/01/11 00:00	06/02/11 16:59	94114-58-6	
Kerosene	ND	mg/L	0.22	1	06/01/11 00:00	06/02/11 16:59	8008-20-6	
Mineral Spirits	ND	mg/L	0.22	1	06/01/11 00:00	06/02/11 16:59	8030-30-6	
Motor Oil	ND	mg/L	0.22	1	06/01/11 00:00	06/02/11 16:59	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/L	0.22	1	06/01/11 00:00	06/02/11 16:59		
p-Terphenyl (S)	55	%	20-122	1	06/01/11 00:00	06/02/11 16:59	92-94-4	
n-Tetracosane (S)	58	%	30-122	1	06/01/11 00:00	06/02/11 16:59	646-31-1	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		06/01/11 20:54	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		06/01/11 20:54	100-41-4	
Toluene	ND	ug/L	1.0	1		06/01/11 20:54	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		06/01/11 20:54	1330-20-7	
Dibromofluoromethane (S)	98	%	86-112	1		06/01/11 20:54	1868-53-7	
Toluene-d8 (S)	101	%	90-110	1		06/01/11 20:54	2037-26-5	
4-Bromofluorobenzene (S)	96	%	87-113	1		06/01/11 20:54	460-00-4	
1,2-Dichloroethane-d4 (S)	90	%	82-119	1		06/01/11 20:54	17060-07-0	
Preservation pH	**1.0**		1.0	1		06/01/11 20:54		

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ANALYTICAL RESULTS

Project: SEVERANCE STATION
Pace Project No.: 6099915

Sample: SEVERANCE OUTFALL **Lab ID: 6099915010** Collected: 05/31/11 14:30 Received: 06/01/11 07:33 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/L	0.21	1	06/01/11 00:00	06/02/11 17:23	68334-30-5	
Fuel Oil	ND	mg/L	0.21	1	06/01/11 00:00	06/02/11 17:23	68553-00-4	
Jet Fuel	ND	mg/L	0.21	1	06/01/11 00:00	06/02/11 17:23	94114-58-6	
Kerosene	ND	mg/L	0.21	1	06/01/11 00:00	06/02/11 17:23	8008-20-6	
Mineral Spirits	ND	mg/L	0.21	1	06/01/11 00:00	06/02/11 17:23	8030-30-6	
Motor Oil	ND	mg/L	0.21	1	06/01/11 00:00	06/02/11 17:23	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/L	0.21	1	06/01/11 00:00	06/02/11 17:23		
p-Terphenyl (S)	57	%	20-122	1	06/01/11 00:00	06/02/11 17:23	92-94-4	
n-Tetracosane (S)	58	%	30-122	1	06/01/11 00:00	06/02/11 17:23	646-31-1	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		06/01/11 21:10	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		06/01/11 21:10	100-41-4	
Toluene	ND	ug/L	1.0	1		06/01/11 21:10	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		06/01/11 21:10	1330-20-7	
Dibromofluoromethane (S)	101	%	86-112	1		06/01/11 21:10	1868-53-7	
Toluene-d8 (S)	97	%	90-110	1		06/01/11 21:10	2037-26-5	
4-Bromofluorobenzene (S)	93	%	87-113	1		06/01/11 21:10	460-00-4	
1,2-Dichloroethane-d4 (S)	96	%	82-119	1		06/01/11 21:10	17060-07-0	
Preservation pH	**1.0**		1.0	1		06/01/11 21:10		

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ANALYTICAL RESULTS

Project: SEVERANCE STATION
Pace Project No.: 6099915

Sample: SEVERANCE DITCH **Lab ID: 6099915011** Collected: 05/31/11 14:00 Received: 06/01/11 07:33 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
OA2 GCS	Analytical Method: OA2 Preparation Method: OA2							
Diesel Fuel	ND	mg/L	0.21	1	06/01/11 00:00	06/02/11 17:47	68334-30-5	
Fuel Oil	ND	mg/L	0.21	1	06/01/11 00:00	06/02/11 17:47	68553-00-4	
Jet Fuel	ND	mg/L	0.21	1	06/01/11 00:00	06/02/11 17:47	94114-58-6	
Kerosene	ND	mg/L	0.21	1	06/01/11 00:00	06/02/11 17:47	8008-20-6	
Mineral Spirits	ND	mg/L	0.21	1	06/01/11 00:00	06/02/11 17:47	8030-30-6	
Motor Oil	ND	mg/L	0.21	1	06/01/11 00:00	06/02/11 17:47	64742-65-0	
Total Petroleum Hydrocarbons	ND	mg/L	0.21	1	06/01/11 00:00	06/02/11 17:47		
p-Terphenyl (S)	56	%	20-122	1	06/01/11 00:00	06/02/11 17:47	92-94-4	
n-Tetracosane (S)	60	%	30-122	1	06/01/11 00:00	06/02/11 17:47	646-31-1	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		06/01/11 21:25	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		06/01/11 21:25	100-41-4	
Toluene	ND	ug/L	1.0	1		06/01/11 21:25	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		06/01/11 21:25	1330-20-7	
Dibromofluoromethane (S)	98	%	86-112	1		06/01/11 21:25	1868-53-7	
Toluene-d8 (S)	96	%	90-110	1		06/01/11 21:25	2037-26-5	
4-Bromofluorobenzene (S)	93	%	87-113	1		06/01/11 21:25	460-00-4	
1,2-Dichloroethane-d4 (S)	94	%	82-119	1		06/01/11 21:25	17060-07-0	
Preservation pH	1.0		1.0	1		06/01/11 21:25		

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ANALYTICAL RESULTS

Project: SEVERANCE STATION
Pace Project No.: 6099915

Sample: TRIP BLANK **Lab ID: 6099915012** Collected: 05/31/11 15:30 Received: 06/01/11 07:33 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		06/06/11 16:51	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		06/06/11 16:51	100-41-4	
Toluene	ND	ug/L	1.0	1		06/06/11 16:51	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		06/06/11 16:51	1330-20-7	
Dibromofluoromethane (S)	102	%	86-112	1		06/06/11 16:51	1868-53-7	
Toluene-d8 (S)	101	%	90-110	1		06/06/11 16:51	2037-26-5	
4-Bromofluorobenzene (S)	97	%	87-113	1		06/06/11 16:51	460-00-4	
1,2-Dichloroethane-d4 (S)	105	%	82-119	1		06/06/11 16:51	17060-07-0	
Preservation pH	**1.0**		1.0	1		06/06/11 16:51		

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QUALITY CONTROL DATA

Project: SEVERANCE STATION
Pace Project No.: 6099915

QC Batch: OEXT/28726 Analysis Method: OA2
QC Batch Method: OA2 Analysis Description: OA2 GCS
Associated Lab Samples: 6099915001, 6099915002, 6099915003, 6099915004, 6099915005, 6099915006, 6099915007

METHOD BLANK: 823487 Matrix: Solid
Associated Lab Samples: 6099915001, 6099915002, 6099915003, 6099915004, 6099915005, 6099915006, 6099915007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Diesel Fuel	mg/kg	ND	19.0	06/02/11 18:59	
Fuel Oil	mg/kg	ND	19.0	06/02/11 18:59	
Jet Fuel	mg/kg	ND	19.0	06/02/11 18:59	
Kerosene	mg/kg	ND	19.0	06/02/11 18:59	
Mineral Spirits	mg/kg	ND	19.0	06/02/11 18:59	
Motor Oil	mg/kg	ND	19.0	06/02/11 18:59	
Total Petroleum Hydrocarbons	mg/kg	ND	19.0	06/02/11 18:59	
n-Tetracosane (S)	%	83	50-137	06/02/11 18:59	
p-Terphenyl (S)	%	89	41-129	06/02/11 18:59	

LABORATORY CONTROL SAMPLE: 823488

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Diesel Fuel	mg/kg	466	507	109	66-138	
n-Tetracosane (S)	%			85	50-137	
p-Terphenyl (S)	%			91	41-129	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 823489 823490

Parameter	Units	6099915002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Diesel Fuel	mg/kg	ND	562	606	662	682	118	113	56-154	3	27	
n-Tetracosane (S)	%						82	78	50-137			
p-Terphenyl (S)	%						94	89	41-129			

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QUALITY CONTROL DATA

Project: SEVERANCE STATION
Pace Project No.: 6099915

QC Batch: OEXT/28713 Analysis Method: OA2
QC Batch Method: OA2 Analysis Description: OA2 GCS
Associated Lab Samples: 6099915009, 6099915010, 6099915011

METHOD BLANK: 823194 Matrix: Water
Associated Lab Samples: 6099915009, 6099915010, 6099915011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Diesel Fuel	mg/L	ND	0.20	06/02/11 16:12	
Fuel Oil	mg/L	ND	0.20	06/02/11 16:12	
Jet Fuel	mg/L	ND	0.20	06/02/11 16:12	
Kerosene	mg/L	ND	0.20	06/02/11 16:12	
Mineral Spirits	mg/L	ND	0.20	06/02/11 16:12	
Motor Oil	mg/L	ND	0.20	06/02/11 16:12	
Total Petroleum Hydrocarbons	mg/L	ND	0.20	06/02/11 16:12	
n-Tetracosane (S)	%	56	30-122	06/02/11 16:12	
p-Terphenyl (S)	%	45	20-122	06/02/11 16:12	

LABORATORY CONTROL SAMPLE: 823195

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Diesel Fuel	mg/L	2.5	1.6	65	47-122	
n-Tetracosane (S)	%			55	30-122	
p-Terphenyl (S)	%			48	20-122	

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QUALITY CONTROL DATA

Project: SEVERANCE STATION
Pace Project No.: 6099915

QC Batch: MSV/37526 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV 5035A Volatile Organics
Associated Lab Samples: 6099915001, 6099915002, 6099915003, 6099915004, 6099915005, 6099915006, 6099915007

METHOD BLANK: 824344 Matrix: Solid
Associated Lab Samples: 6099915001, 6099915002, 6099915003, 6099915004, 6099915005, 6099915006, 6099915007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/kg	ND	5.0	06/04/11 10:38	
Ethylbenzene	ug/kg	ND	5.0	06/04/11 10:38	
Toluene	ug/kg	ND	5.0	06/04/11 10:38	
Xylene (Total)	ug/kg	ND	5.0	06/04/11 10:38	
1,2-Dichloroethane-d4 (S)	%	100	77-131	06/04/11 10:38	
4-Bromofluorobenzene (S)	%	97	75-131	06/04/11 10:38	
Dibromofluoromethane (S)	%	101	68-129	06/04/11 10:38	
Toluene-d8 (S)	%	101	81-121	06/04/11 10:38	

LABORATORY CONTROL SAMPLE: 824345

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/kg	100	101	101	84-119	
Ethylbenzene	ug/kg	100	106	106	80-120	
Toluene	ug/kg	100	97.7	98	83-117	
Xylene (Total)	ug/kg	300	309	103	80-120	
1,2-Dichloroethane-d4 (S)	%			96	77-131	
4-Bromofluorobenzene (S)	%			102	75-131	
Dibromofluoromethane (S)	%			99	68-129	
Toluene-d8 (S)	%			99	81-121	

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QUALITY CONTROL DATA

Project: SEVERANCE STATION
Pace Project No.: 6099915

QC Batch: MSV/37469 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 6099915009, 6099915010, 6099915011

METHOD BLANK: 823353 Matrix: Water
Associated Lab Samples: 6099915009, 6099915010, 6099915011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	06/01/11 15:33	
Ethylbenzene	ug/L	ND	1.0	06/01/11 15:33	
Toluene	ug/L	ND	1.0	06/01/11 15:33	
Xylene (Total)	ug/L	ND	3.0	06/01/11 15:33	
1,2-Dichloroethane-d4 (S)	%	105	82-119	06/01/11 15:33	
4-Bromofluorobenzene (S)	%	102	87-113	06/01/11 15:33	
Dibromofluoromethane (S)	%	99	86-112	06/01/11 15:33	
Toluene-d8 (S)	%	96	90-110	06/01/11 15:33	

LABORATORY CONTROL SAMPLE: 823354

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	19.1	95	82-117	
Ethylbenzene	ug/L	20	18.2	91	79-121	
Toluene	ug/L	20	17.8	89	80-120	
Xylene (Total)	ug/L	60	56.6	94	79-120	
1,2-Dichloroethane-d4 (S)	%			94	82-119	
4-Bromofluorobenzene (S)	%			97	87-113	
Dibromofluoromethane (S)	%			93	86-112	
Toluene-d8 (S)	%			94	90-110	

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QUALITY CONTROL DATA

Project: SEVERANCE STATION
Pace Project No.: 6099915

QC Batch: MSV/37569
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 6099915012

METHOD BLANK: 825515
Matrix: Water
Associated Lab Samples: 6099915012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	06/06/11 15:58	
Ethylbenzene	ug/L	ND	1.0	06/06/11 15:58	
Toluene	ug/L	ND	1.0	06/06/11 15:58	
Xylene (Total)	ug/L	ND	3.0	06/06/11 15:58	
1,2-Dichloroethane-d4 (S)	%	102	82-119	06/06/11 15:58	
4-Bromofluorobenzene (S)	%	97	87-113	06/06/11 15:58	
Dibromofluoromethane (S)	%	98	86-112	06/06/11 15:58	
Toluene-d8 (S)	%	98	90-110	06/06/11 15:58	

LABORATORY CONTROL SAMPLE: 825516

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	19.5	97	82-117	
Ethylbenzene	ug/L	20	19.5	97	79-121	
Toluene	ug/L	20	19.8	99	80-120	
Xylene (Total)	ug/L	60	56.6	94	79-120	
1,2-Dichloroethane-d4 (S)	%			104	82-119	
4-Bromofluorobenzene (S)	%			101	87-113	
Dibromofluoromethane (S)	%			101	86-112	
Toluene-d8 (S)	%			102	90-110	

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QUALITY CONTROL DATA

Project: SEVERANCE STATION
Pace Project No.: 6099915

QC Batch: PMST/6187 Analysis Method: ASTM D2974-87
QC Batch Method: ASTM D2974-87 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 6099915001, 6099915002, 6099915003, 6099915004, 6099915005, 6099915006, 6099915007

METHOD BLANK: 823560 Matrix: Solid
Associated Lab Samples: 6099915001, 6099915002, 6099915003, 6099915004, 6099915005, 6099915006, 6099915007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Percent Moisture	%	ND	0.50	06/02/11 00:00	

SAMPLE DUPLICATE: 823561

Parameter	Units	6099570024 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	19.4	19.2	1	20	

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QUALIFIERS

Project: SEVERANCE STATION
Pace Project No.: 6099915

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is NELAP accredited. Contact your Pace PM for the current list of accredited analytes.

BATCH QUALIFIERS

Batch: OEXT/28713

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

Batch: MSV/37469

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

Batch: MSV/37526

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

Batch: MSV/37569

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: SEVERANCE STATION
Pace Project No.: 6099915

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
6099915001	OFF-1	OA2	OEXT/28726	OA2	GCSV/10599
6099915002	OFF-2	OA2	OEXT/28726	OA2	GCSV/10599
6099915003	OFF-3	OA2	OEXT/28726	OA2	GCSV/10599
6099915004	OFF-4	OA2	OEXT/28726	OA2	GCSV/10599
6099915005	OFF-5	OA2	OEXT/28726	OA2	GCSV/10599
6099915006	ON-1	OA2	OEXT/28726	OA2	GCSV/10599
6099915007	ON-2	OA2	OEXT/28726	OA2	GCSV/10599
6099915009	SEVERANCE POND	OA2	OEXT/28713	OA2	GCSV/10598
6099915010	SEVERANCE OUTFALL	OA2	OEXT/28713	OA2	GCSV/10598
6099915011	SEVERANCE DITCH	OA2	OEXT/28713	OA2	GCSV/10598
6099915001	OFF-1	EPA 8260	MSV/37526		
6099915002	OFF-2	EPA 8260	MSV/37526		
6099915003	OFF-3	EPA 8260	MSV/37526		
6099915004	OFF-4	EPA 8260	MSV/37526		
6099915005	OFF-5	EPA 8260	MSV/37526		
6099915006	ON-1	EPA 8260	MSV/37526		
6099915007	ON-2	EPA 8260	MSV/37526		
6099915009	SEVERANCE POND	EPA 8260	MSV/37469		
6099915010	SEVERANCE OUTFALL	EPA 8260	MSV/37469		
6099915011	SEVERANCE DITCH	EPA 8260	MSV/37469		
6099915012	TRIP BLANK	EPA 8260	MSV/37569		
6099915001	OFF-1	ASTM D2974-87	PMST/6187		
6099915002	OFF-2	ASTM D2974-87	PMST/6187		
6099915003	OFF-3	ASTM D2974-87	PMST/6187		
6099915004	OFF-4	ASTM D2974-87	PMST/6187		
6099915005	OFF-5	ASTM D2974-87	PMST/6187		
6099915006	ON-1	ASTM D2974-87	PMST/6187		
6099915007	ON-2	ASTM D2974-87	PMST/6187		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1217969

Section A Required Client Information:

Company: URS Corp
Address: 8300 College Blvd Ste 220
Overland Park, KS 66210
Email To:
Phone: 913-344-1000 Fax: 913-344-1011
Requested Due Date/TAT: 24hr/5day/2day

Section B Required Project Information:

Report To: rick_horner@urscorp.com
Copy To: Aaron_Steigerwalt@urscorp.com
brian_meyer@urscorp.com
Purchase Order No.:
Project Name: Severance Station
Project Number:

Section C Invoice Information:

Attention: Transcepta
Company Name: URS
Address: Same
Pace Quote Reference:
Pace Project Manager: Mary Jane Wells
Pace Profile #:

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER
Site Location STATE: KS

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	BTEX 8260	TPH - DRO DA2	TCLP Benzene	TCLP RCRA metals	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	Off-1 2(WGFU)	SL	G	5/31/11	1530				2	X								Y	X	X				5 day turn 001
2	Off-2	SL	G		1545				2	X								Y	X	X				002
3	Off-3	SL	G		1600				2	X								Y	X	X				003
4	Off-4	SL	G		1610				2	X								Y	X	X				004
5	Off-5	SL	G		1620				2	X								Y	X	X				005
6	On-1	SL	G		1630				2	X								Y	X	X				006
7	On-2	SL	G		1640				2	X								Y	X	X				007
8	Waste 3(WGFU)	SL	C		1650				3	X								Y	X	X	X			008
9	Severance Pond AGIU	WT	G		1330			3(DG9H)	4	X			X					Y	X	X				4 Bhr turn 009
10	Severance Outfall	WT	G		1430				4	X			X					Y	X	X				24hr turn 010
11	Severance Ditch	WT	G		1400				4	X			X					Y	X	X				011
12	Trip Blank 2(DG9H) TB								2				X					Y		X				012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
		6/1/11	0733		6/1/11	0733	2.0	Y	N	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Brian Meyer
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 5/31/11

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

017587

Sample Condition Upon Receipt

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Client Name: URS Corp. Project # 6099915

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ Other ____

Tracking #: ____ Pace Shipping Label Used? ☐ Yes ☒ No

Custody Seal on Cooler/Box Present: ☐ Yes ☒ No Seals intact: ☐ Yes ☒ No

Optional
Proj. Due Date: 6/2/11
Proj. Name: Severance Station

Packing Material: ☒ Bubble Wrap ☒ Bubble Bags ☒ Foam ☐ None ☒ Other ZFLC

Thermometer Used: T-191 / T-194 Type of Ice: (Wet) Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature: 2.0

Temperature should be above freezing to 6°C

Date and Initials of person examining contents: MR 6-1-11

		Comments:
Chain of Custody present:	☒ Yes ☐ No ☐ N/A	1.
Chain of Custody filled out:	☒ Yes ☐ No ☐ N/A	2.
Chain of Custody relinquished:	☒ Yes ☐ No ☐ N/A	3.
Sampler name & signature on COC:	☒ Yes ☐ No ☐ N/A	4.
Samples arrived within holding time:	☒ Yes ☐ No ☐ N/A	5.
Short Hold Time analyses (<72hr):	☐ Yes ☒ No ☐ N/A	6.
Rush Turn Around Time requested:	☒ Yes ☐ No ☐ N/A	7. 24 hour & 48 hour
Sufficient volume:	☒ Yes ☐ No ☐ N/A	8.
Correct containers used:	☒ Yes ☐ No ☐ N/A	9.
-Pace containers used:	☒ Yes ☐ No ☐ N/A	
Containers intact:	☒ Yes ☐ No ☐ N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐ Yes ☐ No ☒ N/A	11.
Filtered volume received for dissolved tests	☐ Yes ☒ No ☐ N/A	12.
Sample labels match COC:	☒ Yes ☐ No ☐ N/A	13.
-Includes date/time/ID/analyses Matrix: WT, SL		
All containers needing preservation have been checked.	☐ Yes ☐ No ☒ N/A	14.
All containers needing preservation are found to be in compliance with EPA recommendation.	☐ Yes ☐ No ☒ N/A	
Exceptions: (VOA), coliform, TOC, O&G, WI-DRO (water), Phenolics	☒ Yes ☐ No	Initial when completed ____ Lot # of added preservative ____
Trip Blank present:	☒ Yes ☐ No ☐ N/A	15.
Pace Trip Blank lot # (if purchased): 062209-3		
Headspace in VOA vials (>6mm):	☐ Yes ☒ No ☐ N/A	16.
Project sampled in USDA Regulated Area:	☐ Yes ☒ No ☐ N/A	17. List State: ____

Client Notification/ Resolution: Copy COC to Client? (Y) / N Field Data Required? Y (N)

Person Contacted: ____ Date/Time: ____

Comments/ Resolution: ____

Project Manager Review: [signature] Date: 6.1.11

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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June 03, 2011

Rick Horner
URS Corporation
8300 College Blvd.
Overland Park, KS 66210

RE: Project: SEVERANCE STATION
Pace Project No.: 60100143

Dear Rick Horner:
Enclosed are the analytical results for sample(s) received by the laboratory on June 01, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Sherri Guess

Sherri Guess

sherri.guess@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: SEVERANCE STATION
Pace Project No.: 60100143

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 05-008-0
Illinois Certification #: 001191
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-08-TX
Utah Certification #: 9135995665

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SAMPLE SUMMARY

Project: SEVERANCE STATION
Pace Project No.: 60100143

Lab ID	Sample ID	Matrix	Date Collected	Date Received
6099915008	WASTE	Solid	05/31/11 16:50	06/01/11 07:33

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SAMPLE ANALYTE COUNT

Project: SEVERANCE STATION
Pace Project No.: 60100143

Lab ID	Sample ID	Method	Analysts	Analytes Reported
6099915008	WASTE	EPA 6010	SMW	7
		EPA 7470	JDH	1
		EPA 8260	RAB	5

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ANALYTICAL RESULTS

Project: SEVERANCE STATION
Pace Project No.: 60100143

Sample: WASTE **Lab ID: 6099915008** Collected: 05/31/11 16:50 Received: 06/01/11 07:33 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
	Leachate Method/Date: EPA 1311; 06/01/11 00:00							
Arsenic	ND	mg/L	0.50	1	06/02/11 10:50	06/02/11 18:35	7440-38-2	
Barium	ND	mg/L	2.5	1	06/02/11 10:50	06/02/11 18:35	7440-39-3	
Cadmium	ND	mg/L	0.050	1	06/02/11 10:50	06/02/11 18:35	7440-43-9	
Chromium	ND	mg/L	0.10	1	06/02/11 10:50	06/02/11 18:35	7440-47-3	
Lead	ND	mg/L	0.50	1	06/02/11 10:50	06/02/11 18:35	7439-92-1	
Selenium	ND	mg/L	0.50	1	06/02/11 10:50	06/02/11 18:35	7782-49-2	
Silver	ND	mg/L	0.10	1	06/02/11 10:50	06/02/11 18:35	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
	Leachate Method/Date: EPA 1311; 06/01/11 00:00							
Mercury	ND	ug/L	2.0	1	06/03/11 11:04	06/03/11 15:24	7439-97-6	
8260 MSV TCLP	Analytical Method: EPA 8260 Leachate Method/Date: EPA 1311; 06/01/11 00:00							
Benzene	ND	ug/L	50.0	1		06/02/11 14:29	71-43-2	
1,2-Dichloroethane-d4 (S)	100	%	83-120	1		06/02/11 14:29	17060-07-0	
Toluene-d8 (S)	100	%	81-117	1		06/02/11 14:29	2037-26-5	
4-Bromofluorobenzene (S)	98	%	82-121	1		06/02/11 14:29	460-00-4	
Dibromofluoromethane (S)	100	%	85-113	1		06/02/11 14:29	1868-53-7	

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QUALITY CONTROL DATA

Project: SEVERANCE STATION
Pace Project No.: 60100143

QC Batch: MPRP/14376
QC Batch Method: EPA 3010
Analysis Method: EPA 6010
Analysis Description: 6010 MET TCLP
Associated Lab Samples: 6099915008

METHOD BLANK: 823670 Matrix: Water
Associated Lab Samples: 6099915008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.50	06/02/11 18:29	
Barium	mg/L	ND	2.5	06/02/11 18:29	
Cadmium	mg/L	ND	0.050	06/02/11 18:29	
Chromium	mg/L	ND	0.10	06/02/11 18:29	
Lead	mg/L	ND	0.50	06/02/11 18:29	
Selenium	mg/L	ND	0.50	06/02/11 18:29	
Silver	mg/L	ND	0.10	06/02/11 18:29	

LABORATORY CONTROL SAMPLE: 823671

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	1	0.94	94	80-120	
Barium	mg/L	1	0.98	98	80-120	
Cadmium	mg/L	1	0.95	95	80-120	
Chromium	mg/L	1	0.98	98	80-120	
Lead	mg/L	1	1.0	100	80-120	
Selenium	mg/L	1	0.94	94	80-120	
Silver	mg/L	.5	0.48	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 823672 823673

Parameter	Units	6099915008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	10	10	9.8	9.4	98	94	75-125	5	20	
Barium	mg/L	ND	10	10	9.9	9.4	97	92	75-125	5	20	
Cadmium	mg/L	ND	10	10	9.6	9.2	96	92	75-125	5	20	
Chromium	mg/L	ND	10	10	9.6	9.2	96	92	75-125	5	20	
Lead	mg/L	ND	10	10	9.5	9.0	95	90	75-125	5	20	
Selenium	mg/L	ND	10	10	9.8	9.3	98	93	75-125	5	20	
Silver	mg/L	ND	5	5	4.9	4.6	97	92	75-125	5	20	

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QUALITY CONTROL DATA

Project: SEVERANCE STATION
Pace Project No.: 60100143

QC Batch: MERP/5216
QC Batch Method: EPA 7470
Analysis Method: EPA 7470
Analysis Description: 7470 Mercury TCLP
Associated Lab Samples: 6099915008

METHOD BLANK: 824262 Matrix: Water
Associated Lab Samples: 6099915008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	2.0	06/03/11 15:20	

LABORATORY CONTROL SAMPLE: 824263

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.4	89	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 824264 824265

Parameter	Units	6099915008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	15	15	13.4	13.7	90	91	75-125	2	19	

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QUALITY CONTROL DATA

Project: SEVERANCE STATION
Pace Project No.: 60100143

QC Batch: MSV/37500
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV TCLP
Associated Lab Samples: 6099915008

METHOD BLANK: 823813 Matrix: Water
Associated Lab Samples: 6099915008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	50.0	06/02/11 14:15	
1,2-Dichloroethane-d4 (S)	%	102	83-120	06/02/11 14:15	
4-Bromofluorobenzene (S)	%	99	82-121	06/02/11 14:15	
Dibromofluoromethane (S)	%	101	85-113	06/02/11 14:15	
Toluene-d8 (S)	%	101	81-117	06/02/11 14:15	

LABORATORY CONTROL SAMPLE: 823814

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	1000	1010	101	81-120	
1,2-Dichloroethane-d4 (S)	%			100	83-120	
4-Bromofluorobenzene (S)	%			102	82-121	
Dibromofluoromethane (S)	%			100	85-113	
Toluene-d8 (S)	%			100	81-117	

MATRIX SPIKE SAMPLE: 823815

Parameter	Units	6099879009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	ND	1000	980	98	53-130	
1,2-Dichloroethane-d4 (S)	%				99	83-120	
4-Bromofluorobenzene (S)	%				101	82-121	
Dibromofluoromethane (S)	%				99	85-113	
Toluene-d8 (S)	%				100	81-117	

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QUALIFIERS

Project: SEVERANCE STATION
Pace Project No.: 60100143

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is NELAP accredited. Contact your Pace PM for the current list of accredited analytes.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: SEVERANCE STATION
Pace Project No.: 60100143

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
6099915008	WASTE	EPA 3010	MPRP/14376	EPA 6010	ICP/12503
6099915008	WASTE	EPA 7470	MERP/5216	EPA 7470	MERC/5187
6099915008	WASTE	EPA 8260	MSV/37500		

NOTICE: This report is required by 49 CFR Part 195. Failure to report can result in a civil penalty not to exceed $100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122.	OMB NO: 2137-0047 EXPIRATION DATE: 01/31/2014

U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	**Original Report Date:**	08/21/2014
	No.	20140298 - 19675 --- (DOT Use Only)

ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0047. Public reporting for this collection of information is estimated to be approximately 10 hours per response (5 hours for a small release), including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.

INSTRUCTIONS

Important: *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline.*

PART A - KEY REPORT INFORMATION

Report Type: *(select all that apply)*	**Original:**	**Supplemental:**	**Final:**
	Yes		
Last Revision Date:			

1. Operator's OPS-issued Operator Identification Number (OPID):	32334
2. Name of Operator	TC OIL PIPELINE OPERATIONS INC
3. Address of Operator:	
3a. Street Address	717 TEXAS AVE
3b. City	HOUSTON
3c. State	Texas
3d. Zip Code	77002
4. Local time *(24-hr clock)* and date of the Accident:	07/24/2014 15:55
5. Location of Accident:	
Latitude:	29.991106
Longitude:	-93.993675
6. National Response Center Report Number (if applicable):	1090163
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	07/24/2014 17:20
8. Commodity released: *(select only one, based on predominant volume released)*	Crude Oil
- Specify Commodity Subtype:	
- If "Other" Subtype, Describe:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Ethanol Blend, then % Ethanol Blend: %:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Biodiesel, then Biodiesel Blend (e.g. B2, B20, B100): B	
9. Estimated volume of commodity released unintentionally (Barrels):	1.00
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):	
11. Estimated volume of commodity recovered (Barrels):	1.00
12. Were there fatalities?	No
- If Yes, specify the number in each category:	
12a. Operator employees	
12b. Contractor employees working for the Operator	
12c. Non-Operator emergency responders	
12d. Workers working on the right-of-way, but NOT associated with this Operator	
12e. General public	
12f. Total fatalities (sum of above)	
13. Were there injuries requiring inpatient hospitalization?	No
- If Yes, specify the number in each category:	
13a. Operator employees	
13b. Contractor employees working for the Operator	
13c. Non-Operator emergency responders	

13d. Workers working on the right-of-way, but NOT associated with this Operator	
13e. General public	
13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	Yes
- If No, Explain:	
- If Yes, complete Questions 14a and 14b: *(use local time, 24-hr clock)*	
14a. Local time and date of shutdown:	07/24/2014 15:56
14b. Local time pipeline/facility restarted:	07/25/2014 21:53
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	No
16. Did the commodity explode?	No
17. Number of general public evacuated:	0
18. Time sequence *(use local time, 24-hour clock)*:	
18a. Local time Operator identified Accident:	07/24/2014 15:55
18b. Local time Operator resources arrived on site:	07/24/2014 16:08

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the origin of Accident onshore?	Yes
If Yes, Complete Questions (2-12)	
If No, Complete Questions (13-15)	
- If Onshore:	
2. State:	Texas
3. Zip Code:	77651
4. City	Nederland
5. County or Parish	Jefferson
6. Operator-designated location:	
Specify:	
7. Pipeline/Facility name:	Nederland Tank Facility
8. Segment name/ID:	
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Totally contained on Operator-controlled property
11. Area of Accident (as found):	Aboveground
Specify:	
- If Other, Describe:	
Depth-of-Cover (in):	
12. Did Accident occur in a crossing?	
- If Yes, specify below:	
- If Bridge crossing –	
Cased/ Uncased:	
- If Railroad crossing –	
Cased/ Uncased/ Bored/drilled	
- If Road crossing –	
Cased/ Uncased/ Bored/drilled	
- If Water crossing –	
Cased/ Uncased	
- Name of body of water, if commonly known:	
- Approx. water depth (ft) at the point of the Accident:	
- Select:	
- If Offshore:	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- On the Outer Continental Shelf (OCS) - Specify:	
- Area:	
- Block #:	
15. Area of Accident:	

PART C - ADDITIONAL FACILITY INFORMATION

1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Pipeline, Including Valve Sites
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	
3. Item involved in Accident:	Valve

- If Pipe, specify:	
3a. Nominal diameter of pipe (in):	
3b. Wall thickness (in):	
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	
3d. Pipe specification:	
3e. Pipe Seam , specify:	
- If Other, Describe:	
3f. Pipe manufacturer:	
3g. Year of manufacture:	
3h. Pipeline coating type at point of Accident, specify:	
- If Other, Describe:	
- If Weld, including heat-affected zone, specify:	
- If Other, Describe:	
- If Valve, specify:	Auxiliary or Other Valve
- If Mainline, specify:	
- If Other, Describe:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	
- If Other - Describe:	
- If Other, describe:	
4. Year item involved in Accident was installed:	
5. Material involved in Accident:	
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Leak
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	Seal or Packing
- If Other, Describe:	
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	

PART D - ADDITIONAL CONSEQUENCE INFORMATION

1. Wildlife impact:	
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	
3. Long term impact assessment performed or planned:	
4. Anticipated remediation:	
4a. If Yes, specify all that apply:	
- Surface water	
- Groundwater	
- Soil	
- Vegetation	
- Wildlife	
5. Water contamination:	No
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	
- Groundwater	
- Drinking water: *(Select one or both)*	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	
5c. Name of body of water, if commonly known:	
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	No
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	No
7a. If Yes, specify HCA type(s): *(Select all that apply)*	
- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect"	

determination for this Accident site in the Operator's Integrity Management Program?	
- High Population Area:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Other Populated Area	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Drinking Water	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Ecological	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
8. Estimated Property Damage:	
8a. Estimated cost of public and non-Operator private property damage	$ 0
8b. Estimated cost of commodity lost	$ 180
8c. Estimated cost of Operator's property damage & repairs	$ 200
8d. Estimated cost of Operator's emergency response	$ 9,182
8e. Estimated cost of Operator's environmental remediation	$ 0
8f. Estimated other costs	$ 0
Describe:	
8g. Total estimated property damage (sum of above)	$ 9,562

PART E - ADDITIONAL OPERATING INFORMATION

1. Estimated pressure at the point and time of the Accident (psig):	
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	
3. Describe the pressure on the system or facility relating to the Accident (psig):	
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	Yes
- If Yes - (*Complete 5a. – 5e. below)*	
5a. Type of upstream valve used to initially isolate release source:	
5b. Type of downstream valve used to initially isolate release source:	
5c. Length of segment isolated between valves (ft):	
5d. Is the pipeline configured to accommodate internal inspection tools?	
- If No, Which physical features limit tool accommodation? (*select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	
- If Yes, Which operational factors complicate execution? (*select all that apply*)	
- Excessive debris or scale, wax, or other wall buildup	

- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	> 20% SMYS Regulated Trunkline/Transmission
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	
If Yes -	
6a. Was it operating at the time of the Accident?	
6b. Was it fully functional at the time of the Accident?	
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	
- If Yes:	
7a. Was it operating at the time of the Accident?	
7b. Was it fully functional at the time of the Accident?	
7c. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	
7d. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	
8. How was the Accident initially identified for the Operator?	
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Guard Patrol by Operator or its contractor" is selected in Question 8, specify the following:	
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	
- If No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)*	
- If Yes, specify investigation result(s): *(select all that apply)*	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
Provide an explanation for why not:	
- Investigation identified no control room issues	
- Investigation identified no controller issues	
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above:	
Describe:	

PART F - DRUG & ALCOHOL TESTING INFORMATION

1. As a result of this Accident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
1a. Specify how many were tested:	
1b. Specify how many failed:	

2. As a result of this Accident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
2a. Specify how many were tested:	
2b. Specify how many failed:	

PART G – APPARENT CAUSE

Select only one box from PART G in shaded column on left representing the APPARENT Cause of the Accident, and answer the questions on the right. Describe secondary, contributing or root causes of the Accident in the narrative (PART H).

Apparent Cause:	G8 - Other Incident Cause
G1 - Corrosion Failure - only one **sub-cause** can be picked from shaded left-hand column	
External Corrosion:	
Internal Corrosion:	
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground?	
- If Yes :	
4a. Was failed item considered to be under cathodic protection at the time of the Accident?	
If Yes - Year protection started:	
4b. Was shielding, tenting, or disbonding of coating evident at the point of the Accident?	
4c. Has one or more Cathodic Protection Survey been conducted at the point of the Accident?	
If "Yes, CP Annual Survey" – Most recent year conducted:	
If "Yes, Close Interval Survey" – Most recent year conducted:	
If "Yes, Other CP Survey" – Most recent year conducted:	
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	
- If Internal Corrosion:	
6. Results of visual examination:	
- Other:	
7. Type of corrosion *(select all that apply)*: -	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	
- Erosion	
- Other:	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following *(select all that apply)*: -	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
9. Location of corrosion *(select all that apply)*: -	
- Low point in pipe	
- Elbow	
- Other:	

- If Other, Describe:	
10. Was the commodity treated with corrosion inhibitors or biocides?	
11. Was the interior coated or lined with protective coating?	
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	
13. Were corrosion coupons routinely utilized?	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Tank/Vessel.	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
15. Has one or more internal inspection tool collected data at the point of the Accident?	
15a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage Tool	
Most recent year:	
- Ultrasonic	
Most recent year:	
- Geometry	
Most recent year:	
- Caliper	
Most recent year:	
- Crack	
Most recent year:	
- Hard Spot	
Most recent year:	
- Combination Tool	
Most recent year:	
- Transverse Field/Triaxial	
Most recent year:	
- Other	
Most recent year:	
Describe:	
16. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
If Yes -	
Most recent year tested:	
Test pressure:	
17. Has one or more Direct Assessment been conducted on this segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident::	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
18a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G2 - Natural Force Damage - only one **sub-cause** can be picked from shaded left-handed column	
Natural Force Damage – Sub-Cause:	
- If Earth Movement, NOT due to Heavy Rains/Floods:	
1. Specify:	

- If Other, Describe:	
- If Heavy Rains/Floods:	
2. Specify:	
- If Other, Describe:	
- If Lightning:	
3. Specify:	
- If Temperature:	
4. Specify:	
- If Other, Describe:	
- If High Winds:	
- If Other Natural Force Damage:	
5. Describe:	
Complete the following if any Natural Force Damage sub-cause is selected.	
6. Were the natural forces causing the Accident generated in conjunction with an extreme weather event?	
6a. If Yes, specify: *(select all that apply)*	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Describe:	
G3 - Excavation Damage - only one **sub-cause** can be picked from shaded left-hand column	
Excavation Damage – Sub-Cause:	
- If Excavation Damage by Operator (First Party):	
- If Excavation Damage by Operator's Contractor (Second Party):	
- If Excavation Damage by Third Party:	
- If Previous Damage due to Excavation Activity:	
Complete Questions 1-5 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
1. Has one or more internal inspection tool collected data at the point of the Accident?	
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
4. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	

5. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
5a. If Yes, for each examination, conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
Complete the following if Excavation Damage by Third Party is selected as the sub-cause.	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from: *(select all that apply)* -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: *(select all that apply)* -	
- Public	
- If "Public", Specify:	
- Private	
- If "Private", Specify:	
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks visible in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption (hours)	
17. Description of the CGA-DIRT Root Cause *(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):*	
Root Cause:	
- If One-Call Notification Practices Not Sufficient, specify:	
- If Locating Practices Not Sufficient, specify:	
- If Excavation Practices Not Sufficient, specify:	
- If Other/None of the Above, explain:	
G4 - Other Outside Force Damage *- only one **sub-cause** can be selected from the shaded left-hand column*	
Other Outside Force Damage – Sub-Cause:	
- If Nearby Industrial, Man-made, or Other Fire/Explosion as Primary Cause of Incident:	
- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:	
1. Vehicle/Equipment operated by:	
- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring:	

2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Heavy Rains/Flood	
- Other	
- If Other, Describe:	
- If Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation:	
- If Electrical Arcing from Other Equipment or Facility:	
- If Previous Mechanical Damage NOT Related to Excavation:	
Complete Questions 3-7 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
3. Has one or more internal inspection tool collected data at the point of the Accident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
6. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
7. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
- If Intentional Damage:	
8. Specify:	
- If Other, Describe:	
- If Other Outside Force Damage:	
9. Describe:	

G5 - Material Failure of Pipe or Weld - only one **sub-cause** can be selected from the shaded left-hand column	
Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."	
Material Failure of Pipe or Weld – Sub-Cause:	
1. The sub-cause selected below is based on the following: *(select all that apply)*	
- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Original Manufacturing-related (NOT girth weld or other welds formed in the field):	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related:	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Environmental Cracking-related:	
3. Specify:	
- Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional factors: (*select all that apply*):	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Describe:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	

Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
7. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident -	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site -	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G6 – Equipment Failure - only one **sub-cause** can be selected from the shaded left-hand column	
Equipment Failure – Sub-Cause:	
- If Malfunction of Control/Relief Equipment:	
1. Specify: *(select all that apply)* -	
- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	
- Relief Valve	
- Power Failure	
- Stopple/Control Fitting	
- ESD System Failure	
- Other	
- If Other – Describe:	
- If Pump or Pump-related Equipment:	
2. Specify:	
- If Other – Describe:	
- If Threaded Connection/Coupling Failure:	
3. Specify:	
- If Other – Describe:	
- If Non-threaded Connection Failure:	
4. Specify:	
- If Other – Describe:	
- If Defective or Loose Tubing or Fitting:	
- If Failure of Equipment Body (except Pump), Tank Plate, or other Material:	
- If Other Equipment Failure:	
5. Describe:	
Complete the following if any Equipment Failure sub-cause is selected.	
6. Additional factors that contributed to the equipment failure: *(select all that apply)*	
- Excessive vibration	
- Overpressurization	
- No support or loss of support	
- Manufacturing defect	

- Loss of electricity	
- Improper installation	
- Mismatched items (different manufacturer for tubing and tubing fittings)	
- Dissimilar metals	
- Breakdown of soft goods due to compatibility issues with transported commodity	
- Valve vault or valve can contributed to the release	
- Alarm/status failure	
- Misalignment	
- Thermal stress	
- Other	
- If Other, Describe:	

G7 - Incorrect Operation - only one **sub-cause** can be selected from the shaded left-hand column

Incorrect Operation – Sub-Cause:	
Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage	
Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow	
1. Specify:	
- If Other, Describe:	
Valve Left or Placed in Wrong Position, but NOT Resulting in a Tank, Vessel, or Sump/Separator Overflow or Facility Overpressure	
Pipeline or Equipment Overpressured	
Equipment Not Installed Properly	
Wrong Equipment Specified or Installed	
Other Incorrect Operation	
2. Describe:	
Complete the following if any Incorrect Operation sub-cause is selected.	
3. Was this Accident related to *(select all that apply)*: -	
- Inadequate procedure	
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	

G8 - Other Accident Cause - only one **sub-cause** can be selected from the shaded left-hand column

Other Accident Cause – Sub-Cause:	Miscellaneous
- If Miscellaneous:	
1. Describe:	Packing failure of the Rising Stem Gate Valve, MOV-2201
- If Unknown:	
2. Specify:	

PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT

The packing failed on the MOV-2201, a rising stem gate valve, causing product to overflow the site glass and spill to the ground.

File Full Name

File Full Name

PART I - PREPARER AND AUTHORIZED SIGNATURE

Preparer's Name	Erik Hughes
Preparer's Title	Compliance Specialist
Preparer's Telephone Number	4024907253
Preparer's E-mail Address	erik_hughes@transcanada.com
Preparer's Facsimile Number	
Authorized Signature's Name	Daniel Cerkoney
Authorized Signature Title	
Authorized Signature Telephone Number	(832)320-5171
Authorized Signature Email	dan_cerkoney@transcanada.com
Date	08/19/2014

Certified Mail No. 7006-2150-0005-3229-2394

TransCanada
In business to deliver

Neal Heil
Nebraska Department of Environmental Quality
P.O. Box 98922
Lincoln, NE 68509

Re: NDEQ Spill #021111-NH-1730

Dear Mr. Heil,

On February 11, 2011, TransCanada Keystone Pipeline L.P. (TransCanada) contacted the Nebraska Department of Environmental Quality (NDEQ) to report an approximately 75 gallon crude oil release at our David City Pump Station facility located at 1016 36th Road, David City, Nebraska. TransCanada and our subcontractor Seneca Waste Solutions conducted cleanup activities from February 11 – 17, 2011 that included cleaning oil stained piping and facility equipment as well as removal of oil stained site gravel.

One 20 yd^3 roll-off of oil stained gravel totaling 12.23 tons, and a second 20 yd^3 roll-off of oil impacted rags and absorbents totaling 1.24 tons were disposed of on March 17, 2011 at Pheasant Point Landfill in Bennington, NE. Find attached the waste disposal manifests and landfill receipts.

TransCanada is providing this information as follow up to Spill Report #021111-NH-1730 in order to close out the incident.

Please contact me if you have any questions.

Sincerely,

Robert M. Baumgartner
Environmental Program Manager

Attachment

017614

Copy

WASTE MANAGEMENT

Pheasant Point Landfill

Bennington, NE 68007
Phone (402) 444-7924

Ticket: 568749
Date: 3/17/2011
Time: 11:03:33 - 11:48
Scale
Gross: 47100 lb In Scale
Tare: 44620 lb Out Scale
Net: 2480 lb

Truck: NAZMATT198
Customer: 2/WASTEMANGEMENT

Generator: CS00001/Trans Canada(Keys Profile: 101938NE/Oil Contaminated

Comment: T 198
CRUDE OIL SOIL AND GRAVEL

Origin	Materials & Services	Quantity Unit	Rate/Unit	Amou
NA/Not Applicable	100% of CS/Contaminated Soil	1.24 ton	$18.50/Ton	$22.

Total Amount: $22.

Driver: _____ Deputy Weighmaster: _____
scale

203 WM

017615

HAZMATT 198

TC-DC0004

WASTE MANAGEMENT, INC.

Special Waste Manifest Disposal Ticket

Disposal Site: Pheasant Point Landfill

Bill To: WM Omaha WM ACCT #2

Transporter: ~~Waste Management~~ Haz-Mat Response Inc. 3E2110079

Generator: TransCanada (Keystone Pipeline)

Location: 1016 36th Road David City, NE 68632

Generator's Signature or Designee: M Schooley

Waste Description: Crude oil contaminated soil and gravel

Profile Number: 101938NE

PHEASANT POINT LANDFILL

Accepted By: _____ Date: 3-12-11

Driver's Signature: Dennis Smith Date: 3-17-11

Truck # T. 158
Trailer #0
Box # 78335

017616

WASTE MANAGEMENT

Pheasant Point Landfill

Bennington, NE 68007
Phone (402) 444-7924

Ticket: 568740
Date: 3/17/2011
Time: 11:01:11 - 11:3
Scale
Gross: 68820 lb In Scale
Tare: 44360 lb Out Scale
Net: 24460 lb

Truck: HAZMAT
Customer: 2/WASTEMANGEMENT

Profile: 101930NE/Oil Contaminated

Generator: CS00001/Trans Canada Keys

Comment: T 182
CRUDE OIL SOIL AND GRAVEL

Origin	Materials & Services	Quantity	Unit	Rate/Unit	Amou
NA/Not Applicable	100% of CS/Contaminated Soil	12.23	ton	$18.50/Ton	$226.

Total Amount: $226.

Driver: _____ Deputy Weighmaster: _____
scale

203 WM

017617

T 182

TC-DC0004

WASTE MANAGEMENT, INC.

Special Waste Manifest Disposal Ticket

Disposal Site: Pheasant Point Landfill

Bill To: WM Omaha WM ACCT #2

Transporter: Haz-Mat Response Inc ~~Waste Management~~ 3E0110079

Generator: TransCanada (Keystone Pipeline)

Location: 1016 36th Road David City, NE 68632

Generator's Signature or Designee: N Shockley

Waste Description: Crude oil contaminated soil and gravel

Profile Number: 101938NE

PHEASANT POINT LANDFILL

Accepted By: _____ Date: 3-17-11

Driver's Signature: Paul Martin Date: 3-17-11

Truck # T-182

TR # 104

R/O Box #: 74636

Dave Heineman
Governor

STATE OF NEBRASKA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Michael J. Linder
Director
Suite 400, The Atrium
1200 'N' Street
P.O. Box 98922
Lincoln, Nebraska 68509-8922
Phone (402) 471-2186
FAX (402) 471-2909
website: www.deq.state.ne.us

APR 21 2011

MR BOB BAUMGARTENER
TRANSCANADA PIPELINE
717 TEXAS STREET
HOUSTON TX 77002

RE: Clean-up of crude oil release at 1016 36th Road, near David City, Nebraska
Spill# 021111-NH-1730, IIS# 97897

Dear Mr. Baumgartener:

The Department has reviewed the follow-up report provided by you regarding the clean-up of a crude oil release that occurred at the above referenced location on February 11, 2011. Based on the information provided in the report, no additional remedial actions will be required at this time. However, if a problem arises in the future as a result of this release, Transcanada Pipeline will remain responsible for further remedial actions.

Thank you for your cooperation in this matter. If you have any questions or comments, please feel free to contact me at (402) 471-4237.

Sincerely,

Dale D. Busch
Unit Supervisor/Geologist
Petroleum Remediation Section
Water Quality Division

db

DENR FILE #: 2,011.004

WRITTEN CONTAMINATION INCIDENT FOLLOW-UP REPORT
(Page 1 of 2)

RETURN COMPLETED FORM TO

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
GROUND WATER QUALITY PROGRAM
JOE FOSS BUILDING
523 EAST CAPITOL AVENUE
PIERRE SD 57501-3182

SITE NAME: TransCanada Keystone Pipeline - Ferney Pump Station

SPILL LOCATION: 41461 144th Street, Andover, SD 57442

LATITUDE/LONGITUDE: 45.2975 / -97.9488

LEGAL LOCATION (TOWNSHIP/RANGE): T121N R059W S017

RESPONSIBLE PARTY: TransCanada Keystone Pipeline, LP

MAILING ADDRESS: 13710 FNB Parkway, Suite 300

CITY: Omaha, NE 68154

TELEPHONE: _____ (HOME) (402) 492-7300 (WORK)

DATE OF SPILL OR WHEN DETECTED: January 5, 2011 TIME: 8:00 am

WHAT WAS THE DURATION OF THE RELEASE? < 48 hours

SUBSTANCE(S) RELEASED: Crude Oil

QUANTITY RELEASED: ~ 2 gallons

CHEMICAL NAME: Canadian Sour Crude
CAS# 8002.05.09

CAS #:

IS SUBSTANCE ON THE "SARA 302 LIST"? YES ____ NO X DON'T KNOW ____
"CERCLA HAZARDOUS SUBSTANCE LIST"? YES ____ NO X DON'T KNOW ____
"SOUTH DAKOTA REGULATED SUBSTANCE"? YES X NO ____ DON'T KNOW ____

CONSULTANT: NA

IDENTIFY KNOWN HEALTH RISKS: None Known

WHAT PERTINENT MEDICAL ADVICE WAS ISSUED? None Required

LAND USE (RESIDENTIAL, INDUSTRIAL, RURAL, OTHER): Rural

UTILITIES INVESTIGATED (WATER, SEWER, TELEPHONE, CATV, STORM WATER, OTHER): _____

Leak occurred in a rural setting within the boundaries of the pump station, no utilities.

FOLLOW-UP REPORT CONTINUED
(Page 2 of 2)

DENR FILE #: 2,011.004

ENVIRONMENTAL MEDIA IMPACTED (SURFACE SOIL, SUBSURFACE SOIL > 3' BELOW GROUND, GROUND WATER, SURFACE WATER, INDOOR AIR, OUTDOOR AIR, ETC.):
Oil sprayed on pump equipment in the immediate area of the seal leak, on concrete pump foundation, and snow adjacent to foundation.

DISTANCE TO AND NAME OF CLOSEST SURFACE WATER OR DRAINAGE:
Road ditch along County Rd. 22

DEPTH/DISTANCE TO AND NAME OF CLOSEST AQUIFER: Unknown

DEPTH/DISTANCE TO NEAREST DRINKING WATERWELL: Suspect >1 mile N on CO Rd 41 (unconfirmed)

CUBIC YARDS OF SOIL EXCAVATED/TREATED: NA

WAS FREE PHASE OR POOLED PRODUCT PRESENT? Yes, limited to surface of pump, concrete pad, snow.

DIMENSIONS OF EXCAVATION: NA

CONTAMINATED MATERIALS DISPOSAL SITE: Two 55-gallon drums of oily absorbent / rags and snow

DATE MATERIAL WAS DISPOSED OF: Pending waste characterization results - scheduled for week of 02-14-2011.

IMMEDIATE CORRECTIVE ACTION TAKEN AND ADDITIONAL WORK PLANNED:
TransCanada technician, upon arrival onsite at 8:00am 01-05-2011, observed the indications of a seal leak. The pump was not operating (was shutdown for no demand at 5:30am 01-05-2011). The technician closed associated suction and discharge valves and immediately initiated remedial activities to contain and clean oil from the pump foundation using absorbent material. Also visually stained snow around the foundation was shoveled up and drummed. A spill cleanup contractor was mobilized to the site to clean off the oiled pump surface and adjacent piping using a non-hazardous citrus based cleaner. Pump and piping cleanup was concluded on 01-06-2011.

Photo 1 is provided as a reference, showing extent of the leak and oil stained equipment.

FORM COMPLETED BY: Robert M. Baumgartner DATE: February 2, 2011

017622

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

March 9, 2011

Robert Baumgartner
TransCanada Keystone Pipeline, LP
13710 FNB Parkway
Omaha NE 68154

Subject: Closure of Department of Environment and Natural Resources File 2011.004 – TransCanada Keystone Pipeline – Ferney Pump Station

Dear Mr. Baumgartner,

The Department of Environment and Natural Resources reviewed all information submitted regarding the above referenced spill. The department has determined the case is closed.

On January 5, 2011, TransCanada staff noticed indications of a leaking seal at the Ferney Pump Station. In response to the two-gallon release, TransCanada staff isolated and stopped the leak and initiated cleanup activities. Six drums of oiled absorbents, rags and snow were collected and properly disposed of. There were no soil or water impacts resulting from the release.

The department has concluded based on the clean-up activities TransCanada conducted, this crude oil spill poses no risk at this time. Therefore, the department will not require TransCanada to take any additional action in this matter. If problems arise because of any remaining contamination, TransCanada may be responsible for conducting additional assessment and remediation.

Please contact Brian Walsh of my staff at (605) 773-3296, if you have any questions. Thank you for your efforts and cooperation regarding this spill.

Sincerely,

Bill Markley, Administrator
Ground Water Quality Program
(605) 773-3296

cc: Wes Williams, Day County emergency Management, Webster, SD

P00001-0005230 loz BRE

safety-kleen®

SAFETY-KLEEN SYSTEMS, INC
5360 LEGACY DRIVE
PLANO, TX 75024

DUNS NO: 05-397-6551
FED ID NO: 39-6090019

ORIGINAL INVOICE

Account Number	Invoice Number	Invoice Date	Terms
0003276060	53273316	02/16/11	Net 30

BILL TO ADDRESS
TRANSCANADA KEYSTONE PIPELINE LP
ATTN ROBERT BAUMGARTNER
717 TEXAS ST
HOUSTON, TX 77002-2761

SERVICE LOCATION
TRANSCANADA KEYSTONE PIPELINE LP
41461 144TH ST
ANDOVER, SD 57442

SK Service Facility
BR SIOUX FALLS

Special Billing Code #
NS 001 56

Facility Phone	Service Date	Service Number
605-332-0231	02/14/2011	0010014341

Department #	Department	Release #	Transporter	Manifest #	Tax Status/#	PO Number
				003826920fle		

QUANTITY	DESC./REFERENCE NUMBER	PRICE PER	SALES TAX	ITEM TOTAL
3.000	LANDFILL -NON-USDOT HAZ/NON-RCRA LIQUIDS 0000088888-07-040465775-0875480 SPILL CLEAN UP - FERN 1	197.0000 DR	35.46	626.46
3.000	LANDFILL -NON-USDOT HAZ/NON-RCRA LIQUIDS 0000088888-07-040465778-0875480 SPILL CLEAN UP - FERN 2	197.0000 DR	35.46	626.46
1.000	FEE, FUEL SURCHARGE 0000100001-24-000000000-0000000	12.2600 EA	0.74	13.00
4.000	DRUM OPEN HEAD 55GL - BLACK - USED 0008003369-24-000000000-0000000	75.0000 EA	18.00	318.00
1.000	PROFILE, MANUAL OR PAPER 0000082100-24-000000000-0000000	0.0000 EA	0.00	0.00

OK To Pay
Robert M. Baumgartner #87309
FERN 4 Pump Station — 1-5-11 LEAK
Raymond Waste Disposal

SUBTOTAL	1,494.26
TOTAL TAX	89.66
TOTAL AMOUNT DUE	**$1,583.92**

Comments
Please be advised delinquent payments may result in a Late Payment Charge of $25.00. To avoid a Late Payment Charge and service interruptions, please ensure that all payments are received by the invoice due date.

The leading provider of responsible cleaning, environmental and re-refining solutions.

Please detach and enclose this coupon with your payment.

safety-kleen®

Account Number	Invoice Number	Invoice Date	Service Number
0003276060	53273316	02/16/11	0010014341

SAFETY-KLEEN SYSTEMS, INC
5360 LEGACY DRIVE
PLANO, TX 75024

PLEASE RETURN THIS PORTION WITH PAYMENT.
MAKE ANY ADDRESS CORRECTIONS BELOW.

Date Due	Amount Due
03/18/11	$1,583.92

00053273316000327606070000158392 5

7518 0100 MULTI RP 17 02172011 YNNNNNNN 0003478 S1 T11
3478 1 MB 0.379

TRANSCANADA KEYSTONE PIPELINE LP
ATTN ROBERT BAUMGARTNER
717 TEXAS ST
HOUSTON TX 77002-2761

SAFETY-KLEEN
PO BOX 650509
DALLAS, TX 75265-0509

017624

P00001-0000049 loz BRE

safety-kleen®

SAFETY-KLEEN SYSTEMS, INC
5360 LEGACY DRIVE
PLANO, TX 75024

DUNS NO: 05-397-6551
FED ID NO: 39-6090019

ORIGINAL INVOICE

Account Number	Invoice Number	Invoice Date	Terms
0003276060	52937534	01/17/11	Net 30

BILL TO ADDRESS
TRANSCANADA
ATTN ROBERT BAUMGARTNER
13710 FNB PKWY STE 300
OMAHA, NE 68154-5298

SERVICE LOCATION
TRANSCANADA KEYSTONE PIPELINE LP
41461 144TH ST
ANDOVER, SD 57442

SK Service Facility
BR SIOUX FALLS

Special Billing Code #
NS 001 56

Facility Phone
605-332-0231

Service Date
01/17/2011

Service Number
0010014341

Department #	Department	Release #	Transporter	Manifest #	Tax Status/#	PO Number

QUANTITY	DESC./REFERENCE NUMBER	PRICE PER	SALES TAX	ITEM TOTAL
2.000	TCLP VOLATILE ORGANICS LAB FEE 0000870807-07-000000000-0000000	318.0000 EA	38.16	674.16
2.000	TCLP METALS (RCRA 8) 0000870805-07-000000000-0000000	228.0000 EA	27.36	483.36
2.000	FLASH/IGNITIBILITY (D001) 0000870813-07-000000000-0000000	34.0000 EA	4.08	72.08

SUBTOTAL	1,160.00
TOTAL TAX	69.60
TOTAL AMOUNT DUE	**$1,229.60**

OK to pay
Robt M. Boyt #87309
Forney Pump Station - 1/5/11 Seal Leak - Waste Classification

Comments
Please be advised delinquent payments may result in a Late Payment Charge of $25.00. To avoid a Late Payment Charge and service interruptions, please ensure that all payments are received by the invoice due date.

The leading provider of responsible cleaning, environmental and re-refining solutions.

Please detach and enclose this coupon with your payment.

safety-kleen®

SAFETY-KLEEN SYSTEMS, INC
5360 LEGACY DRIVE
PLANO, TX 75024

safety-kleen®

Account Number	Invoice Number	Invoice Date	Service Number
0003276060	52937534	01/17/11	0010014341

PLEASE RETURN THIS PORTION WITH PAYMENT.
MAKE ANY ADDRESS CORRECTIONS BELOW.

Date Due	Amount Due
02/16/11	$1,229.60

00052937534000327606070000122960 1

7518 0100 MULTI RP 18 01182011 YNNNNNNN 0000030 S1 T3
30 1 AB 0.357

TRANSCANADA
ATTN ROBERT BAUMGARTNER
13710 FNB PKWY STE 300
OMAHA NE 68154-5298

SAFETY-KLEEN
PO BOX 650509
DALLAS, TX 75265-0509

017625 SAF001-P01001 (08-06)
24-W-3.5-3/1C

SAFETY-KLEEN
WASTE MATERIAL PROFILE

PROFILE #: 40465778

Customer #: 10014341 *Analytical Part #:*
Sales Name: Kevin Gjoraas *Employee #:* 436054 *Rep Email:* kevin.gjoraas@safety-kleen.com *Location/Branch #:* 7123 - BR Sioux Falls

A. CUSTOMER INFORMATION ☐ *Check if Billing Same*

Generator: TRANSCANADA KEYSTONE PIPELINE — *Billing Company:*
Facility Address (No P.O. Box): 41461 144TH ST — *Billing Address:*
City/State/Zip:
City/State/Zip: ANDOVER / SD / 57442 — *Billing Contact:*
Technical Contact: BOB BAUMGARTNER — *Phone:* *FAX:*
Phone: 402-492-7464 FAX: — *Email:*
☑ CESQG ☐ SQG ☐ LQG EPA ID#: CESQG State ID#:

B. SHIPPING INFORMATION
US DOT Shipping Name:
Hazardous Class/Division #: UN/NA #: Packing Group: RQ:
Size: 55 - GALLONS Container Type: STEEL Quantity: 3 Frequency: ONE-TIME ONLY

C. GENERAL MATERIAL & REGULATORY INFORMATION
Name of Material: SPILL CLEAN UP - FERN 2
Process Generating the Material: SPILL CLEAN UP

Yes	No		Yes	No	
☐	☑	Regulated or Licensed Radioactive Waste	☐	☑	Contains UHCs/Constituents of Concern: List in section D
☐	☑	Regulated Medical/Infectious Waste	☐	☑	Exempt Waste: If yes, list ref. 40 CFR
☐	☑	Waste Subject to Benzene NESHAP regulations			
☐	☑	TSCA Regulated PCB Waste: List PCB level in section D	☐	☑	State Hazardous Waste: List Codes
☐	☑	Regulated Ozone Depleting Substance	☐	☑	EPA Hazardous Waste: List Codes
☐	☑	CERCLA Regulated (Superfund) Waste	Source Code G		Form Code W

D. MATERIAL COMPOSITION (Range Total > or = 100%) or ppm

WATER/SNOW	10 - 40%
DEBRIS OIL	20 - 50%
KITTY LITTER	1 - 30%
OILY ABSORBENTS	20 - 40%
SAND/DIRT	1 - 30%

☐ Supporting documentation attached **Total:** 100%

E. REACTIVE CHARACTERITSTICS

Yes☐ No☑ React. Sulfides ____ ppm
Yes☐ No☑ React. Cyanides ____ ppm
Yes☐ No☑ Water/Air (Pyrophoric) React.
Yes☐ No☑ Oxidizer
Yes☐ No☑ Shock/Explosive
Yes☐ No☑ Polymerizable
Yes☐ No☑ Other-Comments

Elemental Constituents (ppm):

☑ No detectable Elements

Sb	NR	As	NR	Ba	NR	Be	NR	Cd	NR	Cr	NR
Pb	NR	Hg	NR	Ni	NR	Se	NR	Ag	NR	Tl	NR
V	NR										

Metals Data based on: ☑TCLP ☐Total Analysis ☐Generator Knowledge (no testing)

F. PHYSICAL CHARACTERISTICS

Flash Point: pH Range: ☐ ≤2
☐ 73-<100 ☐ 100-141 ☐ >2-4 ☑ >4-10
☑ 142-<200 ☐ ≥200 ☐ >10-<12.5 ☐ ≥12.5
Phases: 2 % Liquid: 10 - 30% Viscosity cps: 30,001- 50,000
% Sludge: % Solid: 40 - 80% % Halogens:
BTU's/lb: <5000 Specific Gravity: >1

G. COMMENTS
TCLP ANALYTICAL ATTACHED

Customer Restrictions: ☐ Yes ☐ No

H. GENERATOR'S CERTIFICATION

I hereby certify that I am an authorized agent of the generator, and warrant on behalf of the generator that the information supplied on this form and on any attachments or supplements hereto is complete and accurate, and that all known or suspected hazards of the material(s) described herein have been disclosed. I agree that if there is a discrepancy between the waste received and any information supplied on this form, that either Safety-Kleen or the generator may initiate further testing and evaluation in accordance with the terms and conditions of the contract between Safety-Kleen and the generator; that this profile certification may be amended accordingly; and that additional expenses incurred by Safety-Kleen in order to manage the waste in accordance with Federal, State, and Local regulatory requirements will be the sole responsibility of the generator, including the return of the material to the generator at generator's expense.

Generator Signature: X Printed Name and Title: BOB BAUMGARTNER - EH & S MANAGER Date: 2/4/2011

Rev: 10/02/09

017626

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

ANALYTICAL REPORT

PROJECT NO. 118305/FERN 2

SK, Cust:TRANSCANADA

Lot #: C1A170436

Safety-Kleen

Safety-Kleen Systems, Inc
PO Box 7813
Ocala, FL 34478-7813

TESTAMERICA LABORATORIES, INC.

Kathryn L. Bort
Project Manager

January 24, 2011

CASE NARRATIVE

Safety-Kleen

Lot # C1A170436

Sample Receiving:
TestAmerica's Pittsburgh laboratory received one sample on January 17, 2011. The sample was received at 2.6°C.

TCLP GC/MS Volatiles:
There were no problems associated with the analysis.

TCLP Metals:
There were no problems associated with the analysis.

General Chemistry:
There were no problems associated with the analysis.

METHODS SUMMARY

C1A170436

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Flashpoint at 140 degF	SW846 1020B	
Mercury in Liquid Waste (Manual Cold-Vapor)	SW846 7470A	SW846 1311/7470
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010B	SW846 1311/3010
Volatile Organics by GC/MS	SW846 8260B	SW846 1311/5030

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

C1A170436

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
MDD5F	001	FERN 2	01/12/11	15:00

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

SK,Cust:TRANSCANADA

118305/FERN 2

Lab Name:	TESTAMERICA PITTSBURGH	Lot Number:	C1A170436
Client Name:	Safety-Kleen Systems, Inc.	Date Received:	1/17/2011
Matrix:	SOLID	Date Sampled:	1/12/2011

GC/MS Volatile Organics in TCLP Leachate

Client Sample ID:	FERN 2	Sample Number	Analysis Date	Method Reference	Reg Limit	MDL	Result
EPA Waste #	Analyte	001			mg/L	mg/L	mg/L
D029	1,1-Dichloroethene		1/20/2011	SW846 8260B	0.7	0.043	<0.20
D028	1,2-Dichloroethane		1/20/2011	SW846 8260B	0.5	0.038	<0.20
D027	1,4-Dichlorobenzene		1/20/2011	SW846 8260B	7.5	0.021	<0.20
D018	Benzene		1/20/2011	SW846 8260B	0.5	0.040	<0.20
D019	Carbon tetrachloride		1/20/2011	SW846 8260B	0.5	0.043	<0.20
D021	Chlorobenzene		1/20/2011	SW846 8260B	100	0.021	<0.20
D022	Chloroform		1/20/2011	SW846 8260B	6	0.040	<0.20
D035	Methyl ethyl ketone		1/20/2011	SW846 8260B	200	0.043	<0.20
D039	Tetrachloroethene		1/20/2011	SW846 8260B	0.7	0.033	<0.20
D040	Trichloroethene		1/20/2011	SW846 8260B	0.5	0.032	<0.20
D043	Vinyl chloride		1/20/2011	SW846 8260B	0.2	0.052	<0.20

SK,Cust:TRANSCANADA

118305/FERN 2

Lab Name:	TESTAMERICA P TTSBURGH	Lot Number:	C1A170436
Client Name:	Safety-Kleen Systems, Inc.	Date Received:	1/17/2011
Matrix:	SOLID	Date Sampled:	1/12/2011

Metals in TCLP Leachate

Client Sample ID:	FERN 2	Sample Number	Analysis Date	Method Reference	Reg Limit	MDL	Result
EPA Waste #	Analyte	001			mg/L	mg/L	mg/L
D009	Mercury		1/19/2011	SW846 7470A	0.2	0.000038	<0.00020
D004	Arsenic		1/20/2011	SW846 6010B	5	0.0022	0.81
D005	Barium		1/20/2011	SW846 6010B	100	0.00050	0.31
D006	Cadmium		1/20/2011	SW846 6010B	1	0.00024	<0.050
D007	Chromium		1/20/2011	SW846 6010B	5	0.00084	<0.050
D008	Lead		1/20/2011	SW846 6010B	5	0.0014	<0.050
D010	Selenium		1/20/2011	SW846 6010B	1	0.0021	<0.050
D011	Silver		1/20/2011	SW846 6010B	5	0.00058	<0.050

General Chemistry

Client Sample ID:	FERN 2	Sample Number	Analysis Date	Method Reference	Reg Limit	MDL	Result
EPA Waste #	Analyte	001			deg F	deg F	deg F
D001	Flashpoint at 140 degF		1/18/2011	SW846 1020B			>140

SAFETY-KLEEN
WASTE MATERIAL PROFILE

PROFILE #: 40465775

Customer #: 10014341 *Analytical Part #:* _____

Sales Name: Kevin Gjoraas *Employee #:* 436054 *Rep Email:* kevin.gjoraas@safety-kleen.com *Location/Branch #:* 7123 - BR Sioux Falls

A. CUSTOMER INFORMATION ☐ *Check if Billing Same*

Generator: TRANSCANADA KEYSTONE PIPELINE — *Billing Company:* _____

Facility Address (No P.O. Box): 41461 144TH ST — *Billing Address:* _____

_____ — *City/State/Zip:* _____

City/State/Zip: ANDOVER / SD / 57442 — *Billing Contact:* _____

Technical Contact: BOB BAUMGARTNER — *Phone:* _____ *FAX:* _____

Phone: 402-492-7464 FAX: _____ *Email:* _____

☑ CESQG ☐ SQG ☐ LQG EPA ID#: CESQG State ID#: _____

B. SHIPPING INFORMATION

US DOT Shipping Name: _____

Hazardous Class/Division #: _____ UN/NA #: _____ Packing Group: _____ RQ: _____

Size: 55 - GALLONS Container Type: STEEL Quantity: 7 Frequency: ONE-TIME ONLY

C. GENERAL MATERIAL & REGULATORY INFORMATION

Name of Material: SPILL CLEAN UP - FERN 1

Process Generating the Material: SPILL CLEAN UP

Yes	No		Yes	No	
☐	☑	Regulated or Licensed Radioactive Waste	☐	☑	Contains UHCs/Constituents of Concern: List in section D
☐	☑	Regulated Medical/Infectious Waste	☐	☑	Exempt Waste: If yes, list ref. 40 CFR _____
☐	☑	Waste Subject to Benzene NESHAP regulations			
☐	☑	TSCA Regulated PCB Waste: List PCB level in section D	☐	☑	State Hazardous Waste: List Codes _____
☐	☑	Regulated Ozone Depleting Substance	☐	☑	EPA Hazardous Waste: List Codes _____
☐	☑	CERCLA Regulated (Superfund) Waste	Source Code G _____ Form Code W _____		

D. MATERIAL COMPOSITION (Range Total > or = 100%) or ppm

WATER/SNOW	10 - 40%
DEBRIS OIL	20 - 50%
PLASTIC BAGS	20 - 50%
SAND/DIRT	10 - 30%

☐ Supporting documentation attached **Total:** 100%

E. REACTIVE CHARACTERITSTICS

Yes☐ No☑ React. Sulfides _____ ppm

Yes☐ No☑ React. Cyanides _____ ppm

Yes☐ No☑ Water/Air (Pyrophoric) React.

Yes☐ No☑ Oxidizer

Yes☐ No☑ Shock/Explosive

Yes☐ No☑ Polymerizable

Yes☐ No☑ Other-Comments

Elemental Constituents (ppm):

☑ No detectable Elements

Sb	NR	As	NR	Ba	NR	Be	NR	Cd	NR
Cr	NR	Pb	NR	Hg	NR	Ni	NR	Se	NR
Ag	NR	Tl	NR	V	NR				

Metals Data based on: ☑TCLP ☐Total Analysis ☐Generator Knowledge (no testing)

F. PHYSICAL CHARACTERISTICS

Flash Point: _____ pH Range: ☐ ≤2

☐ 73-<100 ☐ 100-141 ☐ >2-4 ☑ >4-10

☑ 142-<200 ☐ ≥200 ☐ >10-<12.5 ☐ ≥12.5

Phases: 2 % Liquid: 10 - 40% Viscosity cps: 30,001-50,000

% Sludge: _____ % Solid: 30 - 70% % Halogens: _____

BTU's/lb: <5000 Specific Gravity: >1

G. COMMENTS

TCLP ANALYTICAL ATTACHED

Customer Restrictions: ☐ Yes ☐ No

H. GENERATOR'S CERTIFICATION

I hereby certify that I am an authorized agent of the generator, and warrant on behalf of the generator that the information supplied on this form and on any attachments or supplements hereto is complete and accurate, and that all known or suspected hazards of the material(s) described herein have been disclosed. I agree that if there is a discrepancy between the waste received and any information supplied on this form, that either Safety-Kleen or the generator may initiate further testing and evaluation in accordance with the terms and conditions of the contract between Safety-Kleen and the generator; that this profile certification may be amended accordingly; and that additional expenses incurred by Safety-Kleen in order to manage the waste in accordance with Federal, State, and Local regulatory requirements will be the sole responsibility of the generator, including the return of the material to the generator at generator's expense.

Generator Signature: X _____ Printed Name and Title: ROBERT BAUMGARTNER - EH & S MANAGER Date: 2/4/2011

Rev: 10/02/09

017633

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

ANALYTICAL REPORT

PROJECT NO. 118305/FERN 1

SK, Cust: TRANSCANADA

Lot #: C1A170446

Safety-Kleen

Safety-Kleen Systems, Inc
PO Box 7813
Ocala, FL 34478-7813

TESTAMERICA LABORATORIES, INC.

Kathryn L. Bort
Project Manager

January 24, 2011

CASE NARRATIVE

Safety-Kleen

Lot # C1A170446

Sample Receiving:
TestAmerica's Pittsburgh laboratory received one sample on January 17, 2011. The sample was received at 2.6°C.

TCLP GC/MS Volatiles:
There were no problems associated with the analysis.

TCLP Metals:
There were no problems associated with the analysis.

General Chemistry:
There were no problems associated with the analysis.

METHODS SUMMARY

C1A170446

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Flashpoint at 140 degF	SW846 1020B	
Mercury in Liquid Waste (Manual Cold-Vapor)	SW846 7470A	SW846 1311/7470
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010B	SW846 1311/3010
Volatile Organics by GC/MS	SW846 8260B	SW846 1311/5030

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

C1A170446

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
MDD59	001	FERN 1	01/12/11	15:00

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

SK,Cust:TRANSCANADA

118305/FERN 1

Lab Name:	TESTAMERICA PITTSBURGH	Lot Number:	C1A170446
Client Name:	Safety-Kleen Systems, Inc.	Date Received:	1/17/2011
Matrix:	SOLID	Date Sampled:	1/12/2011

GC/MS Volatile Organics in TCLP Leachate

Client Sample ID:	FERN 1	Sample Number	Analysis Date	Method Reference	Reg Limit	MDL	Result
EPA Waste #	Analyte	001			mg/L	mg/L	mg/L
D029	1,1-Dichloroethene		1/20/2011	SW846 8260B	0.7	0.043	<0.20
D028	1,2-Dichloroethane		1/20/2011	SW846 8260B	0.5	0.038	<0.20
D027	1,4-Dichlorobenzene		1/20/2011	SW846 8260B	7.5	0.021	<0.20
D018	Benzene		1/20/2011	SW846 8260B	0.5	0.040	<0.20
D019	Carbon tetrachloride		1/20/2011	SW846 8260B	0.5	0.043	<0.20
D021	Chlorobenzene		1/20/2011	SW846 8260B	100	0.021	<0.20
D022	Chloroform		1/20/2011	SW846 8260B	6	0.040	<0.20
D035	Methyl ethyl ketone		1/20/2011	SW846 8260B	200	0.043	<0.20
D039	Tetrachloroethene		1/20/2011	SW846 8260B	0.7	0.033	<0.20
D040	Trichloroethene		1/20/2011	SW846 8260B	0.5	0.032	<0.20
D043	Vinyl chloride		1/20/2011	SW846 8260B	0.2	0.052	<0.20

SK,Cust:TRANSCANADA

118305/FERN 1

Lab Name:	TESTAMERICA PITTSBURGH	Lot Number:	C1A170446
Client Name:	Safety-Kleen Systems, Inc.	Date Received:	1/17/2011
Matrix:	SOLID	Date Sampled:	1/12/2011

Metals in TCLP Leachate

Client Sample ID: FERN 1		Sample Number	Analysis Date	Method Reference	Reg Limit	MDL	Result
EPA Waste #	Analyte	001			mg/L	mg/L	mg/L
D009	Mercury		1/19/2011	SW846 7470A	0.2	0.000038	<0.00020
D004	Arsenic		1/20/2011	SW846 6010B	5	0.0022	0.17
D005	Barium		1/20/2011	SW846 6010B	100	0.00050	0.31
D006	Cadmium		1/20/2011	SW846 6010B	1	0.00024	<0.050
D007	Chromium		1/20/2011	SW846 6010B	5	0.00084	<0.050
D008	Lead		1/20/2011	SW846 6010B	5	0.0014	<0.050
D010	Selenium		1/20/2011	SW846 6010B	1	0.0021	<0.050
D011	Silver		1/20/2011	SW846 6010B	5	0.00058	<0.050

General Chemistry

Client Sample ID: FERN 1		Sample Number	Analysis Date	Method Reference	Reg Limit	MDL	Result
EPA Waste #	Analyte	001			deg F	deg F	deg F
D001	Flashpoint at 140 degF		1/18/2011	SW846 1020B			>140

Safety-Kleen Systems, Inc.

5360 Legacy Drive.
Building 2, Suite 100
Plano, Texas 75024
800-669-5740
605-332-0231

REFERENCE NBR. 53273316

CUSTOMER# 10014341 TRANSCANADA KEYSTONE PIPELINE
41461 144TH ST
ANDOVER SD 57442
PHONE 402-492-7464

SRVC WEEK: 2011-8
SRVC DATE: 02/14/11 13:01

PURCHASE ORDER#

TAX EXEMPTION NBR

PRODUCT/SERVICES

SERVICE/ PRODUCT		QTY	UNIT PRICE	TAX	TOTAL CHARGE
40465775/					
875480	LANDF NON USDOT HAZMAT, N SERVICE TERM 7 WEEK PROMO NBR: 0	3.000	197.0000	35.46	626.46
# CONTS: 3	TSDF: 7407 MANIFEST#: 003826920fle FORM CD: US SK SHIP# 203205645				
	CNT#: 110208406594 QTY: 55 WT/VOL G PROFILE: 040465775SKDOT 202863				
	CNT#: 110208406595 QTY: 55 WT/VOL G PROFILE: 040465775SKDOT 202863				
	CNT#: 110208406596 QTY: 55 WT/VOL G PROFILE: 040465775SKDOT 202863				
40465778/					
875480	LANDF NON USDOT HAZMAT, N SERVICE TERM 7 WEEK PROMO NBR: 0	3.000	197.0000	35.46	626.46
# CONTS: 3	TSDF: 7407 MANIFEST#: 003826920fle FORM CD: US SK SHIP# 203205645				
	CNT#: 110208406598 QTY: 55 WT/VOL G PROFILE: 040465778SKDOT 202863				
	CNT#: 110208406599 QTY: 55 WT/VOL G PROFILE: 040465778SKDOT 202863				
	CNT#: 110208406600 QTY: 55 WT/VOL G PROFILE: 040465778SKDOT 202863				
8003369	DRUM,55 O.H. MT-USED SERVICE TERM 52 WEEK	4.000	75.0000	18.00	318.00
100001	FEE, FUEL SURCHARGE	1.000	12.2600	0.74	13.00
	TOTAL SERVICE/PRODUCTS		481.2600	89.66	1583.92

TOTAL CHARGE	1583.92
CREDITS	0.00
TOTAL DUE	1583.92

UNPAID BALANCE THIS RECEIPT 1583.92

GENERATOR STATUS
0 - 220 lbs/month

Customer certifies that (i) the above-named materials are properly classified, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and (ii) no material change has occurred either in the characteristics of the waste/material or in the process generating the waste/material. Customer agrees to pay the above charges and to be bound by the terms and conditions (1) set forth in (a) the General Terms and Conditions provided separately to Customer or (b) any SK agreement signed by Customer and SK, and (2) incorporated herein by reference. Unless otherwise indicated in the payment received section, SK is authorized to charge Customer's account for this transaction. Customer certifies that the individual signing this Service Acknowledgement is duly authorized to sign and bind Customer. The following provision is applicable to Safety-Kleen's parts cleaner and paint gun cleaner services: Customer agrees that it will not introduce any substance into the solvent or aqueous cleaning solution, including without limitation any hazardous waste or hazardous waste constituent, except to the extent such introduction is incidental to the normal use of the machine. Customer further agrees that it will not clean parts/paint guns that have been contaminated with or otherwise introduce polychlorinated biphenyls (PCB's), herbicides, pesticides, dioxins or listed hazardous waste into the solvent or aqueous cleaning solution. Safety-Kleen has the capacity and is permitted to accept, store, and/or reclaim the spent parts washer solvent; paint thinners, solvents and paints generated by customer; or dry cleaning filter cartridges, powder, and still residues containing perchloroethylene, petroleum naphtha, or triflurotrichloroethane dry cleaning solvents. Safety-Kleen and customer agree that this agreement is intended to satisfy the requirements of 40 CFR 262.20(e). IN THE EVENT OF AN EMERGENCY CALL 24 HR EMERGENCY # 1-800-468-1760 (Safety-Kleen Contract # 94138)

X

CUSTOMER / GENERATOR :Brad

LAST PAGE

SAFETY-KLEEN
WASTE MATERIAL PROFILE

PROFILE #: 40465778

Customer #: 10014341 Analytical Part #:
Sales Name: Kevin Gjoraas Employee #: 436054 Rep Email: kevin.gjoraas@safety-kleen.com Location/Branch #: 7123 - BR Sioux Falls

A. CUSTOMER INFORMATION ☐ Check if Billing Same

Generator: TRANSCANADA KEYSTONE PIPELINE
Facility Address (No P.O. Box): 41461 144TH ST
City/State/Zip: ANDOVER / SD / 57442
Technical Contact: BOB BAUMGARTNER
Phone: 402-492-7464 FAX:

Billing Company:
Billing Address:
City/State/Zip:
Billing Contact:
Phone: FAX:
Email:

☑ CESQG ☐ SQG ☐ LQG EPA ID#: CESQG State ID#:

B. SHIPPING INFORMATION
US DOT Shipping Name:
Hazardous Class/Division #: UN/NA #: Packing Group: RQ:
Size: 55 - GALLONS Container Type: STEEL Quantity: 3 Frequency: ONE-TIME ONLY

C. GENERAL MATERIAL & REGULATORY INFORMATION
Name of Material: SPILL CLEAN UP - FERN 2
Process Generating the Material: SPILL CLEAN UP

Yes	No		Yes	No	
☐	☑	Regulated or Licensed Radioactive Waste	☐	☑	Contains UHCs/Constituents of Concern: List in section D
☐	☑	Regulated Medical/Infectious Waste	☐	☑	Exempt Waste: If yes, list ref. 40 CFR
☐	☑	Waste Subject to Benzene NESHAP regulations			
☐	☑	TSCA Regulated PCB Waste: List PCB level in section D	☐	☑	State Hazardous Waste: List Codes
☐	☑	Regulated Ozone Depleting Substance	☐	☑	EPA Hazardous Waste: List Codes
☐	☑	CERCLA Regulated (Superfund) Waste	Source Code G		Form Code W

D. MATERIAL COMPOSITION (Range Total > or = 100%) or ppm

WATER/SNOW	10 - 40%
DEBRIS OIL	20 - 50%
KITTY LITTER	1 - 30%
OILY ABSORBENTS	20 - 40%
SAND/DIRT	1 - 30%
Total:	100%

☐ Supporting documentation attached

E. REACTIVE CHARACTERITSTICS

Yes☐ No☑ React. Sulfides ____ ppm
Yes☐ No☑ React. Cyanides ____ ppm
Yes☐ No☑ Water/Air (Pyrophoric) React.
Yes☐ No☑ Oxidizer
Yes☐ No☑ Shock/Explosive
Yes☐ No☑ Polymerizable
Yes☐ No☑ Other-Comments

Elemental Constituents (ppm):

☑ No detectable Elements

Sb	NR	As	NR	Ba	NR	Be	NR	Cd	NR	Cr	NR
Pb	NR	Hg	NR	Ni	NR	Se	NR	Ag	NR	Tl	NR
V	NR										

Metals Data based on: ☑ TCLP ☐ Total Analysis ☐ Generator Knowledge (no testing)

F. PHYSICAL CHARACTERISTICS

Flash Point:
☐ 73-<100 ☐ 100-141 ☐ 142-<200 ☐ ≥200
pH Range: ☐ ≤2 ☐ >2-4 ☑ >4-10 ☐ >10-<12.5 ☐ ≥12.5
Phases: 2 % Liquid: 10 - 30% Viscosity cps: 30,001 - 50,000
% Sludge: % Solid: 40 - 80% % Halogens:
BTU's/lb: <5000 Specific Gravity: >1

G. COMMENTS
TCLP ANALYTICAL ATTACHED

Customer Restrictions: ☐ Yes ☐ No

H. GENERATOR'S CERTIFICATION

I hereby certify that I am an authorized agent of the generator, and warrant on behalf of the generator that the information supplied on this form and on any attachments or supplements hereto is complete and accurate, and that all known or suspected hazards of the material(s) described herein have been disclosed. I agree that if there is a discrepancy between the waste received and any information supplied on this form, that either Safety-Kleen or the generator may initiate further testing and evaluation in accordance with the terms and conditions of the contract between Safety-Kleen and the generator; that this profile certification may be amended accordingly; and that additional expenses incurred by Safety-Kleen in order to manage the waste in accordance with Federal, State, and Local regulatory requirements will be the sole responsibility of the generator, including the return of the material to the generator at generator's expense.

Generator Signature: X Printed Name and Title: BOB BAUMGARTNER - EH & S MANAGER Date: 2/4/2011

Rev: 10/02/09

017641

SAFETY-KLEEN
WASTE MATERIAL PROFILE

PROFILE #: 40465775

Customer #: 10014341 Analytical Part #:
Sales Name: Kevin Gjoraas Employee #: 436054 Rep Email: kevin.gjoraas@safety-kleen.com Location/Branch #: 7123 - BR Sioux Falls

A. CUSTOMER INFORMATION ☐ Check if Billing Same

Generator: TRANSCANADA KEYSTONE PIPELINE
Facility Address (No P.O. Box): 41461 144TH ST
City/State/Zip: ANDOVER / SD / 57442
Technical Contact: BOB BAUMGARTNER
Phone: 402-492-7464 FAX:
☑ CESQG ☐ SQG ☐ LQG EPA ID#: CESQG

Billing Company:
Billing Address:
City/State/Zip:
Billing Contact:
Phone: FAX:
Email:
State ID#:

B. SHIPPING INFORMATION

US DOT Shipping Name:
Hazardous Class/Division #: UN/NA #: Packing Group: RQ:
Size: 55 - GALLONS Container Type: STEEL Quantity: 7 Frequency: ONE-TIME ONLY

C. GENERAL MATERIAL & REGULATORY INFORMATION

Name of Material: SPILL CLEAN UP - FERN 1
Process Generating the Material: SPILL CLEAN UP

Yes	No		Yes	No	
☐	☑	Regulated or Licensed Radioactive Waste	☐	☑	Contains UHCs/Constituents of Concern: List in section D
☐	☑	Regulated Medical/Infectious Waste	☐	☑	Exempt Waste: If yes, list ref. 40 CFR
☐	☑	Waste Subject to Benzene NESHAP regulations			
☐	☑	TSCA Regulated PCB Waste: List PCB level in section D	☐	☑	State Hazardous Waste: List Codes
☐	☑	Regulated Ozone Depleting Substance	☐	☑	EPA Hazardous Waste: List Codes
☐	☑	CERCLA Regulated (Superfund) Waste	Source Code G		Form Code W

D. MATERIAL COMPOSITION (Range Total > or = 100%) or ppm

WATER/SNOW	10 - 40%
DEBRIS OIL	20 - 50%
PLASTIC BAGS	20 - 50%
SAND/DIRT	10 - 30%

☐ Supporting documentation attached Total: 100%

E. REACTIVE CHARACTERITSTICS

Yes☐ No☑ React. Sulfides ppm
Yes☐ No☑ React. Cyanides ppm
Yes☐ No☑ Water/Air (Pyrophoric) React.
Yes☐ No☑ Oxidizer
Yes☐ No☑ Shock/Explosive
Yes☐ No☑ Polymerizable
Yes☐ No☑ Other-Comments

Elemental Constituents (ppm):

☑ No detectable Elements

Sb	NR	As	NR	Ba	NR	Be	NR	Cd	NR
Cr	NR	Pb	NR	Hg	NR	Ni	NR	Se	NR
Ag	NR	Tl	NR	V	NR				

Metals Data based on: ☑TCLP ☐Total Analysis ☐Generator Knowledge (no testing)

F. PHYSICAL CHARACTERISTICS

Flash Point:
☐ 73-<100 ☐ 100-141 ☑ 142-<200 ☐ ≥200
pH Range: ☐ ≤2 ☐ >2-4 ☑ >4-10 ☐ >10-<12.5 ☐ ≥12.5
Phases: 2 % Liquid: 10 - 40% Viscosity cps: 30,001-50,000
% Sludge: % Solid: 30 - 70% % Halogens:
BTU's/lb: <5000 Specific Gravity: >1

G. COMMENTS

TCLP ANALYTICAL ATTACHED

Customer Restrictions: ☐ Yes ☐ No

H. GENERATOR'S CERTIFICATION

I hereby certify that I am an authorized agent of the generator, and warrant on behalf of the generator that the information supplied on this form and on any attachments or supplements hereto is complete and accurate, and that all known or suspected hazards of the material(s) described herein have been disclosed. I agree that if there is a discrepancy between the waste received and any information supplied on this form, that either Safety-Kleen or the generator may initiate further testing and evaluation in accordance with the terms and conditions of the contract between Safety-Kleen and the generator; that this profile certification may be amended accordingly; and that additional expenses incurred by Safety-Kleen in order to manage the waste in accordance with Federal, State, and Local regulatory requirements will be the sole responsibility of the generator, including the return of the material to the generator at generator's expense.

Generator Signature: X Printed Name and Title: ROBERT BAUMGARTNER - EH & S MANAGER Date: 2/4/2011

Rev: 10/02/09

017642

017643

7123

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CESQG
2. Page 1 of: 1
3. Emergency Response Phone: 1-800-468-1760
4. Manifest Tracking Number: 003826920 FLE

GENERATOR

5. Generator's Name and Mailing Address
TRANSCANADA KEYSTONE PIPELINE
41461 144TH ST
ANDOVER SD 57442
Generator's Phone: 402-492-7464

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: SAFETY-KLEEN SYSTEMS, INC.
U.S. EPA ID Number: SDD000716696

7. Transporter 2 Company Name: SAFETY-KLEEN SYSTEMS, INC.
U.S. EPA ID Number: TXR000050930

8. Designated Facility Name and Site Address: SAFETY-KLEEN SYSTEMS, INC.
633 E 138TH ST
DOLTON, IL 60419
Facility's Phone: 708-225-8100
U.S. EPA ID Number: ILD980613913

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. NON-RCRA/NON-DOT REGULATED LIQUID MATERIAL	3	DM	165	G	NONE
	2. NON-RCRA/NON-DOT REGULATED LIQUID MATERIAL	3	DM	165	G	NONE
	3.					
	4.					

14. Special Handling Instructions and Additional Information: SK SHIP#203205645 53273316 10014341 CSG:

24 HR EMERGENCY #1-800-468-1760 (SAFETY-KLEEN - CONTRACT #94138)
SK AUTHORIZED TO RETAIN LICENSED SUBSEQUENT CARRIERS AS NECESSARY

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Brad Jarvis
Signature:
Month: 3 Day: 14 Year: 11

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Jesse Stanek
Signature:
Month: 3 Day: 14 Year: 11

Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name:
Signature:
Month: Day: Year:

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

GENERATOR'S INITIAL COPY

1)202863/40465775 2)202863/40465778

DENR FILE #: 2010.169

WRITTEN CONTAMINATION INCIDENT FOLLOW-UP REPORT
(Page 1 of 2)

RETURN COMPLETED FORM TO

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
GROUND WATER QUALITY PROGRAM
JOE FOSS BUILDING
523 EAST CAPITOL AVENUE
PIERRE SD 57501-3182

SITE NAME: TransCanada Keystone Pipeline - Freeman Pump Station

SPILL LOCATION: 28245 436th Ave., Freeman, SD

LATITUDE: 43.29278 LONGITUDE : -97.4804

LEGAL LOCATION (TOWNSHIP/RANGE): T098N R056W S020

RESPONSIBLE PARTY: TransCanada Keystone Pipeline, LP

MAILING ADDRESS: 13710 FNB Parkway, Suite 300

CITY: Omaha STATE : NE ZIP: 68154

TELEPHONE: _____ (HOME) (402) 492-7300 (WORK)

DATE OF SPILL OR WHEN DETECTED: 8-10-2010 TIME: 11:30am

WHAT WAS THE DURATION OF THE RELEASE? <1.5 hours

SUBSTANCE(S) RELEASED: Crude Oil

QUANTITY RELEASED: < 5 gallons

CHEMICAL NAME: Canadian Sour Crude CAS #: _____
CAS # 8002.05.09

IS SUBSTANCE ON THE "SARA 302 LIST"? YES ____ NO ✓ DON'T KNOW ____
"CERCLA HAZARDOUS SUBSTANCE LIST"? YES ____ NO ✓ DON'T KNOW ____
"SOUTH DAKOTA REGULATED SUBSTANCE"? YES ✓ NO ____ DON'T KNOW ____

CONSULTANT: NA

IDENTIFY KNOWN HEALTH RISKS: None Known

WHAT PERTINENT MEDICAL ADVICE WAS ISSUED? None Required

LAND USE (RESIDENTIAL, INDUSTRIAL, RURAL, OTHER): Rural

UTILITIES INVESTIGATED (WATER, SEWER, TELEPHONE, CATV, STORM WATER, OTHER):

Release occurred in a rural setting within the boundaries of the pump station, no utilities.

017644

FOLLOW-UP REPORT CONTINUED
(Page 2 of 2)

DENR FILE #: 2010.169

ENVIRONMENTAL MEDIA IMPACTED (SURFACE SOIL, SUBSURFACE SOIL > 3' BELOW GROUND, GROUND WATER, SURFACE WATER, INDOOR AIR, OUTDOOR AIR, ETC.):

Surface gravel / soil.

DISTANCE TO AND NAME OF CLOSEST SURFACE WATER OR DRAINAGE:

Road ditch along 436th Avenue.

DEPTH/DISTANCE TO AND NAME OF CLOSEST AQUIFER: >100' depth (SD Aquifer Map 25)

DEPTH/DISTANCE TO NEAREST DRINKING WATERWELL: 120' depth - farm 0.5 miles east

CUBIC YARDS OF SOIL EXCAVATED/TREATED: Approximately 20

WAS FREE PHASE OR POOLED PRODUCT PRESENT? Yes

DIMENSIONS OF EXCAVATION: Approximately 24 ft. by 33 ft.

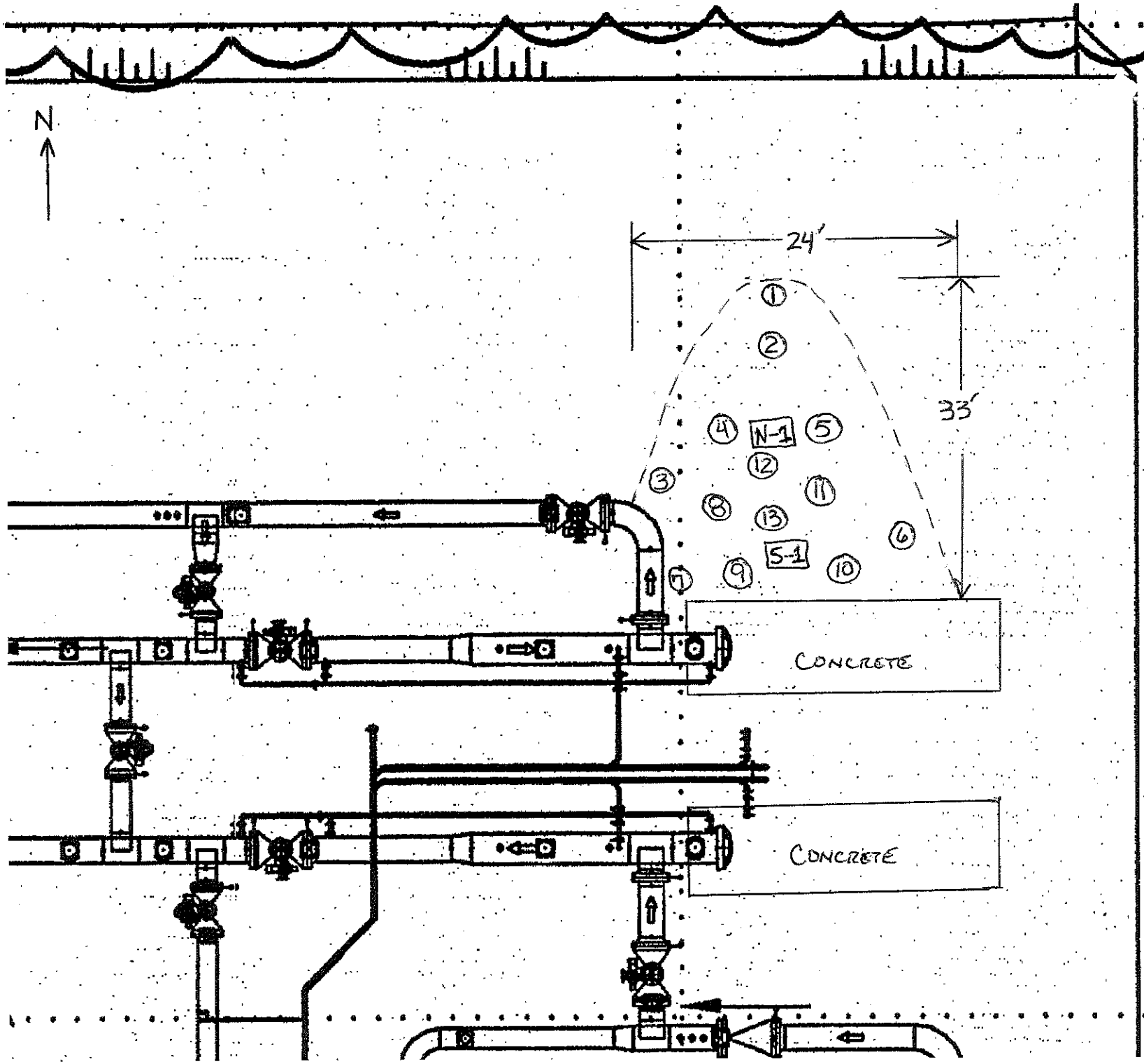
CONTAMINATED MATERIALS DISPOSAL SITE: Waste Management - Spruce Ridge LF

DATE MATERIAL WAS DISPOSED OF: To be determined. Planned for early September, 2010.

IMMEDIATE CORRECTIVE ACTION TAKEN AND ADDITIONAL WORK PLANNED:

At approximately 11:30 am CST on August 10th, 2010, contractor construction staff who were on site noticed a fine mist/spray of oil coming from the pig trap receiver fitting in the station yard. They immediately called local Operations' staff that were dispatched to site. The operations personal arrived within one hour and immediately isolated the leak and began cleaning up the oil which had sprayed onto the gravel within the pump station.
A skid-steer loader and other equipment were mobilized to the site along with qualified spill response personnel. Visually stained gravel/soils were scraped/excavated from the surface around the pig trap structures using the skid-steer loader and hand tools. Impacted gravel/soil was placed in roll-off containers for later transfer to an approved landfill facility. All excavations were less than two feet in depth and groundwater was not encountered. Following gravel/rock removal, the excavated area was screened using a photoionization detector (PID) with 10.6 eV lamp. Confirmation soil samples were collected at two locations after excavation was completed. Soil sample and PID screening locations are shown in Figure 1. The field PID screening and laboratory analytical results for benzene, toluene, ethylbenzene and xylenes (BTEX), naphthalene, and Total Petroleum Hydrocarbons as Diesel (TPH-Diesel) are summarized on Table 1 and Table 2. In addition, one composite waste soil sample was collected from the roll-offs and laboratory analysis results are shown in Table 2.
Based on field observations, measurements, and analytical data, the response excavation efforts have mitigated impacts to the surface and shallow subsurface soils to below SD DENR Tier 1 action levels. The excavated area has been backfilled with clean material and no additional work is planned.

FORM COMPLETED BY: Robert M. Baumgartner DATE: September 9, 2010



① PID FIELD Screening LOCATION

N-1 SOIL VERIFICATION SAMPLE LOCATION

--- EXCAVATION LIMIT

Figure 1

Freeman Pump Station
Soil Excavation
August 2010

Table 1 - PID Field Screening
TransCanada Keystone Pipeline
Freeman Pump Station; Freeman, South Dakota

Location	Units	1	2	3	4	5	6	7	8	9	10	11	12	13
Sample Date		8/11/10	8/11/10	8/11/10	8/11/10	8/11/10	8/11/10	8/11/10	8/11/10	8/11/10	8/11/10	8/11/10	8/11/10	8/11/10
Lithology		Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel
Depth	(feet)	<1	<1	<1	<1	<1	<1	<2	<2	<2	<2	<1	<1	<1
PID	(ppm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 2 - Laboratory Analysis Soil Verification and Waste Soil Analysis
TransCanada Keystone Pipeline
Freeman Pump Station; Freeman, South Dakota

Location	Units	N-1	S-1	Disp-1 Waste	Tier 1 Action Level
Sample Date		8/12/10	8/12/10	8/12/10	
Lithology		Gravel	Gravel	Gravel	
Depth	(feet)	<2	<2	<2	
Chemical of Concern					
Benzene	µg/kg	<20.8	<21.8	<22.4	200
Ethylbenzene	µg/kg	<52	<54.4	<56.1	1,500
Toluene	µg/kg	<52	<54.4	<56.1	1,000
Xylene (Total)	µg/kg	<156	<163	256	300,000
Naphthalene	µg/kg	<208	<218	<224	25,000
Diesel Components	mg/kg	<10.5	<10.9	582	500**

NOTES: mg/kg = Milligrams per kilogram, equivalent to parts per million (ppm) dry weight
<x = Not detected to reporting limits of x
** = Tier 1 "Trigger Level" for total petroleum hydrocarbons
< 3= less than three feet of excavation

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

November 12, 2010

Robert Baumgartner
TransCanada Keystone Pipeline, LP
13710 FNB Parkway
Omaha NE 68154

Subject: Department of Environment and Natural Resources File 2010.169 – TransCanada Keystone Pipeline – Freeman Pump Station

Dear Mr. Baumgartner,

The Department of Environment and Natural Resources reviewed all information submitted regarding the above referenced spill. The department has determined the case is closed.

On August 10, 2010, contractors working at the Freeman pump station noticed a fine mist oil spray coming from the pig trap receiver fitting. In response to the release, TransCanada operations staff isolated and stopped the leak and performed a remedial excavation. Approximately 16.67 tons of potentially contaminated soil were removed from the site and properly disposed of. All post-excavation soil samples were below the department's Tier 1 Action Levels.

The department has concluded based on the clean-up activities TransCanada conducted, this crude oil spill poses no risk at this time. Therefore, the department will not require TransCanada to take any additional action in this matter. If problems arise because of any remaining contamination, TransCanada may be responsible for conducting additional assessment and remediation.

Please contact Brian Walsh of my staff at (605) 773-3296, if you have any questions. Thank you for your efforts and cooperation regarding this spill.

Sincerely,

Bill Markley, Administrator
Ground Water Quality Program
(605) 773-3296

cc: Dave Hoffman, Hutchinson County Emergency Manager, Parkston, SD

Environmental Incident Report

This report has been submitted.

North Dakota Department of Health
Environmental Health Section
1.701.328.5210 or 1.701.328.5166

North Dakota Department of Emergency Services
1.701.328.8100
1.800.472.2121 State Radio 24-Hour Hotline

If this is an emergency, or for additional assistance, please call the Health or Emergency Services Department at the numbers shown above

This form is NOT for RCRA-exempt oilfield related incidents
(for RCRA-exempt oilfield incidents click here)
(if you are not sure which form to use click here)

Fill out information as completely as possible
Error messages appear to the right of the field
Use the Tab key or mouse to move between fields
Pressing the Enter key while in the form will submit the report
Required fields are shown in Red

Location Information:

County	Sargent
Township	129
Range	58
Section	26
Quarter	
QQSection	
QQQSection	

Location Description (911 address or location from nearest town)

10075 119th Ave. SE
Brampton, ND 58017

Distance to Nearest Residence or Occupied Building Units

Incident Information:

Date 3/8/2011
(mm/dd/yyyy) If unknown, enter date of discovery
Time

1030

hhmm 24-hour time, no colon

Type Pump Leak

Estimated Duration Units

Estimated Volume 5 Units gallons

Substance released or of concern (include trade and/or chemical name if applicable)

Crude oil

Agriculture Related? No

Is this substance on EPA's Extremely Hazardous Substance list? No

To find out if this substance is on the EHS list, Click Here

Describe Cause

Leak from pump unit bearing housing. Leaked oil is confined to concrete pump skid.

Action Taken and Recommended/Planned Future Action
(how spill was contained, soil excavated, emergency approval
to burn contaminant, evacuation of nearby personnel, etc.)

Oil was confined to concrete pump skid, was collected with absorbents and drummed.

Where will recovered wastes be disposed?

To be determined.

Impact Information:

Fatalities

Injuries

Medium affected

Immediate Risk Evaluation (explosive atmosphere, immediate health hazards, etc.)

None

Potential Environmental Impacts

(describe impacts to, or likelihood of impacts, to surface water, ground water, soils, etc.)

None. Oil is confined to the concrete pump skid. No threat of offsite impacts.

Responsible Party Information:

Responsible Party	TransCanada
Address (Line 1)	13710 FNB Parkway
Address (Line 2)	Suite 300
City	Omaha
State/Province	NE - Nebraska
Zip	68154
Contact First Name	Robert
Contact Last Name	Baumgartner
Contact Telephone	402-960-0483
Contact Email	robert_baumgartner@tra

Property Owner if not the Responsible Party

Has or will the incident be reported to property owner? Unknown

Reporting Information:

First Name	Robert
Last Name	Baumgartner
Date Reported (mm/dd/yyyy)	3/8/2011
Time Reported	1230

hhmm 24-hour time, no colon

Other agencies that have or will be notified

- ☐ NDDES
- ☐ State Fire Marshal
- ☐ State Highway Patrol
- ☐ Local Fire Department
- ☐ Local Law Enforcement
- ☐ Local Emergency Manager

Other

To see if this incident is required to be reported to the National Response Center (NRC) Click Here

Has or will the incident be reported to the NRC ?? 1-800-424-8802 Unknown

Additional E-Mail Recipients to send report to

robert_baumgartner@transcanada

Official Use Only:

State Agency Person Who Received Call First Name

Last Name

Department of Emergency Services Incident Number

Send this email to Department of Mineral Resources No

Pressing the submit button will send an E-Mail version of this completed Environmental Incident Report to NDDH Environmental Health Section and ND Dept. of Emergency Services personnel

Submit

Robert Baumgartner

From: aharries@nd.gov

Sent: Tuesday, March 08, 2011 12:34 PM

To: sradig@nd.gov; cerickso@nd.gov; rdisney@nd.gov; dahall@nd.gov; christysmith@nd.gov; croob@nd.gov; stillots@nd.gov; btorgers@nd.gov; tpoppke@nd.gov; jkangas@nd.gov; kijohnson@nd.gov; gaberret@nd.gov; dcameron@nd.gov; dfewless@nd.gov; cjanders@nd.gov; aharries@nd.gov; kroberts@nd.gov; sstockdill@nd.gov; ssuggs@nd.gov; jegrosz@nd.gov; nbartels@nd.gov; hhubrig@nd.gov; gbracht@nd.gov; msauer@nd.gov; toclair@nd.gov; tbachman@nd.gov; jsemerad@nd.gov; cthorstenson@nd.gov; wkern@nd.gov; dbergsag@nd.gov; dglatt@nd.gov; ajohnson@nd.gov; ccain@nd.gov; tlundquist@nd.gov; jestrada@nd.gov; jkwanner@nd.gov; pflander@nd.gov; mabata@nd.gov; mslee@nd.gov; ecotto@nd.gov; sladams@nd.gov; mfischer@nd.gov; cjpeterson@nd.gov; jmichael@nd.gov; jheckman@nd.gov; amcKay@nd.gov; crcarlson@nd.gov; kpavlish@nd.gov; lkok@umdhu.org; jbitz@nd.gov; rdeboer@nd.gov; sdyke@nd.gov; bgunners@nd.gov; twiedric@nd.gov; nddes@nd.gov; slwalters@nd.gov; bnesemeier@nd.gov; blakeschaan@nd.gov; dclark@umdhu.org; thaak@grandforksgov.com; dstreitz@grandforksgov.com; mlarson@grandforksgov.com; bbergman@grandforksgov.com; dhuseby@cityoffargo.com; mschacher@cityoffargo.com; MOBerglund@cityoffargo.com; richard_grosz@fws.gov; micah_reuber@fws.gov; R8_RRC@epamail.epa.gov; Robert Baumgartner; Robert Baumgartner

Subject: Environmental Incident Report

Location Information

Location of Incident (County/Township/Range/Section/Q/QQ/QQQ):
Sargent / 129 / 58 / 26 / / /
Description of Incident Location: 10075 119th Ave. SE Brampton, ND 58017
Distance to Nearest Occupied Building:

Incident Information

Date and Time of Incident: 3/8/2011 at 1030
Type of Incident: Pump Leak
Duration of Incident/Release:
Estimated Volume of Release: 5 gallons
Description of Substance of Concern: Crude oil
Agriculture Related: No
On Extremely Hazardous Substance List: No
Cause of Incident: Leak from pump unit bearing housing. Leaked oil is confined to concrete pump skid.
Action Taken and Recommended/Planned Future Action: Oil was confined to concrete pump skid, was collected with absorbents and drummed.
Where Will the Recovered Wastes be Disposed: To be determined.

Impact Information

Fatalities:
Injuries:
Medium Affected:
Risk Evaluation: None
Potential Environmental Impacts: None. Oil is confined to the concrete pump skid. No threat of offsite impacts.

Responsible Party Information

Responsible Party: TransCanada
Contact Address: 13710 FNB Parkway, Suite 300
City: Omaha
State: NE
Zip: 68154
Contact Person: Robert Baumgartner
Contact Telephone: 402-960-0483
Contact Email: robert_baumgartner@transcanada.com
Property Owner (if not the Responsible Party):
Has or Will the Incident be Reported to Property Owner: Unknown

Reporting Information

Reported By: Robert Baumgartner
Date and Time of Notice: 3/8/2011 at 1230
Other Agencies That Have or Will be Notified:
Has or Will This Incident be Reported to the NRC: Unknown
Agency Person Who Received Call:
DEM Incident Number:
This Report Also Emailed to:
robert_baumgartner@transcanada.com