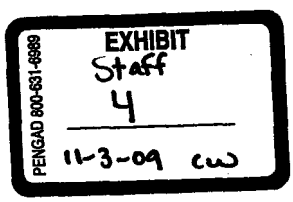
BEFORE THE
PUBLIC UTILITIES COMMISSION
STATE OF SOUTH DAKOTA

KEYSTONE XL PROJECT
DOCKET HP09-001

PREFILED TESTIMONY OF JAMES ARNDT
ON BEHALF OF THE COMMISSION STAFF
SEPTEMBER 2009



BEFORE THE SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

DIRECT TESTIMONY OF JAMES ARNDT

Q: Please state your name and business address.

A: James Arndt, Ph.D., Natural Resource Group, LLC (NRG), 1000 IDS Center, 80 South 8th Street, Minneapolis, MN, 55402.

Q: Describe your educational background.

A: I received my Bachelor of Science Degree in 1980 from the University of Wisconsin – Stevens Point with Majors in Soil Science and Natural Resources Management. I then received my Masters of Science and Doctorate degrees in Soil Science from North Dakota State University in 1987 and 1995, respectively. My educational and research specialties are in soil interpretations, soil pedology and survey, wetland soils, and soil chemistry, physics, and hydrology.

Q: By whom are you now employed?

A: I have been employed by Natural Resource Group, LLC since 2005. I currently hold the position of Senior Consultant.

Q: What work experience have you had that is relevant to your involvement on this project?

A: From 2005 to present, my responsibilities have been to provide NRG clients in the pipeline industry with environmental permitting services, including the preparation of Environmental Assessments and Environmental Impact Statements (EISs) (under the National Environmental Policy Act and/or relevant state programs), and preparation of permit applications under Sections 404 and 401 of the Clean Water Act. I also provide environmental survey and technical support involving the characterization and interpretation of land-use, soils, agricultural issues, wetlands, and hydrologic features along pipeline construction rights-of-way. From 1995 to 2005 I was Vice President of Peterson Environmental Consulting, Inc. I was in direct charge of performing natural

resource assessments along pipeline rights-of-way in the upper Midwest. As a preferred sub-contractor to the U.S. Army Corps of Engineers I provided wetlands and soils support for several large EISs including an assessment of soil salinization hazards associated with the proposed outlet to control flooding in Devils Lake, North Dakota. From 1980 to 1995 I worked in various capacities for North Dakota State University Department of Soil Science. My duties included the collection, processing, evaluation and interpretation of soil and water data. I attended and assisted in Natural Resources Conservation Service (NRCS) field reviews of county soil surveys, collected typifying soil profile descriptions, and soil correlation samples for characterization and presentation in interpretative tables in county soil surveys. As Supervisor of the department's Soils and Water Environmental Laboratory, I provided assistance to private individuals requiring information on soil-water compatibility and interpretation of water and soil analyses from locations throughout the state. A copy of my resume is appended to this testimony as Attachment 1.

Q: What Professional Credentials do you hold?

A: I am certified as a Professional Soil Classifier in the State of North Dakota, and licensed as a Professional Soil Scientist in Minnesota and Wisconsin.

Q. On whose behalf was this testimony prepared?

A. This testimony was prepared on behalf of the Staff of the South Dakota Public Utilities Commission (Staff).

Q: What is the purpose of your testimony?

A: I evaluated the Soils section and the Erosion and Sedimentation section (Sections 5.3.4 and 5.3.5, respectively) of the TransCanada Keystone, LP (Keystone) application to the South Dakota Public Utilities Commission (PUC) for a permit to construct the Keystone XL Project under the Energy Conversion and Transmission Facility Act to determine

whether a sufficient level of detail was provided to characterize the soils in the construction area and assess soil-related limitations and potential hazards associated with pipeline construction consistent with SDAR 20:10:22:13 and 22:10:22:14. I also evaluated portions of Keystone's Construction, Mitigation, and Reclamation Plan (CMRP) to determine whether important soil limitations identified in the application are addressed such that areas affected by construction-related activities would be restored to pre-construction conditions within a reasonable timeframe.

Q: What methodology did you employ?

A: I evaluated Sections 5.3.4 (Soils) and 5.3.5 (Erosion and Sedimentation) of Keystone's application by comparing the information provided in these sections to information typically provided in similar industry-standard applications for federal permits and state permits in the upper Midwest, and in various project-specific construction mitigation plans consistent with the applicable requirements in the appropriate sections of the SDAR. I also utilized my regional knowledge of soil characteristics, soil limitations, soil quality, and land use applicable to the characteristic environment in the Dakotas to assess whether important soil features affected by and affecting pipeline construction were characterized in the application and addressed in appropriate sections of the CMRP. Additionally, I reviewed Keystone's responses to PUC staff's data requests in which Keystone provided additional explanation and information. Keystone's responses to questions and data requests that were not in the original application or revised application but are, in my opinion, a necessary part of the application record and/or should be incorporated into the CMRP are identified and discussed in my testimony.

Q: With respect to soils and erosion/sedimentation information what is your understanding of how South Dakota Rules apply to the information provided in the Application?

A: The following two sub-parts of SDAR 20:10:22 apply directly:

SDAR 20:10:22:13 (Environmental Information) requires that an applicant provide (1) a description of the existing environment at the time of application, (2) estimates of anticipated changes in the environment as a result of construction and operation, and (3) identify potentially irreversible changes in the existing environment. Information should be supplied with sufficient detail to reveal and assess demonstrated or suspected hazards to the health and welfare of human, plant, and animal communities.

SDAR 20:10:22:14(5) (Effect of the Physical Environment) requires a description of the soil type, and SDAR 20:10:22:14(6) requires an analysis of potential erosion or sedimentation that may result from construction and operations and measures that will be taken for their control. An evaluation of applicable components of Keystone's CMRP is assumed to be covered under this rule as well.

Q: With respect to soils and erosion/sedimentation information, what are the commonly accepted industry standards for characterizing the resource and assessing potential project-related impacts?

A: The NRCS provides soil surveys in digital form as spatial map unit polygons (generally at 1:15,540 to 1:24,000 scales) and soil physical, chemical, and interpretation information for individual soil map units in database form as the Soil Survey Geographic Database (Version 2)(SSURGO2) (available at http://soildatamart.nrcs.usda.gov/). Digital NRCS information is available for all counties crossed by the Keystone XL Project in South Dakota. This information is also available in hard-copy soils surveys.

Soils information is important for the evaluation of the impacts of pipeline construction on agricultural and range productivity, erosion potential, and reclamation potential, and for assessing general constructability and certain soil-related construction hazards. Current practice is to evaluate soil characteristics, properties, and limitations along pipeline

rights-of-way by securing the spatial soil map unit data for the counties crossed by the pipeline. Soil map units are placed into project-specific interpretative groups based on their properties using database queries. Using a geographic information system (GIS), the crossing length of each soil map unit along the pipeline route (and at aboveground facility sites) and its project-specific interpretative group is generally provided in tabular form and is frequently summarized by county for permitting purposes. The resulting information is used to assess site-specific soil characteristics and limitations. Common soil interpretative groups include topsoil thickness, slope class, highly wind and water erodible soils, compaction prone soils, stony and rocky soils, saline, sodic, and saline-sodic soils, prime farmland, and hydric (wetland) soils, land capability classification, and poor reclamation potential.

Q: Is the presentation of the soils and erosion/sedimentation information provided in Keystone's application (1) sufficient under the applicable SDARs, and (2) consistent with industry standards?

A: Keystone's application included a description of the general physical characteristics and the physiographic setting for the soils that adequately provides the environmental setting for soils along the proposed route. However, the presentation of soils and erosion and sedimentation information in Keystone's application does not provide sufficient information or organization to identify the location, magnitude, and type of soil-related limitation sufficient to meet what I believe to be the intent of the SDARs, and does not meet industry standards for presenting soil limitations along the pipeline right-of-way for the reasons described below:

- While the maps contained in the soil map book (provided as Exhibit A of Keystone's application) accurately identify locations of specific soils along the proposed pipeline right-of-way, the maps cannot be used to assess potential project-related soils

impacts without more specific information on soil properties and limitations for specific soils.

- Specific soil limitations addressed in the application include soil compaction, rutting, low reclamation potential, hydric soils, prime farmland soils, and stony/rocky soils. State-level percentages were provided for compaction and rutting prone soils, soils with low reclamation potential, hydric soils, and prime farmland soils. However, the method for calculating these percentages, and the definitions for soils falling into these classifications were not provided. Presenting percentages of soils in these classes for the whole route does not provide enough detail to identify where specific soil-related problems are likely to occur.
- Additional soil-related limitation categories are needed that are appropriate to the environment and climate along the proposed route in South Dakota. Soil salinity and sodicity is described as a potential soil limitation affecting reclamation potential and aspects of constructability, but the quantity of saline and sodic soils is not identified or located. Other important soil limitations for South Dakota would include soils with restrictive layers (lithic/paralithic), steep slopes, high pH, and highly wind and water erodible soils.
- The CMRP is described as providing soil protection measures but applicable sections specific to identified soil limitations are not cited in the application, and mitigation measures for several potential soil limitations (e.g. saline/sodic soils) are not provided.
- The application states that Keystone will "work closely with landowners and soil conservation agencies to identify and implement recommended soil conservation practices in specific areas where they are needed," but does not provide a procedure or protocol for this process.

- Soil reclamation and seeding prescriptions for land, especially in range, are frequently related to specific soil groups (e.g. NRCS Range Class). No such soil or land use groupings are provided in the Application.

Q: **Have these concerns been addressed in other information provided by Keystone? If so, how?**

A: Keystone provided additional information on soils and sedimentation/erosion in response to data requests from PUC staff which addressed the general concerns presented above and additional specific requests dealing with Soils and Erosion and Sedimentation.

Q: **Please evaluate Keystone's response to PUC staff's request for tables identifying the information on soil limitations available in the SSURGO2 database for the pipeline route, pump station and valve sites, and other work areas.**

A: Keystone provided six tables (See Attachment 2 to this testimony) that satisfy the PUC staff's request for specific soil limitation information by soil map unit. The tables provide detailed breakdowns of soil limitation categories by soil map unit and crossing length for the pipeline route (Table 1) and Access Roads (Table 2); and soil map unit and acreage for Facilities (e.g., off right-of-way work areas, aboveground facilities) (Table 3). County Summaries are then provided by total crossing length in each limitation category for the pipeline route (Table 4) and access roads (Table 5) and by acreage in each limitation category for facilities (Table 6).

Q: **What soil limitation categories were used, are they adequately defined, and are they appropriate to evaluate the potential limitations, adverse impacts, and construction hazards specific to the environment along the pipeline route in South Dakota?**

A: Soil limitations in the tables provided by Keystone (provided in Attachment 2 to this testimony) include soils with shallow bedrock; soils with other shallow restrictive layers;

drought prone soils and soils with low re-vegetation potential; steeply sloping soils; saline, sodic, and saline-sodic soils; low or high pH soils, compaction prone soils; severely wind erodible and severely water erodible soils; stony or rocky soils; hydric soils, and prime farmland soils.

Keystone provided specific definitions for several limitation categories (see Attachment 3 to this testimony) including highly wind and water erodible soils; low reclamation potential soils; saline, sodic, and saline sodic soils; prime farmland; hydric soils; compaction-prone soils; stony/rocky soils; soils with shallow bedrock; and droughty soils. Slope ranges were not provided to identify steeply sloping soils, and the category "all shallow restrictive layers" was not defined.

The limitation categories selected are appropriate to describe the characteristics, construction-related limitations, and potential impacts of pipeline construction on soils and soil productivity. For example, soil with shallow bedrock may substantially increase in volume when backfilled and pose challenges for trenching and handling trench crowning; highly wind and water erodible soils will require best management practices as indicated in the CMRP to prevent excessive erosion and sedimentation; saline, sodic, saline-sodic, droughty soils, soils with restrictive layers, and high and low pH soils may pose difficulties with respect to establishment of suitable vegetative cover and may have poor reclamation potential; steeply sloping soils may be erosive, and present construction hazards if sodic. Maintenance of soil quality, appropriate topsoil stripping, and decompaction may be special issues on prime farmland soils.

The level of detail provided in Tables 1 through 3 allows the evaluation of detailed, site-specific soil limitations when used in context with the soil maps provided as Exhibit A in the application. Tables 4 through 6 appropriately summarize the soil characteristics and limitations by county, and permit the assessment of the presence and magnitude of the

major potential soil-related problems for pipeline construction and post-construction reclamation.

Q: **Please evaluate Keystone's response to PUC staff's request to identify specialized construction and/or restoration efforts or mitigation measures that are proposed to maintain soil productivity in areas with saline, sodic, and saline-sodic soils.**

A: Keystone proposes to develop site-specific construction/reclamation procedures that are applicable to specific land use/environmental settings prior to construction. Each specific setting (called Construction/Reclamation (Con/Rec) Units) is based on areas with similar pre-construction land-use, slope, soils, and vegetation. Keystone provides examples of Con/Rec Units as including Mixed Grass Prairie, Badlands, Forested Waterway, Crop Field, and Tame Pasture. Keystone's approach indicates an understanding of the need for specific construction and reclamation procedures to deal with the substantial variety of landform and soil conditions experienced along the route. Forested waterways (probable woody draws and river floodplains), while uncommon, are important ecological components whose soil characteristics (steep land in woody draws and potential wet areas adjacent to rivers) will be important in both construction and reclamation.

Keystone's examples of Con/Rec Units, while not a complete list, are appropriate. However, Con/Rec Units will not be useful until they are developed and implemented. I recommend that the PUC require Keystone to provide its Con/Rec Unit classification system and corresponding pipeline milepost references prior to construction and that this classification system be prepared in consultation with the appropriate state or area NRCS staff as suggested by Keystone in Section 5.3.4 of the application.

With respect to saline, sodic, and saline-sodic soils, Keystone provides the following examples of specific reclamation measures that may be used in areas where these soils are present:

- alteration of soil handling procedures to reduce disturbance of natural soil horizons;
- segregation of topsoil materials conserved to avoid increasing soil quality concerns
- to unaffected areas;
- discing or harrowing re-spread topsoil only to the depth of the topsoil, to avoid mixing with subsoils;
- selection of a seed mix appropriate for the site; and
- to the extent practicable, avoidance of small saline seeps in agricultural lands, if these seeps do not encroach substantially into the right-of-way.

The sample procedures provided to deal with salinity and sodicity show an understanding of the potential reclamation issues associated with these soils that can vary substantially in soil physical and chemical properties with depth that can require special soil handling procedures and that are suited only to specific adapted plants. They also recognize that saline seeps can be a significant issue associated with agricultural land. I provide an additional recommendation that pertains to agricultural areas with saline, sodic, and saline-sodic soils later in my testimony.

Q: **Please evaluate Keystone's response to PUC staff's request to identify specialized construction and/or restoration efforts to deal with potential trench crowning and excess subsoil and ripped hard (lithic) and soft (paralithic) sandstone and shale bedrock.**

A: Keystone provided a table of shallow bedrock locations along the proposed pipeline route and referenced the response to another data request question dealing with rock disposal, which stated: "Rock from construction shall be disposed of using one or more

of the following methods: (a) Windrow neatly along the edge of the ROW within the ROW limits, (b) Remove from the ROW and haul to an approved dump site, and (c) Use as rip-rap to stabilize the banks of watercourses. Rock removal may be carried out with a mechanical rock picker or by manual means, provided that preservation of topsoil is assured. Rocks removal will result in a quantity, size, and distribution of rocks on the ROW equivalent to that found in adjacent lands."

Removal and handling of excess hard bedrock is not expected to be much of a problem based on the information provided in the county soil limitation summary table because only 1.17 miles of the route is projected to have hard bedrock. However, 167 miles (53.3 percent) of the proposed route is projected to have a restrictive layer within 5 feet of the surface. Much of this is in Harding (58.2 miles), Perkins (13.6 miles), Meade (31.8 miles), and Jones (23.4 miles) Counties. While this bedrock is likely weakly indurated shale that is easily ripped and dug through with conventional construction equipment, in some areas the bedrock will underlie subsoils and will be excavated as relatively competent pieces that could be gravel to cobble sized. These bedrock fragments may be loosely packed when backfilled resulting in a "bulking factor" that could result in greater soil volumes and the need to account for extra trench spoil volume during restoration.

Q: You have noted that alternative soil handling techniques might be appropriate in areas containing certain soils. Do you have any recommendations regarding such situations?

There are two soil conditions where alternative soil handling procedures might be appropriate during the trenching and backfill operations: areas where indurated (hard), paralithic shale and sandstone underlie unconsolidated subsoils, and areas where saline subsoils underlie non-saline subsoil horizons. In such areas, mixing of poor quality

subsoils with overlying soil layers could potentially reduce soil productivity and adversely affect crop yields. Because alternative soil handling procedures can be costly and can sometimes require additional workspace, the decision to use such procedures should be made based on consultation with NRCS staff, which has the expertise to evaluate soil conditions and appropriate soil handling methods for the project area. Therefore, I recommend that if the PUC issues a permit for the Keystone XL Project, the permit include a condition requiring Keystone to consult with the state or area NRCS office to identify soils for which alternative handling methods in agricultural lands would be appropriate, develop construction procedures to minimize impacts on such soils, and potentially make those alternative soil handling methods available to landowners to maintain soil productivity in agricultural lands.

Q: **Please evaluate Keystone's responses to PUC staff's requests to identify specialized construction and/or restoration efforts or mitigation measures that are proposed to be used in steep areas characterized by the presence of sodium bentonite that have been identified as having potential slump and/or restoration problems, and to maintain a safe workplace when constructing in sodium-affected soils, particularly during wet periods.**

A: Steep areas with sodium bentonite at the surface typically exhibit badlands topography, are naturally erosive, and are usually sparsely vegetated to unvegetated under natural conditions. Sodium bentonite is a 2:1 expanding clay mineral that disperses when wet and forms crusts consisting of hard and massive (unstructured) chips when dry. "Slick spots" and wet areas in drainages with adjacent, highly saline soils are frequently associated with this badlands type topography. Keystone accurately and appropriately identifies that the primary goal of post-construction restoration and reclamation is stabilization of the construction right-of-way to prevent erosion. Revegetation is

secondary, and would be considered if adjacent areas are vegetated.

Keystone's construction, reclamation, and mitigation measures are proposed to be applied on an as needed basis depending on site-specific conditions that would be appropriate for a "Badlands" Con/Rec Unit, and they appropriately represent the types of construction procedures and reclamation "tools" that can be specifically applied to appropriate Con/Rec Units. In response to the PUC staff's data request, Keystone indicated that measures that could potentially be applied to steeply-sloping, sodium bentonite "Badlands," depending on site-specific conditions such as slope steepness, include but would not be limited to:

- temporary sediment barriers to retard slope erosion during construction;
- placement of trench plugs to restrict subsurface water flow in the backfilled trench, which could accelerate slope slumping;
- recontouring the right-of-way to match surrounding topography to the extent practicable to minimize concentrating storm water runoff on the right-of-way;
- permanent sediment control structures such as water bars to divert storm water runoff from the regraded right-of-way;
- depending on the amount of naturally occurring rock [stone lag] or woody debris on the reclaimed slope, mulching with materials such as straw on more gentle slopes, wood fiber mulch and tackifier on moderately steep slopes and erosion control matting on extremely steep slopes or at sites where other mulching methods might not be effective; and
- revegetation, if appropriate for the site, with species similar to those found adjacent to the right-of-way.

Keystone recognizes that the dispersed "greasy" nature of sodium bentonite can create construction hazards and has indicated that it would address wet conditions on dispersed wet soils by shutting down construction operations until the soil dries if conditions prevent safe construction operations. Alternatives include securing working equipment to stationary, stable equipment ("dead man") by means of cables, or blading off the slick surface if only a thin surface soil zone is saturated. Storage of the bladed material must be considered, as does the topsoil status and the topsoil stripping protocols. In fine textured soils where the topsoil has been stripped, blading a thin, wet surface to uncover drier material is standard industry practice. I recommend that the PUC require that Keystone include such practices as applicable to specific Con/Rec units when it develops specifications for each unit prior to construction, and that specifications include appropriate construction minimization, mitigation and post construction reclamation procedures for each unit.

Q: **Please evaluate Keystone's response to PUC staff's request to identify aboveground facilities that would be built on prime farmland and the acreage of prime farmland to be permanently affected as a result.**

A: This information was provided in the detailed soils tables for the facilities (Tables 3 and 6 in Attachment 2). Approximately 13.6 acres of prime farmland and farmland of statewide importance will be permanently removed from actual or potential agricultural use. The majority of the impacts is associated with pump stations proposed in Meade, Haakon, and Tripp counties (13.5 acres). An additional 0.1 acre would cumulatively be affected by the establishment of mainline valves.

Q: **Please evaluate Keystone's response to PUC staff's request to provide a more detailed description of soils and potential soil impacts in the Sand Hills region in**

southern Tripp County, and to identify and describe any special construction or reclamation methods proposed for restoring soils in this region.

A: Keystone provided the table below in response to PUC staff's request. The table indicates that the pipeline in Tripp County will cross approximately 11.1 miles of areas with soils characteristic of sand dunes. Keystone indicated in the response that construction and restoration measures to be implemented in the sand dune areas are provided in Section 4.15 of the CMRP.

Sand Hills Soils in South Dakota

County	From MP	To MP	Distance Crossed (miles)
South Dakota			
Tripp County	570.2	572.8	2.6
	574.7	575.6	0.9
	576.5	578.7	2.2
	582.8	588.2	5.4

Areas with Temporary Impacts to Sand Hills Soils in South Dakota

County	TYPE	FACILITY	Area Crossed (acres)
South Dakota			
Tripp County	Permanent	Easement	66.8
	Temporary	Easements and ATWS	83.7
		Pipe yards	30.0

Keystone interpreted the high-resolution aerial photographs used in the land use maps to identify sand hill areas that consist of native range/pasture land with characteristic sand hills, ridges and blowouts. Keystone provided entry and exit mileposts for sandhills

areas, but did not identify the specific soils. Specific soils within the mileposted increments tabulated and identified above could be determined using GIS or from the soils maps in Exhibit A of the application. This would identify the locations of specific soils for which the site-specific construction and reclamation procedures provided in Section 4.15 would apply.

Based on Keystone's CMRP, site-specific construction and reclamation procedures applicable to sand hills would involve the identification and avoidance of particularly erosion prone areas, minimizing the width of ground disturbance within the construction right-of-way in these areas, appropriately segregating topsoil, minimizing traffic through sensitive areas where plant root systems would be severely damaged by heavy traffic, restoration using native seed mixes and appropriate weed free mulches, applying proven erosion control best management practices in this highly erosion-susceptible landscape, and accommodating existing land uses.

Keystone's site-specific construction and reclamation procedures are appropriate to minimize and avoid unnecessary adverse impacts and appropriately restore components of the sand dune areas affected by construction. I recommend that the approach Keystone has used to identify specific construction and reclamation procedures to be implemented in Sand Hills Areas be used as a template for the development of construction and reclamation procedures to be incorporated into other proposed Con/Rec Units.

Q: Please evaluate Keystone's response to PUC staff's request to identify NRCS range class equivalents for soils crossed by the pipeline.

A: Keystone recognizes the diversity of environmental settings and land uses along the proposed pipeline route in South Dakota, and also recognizes the utility of project- and use-specific classification systems to develop construction and reclamation procedures

and prescriptions that would minimize adverse impacts. Keystone indicated in response to a staff data request that the Con/Rec classification units will be based on several features including but not limited to soil type, land use, and landform and based on information from a variety of sources including consultation with local and regional NRCS offices. Keystone has indicated that NRCS Ecological Sites and SSURGO2 data may be incorporated into the Con/Rec Units.

To restate my views on the Con/Rec Unit classification proposed by Keystone, I believe that this system has very good potential to appropriately identify situations where site-specific construction and reclamation procedures could be implemented to minimize construction-related impacts and to facilitate the appropriate restoration and reclamation of affected areas. I recommend that the PUC support the development and implementation of the Con/Rec Unit classification for use on the Keystone XL Project by conditioning its permit to require a workable system developed with input from appropriate agency staff prior to construction.

Q: **Please evaluate Keystone's response to PUC staff's request to identify the length of the pipeline route that may have agricultural draintiles potentially affected by trenching activities.**

A: Draintiles would be rare along the pipeline route with the exception of areas with extensive floodplain soils. Keystone has estimated that approximately 3 miles of the pipeline route in South Dakota have soils that may be tiled, and indicate that this is a conservative estimate. I agree. In the unlikely event that draintiles are encountered, they will be repaired as indicated in the CMRP, with some likely modifications that will bring the draintile repair process to industry standards.

Q: **Please evaluate Keystone's response to PUC staff's request to identify where Keystone proposes site-specific erosion control measures due to slope length, magnitude, and soils and to describe those measures.**

A: Keystone has not yet identified specific areas requiring site-specific erosion and sediment control plans. However, Keystone has indicated that it will work with landowners and conservation agencies to develop site-specific best management practices as necessary, and has provided detailed tables and maps of soil conditions that identify locations where highly erosive conditions exist. Keystone has indicated that it will implement measures outlined in the CMRP, which includes best management practices that use slope length and magnitude to minimize soil erosion hazards. The final pre-construction design efforts will include site-specific drawings and plans that identify and locate the type of best management practices proposed for specific highly erosive locations that are considered particularly sensitive to erosion.

CURRICULUM VITAE

JAMES L. ARNDT, Ph.D., LPSS, CPSS, PSC

Senior Scientist, Professional Soil Scientist

NATURAL RESOURCE GROUP, INC.

EXPERTISE

- Soil Chemistry, Physics, Genesis and Classification
- Soil Survey, Mapping and Interpretations
- Permafrost (Gelisols) soil description and characteristics
- Urban Soils, Assessment and Interpretation
- Environmental Resource Inventories
- Hydric Soil Identification and Assessment
- Wetland Hydrogeology
- GIS, CAD Applications and Development, Database Creation and Management, Digital Terrain Modeling.
- Wetland Delineation (COE 1987), Wetland Identification (Cowardin, 1979; Shaw and Fredine; 1971; Stewart and Kantrud, 1969)
- Mitigation and Treatment Wetland Planning and Design
- Regulatory Compliance Strategies
- Expert Witness Testimony
- Laboratory Analysis, Interpretation of Soil and Water Laboratory Data, geochemical modeling
- Information Transfer (Report Preparation, Presentation of Pertinent Findings, Teaching)

ACADEMIC BACKGROUND

- Ph.D., Soil Science, ND State University, 1995
- M.S., Soil Science, ND State University, 1987
- B.S., Soil Science, Natural Resource Management, Univ. Wisc. - Stevens Point, 1980
- B.A., Psychology, Anthropology, English, Univ. Wisc.-Milwaukee, 1976

REGISTRATION

- Licensed Professional Soil Scientist, Minnesota #30684
- Licensed Professional Soil Scientist, Wisconsin #112
- Licensed Professional Soil Scientist, North Dakota #64
- Certified Professional Soil Scientist, ARCPACS #24904

PROFESSIONAL AFFILIATIONS

- Minnesota Association of Professional Soil Scientists, President Elect, 2000; President, 2001; Past president, 2002. Chair Professional Practice Committee 2003-2005.
- Soil Science Society of America
- Society of Wetland Scientists
- Minnesota Wetland Delineators Association
- American Geophysical Union
- Reviewer/Referee;
  Wetlands,
  Soil Survey Horizons,
  Soil Science Society of America Journal,
  Journal of Hydrology,
  National Science Foundation,
  Journal of Environmental Quality.
  Journal of Vegetation Science/Applied Vegetation Science

SPECIALIZED TRAINING

- *Environmental Compliance Seminar; Regulatory Overview and Guidance Seminar,*. Federal Energy Regulatory Commission, July 9-10, 2007, Atlanta Georgia
- *Stormwater Compliance training.* Paradigm Engineering, March 2, 2005.
- *Design Techniques in AutoCAD™lt*, Mr. John Moreira, P.E., 2004.
- *Wetland Plant Identification*, Biotic Consultants, Inc. (Dr. Robert H. Mohlenbrock, Instructor), August 19-22, 2003.
- USACE-approved *Regulatory IV Wetland Delineation Training Course*, with an Introduction to Wisconsin Wetlands Regulation, August 11 – August 15, 2003, UW-La Crosse Extension, La Crosse Wisconsin.
- *Creating and Using Wetlands for Wastewater and Stormwater Treatment and Water Quality Improvement*, 2000 (Drs. RH Kadlec and RL Knight, Instructors), Department of Engineering Professional Development, University of Wisconsin – Madison.
- *Access™ Fastrack.* Science Museum of Minnesota – Computer education Center. 1999.
- *Wetland Functions and Values Workshop; An In-Depth Look at Today's Methods: WET, WRAM, MNRAM, HGM*, 1998.
- *Soil Landscape-Vegetation Relationships in Arctic Tundra, Advances in Taxonomy and Genesis of Permafrost Soils (Gelisols) with an emphasis on hydric permafrost soils*, University of Alaska Fairbanks, 1999
- *Power Arcview™, Advanced techniques in Arcview* GIS, Rowekamp and Associates, 1998.
- *Wetlands Conservation Act Administrative Training*, Minn. Board of Water and Soil Resources, Minn. Assoc. Soil and Watershed Districts, 1997, 1998, *2001.*
- *Project Management Skills: The Complete Curriculum.* University of St. Thomas, Minnesota. 1996.

WORKSHOPS TAUGHT

- Hydrology of Shallow Aquifers in Soil Landscapes. Hydric Soil Identification for Wetland Soils Workshop, 1995 Annual Meeting Soil Science Society of America, St. Louis, MO, 1994 Annual Meeting Soil Science Society of America, Seattle, Washington.
- Hydric Soils and Hydrology, Wetland Field Methodologies Workshop, Franklin Svoboda and Associates, July 12-15; September 20-21, 1994 Minneapolis, Minnesota.
- For symposia see invited presentations below.

Attachment 1

PROJECT-RELATED EXPERIENCE

Dr. Arndt has worked in soil science for over 25 years. He specializes in pedology research, including wetland biogeochemistry, the genesis and morphology of hydric soils, soil survey and interpretations, applications of IT methods to natural resource evaluation, and the preparation of reports in support of NEPA compliance. He has worked on several large interstate pipeline projects in support of the preparation of FERC resource reports, pre-application filings, and pre-construction resource evaluation. He has provided expert witness testimony and technical expert assistance on various soils issues.

He has authored many refereed and outreach publications and frequently speaks on soils, natural resource, and technology application issues. Dr. Arndt's skills include the applications of GIS/GPS/remote sensing/terrain modeling technologies to resource assessments emphasizing interstate gas and oil pipeline projects, applications of hydrology and hydric soils research to the delineation of wetlands and the assessment of wetland functions. He has developed procedures that integrate GIS/GPS/database technology to evaluate wetland and soil resources for large natural resource inventory projects and has worked on several complex components of third-party EIS projects for the USACE and MnDOT.

For Natural Resource Group, Inc.

- Task Manager. In association with Ms. Linda Fisher, Esq. (Larkin Hoffman Daly & Lindgren Law Firm) prepare documentation in support of a Section 404 Clean Water Act and Section 10 Rivers and Harbors Act Individual Permit Application and supporting NEPA documentation for Enbridge Partners, combined Alberta Clipper and Southern Lights Diluent pipeline projects. Project Ongoing.
- Task Manager. In association with Ms. Linda Fisher, Esq. (Larkin Hoffman Daly & Lindgren Law Firm) prepare Supplemental Clean Water 4041b permit application materials for Enbridge Partners, Southern Lights pipeline project. Project Complete.
- Prepare Cumulative Impact Analysis Section for the Environmental Assessment (EA) for Enbridge Partners LSr pipeline project. Project Complete.
- Expert Witness: Train county assessors in agricultural impacts resulting from pipeline construction including compaction, topsoil mixing, and other impacts. Provide expert testimony on agricultural impacts to soil and crop productivity at condemnation hearings for the Minnesota Pipe Line Company, MinnCan Project. 2008 – 2009, Project on-going.
- Task Manager: Train and act as technical support for agricultural and soil related construction issues along Minnesota Pipe Line Company's 300-mile MinnCan Project, Minnesota. Project on-going.
- Task Manager. Manage subcontractors performing wetland delineations along the approximate 300-mile proposed MinnCan pipeline route in Minnesota. Minnesota Pipe Line Company. Project on-going.
- Task Manager. Assess and document properties of a calcareous fen along the Enbridge Partners Southern Lights pipeline route, Pennington County, Minnesota. Assist in developing avoidance reroute alternatives and coordinate with MnDNR staff to completely avoid impacts. Project complete 2007.
- Task Manager. Feasibility study modeling soil temperatures along a proposed pipeline right-of-way from Montana to Louisiana. Project involved application of STATSGO soil data, detailed climatic data, and soil temperature modeling to estimate average temperatures at 4.5 foot depths along nodes separated by 100 miles. Anonymous client. Project complete 2006.
- Task Manager. Develop project-specific wetland delineation databases (Microsoft Access™) to facilitate the rapid, economical presentation and GIS-assisted analysis of wetland delineation data. Minnesota Pipe Line MinnCan Project (Minnesota), Gulf South Gulf Crossing Project: (Oklahoma, Texas, Louisiana), Palomar Gas Transmission LLC Palomar Project (Oregon), Enbridge Partners Southern Access/Southern Lights/Alberta Clipper projects (Minnesota, Wisconsin, Illinois). Projects on-going.
- Task Manager: Evaluate aquifer sensitivity to crude oil releases, Troy Buried Valley Aquifer, Mazon Unconfined Aquifer, Illinois. Enbridge Partners Southern Access Stage 2 Project, Illinois. Tasks completed 2006 and 2007.
- Technical Assistance: Assist with development of Pipeline Construction Agricultural Impact Mitigation Plan (AIMP) and Appendix to the AIMP developed to address pipeline construction across Certified Organic farms. Enbridge Partners Southern Access Stage 2 Project. Minnesota Pipe Line MinnCan Project, Minnesota. Complete 2007.
- Technical Assistance. Use of detailed SSURGO2 soil spatial and attribute data to determine soil properties and construction limitations along proposed pipeline rights-of-way. Enbridge Partners (Wisconsin, Illinois, Minnesota, and North Dakota), Minnesota Pipe Line Company (Minnesota), Guardian Pipe Line (Wisconsin), Gulf South (Oklahoma, Texas, Louisiana), Willbros Company (Wyoming). Tasks completed 2006-2008, tasks ongoing.
- Technical Assistance. Develop and employ digital terrain models of digital elevation data to augment existing soils data. Develop project-specific soil property and construction limitation maps, Overland Pass Project, Wyoming. Task on-going.

For Peterson Environmental Consulting, Inc.

- Expert technical assistance, Crowley, Haughey, Hanson, Toole & Dietrich P.L.L.P. and Williston Basin Pipeline Company. Using GIS and Field techniques critically evaluate pipeline-related soil impact issues and reclamation compliance along pipeline right of way in southwest North Dakota. 2004. Project completed through landowner settlement.
- Expert technical assistance, Larkin Hoffman Daly & Lindgren Law Firm, LLP, Gislason and Hunter Law firm, and Hutchinson Utilities Commission. Critically evaluate using GIS and field techniques soil compaction/soil mixing

issues, their influence on crop yields, and Agricultural Impact Mitigation Plan compliance along 90 miles of pipeline right of way in south-central central Minnesota. Project complete 2005.

- Project Manager. Determine impacts of proposed TH41 road construction on the ecology, soils, and hydrology of the Seminary Calcareous Fen, Carver County, Minnesota. In support of the DEIS developed for the project. Subcontractor to MnDOT AND SRF Consulting, Inc. Phase 1 of project complete. Technical assistance and document review, Phase 2 on-going.
- Project Manager 2004-2005. Design, implement, document, and report on a study to evaluate the effects of wetland buffer width on sediment and nutrient load reductions to receiving waters. Project funded by the Metropolitan Council of the Twin Cities, the Builders Association of the Twin Cities, and the National Association of Home Builders.
- Project Manager. GIS and database support, wetlands along the Alliance Pipeline Corridor, North Dakota, Minnesota, Iowa, and Illinois. Reviewed and consolidated existing data files and data collected by PEC during 1997-1999, cleaned, revised, and consolidated existing spatial (Arcview) and attribute (Access) databases, develop consolidated spatial and attribute databases of wetland location and wetland physical characteristics for incorporation into the Alliance master GIS. Alliance Pipeline Company, Inc. 2003.
- Project Manager. Evaluate the potential impacts of using non-perforated PVC tile support on the function of repaired draintile damaged during pipeline construction. Natural gas Consulting, Inc. 2003.
- Principal in Charge. Development of a mitigation and monitoring strategy for the proposed Pelican Lake Outlet Alternative to mitigate Devils Lake flooding in North Dakota. Prepared salinity and groundwater effects mitigation strategies. Assisted in development of project GIS. USACE, Project Complete, December 2002
- Expert Witness Testimony. Provide expert testimony on the extent of historic and current wetlands on a section of land in North Dakota. Case involved review of historic aerial photographs, fieldwork on wetland delineation, forensic soils work, and development of a project GIS. Case involved unauthorized fill activities in wetlands. United States Department of Justice, case settled 2002.
- Project Manager. Assess impacts to wetland resources of a reduced sulfide zinc/copper shaft mine proposed by Nicolet Minerals Corporation near Crandon, Wisconsin. Prepare Wetland Impacts component of the project EIS. Prepared for the USACE as approved subconsultant to Montgomery Watson. Project complete April 2003.
- Project Manager. Phase II Assessment of the Soil Salinization Potential of Devils Lake Flood Damage Reduction Alternatives. Team Leader to assess the magnitude of induced soil salinization under Upper Basin Storage and West Bay constructed outlet discharge alternatives. USACE, Project Complete, April 2002.
- Project Manager. Preparation of Environmental Resource Report 7 (FERC Guidelines) for several pipeline right-of-way projects in North Dakota, Minnesota, Iowa, Wisconsin, Illinois, and Alaska. Used soil spatial and attribute databases (STATSGO, MUIR) to identify specific soil limitations and hazards along the pipeline routes. Complex queries and models on the soil attribute data were developed in Microsoft Access™ to provide more detailed, use specific interpretations than those present in the NRCS database. Natural Resource Group, Inc. 1996-2002.
- Project Manager. Phase I Assessment of the Soil Salinization Potential of Devils Lake Flood Damage Reduction Alternatives. Team Leader for Literature review and Phase II scope development to assess the magnitude of induced soil salinization under Upper Basin Storage and Peterson Coulee discharge alternatives. USACE, completed 2001.
- Project Manager. Manage and direct soil documentation fieldwork for the Dodge and Goodhue Counties Order 2 Soil Survey update (MLRA 104). Under contract with the Minnesota Board of Soil and Water Resources (BWSR) and joint cooperation between the University of Minnesota, BWSR, and the NRCS.
- Project Manager. Perform a geochemical evaluation (PHREEQC-I) of created wetlands to mitigate high groundwater-sulfate levels. Provide a conceptual created wetland design for treatment wetland. Northern States Power and ERG, Inc. 2000-2001, project complete.
- Project Manager. Restoration of historic wetlands within the Sugarloaf Cove Natural and Scientific Area. Performed detailed assessment of pre-disturbance hydric soils and landforms, and designed and supervised restoration, including excavation and reseeding efforts. Minnesota Department of Natural Resources. 1999-2001.
- Project Manager. Produced digital Order 1 soil survey of land holdings for the Shakopee Mdewakanton Sioux Community. Tasks include field mapping and verification, digital terrain modeling (Surfer, TAPESG, Arcview, Spatial Analyst), creation of descriptive map legend, production of detailed profile descriptions (NASIS), soil attribute database development (Access™, MUIR, NASIS, SSURGO), and creation of soil data layers for use in GIS (Arcview). Cooperative project between the NRCS, the University of Minnesota, 1999-present.
- Project Manager. Delineation of over 100 problem and disturbed area wetlands where interpretation of hydrology, landform, and soils were critical to produce an accurate delineation. 1995-Present.
- Project Manager. Preparation of an informational document on calcareous fens in northeastern South Dakota. The document consisted of a review of calcareous fen characteristics, briefly examined pedologic, hydrologic, geochemical, and floristic characteristics of dome type fens in the area, and assessed values and functions in relation to maintenance of the fen resource. USEPA, 1996-1999.
- Project Manager. Develop Commitments Database (Microsoft Access) that employs user-friendly forms-input to facilitate error-free data entry, relational tables to organize the data, forms driven logic queries to reduce the dataset, and reports output to facilitate transfer and printing of query results. Database was developed to organize commitments made to local, county state and federal entities involving construction of a 1000-mile pipeline

through North Dakota, Minnesota, Iowa, and Illinois. Natural Resource Group, Inc. 1998-1999.

- Project Manager. Organized, planned, and supervised the delineation of over a thousand wetlands along an 850 mile length of a proposed, natural-gas pipeline. Delineations made extensive use of GIS (Arcview™), GPS (CMT PCGPS), and database (Access™) methods developed in-house under my supervision. Ditigized polygon, point, and line data were merged with photos and attribute data to automate the production of data forms compliant with 1987 COE Wetland Delineation Manual and NRCS specifications. Digital spatial and attribute data were integrated into environmental worksheets prepared by the project engineer. All reports were produced in html-linked digital (Adobe Reader) format. Natural Resources Group, Inc., 1996-present
- Project Manager. Hydrologic assessment and delineation of partially and effectively drained wetlands on over 1500 acres of sodfarms (drained peatlands) and other historically drained lands in East Central Minnesota. Projects combine geostatistical evaluation (Kriging in Surfer, GEOEAS) and 3-dimensional mathematical modeling (Surfer, Arcview Spatial Analyst) of jurisdictional hydrology in a climatic context to determine the extent of jurisdictional wetlands. Sienna Corporation, Pilot Land Development, Ed Fields and Sons, G.M. Development Inc., Glenn Rehbein Companies, 1997-Present.
- Project Manager. Hydrologic study of the effects of channelization, dredging, and drainage on the jurisdictional status of historic riparian wetlands proposed for development in Coon Rapids, Minnesota. Conceptual and mathematical models (Flownet, Modflow, Scope and Effect spreadsheets) of wetland hydrology were validated with field studies including hydric soil correlation and well and piezometer monitoring. Assisted with wetland permitting process, and wetland mitigation design for the entire project. Robert C. Muir Company, 1995-1996.
- Project Manager. Scope and Effect analysis of municipal well withdrawals and surface ditching on potential wetland drainage in a 32 acre parcel in Blaine, Minnesota. Mr. Doug Bannochie, 1995-1996.
- Project Manager. Perform a field investigation of known and proposed calcareous fens in Yellow Medicine County, Minnesota. The investigation examined pedologic, hydrologic, geochemical, and floristic characteristics of the known and proposed fen areas. Lincoln-Pipestone Rural Water, 1995.
- Project Manager. Perform a field assessment of the potential impacts of pipeline construction on nearby calcareous fens, Kendall County, Illinois. The investigation examined in detail pedologic, hydrologic, and floristic features of the area in the context of listing requirements for inclusion into the Illinois Natural Heritage Inventory and compared observed features to Minnesota Fen Criteria. Natural Resource Group, Inc., 1996
- Project Manager. Evaluate potential water quality and temperature effects of the proposed Farmington Planned Urban Development and Prairie Waterway on cold-water fisheries in the Vermillion River around Farmington, Minnesota. Trout Unlimited, Sienna Corporation, 1995
- Expert Witness Testimony. Inverse condemnation lawsuit involving stormwater and historic wetland issues. Barna, Guzy, and Steffen Ltd. Law Firm, 1996-1997.
- Expert Witness Testimony. Inverse condemnation lawsuit involving stormwater management effects on wetlands, watertables, and salinity in the City of Oakdale Minnesota. Jardine Logan, and Obrien, P.L.L.P. 1997-1998.
- Expert Witness Testimony. Inverse condemnation lawsuit involving the effects of stormwater management practices on land valuation, wetlands, and watertables in Shorewood, Minnesota. Hoff, Barry, and Kuderer, P.A., 1996-1997.
- Project Manager. Supervised and assisted with an inventory of native plant species near the proposed SEP-II Pipeline in McHenry County, Illinois. Natural Resource Group, Inc. 1996.
- Project Manager. Wetland soil and hydrology characterization for wetland-related litigation regarding a restoration of a drained wetland complex near Nicollet, Minnesota. Minnesota DNR-determined ordinary high water levels were correlated to existing soils, hydrology and historic water levels, Larkin-Hoffman Law Firm, 1996-1997.
- Retained Consultant. Provide information on hydrogeology, geochemistry, and soils for the Polk County Sanitary Landfill. Polk County, Minnesota, 1993-2000.

For North Dakota State University

- Research Associate/Instructor, Supervisor, Soil and Water Environmental Laboratory (SWEL), 1991 to 1995.
- Graduate Research Fellow/Supervisor, SWEL, 1987-1991
- Research Assistant/Supervisor, SWEL,1983-1987
- Research Assistant, SWEL, 1981-1983.
- *Research:* Collect, process, evaluate (QA/QC), and interpret data. Prepare research reports and grant proposals pertinent to wetlands and pedology research specifically and soils research in general (see publications, below). Attend and assist in NRCS field reviews and correlation sampling for ongoing soil surveys (description, sampling, and characterization of over 200 profiles representative of soil series and map units in several counties). Present data and assist with various hydric soils workshops nationwide (see presentations, below). Collect soil samples and pedon descriptions, and install field equipment.
- *Laboratory:* Develop appropriate analytical methods, including computer-assisted data analysis. Supervise hourly employees, maintain laboratory equipment, purchase supplies, and manage operating budget. Provide assistance to private individuals requiring information on soil-water compatibility, interpretation of water and soil analyses. Perform laboratory analyses.
  Teaching: As principal instructor.
  1987 Soil Judging (Soil Sci. 340)
  1993 Soil and The Environment (Soil Sci. 410/610)
  1994 Soil and the Environment (Soil Sci. 410/610)
- *Teaching*: As support.
  Instructor (1990, 1991, 1992) for sections on hydrology, wetlands, weathering and soil chemistry, and soil

mineralogy, Soils 440: Soil Genesis, Survey, and Classification (Dr. J.L. Richardson, Professor).

SELECTED PUBLICATIONS AND PRESENTATIONS

Hydric Soils, Hydrology, and General Soil Science

Arndt, J.L. and J. Flannery. 2007. Land and environmental data integration and management. Proceedings Geospatial Information & Technology Association, GIS for Oil and Gas Conference, September 24-26, 2007. Houston, TX

Richardson, J. L., J. L. Arndt, and J. A. Montgomery. 2000. CH 3: *Hydrology of Wetland and Related Soils.* in Richardson, J.L., and M.J. Vepraskas (eds.). Wetland Soils: Their Genesis, Morphology, Hydrology, Landscapes, and Classification. CRC Press. Boca Raton. FL.

Peterson, R.P., and J.L. Arndt. 1998. *Consideration of peat subsidence in wetland delineation activities.* Abstracts, 19th Annual Meeting Society of Wetland Scientists, Anchorage Alaska.

Arndt, J.L. 1994. *Hydrology of shallow aquifers in soil landscapes.* In J.H. Huddleston (ed.) Hydric Soil Identification for Wetland Soils Workshop. 1994 Annual Meetings of the Soil Science Society of America. November 12-17, 1994, Seattle WA.

Richardson, J.L., J.L. Arndt, and J.E. Freeland. 1994. *Wetland soils of the prairie potholes.* Advances in Agronomy 52:121-171. (invited paper).

Arndt, J.L., and J.L. Richardson. 1994. *Impacts of groundwater flow systems on hydric soils of the glaciated northern prairies of the U.S.* p. 64-84. Proceed. 37th Ann. Manitoba Soil Science Society Meetings, Jan. 4-6, 1994, Winnipeg, Manitoba, Canada.

Arndt, J.L., D.O. Rosenberry, and J.W. LaBaugh. 1993. *Effects of ground-water flow systems on hydric soils in two prairie wetlands in North Dakota.* EOS 74(43): 273.

Cooperating author in T.D. Searchinger et al., 1992. *How wet is a wetland? The impacts of the proposed revisions to the federal wetlands delineation manual.* Published jointly by the Environmental Defense Fund, New York, and the World Wildlife Fund, Washington, DC. 170pp.

Arndt, J.L., and J.L. Richardson. 1989. *A comparison of soils to wetland hydrology in North Dakota.* Proc. 32nd Annual Manitoba Soil Science Society Meeting, Dep. Soil Science, Univ. of Manitoba, Winnipeg. p. 76-90.

Richardson, J.L., and J.L. Arndt. 1988. *Groundwater recharge and discharge as fundamental pedogenic processes in Aquic moisture regimes.* Agron. Abstr., p. 265.

Richardson, J.L., T.J. Malterer, A. Gienke, J.L. Arndt, M.J. Rosek, and A.J. Duxbury. 1987. *Classification problems associated with histic soils of calcareous fens.* Soil Surv. Horiz. 28(2):53-55.

Richardson, J.L., and J.L. Arndt. 1987. *Wetland soils in relation to land use.* p. 24-29 In Proceedings of the North Dakota Wetlands Workshop. July 13-15. Bismarck, ND. Published jointly by the North Dakota Extension Service and the U.S. Environmental Protection Agency.

Soil and Water Biogeochemistry

Arndt, J.L., and J.L. Richardson. 1993. *Temporal variations in the salinity of shallow groundwaters collected from the periphery of some North Dakota USA wetlands.* J. Hydrology 141:75-105.

Arndt, J.L., and J.L. Richardson. 1992. *Carbonate and gypsum chemistry in saturated, neutral pH soil environments.* In Aquatic Ecosystems in Semi Arid Regions; Implications for Resource Management, R.D. Robarts and M.L. Bothwell (eds.). N.H.R.I. Symposium Series 7, Environment Canada, Saskatoon, Saskatchewan, Can.

Hanson, M.A., M.G. Butler, J.L. Richardson, and J.L. Arndt. 1990. *Indirect effects of fish predation on calcite supersaturation, precipitation, and turbidity in a shallow prairie lake.* J. Freshwater Biol. 24:547-556.

Arndt, J.L., and J.L. Richardson. 1989. *Geochemistry of hydric soil salinity in a recharge-flowthrough-discharge prairie-pothole wetland system.* Soil Sci. Soc. Am. J. 53:848-855.

Arndt, J.L., and J.L. Richardson. 1989. *Geochemistry of hydric-soil salinity associated with wetlands in the subhumid prairie-pothole region, North Dakota, USA.* Proceed 28th Int. Geol. Congr., July 9-19, 1989, Washington, DC; p. 1-53 to 1-54.

Arndt, J.L., and J.L. Richardson. 1988. *Hydrology, salinity, and hydric soil development in some North Dakota prairie-pothole wetlands.* Wetlands 8:93-108.

D.O. Rosenberry, J.L. Arndt, and J.W. LaBaugh. 1993. *Ground-water flow reversals and near-shore soil mineralization affect chemical characteristics of a prairie wetland in North Dakota.* EOS 74(43): 272.

Biondini, M.E., and J.L. Arndt. 1993. *The biogeochemistry of carbon, nitrogen, and sulfur transformations in seasonal and semipermanent wetlands.* Completion Report No. ND90-05. North Dalota Water Resources Research Institute, North Dakota State University, Fargo ND. 83pp.

Arndt, J.L., and J.L. Richardson. 1993. *Salinity and salinization processes in selected drained and undrained wetlands in North Dakota.* Proceed. 36th Ann. Manitoba Soil Science Society Meetings, Jan. 6-7, 1993, Winnipeg, Manitoba, Canada. p. 84-102.

Richardson, J.L., J.L. Arndt, and J.W. Enz. 1990. *Effects of freezing on sulfate salts in North Dakota soils and wetlands.* p. 212-215. in K.R. Cooley (ed.) Proc. International Symposium Frozen Soil Impacts on Agricultural, Range, and Forest Lands, Spokane, Wash., March 21-22, 1990, CRREL Sp. Rpt. 90-1, U.S. Army Cold Regions Research and Engineering Laboratory, 72 Lyme Road, Hanover, NH.

Arndt, J.L., and J.L. Richardson. 1986. *The effects of groundwater hydrology on salinity in a recharge-flowthrough-discharge wetland system in North Dakota.* p. 269-277. In Proc. Third Canadian Hydrogeological Conf., Saskatoon Sask., 21-23 April 1986. International Assoc. of Hydrogeologists, Canadian National Chapter.

Arndt, J.L., and J.L. Richardson. 1985. *Geochemical controls on the ionic composition of pondwater and groundwater in some brackish-subsaline North Dakota Wetlands.* Agron. Abstr., p. 145.

Arndt, J.L., and J.L. Richardson. 1985. *Winter effects on the salt balance of saline ponds in North Dakota.* North Dakota Acad. Sci. Proc. 39:54.

GIS, Database, and Integrated Natural Resources Information Management

Timpson, M.E., J.L. Arndt, and S.A. Krych. 1998. *Innovative approaches to large-scale wetland delineation projects.* Agron. Abstr., p. 328.

Dignen, D.L., D. Desotelle, J.L. Arndt, and R.P Peterson. 1998. *Using Access and GIS applications in water resource planning.* Abstracts, 1998 Conference of the Minnesota GIS/LIS Consortium, October 7-9, St. Cloud, Minnesota. p. 76-77.

Arndt, J.L., T. Kearby, S. Krych, and M. DeRuyter. 1998. *Geostatistical assessment of jurisdictional wetlands on a drained Minnesota peatland.* Abstracts, 19th Annual Meeting Society of Wetland Scientists, Anchorage Alaska.

Arndt, J.L., D.L. Krieger and M.E. Timpson. 2000. *Integrated database strategies for wetland and soil resource assessment. Abstracts 7th International Symposium on Environmental Concerns in Rights-of-Way Management.* Elsevier. http://www.rights-of-way-env.com/index.htm.

Timpson, M.E., Arndt, J.L., S.A. Krych, and D.L. Krieger. 2000. *Rapid and efficient wetland delineation along pipeline corridors using integrated technologies. Abstracts 7th International Symposium on Environmental Concerns in Rights-of-Way Management.* Elsevier. http://www.rights-of-way-env.com/index.htm.

Archaeology

Artz, J.A., E.A. Hayden, C.E. Haury, J.L. Arndt, and D.G. Hopkins. 1991. *Southwest pipeline archeology: The 1987 survey and test excavation programs at prehistoric sites in Mercer and Dunn Counties, North Dakota.* North Dakota State Water Commission, Contribution No. 54. 398pp.

Timpson, M.E., R.G. Thompson, and J.L. Arndt. 1987. *Pedologic investigation of the Dahnke archaeological site: Red River Valley, ND.* Agron. Abstr., p. 233.

Arndt, J.L., and D. Hopkins. 1987. *Report of pedologic investigations at the Marshall, North Dakota archaeological site.* Report subcontracted by the Univ. of North Dakota Anthropology Dept. to investigate archaeological sites along the SW Pipeline right-of-way.

Arndt, J.L., N.D. Prochnow, and J.L. Richardson. 1987. *Estimating weighted soil salinity with an aboveground electromagnetic-induction meter.* North Dakota State University, Dept. Soil Sci. Res. Rpt. #30. 6pp.

Timpson, M.E., R.G. Thompson, and J.L. Arndt. 1987. *Geoarchaeological investigation of the Dahnke site: Red River Valley, North Dakota.* North Dakota Acad. Sci. Proc. 41:60.

Foss, J.E., J.L. Richardson, M.E. Timpson, J.L. Arndt, D.G. Hopkins, M.G. Michlovic, S.A. Ahler, and M.L. Gregg. 1986. *Pedological record of the Holocene in the Northern Great Plains as observed in some archaeological sites.* Agron. Abstr., p. 225.

Timpson, M.E., J.L. Arndt, and D.G. Hopkins. 1986. *Pedologic study of an archaeological site in the James River Valley; Stutsman County, North Dakota.* North Dakota State University, Department of Soil Sci. Res. Rpt. #21. 13pp.

Foss, J.E., J.L. Richardson, J.L. Arndt, M.E. Timpson, and M.G. Michlovic. 1985. *Pedologic study of archeological sites along the Red River.* North Dakota Acad. Sci. Proc. 39:51.

Selected Presentations

Invited Presentation: *Guidance for Scope and Effect and Hydrology (Well) Studies to support Wetland Delineation inb Minnesota and the Upper Midwest.* Minnesota Water Resources Conference, October 23-24, 2007. Earle Brown Heritage Center, Brooklyn Center, Minnesota.

Invited Presentation: *Land and Environmental Data Integration and Management.* Geospatial information & Technology Association GIS for Oil and Gas Conference, September 24-26, 2007, Marriott Westchase Hotel, Houston TX.

Invited Presentation: *Hydrogeology, Pedology, and Botany of the Seminary Calcareous Fen, Carver County, Minnesota.* Minnesota Section American Institute of Professional Geologists, September 5, 2006, Minneapolis, Minnesota.

Invited Presentation: Redoximorphic features in hydric soils: Genesis, morphlogy and use in wetland delineation presented to the Minnesota Wetland Delineators Association Forum Series, January 2006, Wood River Nature Center, Richfield Minnesota

Invited Presentation: Monitoring the Health and Function of Existing, Impacted, and Restored Calcareous Fens. Presenter and member of Planning Committee. Calcareous Fen Forum: Long Term Management and Restoration of Hillslope Calcareous Fens, Rochester, Minnesota, April 13, 2005.

Invited Presentation: GIS Assessment of Soil Salinization Hazards Associated with the Restoration of Drained Wetlands in the Upper Basin of Devils Lake, North Dakota. Presented to the Symposium – Soils and Wetland Assessment II. 2004 Annual Meeting of the Soil Science Society of America, October 31-November 4, 2004, Seattle Washington.

Invited Presentation: Watchin' the Water Rise. Assessment of Soil Salinization Hazards, Devils Lake Flood Reduction Alternatives. University of Minnesota Department of Soil Science Seminar Series, December 9, 2002.

Invited Presentation: Is it Alive? Lessons Learned in Forensic Soil Investigation. 2002 Annual Winter Meeting, Minnesota Association of Professional Soil Scientists, December 6, 2002, Radisson Hotel, St. Cloud Minnesota.

Integrated Database Strategies for Wetland and Resource Assesments. 2000. 7th International Symposium on Environmental Concerns in Rights-of-Way Management. 9-13 September. Calgary, Alberta, Canada.

Invited Presentation: Fresh out-of-the Box: High Technology and the Creation of Detailed, User-friendly Soil Surveys presented to the Technology for Professionals Symposium, Division A-9, Professional Practitioners (Prov.), 2000 Annual Meeting of the Soil Science Society of America, November 5-9, Minneapolis, Minnesota

Teaching and Public Outreach. Invited presentations to address soil hydrology related topics as a guest lecturer for University of Minnesota, Department of Soil Science Wetland Soils class (Soil 5555), 1995 – 2005. Invited presentation to address general soil science issues, University of Minnesota, Department of Landscape Architecture, 2005. Invited presentation to Environmental Assessment Worksheet and Environmental Impact Statement preparation, April 2006, and April 2007.

Invited Presentation on Soil and Groundwater Chemistry in Calcareous Fens to the Minnesota Wetland Delineators Association Forum Series, December 6, 1999, City of Plymouth Council Chambers, Plymouth Minnesota.

Invited Presentation on High Tech Wetland Delineation Using GPS and GIS to the Minnesota Association of Professional Soil Scientists (MAPSS), December 4, 1998, St. Cloud, Minnesota.

Integrated database strategies for wetland and soil resource assessments. 1998 Annual Meeting of the Soil Science Society of America, October 18-22, 1998, Baltimore, Maryland.

Geostatistical assessment of jurisdictional wetlands on a drained Minnesota peatland. 19th Annual Meeting Society of Wetland Scientists, June 6-12, 1998, Anchorage Alaska.

Invited presentation on Problems associated with Salts and Chlorides in Soil, Salts/Chlorides session, Land Application of Biosolids, Residuals, and Effluents Conference, Minnesota Pollution Control Agency, Water Quality Division, Thunderbird Hotel & Convention Center, Bloomington, Minnesota, February 20, 1998.

Invited presentation on the Theory and Use of Drain Spacing equations to Estimate the Extent of Effective Wetland Drainage. Wetland Delineators Association Forum Series "Wetlands, Ditches, and Drainage" Minnesota Valley National Wildlife Refuge Headquarters, Bloomington, Minnesota, February 4, 1998.

Invited presentation on Selection, Use, and Application of Reference Wetlands for Hydrology Studies , Wetland Delineators Association Forum Series "The Role of Reference Wetlands in Wetland Inventories and Hydrology Studies" Maple Grove City Hall Council Chambers, Maple Grove, Minnesota, February 6, 1997.

Invited presentation on Applications of Hydric Soils Information to Jurisdictional Wetland Determinations: Issues and Examples to the 1996 annual winter meeting of The Minnesota Association of Professional Soil Scientists (MAPSS) meeting, Land O' Lakes Inc. Corporate Headquarters, Minneapolis, Minnesota, December 6, 1996.

Invited presentation on Hydric Soils, Wetland Delineators Association Forum Series, "Hydric Soils", Shoreview City Hall Council Chambers, Shoreview, Minnesota.

Invited presentation on Surface and subsurface controls on wetland hydrology to the Hydric Soil Identification for Wetland Soils Workshop, 1994 and 1995 annual meetings, Soil Science Society of America, Seattle WA, November 12-18, 1994, and October 29-November 3, 1995.

Invited presentation on Impacts of Ground Water Flow Systems on Hydric Soils in the Glaciated Northern Prairies of the United States to Hydric Soils Symposium, SSSA, Division S10 (prov.), 1993 Annual Meetings of the ASA-CSSA-SSSA.

Effects of ground-water flow systems on hydric soils in two prairie wetlands in North Dakota to the Lake-Land Linkages Session, Hydrology Section, American Geophysical Union Annual Meeting held in San Francisco, Dec. 6-10, 1993.

Invited presentation on Geochemistry of hydric-soil salinity associated with wetlands in the subhumid prairie-pothole region, North Dakota, USA, 28th International Geological Congress, Washington, DC, July 9-19, 1989

Invited presentation on Characterizing and Monitoring Hydric Soils of the Pothole Region, EPA-EMAP (Environmental Monitoring and Assessment) workshop for the prairie pothole region, Northern Prairie Wildlife Research Center, Jamestown, ND, July 23-25, 1991.

Developed daylong field trip for the 45 participants of the 1992 meeting of the National Technical Committee for Hydric Soils, August 18, 1992. Prepared trip guidebook and acted as tourguide.

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Harding	282.518	282.546	0.028	148	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.03	0.02	0.00		0.00	0.01		0.01	0.01		0.01				
Harding	282.546	282.719	0.173	913	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.16	0.07				0.14		0.14	0.15		0.01				
Harding	282.719	282.809	0.090	476	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.09	0.05	0.00		0.00	0.07		0.08	0.08		0.01				
Harding	282.809	282.967	0.158	835	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.16	0.04	0.02		0.02	0.06		0.07	0.06		0.02				
Harding	282.967	283.036	0.068	362	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.07	0.04	0.00		0.00	0.06		0.06	0.06		0.01				
Harding	283.036	283.112	0.076	404	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.08	0.02	0.01		0.01	0.03		0.03	0.03		0.01				
Harding	283.112	283.603	0.491	2,592	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.47	0.42	0.02		0.02	0.15		0.17	0.20		0.20				
Harding	283.603	283.812	0.209	1,102	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.05	0.20		0.16			0.02		0.02	0.13		0.20	0.06			
Harding	283.812	284.039	0.228	1,201	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.22	0.19	0.01		0.01	0.07		0.08	0.09		0.09				
Harding	284.039	284.198	0.159	839	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.14	0.06				0.13		0.13	0.14		0.00				
Harding	284.198	284.589	0.390	2,061	SD063	355718	Ba	Badlands		0.36		0.36	0.02	0.01	0.03		0.05	0.04		0.37	0.35			
Harding	284.589	284.944	0.356	1,878	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.32	0.14				0.28		0.28	0.31		0.01				
Harding	284.944	284.965	0.021	110	SD063	355728	CdE	Cabbart-Delridge loams, 15 to 40 percent slopes		0.02	0.00	0.02			0.00		0.00	0.02		0.02	0.00			
Harding	284.965	285.059	0.094	495	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.09	0.04				0.08		0.08	0.08		0.00				
Harding	285.059	285.108	0.049	258	SD063	355728	CdE	Cabbart-Delridge loams, 15 to 40 percent slopes		0.05	0.00	0.04			0.00		0.00	0.04		0.04	0.00			
Harding	285.108	285.194	0.086	454	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.08	0.03				0.07		0.07	0.08		0.00				
Harding	285.194	285.220	0.027	141	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.03	0.01	0.00		0.00	0.02		0.02	0.02		0.00				
Harding	285.220	285.575	0.355	1,873	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.32	0.14				0.28		0.28	0.31		0.01				
Harding	285.575	285.681	0.105	557	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.11	0.06	0.00		0.00	0.09		0.09	0.10		0.02				
Harding	285.681	285.742	0.061	323	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.06	0.05	0.00		0.00	0.02		0.02	0.02		0.02				
Harding	285.742	285.763	0.022	115	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.02	0.01				0.02		0.02	0.02		0.00				
Harding	285.763	285.829	0.066	349	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.06	0.06	0.00		0.00	0.02		0.02	0.03		0.03				
Harding	285.829	286.215	0.385	2,035	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.35	0.15				0.31		0.31	0.34		0.01				
Harding	286.715	286.276	0.061	322	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.06	0.03	0.00		0.00	0.05		0.05	0.06		0.01				
Harding	286.276	286.323	0.048	251	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.04	0.02				0.04		0.04	0.04		0.00				
Harding	286.323	286.346	0.022	117	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.02	0.01	0.00		0.00	0.02		0.02	0.02		0.00				
Harding	286.346	286.464	0.118	623	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.11	0.05				0.09		0.09	0.10		0.00				
Harding	286.464	286.544	0.080	422	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.08	0.04	0.00		0.00	0.07		0.07	0.07		0.01				
Harding	286.544	286.718	0.175	922	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.16	0.07				0.14		0.14	0.15		0.01				
Harding	286.718	286.876	0.158	834	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.03	0.11	0.02	0.12			0.02		0.02	0.06		0.14	0.08			
Harding	286.876	286.994	0.118	624	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.12	0.06	0.00		0.00	0.10		0.10	0.11		0.02				
Harding	286.994	287.083	0.089	467	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.02	0.06	0.01	0.07			0.01		0.01	0.04		0.08	0.04			
Harding	287.083	287.184	0.101	535	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.10	0.09	0.01		0.01	0.03		0.04	0.04		0.04				
Harding	287.184	287.279	0.095	500	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.02	0.07	0.01	0.07			0.01		0.01	0.04		0.09	0.05			
Harding	287.279	287.641	0.363	1,915	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.34	0.24	0.09		0.09	0.04		0.13	0.07		0.15				
Harding	287.641	287.711	0.070	367	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.01	0.05	0.01	0.05			0.01		0.01	0.03		0.06	0.03			
Harding	287.711	287.754	0.043	229	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.04	0.03	0.01		0.01	0.00		0.02	0.01		0.02				
Harding	287.754	287.923	0.168	888	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.17	0.09	0.01		0.01	0.14		0.14	0.16		0.03				
Harding	287.923	287.942	0.019	103	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.02		0.01	0.00		0.01		0.01	0.02		0.02				
Harding	287.942	287.991	0.049	258	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.05	0.03	0.00		0.00	0.04		0.04	0.05		0.01				
Harding	287.991	288.038	0.047	248	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.04		0.02	0.00		0.02		0.03	0.05		0.04				
Harding	288.038	288.226	0.188	992	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.19	0.10	0.01		0.01	0.15		0.16	0.17		0.03				
Harding	288.226	288.263	0.037	197	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.03	0.01				0.03		0.03	0.03		0.00				
Harding	288.263	288.375	0.112	592	SD063	355734	DcC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.11	0.01				0.01		0.01	0.11		0.11				
Harding	288.375	288.443	0.068	358	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.06		0.02	0.00		0.03		0.04	0.07		0.06				
Harding	288.443	288.663	0.220	1,161	SD063	355734	DcC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.22	0.02				0.02		0.02	0.21		0.21				
Harding	288.663	288.748	0.085	449	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.08		0.03	0.00		0.04		0.05	0.06		0.08				
Harding	288.748	288.953	0.205	1,083	SD063	355741	GdA	Gerdrum silt loam, 0 to 4 percent slopes		0.01			0.02		0.18		0.21	0.21						
Harding	288.953	288.983	0.030	157	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.03		0.01	0.00		0.02		0.02	0.03		0.03				
Harding	288.983	289.057	0.075	393	SD063	355741	GdA	Gerdrum silt loam, 0 to 4 percent slopes		0.00			0.01		0.07		0.07	0.07						
Harding	289.057	289.167	0.110	582	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.10		0.04	0.01		0.06		0.06	0.11		0.10				
Harding	289.167	289.282	0.114	603	SD063	355741	GdA	Gerdrum silt loam, 0 to 4 percent slopes		0.01			0.01		0.10		0.11	0.11						
Harding	289.282	289.441	0.160	844	SD063	355738	EcA	Espa-Archin complex, 0 to 3 percent slopes		0.01	0.01		0.08		0.07		0.15	0.15						
Harding	289.441	289.498	0.056	298	SD063	355787	SaA	Sage loam					0.05		0.00		0.06	0.06						0.05
Harding	289.498	289.672	0.174	918	SD063	355757	Kg	Xorchee loam, channeled					0.02		0.01		0.03	0.17						0.01
Harding	289.672	289.923	0.252	1,329	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.06	0.24		0.20			0.02		0.02	0.16		0.24	0.07			
Harding	289.923	289.955	0.032	168	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.03	0.02	0.00		0.00	0.03		0.03	0.03		0.00				
Harding	289.955	289.973	0.018	97	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.02	0.00	0.00		0.00	0.01		0.01	0.01		0.00				
Harding	289.973	290.024	0.051	268	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.05	0.03	0.00		0.00	0.04		0.04	0.05		0.01				
Harding	290.024	290.206	0.181	958	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.18	0.05	0.02		0.02	0.06		0.08	0.06		0.02				
Harding	290.206	290.675	0.470	2,480	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.47	0.25	0.02		0.02	0.39		0.40	0.44		0.07				
Harding	290.675	290.755	0.079	419	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.08	0.02	0.01		0.01	0.03		0.04	0.03		0.01				
Harding	290.755	290.907	0.153	806	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.15	0.08	0.01		0.01	0.13		0.13	0.14		0.02				
Harding	290.907	290.931	0.024	125	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.02	0.02	0.00		0.00	0.01		0.01	0.01		0.01				

Attachment 2

Table 1: Soil Limitations Along the Pipeline Centerline Milepostd by Soil Map Unit (continued)

Harding	290.931	291.031	0.100	529	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.10	0.05	0.00		0.00	0.08		0.09	0.09		0.02				
Harding	291.031	291.187	0.156	823	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.14	0.06				0.12		0.12	0.14		0.00				
Harding	291.187	291.271	0.084	446	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.08	0.07	0.00		0.00	0.03		0.03	0.03		0.03				
Harding	291.271	291.414	0.143	754	SD063	355724	BsA	Bullock-Slickspots complex, 0 to 4 percent slopes		0.13	0.02		0.00		0.12		0.13	0.14						
Harding	291.414	291.722	0.308	1,627	SD063	355741	GdA	Gerdrum silt loam, 0 to 4 percent slopes		0.02			0.03		0.28		0.31	0.31						
Harding	291.722	291.883	0.161	850	SD063	355751	Hg	Havre loam					0.15		0.01		0.16	0.16				0.16	0.00	
Harding	291.883	292.058	0.174	921	SD063	355742	Ge	Glendive fine sandy loam					0.16		0.02		0.17	0.17				0.17	0.01	
Harding	292.058	292.093	0.035	184	SD063	1013843	W	Water																
Harding	292.093	292.122	0.029	156	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.01	0.03		0.02			0.00		0.00	0.02		0.03	0.01			
Harding	292.122	292.438	0.316	1,670	SD063	355752	Hh	Havre-Harlake complex					0.27		0.03		0.30	0.30				0.32	0.03	
Harding	292.438	292.460	0.022	115	SD063	355742	Ge	Glendive fine sandy loam					0.02		0.00		0.02	0.02				0.02	0.00	
Harding	292.460	292.584	0.123	651	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.03	0.12		0.10			0.01		0.01	0.08		0.12	0.03			
Harding	292.584	292.822	0.238	1,258	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.24	0.13	0.01		0.01	0.20		0.20	0.22		0.04				
Harding	292.822	293.265	0.443	2,340	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.42	0.29	0.11		0.11	0.04		0.16	0.09		0.18				
Harding	293.265	293.320	0.055	291	SD063	355803	TwC	Twilight fine sandy loam, 6 to 9 percent slopes		0.05	0.05	0.00		0.00	0.00		0.00	0.01		0.01				
Harding	293.320	293.947	0.627	3,312	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.60	0.53	0.03		0.03	0.19		0.22	0.25		0.25				
Harding	293.947	293.964	0.016	86	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.00	0.02		0.01			0.00		0.00	0.01		0.02	0.00			
Harding	293.964	294.010	0.046	244	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.04	0.04	0.00		0.00	0.01		0.02	0.02		0.02				
Harding	294.010	294.113	0.103	543	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.03	0.10		0.08			0.01		0.01	0.07		0.10	0.03			
Harding	294.113	294.119	0.006	33	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.01	0.00	0.00		0.00	0.01		0.01	0.01		0.00				
Harding	294.119	294.204	0.085	450	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.08		0.03	0.00		0.04		0.05	0.08		0.08				
Harding	294.204	294.257	0.053	280	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.05	0.03	0.00		0.00	0.04		0.05	0.05		0.01				
Harding	294.257	294.288	0.031	164	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.03		0.01	0.00		0.02		0.02	0.03		0.03				
Harding	294.288	294.351	0.063	333	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.06	0.03	0.00		0.00	0.06		0.05	0.06		0.01				
Harding	294.351	294.403	0.051	272	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.05		0.02	0.00		0.03		0.03	0.05		0.05				
Harding	294.403	294.519	0.116	611	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.12	0.06	0.00		0.00	0.09		0.10	0.11		0.02				
Harding	294.519	294.614	0.096	506	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.09		0.03	0.00		0.05		0.05	0.09		0.09				
Harding	294.614	294.680	0.066	349	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.07	0.04	0.00		0.00	0.05		0.06	0.06		0.01				
Harding	294.680	294.997	0.316	1,670	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.30		0.10	0.02		0.16		0.18	0.31		0.30				
Harding	294.997	295.077	0.081	426	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.08	0.04	0.00		0.00	0.07		0.07	0.07		0.01				
Harding	295.077	295.216	0.139	735	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.13		0.05	0.01		0.07		0.08	0.14		0.13				
Harding	295.216	295.346	0.129	681	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.13	0.07	0.01		0.01	0.11		0.11	0.12		0.02				
Harding	295.346	295.423	0.078	411	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.07		0.03	0.00		0.04		0.04	0.08		0.07				
Harding	295.423	295.545	0.121	641	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.11	0.05				0.10		0.10	0.11		0.00				
Harding	295.545	295.602	0.057	300	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.06	0.03	0.00		0.00	0.05		0.05	0.05		0.01				
Harding	295.602	295.757	0.156	823	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.14	0.06				0.12		0.12	0.14		0.00				
Harding	295.757	296.084	0.326	1,724	SD063	355768	MpB	Marmarth-Parchin fine sandy loams, 2 to 6 percent slopes		0.33	0.09	0.02		0.02	0.09		0.11	0.28		0.04				
Harding	296.084	296.384	0.300	1,587	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.30	0.16	0.01		0.01	0.25		0.26	0.28		0.06				
Harding	296.384	296.734	0.350	1,848	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.33	0.30	0.02		0.02	0.11		0.12	0.14		0.14				
Harding	296.734	297.013	0.279	1,473	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.26		0.09	0.01		0.14		0.16	0.27		0.28				
Harding	297.013	297.255	0.242	1,277	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.24	0.13	0.01		0.01	0.20		0.21	0.23		0.04				
Harding	297.255	297.605	0.349	1,844	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.33		0.12	0.02		0.18		0.20	0.34		0.33				
Harding	297.605	297.834	0.229	1,209	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes			0.03		0.03		0.17		0.20	0.22						
Harding	297.834	297.962	0.129	680	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.12	0.11	0.01		0.01	0.04		0.05	0.05		0.05				
Harding	297.962	298.037	0.075	397	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.07	0.05	0.02		0.02	0.01		0.03	0.02		0.03				
Harding	298.037	298.200	0.163	859	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.15	0.14	0.01		0.01	0.05		0.06	0.07		0.07				
Harding	298.200	298.274	0.074	389	SD063	355768	MpB	Marmarth-Parchin fine sandy loams, 2 to 6 percent slopes		0.07	0.02	0.00		0.00	0.02		0.03	0.08		0.01				
Harding	298.274	298.488	0.214	1,132	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.20	0.18	0.01		0.01	0.06		0.08	0.09		0.09				
Harding	298.488	299.094	0.605	3,197	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.61	0.32	0.02		0.02	0.50		0.52	0.56		0.09				
Harding	299.094	299.175	0.082	431	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.08	0.02	0.01		0.01	0.03		0.04	0.03		0.01				
Harding	299.175	299.605	0.429	2,268	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.43	0.23	0.02		0.02	0.35		0.37	0.40		0.06				
Harding	299.605	299.736	0.132	696	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.13	0.11	0.01		0.01	0.04		0.05	0.05		0.05				
Harding	299.736	299.782	0.046	241	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.04	0.03	0.01		0.01	0.00		0.02	0.01		0.02				
Harding	299.782	299.829	0.047	246	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.04	0.04	0.00		0.00	0.01		0.02	0.02		0.02				
Harding	299.829	299.926	0.098	517	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.10	0.02	0.01		0.01	0.03		0.04	0.03		0.01				
Harding	299.926	299.979	0.052	275	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.05	0.03	0.00		0.00	0.04		0.04	0.05		0.01				
Harding	299.979	300.010	0.031	166	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.03	0.01	0.00		0.00	0.01		0.01	0.01		0.00				
Harding	300.010	300.053	0.043	227	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.04	0.02	0.00		0.00	0.04		0.04	0.04		0.01				
Harding	300.053	300.174	0.121	638	SD063	355787	SaA	Sage loam					0.11		0.01		0.12	0.12						0.10
Harding	300.174	300.235	0.061	322	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.06	0.05	0.00		0.00	0.02		0.02	0.02		0.02				
Harding	300.235	300.359	0.125	658	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.11	0.05				0.10		0.10	0.11		0.00				
Harding	300.359	300.441	0.082	431	SD063	355787	SaA	Sage loam					0.08		0.00		0.08	0.08						0.07
Harding	300.441	300.744	0.303	1,602	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.29	0.28	0.02		0.02	0.09		0.11	0.12		0.12				
Harding	300.744	300.826	0.082	432	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.08	0.04	0.00		0.00	0.07		0.07	0.08		0.01				

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Harding	300.826	300.993	0.167	881	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.16	0.11	0.04		0.04	0.02		0.06	0.03		0.07								
Harding	300.993	301.214	0.221	1,165	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.21	0.19	0.01		0.01	0.07		0.08	0.09		0.09								
Harding	301.214	301.276	0.062	328	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.06		0.02	0.00		0.03		0.03	0.06		0.06								
Harding	301.276	301.450	0.175	922	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.17	0.09	0.01		0.01	0.14		0.15	0.16		0.03								
Harding	301.450	301.538	0.088	464	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.08		0.03	0.00		0.04		0.05	0.09		0.08								
Harding	301.538	301.797	0.258	1,363	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.23	0.10				0.21		0.21	0.23		0.01								
Harding	301.797	302.019	0.222	1,173	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.22	0.06	0.02		0.02	0.08		0.10	0.08		0.02								
Harding	302.019	302.214	0.195	1,031	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.19	0.13	0.06		0.05	0.02		0.07	0.04		0.08								
Harding	302.214	302.696	0.482	2,546	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.12	0.47		0.36			0.04		0.04	0.31		0.46	0.14							
Harding	302.696	302.726	0.029	155	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.03	0.02	0.00		0.00	0.02		0.03	0.03		0.00								
Harding	302.726	303.245	0.520	2,744	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.49	0.44	0.03		0.03	0.18		0.18	0.21		0.21								
Harding	303.245	303.396	0.151	798	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.14		0.05	0.01		0.08		0.08	0.15		0.14								
Harding	303.396	303.805	0.409	2,157	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.39	0.27	0.10		0.10	0.04		0.14	0.08		0.16								
Harding	303.805	303.893	0.088	466	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.08	0.07	0.00		0.00	0.03		0.03	0.04		0.04								
Harding	303.893	304.121	0.228	1,205	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.06	0.22		0.18			0.02		0.02	0.15		0.22	0.06							
Harding	304.121	304.251	0.130	686	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.12		0.04	0.01		0.07		0.07	0.13		0.12								
Harding	304.251	304.431	0.179	948	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.18	0.10	0.01		0.01	0.15		0.15	0.17		0.03								
Harding	304.431	304.601	0.170	898	SD063	355716	AtA	Assiniboine-Archin fine sandy loams, 0 to 3 percent slopes		0.01	0.10				0.06		0.06	0.17			0.01							
Harding	304.601	304.668	0.067	356	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.06	0.03				0.05		0.05	0.06		0.00								
Harding	304.668	304.869	0.201	1,060	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.19		0.07	0.01		0.10		0.11	0.19		0.19								
Harding	304.869	305.174	0.305	1,610	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.28	0.12				0.24		0.24	0.27		0.01								
Harding	305.174	305.283	0.109	575	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.10	0.09	0.01		0.01	0.03		0.04	0.04		0.04								
Harding	305.283	305.360	0.078	410	SD063	355803	TwC	Twilight fine sandy loam, 6 to 9 percent slopes		0.08	0.07	0.00		0.00	0.00		0.01	0.01		0.01								
Harding	305.360	305.474	0.114	601	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.11	0.03	0.01		0.01	0.04		0.05	0.04		0.01								
Harding	305.474	305.729	0.255	1,344	SD063	355803	TwC	Twilight fine sandy loam, 6 to 9 percent slopes		0.25	0.23	0.01		0.01	0.02		0.02	0.03		0.03								
Harding	305.729	306.062	0.333	1,757	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.33	0.08	0.03		0.03	0.12		0.15	0.12		0.03								
Harding	306.062	306.512	0.451	2,380	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes			0.06		0.05		0.34		0.39	0.42										
Harding	306.512	306.541	0.028	150	SD063	355716	AtA	Assiniboine-Archin fine sandy loams, 0 to 3 percent slopes		0.00	0.02				0.01		0.01	0.03			0.00							
Harding	306.541	306.717	0.176	932	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.17		0.06	0.01		0.09		0.10	0.17		0.17								
Harding	306.717	307.079	0.361	1,908	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.36	0.09	0.04		0.04	0.13		0.16	0.13		0.04								
Harding	307.079	307.185	0.106	562	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.10	0.09	0.01		0.01	0.03		0.04	0.04		0.04								
Harding	307.185	307.379	0.194	1,023	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.19	0.10	0.01		0.01	0.16		0.17	0.18		0.03								
Harding	307.379	307.494	0.116	610	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.11		0.04	0.01		0.06		0.06	0.11		0.11								
Harding	307.494	307.601	0.106	561	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.11	0.06	0.00		0.00	0.09		0.09	0.10		0.02								
Harding	307.601	307.830	0.229	1,208	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.21	0.09				0.18		0.18	0.20		0.01								
Harding	307.830	307.947	0.118	623	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.11	0.10	0.01		0.01	0.04		0.04	0.05		0.06								
Harding	307.947	308.031	0.084	443	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.08	0.04	0.00		0.00	0.07		0.07	0.08		0.01								
Harding	308.031	308.108	0.076	403	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.07	0.05	0.02		0.02	0.01		0.03	0.02		0.03								
Harding	308.108	308.620	0.512	2,703	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.47	0.20				0.41		0.41	0.45		0.02								
Harding	308.620	308.670	0.051	267	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.01	0.05		0.04			0.00		0.00	0.03		0.05	0.01							
Harding	308.670	308.772	0.102	536	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.10		0.03	0.01		0.05		0.06	0.10		0.10								
Harding	308.772	308.963	0.191	1,010	SD063	355768	MpB	Marmarth-Parchin fine sandy loams, 2 to 6 percent slopes		0.19	0.06	0.01		0.01	0.06		0.07	0.17		0.02								
Harding	308.963	309.210	0.247	1,304	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.23		0.08	0.01		0.13		0.14	0.24		0.23								
Harding	309.210	309.420	0.210	1,109	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.19	0.08				0.17		0.17	0.18		0.01								
Harding	309.420	309.575	0.155	818	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.04	0.15		0.12			0.01		0.01	0.10		0.15	0.04							
Harding	309.575	310.006	0.431	2,274	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.41	0.28	0.11		0.11	0.04		0.15	0.09		0.17								
Harding	310.006	310.105	0.100	526	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.02	0.10		0.08			0.01		0.01	0.06		0.09	0.03							
Harding	310.105	310.305	0.199	1,053	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.19	0.13	0.05		0.05	0.02		0.07	0.04		0.08								
Harding	310.305	310.564	0.260	1,371	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.26	0.14	0.01		0.01	0.21		0.22	0.24		0.04								
Harding	310.564	310.601	0.037	194	SD063	355718	Ba	Badlands		0.03		0.03	0.00	0.00	0.00		0.00	0.00		0.03	0.03							
Harding	310.601	310.648	0.047	247	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.04	0.02				0.04		0.04	0.04		0.00								
Harding	310.648	310.838	0.191	1,007	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.18	0.16	0.01		0.01	0.06		0.07	0.08		0.08								
Harding	310.838	311.140	0.301	1,591	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.08	0.29		0.24			0.02		0.02	0.19		0.29	0.08							
Harding	311.140	311.419	0.278	1,475	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.27	0.24	0.01		0.01	0.08		0.10	0.11		0.11								
Harding	311.419	311.600	0.181	955	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.18	0.10	0.01		0.01	0.15		0.16	0.17		0.03								
Harding	311.600	311.884	0.284	1,500	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.27	0.24	0.01		0.01	0.09		0.10	0.11		0.11								
Harding	311.884	312.030	0.145	767	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.15	0.08	0.01		0.01	0.12		0.12	0.14		0.02								
Harding	312.030	312.666	0.636	3,359	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.60	0.54	0.03		0.03	0.19		0.22	0.25		0.25								
Harding	312.666	312.866	0.200	1,058	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.20	0.11	0.01		0.01	0.18		0.17	0.19		0.03								
Harding	312.866	313.152	0.286	1,511	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.26	0.11				0.23		0.23	0.25		0.01								
Harding	313.152	313.314	0.161	851	SD063	355780	RhB	Rhame fine sandy loam, 2 to 6 percent slopes		0.16	0.01	0.01		0.01	0.02		0.02	0.02		0.01		0.16						
Harding	313.314	313.372	0.059	310	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.05	0.02				0.05		0.06	0.06		0.00								
Harding	313.372	313.514	0.142	749	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.13	0.12	0.01		0.01	0.04		0.05	0.06		0.06								
Harding	313.514	313.673	0.159	839	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.15	0.10	0.04		0.04	0.02		0.06	0.03		0.06								

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Harding	313.673	313.773	0.100	529	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.10	0.03	0.01		0.01	0.04		0.06	0.04		0.01					
Harding	313.773	313.869	0.096	504	SD063	355803	TwC	Twilight fine sandy loam, 6 to 9 percent slopes		0.09	0.09	0.00		0.00	0.01		0.01	0.01		0.01					
Harding	313.869	313.970	0.101	532	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.10	0.03	0.01		0.01	0.04		0.06	0.04		0.01					
Harding	313.970	314.278	0.308	1,628	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.29	0.26	0.02		0.02	0.09		0.11	0.12		0.12					
Harding	314.278	314.406	0.128	674	SD063	355803	TwC	Twilight fine sandy loam, 6 to 9 percent slopes		0.12	0.12	0.00		0.00	0.01		0.01	0.02		0.02					
Harding	314.406	314.696	0.291	1,535	SD063	355801	TtC	Trey-Fleak loamy fine sands, 2 to 15 percent slopes		0.29	0.26				0.05		0.05	0.05	0.22	0.05					
Harding	314.696	314.781	0.085	446	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.08	0.07	0.00		0.00	0.03		0.03	0.03		0.03					
Harding	314.781	314.879	0.098	519	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.09	0.06	0.02		0.02	0.01		0.03	0.02		0.04					
Harding	314.879	314.912	0.033	174	SD063	355803	TwC	Twilight fine sandy loam, 6 to 9 percent slopes		0.03	0.03	0.00		0.00	0.00		0.00	0.00		0.00					
Harding	314.912	315.098	0.186	983	SD063	355780	RhB	Rhame fine sandy loam, 2 to 6 percent slopes		0.19	0.01	0.01		0.01	0.02		0.03	0.03		0.01		0.19			
Harding	315.098	315.284	0.186	980	SD063	355766	MaB	Marmarth fine sandy loam, 2 to 6 percent slopes		0.19	0.01	0.01		0.01	0.01		0.02	0.17		0.01		0.19			
Harding	315.284	315.342	0.058	307	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.06	0.01	0.01		0.01	0.02		0.03	0.02		0.01					
Harding	315.342	315.462	0.121	636	SD063	355780	RhB	Rhame fine sandy loam, 2 to 6 percent slopes		0.12	0.01	0.01		0.01	0.01		0.02	0.02		0.01		0.12			
Harding	315.462	315.579	0.117	616	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.12	0.03	0.01		0.01	0.04		0.05	0.04		0.01					
Harding	315.579	315.866	0.287	1,514	SD063	355715	AsB	Assiniboine fine sandy loam, 3 to 6 percent slopes			0.24				0.03		0.03	0.29				0.29			
Harding	315.866	315.950	0.084	442	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.08	0.04	0.00		0.00	0.07		0.07	0.08		0.01					
Harding	315.950	316.353	0.404	2,132	SD063	355803	TwC	Twilight fine sandy loam, 6 to 9 percent slopes		0.39	0.37	0.01		0.01	0.02		0.04	0.05		0.05					
Harding	316.353	316.591	0.238	1,256	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.24	0.06	0.02		0.02	0.08		0.11	0.08		0.02					
Harding	316.591	316.739	0.148	782	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.14		0.05	0.01		0.08		0.08	0.14		0.14					
Harding	316.739	317.243	0.504	2,659	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.50	0.13	0.05		0.05	0.18		0.23	0.18		0.05					
Harding	317.243	317.503	0.260	1,375	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.25		0.09	0.01		0.13		0.15	0.25		0.25					
Harding	317.503	317.780	0.276	1,459	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.25	0.11				0.22		0.22	0.24		0.01					
Harding	317.780	318.027	0.247	1,306	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.23	0.21	0.01		0.01	0.07		0.09	0.10		0.10					
Harding	318.027	318.040	0.014	72	SD063	355746	Ha	Hanly fine sandy loam					0.00		0.00		0.00	0.00							0.00
Harding	318.040	318.143	0.103	543	SD063	355748	Hd	Hanly-Doglecreek fine sandy loams		0.00			0.04		0.01		0.05	0.02							0.04
Harding	318.143	318.359	0.216	1,142	SD063	355802	TvB	Trey-Parchin-Bullock complex, 2 to 9 percent slopes		0.21	0.16	0.01		0.01	0.09		0.10	0.10	0.10	0.01					
Harding	318.359	318.420	0.060	318	SD063	355819	ZbC	Zeona-Blowout land complex, 2 to 15 percent slopes		0.03	0.04				0.00		0.00	0.00	0.04	0.00					
Harding	318.420	318.544	0.124	656	SD063	355802	TvB	Trey-Parchin-Bullock complex, 2 to 9 percent slopes		0.12	0.09	0.00		0.00	0.06		0.06	0.06	0.05	0.00					
Harding	318.544	318.602	0.058	309	SD063	355819	ZbC	Zeona-Blowout land complex, 2 to 15 percent slopes		0.03	0.04				0.00		0.00	0.00	0.04	0.00					
Harding	318.602	318.820	0.217	1,147	SD063	355817	ZaB	Zeona loamy fine sand, 2 to 9 percent slopes		0.03	0.21				0.02		0.02	0.02	0.19	0.02					
Harding	318.820	319.486	0.666	3,518	SD063	355801	TtC	Trey-Fleak loamy fine sands, 2 to 15 percent slopes		0.67	0.61				0.11		0.11	0.11	0.50	0.11					
Harding	319.486	319.855	0.369	1,949	SD063	355818	ZaD	Zeona loamy fine sand, 9 to 25 percent slopes		0.07	0.35	0.33			0.04		0.04	0.04	0.31	0.37					
Harding	319.855	319.928	0.072	382	SD063	355801	TtC	Trey-Fleak loamy fine sands, 2 to 15 percent slopes		0.07	0.07				0.01		0.01	0.01	0.05	0.01					
Harding	319.928	320.009	0.081	428	SD063	355818	ZaD	Zeona loamy fine sand, 9 to 25 percent slopes		0.02	0.08	0.07			0.01		0.01	0.01	0.07	0.08					
Harding	320.009	320.064	0.055	293	SD063	355801	TtC	Trey-Fleak loamy fine sands, 2 to 15 percent slopes		0.06	0.05				0.01		0.01	0.01	0.04	0.01					
Harding	320.064	320.607	0.543	2,868	SD063	355818	ZaD	Zeona loamy fine sand, 9 to 25 percent slopes		0.11	0.52	0.49			0.05		0.05	0.05	0.46	0.54					
Harding	320.607	320.725	0.118	624	SD063	355817	ZaB	Zeona loamy fine sand, 2 to 9 percent slopes		0.02	0.11				0.01		0.01	0.01	0.11	0.01					
Harding	320.725	321.763	1.037	5,476	SD063	355803	TwC	Twilight fine sandy loam, 6 to 9 percent slopes		1.01	0.94	0.03		0.03	0.06		0.09	0.12		0.12					
Harding	321.763	321.809	0.047	248	SD063	355817	ZaB	Zeona loamy fine sand, 2 to 9 percent slopes		0.01	0.06				0.00		0.00	0.00	0.04	0.00					
Harding	321.809	321.875	0.066	347	SD063	355730	ChA	Chinook fine sandy loam, 0 to 3 percent slopes			0.06		0.00		0.01		0.01	0.01			0.00	0.07			
Harding	321.875	321.946	0.070	371	SD063	355817	ZaB	Zeona loamy fine sand, 2 to 9 percent slopes		0.01	0.07				0.01		0.01	0.01	0.06	0.01					
Harding	321.946	322.051	0.106	559	SD063	355780	RhB	Rhame fine sandy loam, 2 to 6 percent slopes		0.11	0.01	0.01		0.01	0.01		0.02	0.02		0.01		0.11			
Harding	322.051	322.143	0.092	485	SD063	355730	ChA	Chinook fine sandy loam, 0 to 3 percent slopes			0.08		0.00		0.01		0.01	0.01			0.00	0.09			
Harding	322.143	322.637	0.494	2,608	SD063	355780	RhB	Rhame fine sandy loam, 2 to 6 percent slopes		0.49	0.02	0.02		0.02	0.05		0.07	0.07		0.02		0.49			
Harding	322.637	322.797	0.160	844	SD063	355731	CnA	Chinook-Archin fine sandy loams, 0 to 3 percent slopes			0.10		0.02		0.05		0.06	0.07			0.01				
Harding	322.797	323.017	0.219	1,158	SD063	355730	ChA	Chinook fine sandy loam, 0 to 3 percent slopes			0.20		0.01		0.02		0.02	0.03			0.01	0.22			
Harding	323.017	323.108	0.092	486	SD063	355748	Hd	Hanly-Doglecreek fine sandy loams		0.00			0.04		0.01		0.05	0.02							0.03
Harding	323.108	323.209	0.100	529	SD063	355817	ZaB	Zeona loamy fine sand, 2 to 9 percent slopes		0.02	0.10				0.01		0.01	0.01	0.09	0.01					
Harding	323.209	323.250	0.042	220	SD063	355819	ZbC	Zeona-Blowout land complex, 2 to 15 percent slopes		0.02	0.03				0.00		0.00	0.00	0.02	0.00					
Harding	323.250	323.315	0.065	343	SD063	355802	TvB	Trey-Parchin-Bullock complex, 2 to 9 percent slopes		0.06	0.05	0.00		0.00	0.03		0.03	0.03	0.03	0.00					
Harding	323.315	323.478	0.162	857	SD063	355749	He	Hanly-Slickspots complex		0.03	0.10		0.02		0.05		0.06	0.06	0.10						0.00
Harding	323.478	323.547	0.069	364	SD063	355817	ZaB	Zeona loamy fine sand, 2 to 9 percent slopes		0.01	0.07				0.01		0.01	0.01	0.06	0.01					
Harding	323.547	323.740	0.193	1,019	SD063	355740	FtE	Fleak-Trey-Rock outcrop complex, 15 to 50 percent slopes	0.04	0.19	0.14	0.15			0.02		0.02	0.02	0.12	0.17	0.04				
Harding	323.740	324.028	0.288	1,522	SD063	355800	TrB	Trey loamy fine sand, 2 to 9 percent slopes		0.28	0.28				0.02		0.02	0.02	0.27	0.02					
Harding	324.028	324.561	0.534	2,817	SD063	355740	FtE	Fleak-Trey-Rock outcrop complex, 15 to 50 percent slopes	0.11	0.53	0.37	0.43			0.05		0.05	0.05	0.32	0.48	0.11				
Harding	324.561	324.956	0.395	2,085	SD063	355819	ZbC	Zeona-Blowout land complex, 2 to 15 percent slopes		0.18	0.28				0.02		0.02	0.02	0.24	0.02					
Harding	324.956	325.176	0.220	1,160	SD063	355801	TtC	Trey-Fleak loamy fine sands, 2 to 15 percent slopes		0.22	0.20				0.04		0.04	0.04	0.18	0.04					
Harding	325.176	325.481	0.305	1,609	SD063	355740	FtE	Fleak-Trey-Rock outcrop complex, 15 to 50 percent slopes	0.06	0.30	0.21	0.24			0.03		0.03	0.03	0.18	0.27	0.06				
Harding	325.481	325.567	0.086	454	SD063	355803	TwC	Twilight fine sandy loam, 6 to 9 percent slopes		0.08	0.08	0.00		0.00	0.01		0.01	0.01		0.01					
Harding	325.567	325.619	0.052	273	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.05	0.01	0.01		0.01	0.02		0.02	0.02		0.01					
Harding	325.619	325.663	0.044	232	SD063	355803	TwC	Twilight fine sandy loam, 6 to 9 percent slopes		0.04	0.04	0.00		0.00	0.00		0.00	0.01		0.01					
Harding	325.663	326.001	0.339	1,787	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.34	0.08	0.03		0.03	0.12		0.15	0.12		0.03					
Harding	326.001	326.301	0.300	1,586	SD063	355780	RhB	Rhame fine sandy loam, 2 to 6 percent slopes		0.30	0.02	0.02		0.02	0.03		0.05	0.05		0.02		0.30			
Harding	326.301	326.416	0.114	603	SD063	355803	TwC	Twilight fine sandy loam, 6 to 9 percent slopes		0.11	0.10	0.00		0.00	0.01		0.01	0.01		0.01					

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Harding	326.416	326.663	0.248	1,309	SD063	355716	AtA	Assiniboine-Archin fine sandy loams, 0 to 3 percent slopes		0.01	0.14				0.09		0.09	0.25			0.02					
Harding	326.663	326.702	0.039	205	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.04	0.01	0.00		0.00	0.01		0.02	0.01		0.00					
Harding	326.702	326.875	0.172	911	SD063	355715	AsB	Assiniboine fine sandy loam, 3 to 6 percent slopes			0.15				0.02		0.02	0.17					0.17		
Harding	326.875	326.908	0.033	174	SD063	355716	AtA	Assiniboine-Archin fine sandy loams, 0 to 3 percent slopes		0.00	0.02				0.01		0.01	0.03			0.00				
Harding	326.908	327.167	0.259	1,368	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.26	0.14	0.01		0.01	0.21		0.22	0.24		0.04					
Harding	327.167	327.366	0.199	1,050	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.20	0.05	0.02		0.02	0.07		0.09	0.07		0.02					
Harding	327.366	327.625	0.259	1,367	SD063	355780	RhB	Rhame fine sandy loam, 2 to 6 percent slopes		0.26	0.01	0.01		0.01	0.03		0.04	0.04		0.01			0.26		
Harding	327.625	327.724	0.099	525	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.10	0.05	0.00		0.00	0.08		0.09	0.09		0.01					
Harding	327.724	328.152	0.428	2,261	SD063	355780	RhB	Rhame fine sandy loam, 2 to 6 percent slopes		0.43	0.02	0.02		0.02	0.04		0.06	0.06		0.02			0.43		
Harding	328.152	328.202	0.050	265	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes			0.01		0.01		0.04		0.04	0.05							
Harding	328.202	328.373	0.170	898	SD063	355741	GdA	Gerdrum silt loam, 0 to 4 percent slopes		0.01			0.02		0.15		0.17	0.17							
Harding	328.373	328.390	0.018	94	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes			0.00		0.00		0.01		0.02	0.02							
Harding	328.390	328.397	0.007	38	SD063	355741	GdA	Gerdrum silt loam, 0 to 4 percent slopes		0.00			0.00		0.01		0.01	0.01							
Harding	328.397	328.514	0.117	617	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.11		0.04	0.01		0.06		0.07	0.11		0.11					
Harding	328.514	328.581	0.067	355	SD063	355756	Ke	Korchea loam					0.00		0.01		0.01	0.07					0.07		0.00
Harding	328.581	328.945	0.363	1,918	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.35		0.12	0.02		0.19		0.20	0.35		0.35					
Harding	328.945	329.068	0.123	651	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.03	0.12		0.10			0.01		0.01	0.08		0.12	0.03				
Harding	329.068	329.131	0.063	331	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.06	0.03	0.00		0.00	0.05		0.05	0.06		0.01					
Harding	329.131	329.207	0.076	401	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.02	0.07		0.06			0.01		0.01	0.05		0.07	0.02				
Harding	329.207	329.335	0.128	677	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.12	0.05				0.10		0.10	0.11		0.00					
Harding	329.335	329.483	0.148	782	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.15	0.08	0.01		0.01	0.12		0.13	0.14		0.02					
Harding	329.483	329.646	0.164	863	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.15	0.06				0.13		0.13	0.14		0.00					
Harding	329.646	329.693	0.047	247	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.05	0.02	0.00		0.00	0.04		0.04	0.04		0.01					
Harding	329.693	329.761	0.068	360	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.06	0.03				0.05		0.05	0.06		0.00					
Harding	329.761	329.839	0.078	411	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.08	0.04	0.00		0.00	0.06		0.07	0.07		0.01					
Harding	329.839	330.339	0.500	2,638	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.45	0.19				0.40		0.40	0.44		0.01					
Harding	330.339	330.405	0.067	352	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.06	0.06	0.00		0.00	0.02		0.02	0.03		0.03					
Harding	330.405	330.429	0.023	122	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes			0.00		0.00		0.02		0.02	0.02							
Harding	330.429	330.457	0.029	152	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.03	0.01				0.02		0.02	0.03		0.00					
Harding	330.457	330.628	0.171	904	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes			0.02		0.02		0.13		0.15	0.16							
Harding	330.628	330.731	0.103	543	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.10		0.03	0.01		0.06		0.06	0.10		0.10					
Harding	330.731	330.854	0.123	650	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes			0.02		0.01		0.09		0.11	0.12							
Harding	330.854	330.948	0.093	492	SD063	355727	CcE	Cabbart loam, 6 to 60 percent slopes, extremely stony		0.09	0.00	0.07	0.07		0.01		0.08	0.09		0.09	0.07				
Harding	330.948	331.053	0.105	554	SD063	355768	MpB	Marmarth-Parchin fine sandy loams, 2 to 6 percent slopes		0.10	0.03	0.01		0.01	0.03		0.04	0.09		0.01					
Harding	331.053	331.539	0.486	2,567	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.44	0.19				0.39		0.39	0.43		0.01					
Harding	331.539	331.846	0.308	1,624	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.29		0.10	0.02		0.16		0.17	0.30		0.29					
Harding	331.846	332.259	0.412	2,177	SD063	355799	ToC	Tanna-Rhoades complex, 2 to 9 percent slopes		0.41			0.33		0.14		0.37	0.41		0.41					
Harding	332.259	332.524	0.265	1,399	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.26	0.14	0.01		0.01	0.22		0.23	0.25		0.04					
Harding	332.524	332.577	0.053	280	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.05		0.02	0.00		0.03		0.03	0.05		0.05					
Harding	332.577	333.068	0.491	2,593	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.45	0.19				0.39		0.39	0.43		0.01					
Harding	333.068	333.101	0.033	174	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.03	0.02	0.00		0.00	0.03		0.03	0.03		0.00					
Harding	333.101	333.131	0.031	161	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.03	0.01				0.02		0.02	0.03		0.00					
Harding	333.131	333.339	0.208	1,098	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.21	0.11	0.01		0.01	0.17		0.18	0.19		0.03					
Harding	333.339	333.589	0.249	1,316	SD063	355768	MpB	Marmarth-Parchin fine sandy loams, 2 to 6 percent slopes		0.25	0.07	0.01		0.01	0.07		0.08	0.22		0.03					
Harding	333.589	333.659	0.071	374	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.06	0.03				0.06		0.06	0.06		0.00					
Harding	333.659	333.745	0.086	453	SD063	355768	MpB	Marmarth-Parchin fine sandy loams, 2 to 6 percent slopes		0.09	0.02	0.00		0.00	0.02		0.03	0.07		0.01					
Harding	333.745	333.901	0.155	821	SD063	355770	MtD	Marmarth-Twilight fine sandy loams, 9 to 15 percent slopes		0.16	0.06	0.01		0.01	0.02		0.03	0.10		0.11					
Harding	333.901	334.072	0.172	906	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.16	0.15	0.01		0.01	0.05		0.06	0.07		0.07					
Harding	334.072	334.170	0.098	516	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.02	0.09		0.08			0.01		0.01	0.06		0.09	0.03				
Harding	334.170	334.235	0.065	341	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.06	0.02	0.01		0.01	0.02		0.03	0.02		0.01					
Harding	334.235	334.389	0.154	813	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.14	0.06				0.12		0.12	0.14		0.00					
Harding	334.389	334.489	0.101	532	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.10	0.09	0.01		0.01	0.03		0.04	0.04		0.04					
Harding	334.489	334.537	0.048	252	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.05	0.03	0.00		0.00	0.04		0.04	0.04		0.01					
Harding	334.537	335.651	1.114	5,881	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		1.06	0.95	0.06		0.06	0.33		0.39	0.45		0.45					
Harding	335.651	335.747	0.096	508	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.09	0.06	0.02		0.02	0.01		0.03	0.02		0.04					
Harding	335.747	335.884	0.137	724	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.13	0.12	0.01		0.01	0.04		0.05	0.05		0.06					
Harding	335.884	336.030	0.146	770	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.14	0.09	0.04		0.04	0.01		0.05	0.03		0.06					
Harding	336.030	336.193	0.162	857	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.15	0.14	0.01		0.01	0.05		0.06	0.06		0.06					
Harding	336.193	336.348	0.156	821	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.16	0.08	0.01		0.01	0.13		0.13	0.14		0.02					
Harding	336.348	336.526	0.178	938	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.16	0.07				0.14		0.14	0.18		0.01					
Harding	336.526	336.626	0.100	530	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.10	0.07	0.03		0.03	0.01		0.04	0.02		0.04					
Harding	336.626	336.792	0.165	873	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.16	0.14	0.01		0.01	0.05		0.06	0.07		0.07					
Harding	336.792	336.958	0.167	880	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.17	0.09	0.01		0.01	0.14		0.14	0.16		0.03					
Harding	336.958	337.122	0.164	865	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		0.16	0.11	0.04		0.04	0.02		0.06	0.03		0.07					

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Harding	337.122	337.207	0.084	446	SD063	355768	MpB	Marmarth-Parchin fine sandy loams, 2 to 6 percent slopes		0.08	0.02	0.00		0.00	0.02		0.03	0.07		0.01				
Harding	337.207	337.346	0.140	737	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.14	0.07	0.01		0.01	0.11		0.12	0.13		0.02				
Harding	337.346	337.425	0.079	418	SD063	355768	MpB	Marmarth-Parchin fine sandy loams, 2 to 6 percent slopes		0.08	0.02	0.00		0.00	0.02		0.03	0.07		0.01				
Harding	337.425	337.546	0.120	635	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.12	0.06	0.00		0.00	0.10		0.10	0.11		0.02				
Harding	337.546	337.973	0.427	2,256	SD063	355741	GdA	Gerdrum silt loam, 0 to 4 percent slopes		0.02			0.04		0.38		0.43	0.43						
Harding	337.973	338.069	0.096	508	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.09	0.08	0.00		0.00	0.03		0.03	0.04		0.04				
Harding	338.069	338.237	0.168	887	SD063	355741	GdA	Gerdrum silt loam, 0 to 4 percent slopes		0.01			0.02		0.15		0.17	0.17						
Harding	338.237	338.405	0.168	885	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.17	0.09	0.01		0.01	0.14		0.14	0.16		0.03				
Harding	338.405	338.544	0.139	735	SD063	355728	CdE	Cabbart-Delridge loams, 15 to 40 percent slopes		0.14	0.00	0.11			0.01		0.01	0.12		0.13	0.00			
Harding	338.544	338.714	0.171	901	SD063	355757	Kg	Korchea loam, channeled					0.02		0.01		0.03	0.16						0.01
Harding	338.714	338.814	0.099	523	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.10	0.02	0.01		0.01	0.03		0.04	0.03		0.01				
Harding	338.814	338.952	0.139	731	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.13	0.05				0.11		0.11	0.12		0.00				
Harding	338.952	339.045	0.093	492	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.09	0.02	0.01		0.01	0.03		0.04	0.03		0.01				
Harding	339.045	339.251	0.205	1,084	SD063	355716	AtA	Assiniboine-Archin fine sandy loams, 0 to 3 percent slopes		0.01	0.12				0.08		0.08	0.21			0.01			
Harding	339.251	339.440	0.189	1,000	SD063	355741	GdA	Gerdrum silt loam, 0 to 4 percent slopes		0.01			0.02		0.17		0.19	0.19						
Harding	339.440	339.527	0.087	459	SD063	355714	AsA	Assiniboine fine sandy loam, 0 to 3 percent slopes			0.07		0.00		0.01		0.01	0.09				0.09		
Harding	339.527	339.630	0.103	546	SD063	355752	Hh	Havre-Harlake complex					0.09		0.01		0.10	0.10				0.10		0.01
Harding	339.630	339.710	0.080	421	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.08	0.02	0.01		0.01	0.03		0.04	0.03		0.01				
Harding	339.710	340.008	0.298	1,573	SD063	355716	AtA	Assiniboine-Archin fine sandy loams, 0 to 3 percent slopes		0.02	0.17				0.11		0.11	0.30			0.02			
Harding	340.008	340.190	0.182	962	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes			0.02		0.02		0.14		0.16	0.17						
Harding	340.190	340.440	0.250	1,320	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.24		0.08	0.01		0.13		0.14	0.24		0.24				
Harding	340.440	340.577	0.137	722	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.13	0.12	0.01		0.01	0.04		0.05	0.05		0.05				
Harding	340.577	340.610	0.033	174	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.03	0.02	0.00		0.00	0.03		0.03	0.03		0.00				
Harding	340.610	340.658	0.048	253	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.05	0.04	0.00		0.00	0.01		0.02	0.02		0.02				
Harding	340.658	340.718	0.061	319	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.06	0.03	0.00		0.00	0.05		0.05	0.06		0.01				
Harding	340.718	340.773	0.055	291	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes			0.01		0.01		0.04		0.05	0.06						
Harding	340.773	340.881	0.108	568	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.11	0.06	0.00		0.00	0.09		0.09	0.10		0.02				
Harding	340.881	341.605	0.724	3,822	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes			0.09		0.09		0.54		0.63	0.68						
Harding	341.605	341.664	0.059	310	SD063	355716	AtA	Assiniboine-Archin fine sandy loams, 0 to 3 percent slopes		0.00	0.03				0.02		0.02	0.06			0.00			
Harding	341.664	341.727	0.063	333	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes			0.01		0.01		0.05		0.05	0.06						
Harding	341.727	341.830	0.103	545	SD063	355714	AsA	Assiniboine fine sandy loam, 0 to 3 percent slopes			0.09		0.01		0.01		0.02	0.10				0.10		
Harding	341.830	341.993	0.163	861	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes			0.02		0.02		0.12		0.14	0.15						
Harding	341.993	342.073	0.080	421	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.07	0.03				0.06		0.06	0.07		0.00				
Harding	342.073	342.156	0.083	440	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes			0.01		0.01		0.06		0.07	0.08						
Harding	342.156	342.271	0.116	610	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		0.11		0.04	0.01		0.06		0.06	0.11		0.11				
Harding	342.271	342.380	0.108	572	SD063	355724	BsA	Bullock-Slickspots complex, 0 to 4 percent slopes		0.10	0.01		0.00		0.09		0.10	0.10						
Harding	342.380	342.570	0.190	1,003	SD063	355768	MpB	Marmarth-Parchin fine sandy loams, 2 to 6 percent slopes		0.19	0.06	0.01		0.01	0.06		0.06	0.17		0.02				
Harding	342.570	342.819	0.250	1,318	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.25	0.13	0.01		0.01	0.20		0.21	0.23		0.04				
Harding	342.819	342.938	0.118	625	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.11	0.05				0.09		0.09	0.10		0.00				
Harding	342.938	343.150	0.213	1,123	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.21	0.11	0.01		0.01	0.17		0.18	0.20		0.03				
Harding	343.150	343.277	0.126	668	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.12	0.11	0.01		0.01	0.04		0.04	0.05		0.05				
Harding	343.277	343.690	0.413	2,182	SD063	355716	AtA	Assiniboine-Archin fine sandy loams, 0 to 3 percent slopes		0.02	0.24				0.16		0.15	0.41			0.03			
Harding	343.690	343.749	0.059	313	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.06	0.03	0.00		0.00	0.05		0.05	0.06		0.01				
Harding	343.749	343.836	0.087	458	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.09	0.02	0.01		0.01	0.03		0.04	0.03		0.01				
Harding	343.836	344.091	0.255	1,346	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.23	0.10				0.20		0.20	0.22		0.01				
Harding	344.091	344.149	0.058	306	SD063	355803	TwC	Twilight fine sandy loam, 6 to 9 percent slopes		0.06	0.05	0.00		0.00	0.00		0.01	0.01		0.01				
Harding	344.149	344.414	0.265	1,398	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.26	0.14	0.01		0.01	0.22		0.23	0.25		0.04				
Harding	344.414	344.423	0.010	51	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.01	0.00				0.01		0.01	0.01		0.00				
Harding	344.423	344.625	0.202	1,067	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.20	0.11	0.01		0.01	0.17		0.17	0.19		0.03				
Harding	344.625	344.684	0.059	310	SD063	355803	TwC	Twilight fine sandy loam, 6 to 9 percent slopes		0.06	0.05	0.00		0.00	0.00		0.01	0.01		0.01				
Harding	344.684	344.917	0.233	1,232	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.23	0.12	0.01		0.01	0.19		0.20	0.22		0.03				
Harding	344.917	344.999	0.082	432	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.08	0.02	0.01		0.01	0.03		0.04	0.03		0.01				
Harding	344.999	345.192	0.193	1,021	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.18	0.18	0.01		0.01	0.06		0.07	0.08		0.08				
Harding	345.192	345.338	0.146	771	SD063	355730	ChA	Chinook fine sandy loam, 0 to 3 percent slopes			0.13		0.00		0.01		0.02	0.02				0.01	0.15	
Harding	345.338	345.468	0.129	682	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.12	0.11	0.01		0.01	0.04		0.05	0.05		0.05				
Harding	345.468	346.286	0.818	4,321	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.82	0.20	0.08		0.08	0.29		0.37	0.29		0.08				
Harding	346.286	346.338	0.052	273	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.05	0.02				0.04		0.04	0.05		0.00				
Harding	346.338	346.362	0.024	126	SD063	355724	BsA	Bullock-Slickspots complex, 0 to 4 percent slopes		0.02	0.00		0.00		0.02		0.02	0.02						
Harding	346.362	346.514	0.153	806	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.14	0.08				0.12		0.12	0.13		0.00				
Harding	346.514	346.649	0.135	714	SD063	355724	BsA	Bullock-Slickspots complex, 0 to 4 percent slopes		0.13	0.01		0.00		0.11		0.12	0.13						
Harding	346.649	346.747	0.098	516	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.09	0.04				0.08		0.08	0.09		0.00				
Harding	346.747	346.791	0.044	230	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.04	0.04	0.00		0.00	0.01		0.02	0.02		0.02				
Harding	346.791	346.863	0.072	379	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes		0.07	0.02	0.01		0.01	0.03		0.03	0.03		0.01				
Harding	346.863	346.884	0.021	111	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.02	0.02	0.00		0.00	0.01		0.01	0.01		0.01				

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Harding	346.884	347.000	0.117	616	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes			0.11		0.04	0.01		0.06		0.07	0.11			0.11					
Harding	347.000	347.062	0.062	325	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes			0.06	0.04	0.02		0.02	0.01		0.02	0.01			0.02					
Harding	347.062	347.140	0.078	413	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes			0.07	0.07	0.00		0.00	0.02		0.03	0.03			0.03					
Harding	347.140	347.158	0.018	94	SD063	355747	Hb	Hanly loamy fine sand				0.02		0.00				0.00	0.00	0.02							0.00
Harding	347.158	347.352	0.195	1,027	SD063	355787	SaA	Sage loam						0.18		0.01		0.19	0.19								0.17
Harding	347.352	347.456	0.103	546	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes			0.10	0.07	0.03		0.03	0.01		0.04	0.02			0.04					
Harding	347.456	347.780	0.324	1,710	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes			0.31		0.11	0.02		0.17		0.18	0.31			0.31					
Harding	347.780	347.899	0.120	632	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes			0.11	0.08	0.03		0.03	0.01		0.04	0.02			0.05					
Harding	347.899	347.969	0.069	367	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes			0.07		0.02	0.00		0.04		0.04	0.07			0.07					
Harding	347.969	348.051	0.082	431	SD063	355728	CdE	Cabbart-Delridge loams, 15 to 40 percent slopes			0.08	0.00	0.06			0.01		0.01	0.07			0.08	0.00				
Harding	348.051	348.225	0.175	923	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.04		0.17		0.14			0.01		0.01	0.11			0.17	0.05				
Harding	348.225	348.371	0.146	768	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes				0.02		0.02		0.11		0.13	0.14								
Harding	348.371	348.383	0.012	65	SD063	355731	CnA	Chinook-Archin fine sandy loams, 0 to 3 percent slopes				0.01		0.00		0.00		0.00	0.01				0.00				
Harding	348.383	348.406	0.023	121	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes			0.02		0.01	0.00		0.01		0.01	0.02			0.02					
Harding	348.406	348.459	0.053	282	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.01		0.05		0.04			0.00		0.00	0.03			0.05	0.01				
Harding	348.459	348.540	0.081	428	SD063	355731	CnA	Chinook-Archin fine sandy loams, 0 to 3 percent slopes				0.05		0.01		0.02		0.03	0.04				0.00				
Harding	348.540	348.828	0.288	1,519	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes				0.04		0.03		0.22		0.25	0.27								
Harding	348.828	349.028	0.200	1,055	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.20	0.11	0.01		0.01	0.16		0.17	0.19			0.03					
Harding	349.028	349.099	0.071	375	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes			0.07	0.05	0.02		0.02	0.01		0.02	0.01			0.03					
Harding	349.099	349.446	0.347	1,835	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.35	0.18	0.01		0.01	0.28		0.30	0.32			0.05					
Harding	349.446	349.469	0.023	122	SD063	355802	TvB	Trey-Parchin-Bullock complex, 2 to 9 percent slopes			0.02	0.02	0.00		0.00	0.01		0.01	0.01	0.01		0.00					
Harding	349.469	349.769	0.300	1,584	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.30	0.16	0.01		0.01	0.25		0.26	0.28			0.05					
Harding	349.769	349.868	0.098	519	SD063	355720	BkF	Bullock fine sandy loam, 6 to 20 percent slopes, extremely stony			0.09	0.00	0.00		0.00	0.09		0.09	0.09			0.09	0.08				
Harding	349.868	349.906	0.038	203	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes			0.04	0.03	0.00		0.00	0.01		0.01	0.02			0.02					
Harding	349.906	349.954	0.048	252	SD063	355727	CcE	Cabbart loam, 6 to 60 percent slopes, extremely stony			0.05	0.00	0.04	0.04		0.00		0.04	0.04			0.04	0.04				
Harding	349.954	350.429	0.476	2,512	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes			0.45	0.40	0.02		0.02	0.14		0.17	0.19			0.19					
Harding	350.429	350.538	0.109	574	SD063	355758	Km	Korchea-Archin complex			0.00			0.00		0.04		0.04	0.11								
Harding	350.538	350.569	0.031	165	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.01		0.03		0.02			0.00		0.00	0.02			0.03	0.01				
Harding	350.569	350.586	0.016	85	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes			0.02	0.01	0.00		0.00	0.00		0.01	0.00			0.01					
Harding	350.586	350.760	0.175	922	SD063	355783	RnB	Rhoades-Daglum loams, 2 to 9 percent slopes			0.17			0.10		0.15		0.15	0.17			0.16					
Harding	350.760	351.132	0.371	1,961	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes			0.34	0.14				0.30		0.30	0.33			0.01					
Harding	351.132	351.303	0.171	905	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes			0.17	0.04	0.02		0.02	0.06		0.08	0.06			0.02					
Harding	351.303	351.485	0.182	960	SD063	355724	BsA	Bullock-Slickspots complex, 0 to 4 percent slopes			0.17	0.02		0.01		0.15		0.16	0.17								
Harding	351.485	351.517	0.033	172	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.03	0.02	0.00		0.00	0.03		0.03	0.03			0.00					
Harding	351.517	351.645	0.128	675	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes			0.13	0.03	0.01		0.01	0.04		0.06	0.04			0.01					
Harding	351.645	351.807	0.162	857	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes			0.15	0.06				0.13		0.13	0.14			0.00					
Harding	351.807	351.835	0.027	144	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.03	0.01	0.00		0.00	0.02		0.02	0.03			0.00					
Harding	351.835	351.912	0.077	407	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes			0.07	0.03				0.06		0.06	0.07			0.00					
Harding	351.912	352.351	0.439	2,319	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes			0.44	0.11	0.04		0.04	0.15		0.20	0.15			0.04					
Harding	352.351	352.392	0.041	217	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.04	0.02	0.00		0.00	0.03		0.04	0.04			0.01					
Harding	352.392	352.459	0.067	353	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes			0.07	0.02	0.01		0.01	0.02		0.03	0.02			0.01					
Harding	352.459	352.533	0.074	391	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes			0.07	0.05	0.02		0.02	0.01		0.03	0.01			0.03					
Harding	352.533	352.599	0.066	350	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.02		0.06		0.05			0.01		0.01	0.04			0.06	0.02				
Harding	352.599	352.751	0.152	805	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes			0.15	0.04	0.04	0.02		0.02	0.05	0.07	0.05			0.02					
Harding	352.751	352.787	0.036	189	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes			0.03	0.01				0.03		0.03	0.03			0.00					
Harding	352.787	352.937	0.150	790	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes			0.15	0.04	0.01		0.01	0.05		0.07	0.05			0.01					
Harding	352.937	352.961	0.024	126	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes			0.02	0.01				0.02		0.02	0.02			0.00					
Harding	352.961	353.254	0.293	1,549	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes			0.29	0.07	0.03		0.03	0.10		0.13	0.10			0.03					
Harding	353.254	353.409	0.155	816	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes			0.15		0.05	0.01		0.08		0.09	0.15			0.15					
Harding	353.409	353.466	0.057	300	SD063	355801	TtC	Trey-Fleak loamy fine sands, 2 to 15 percent slopes			0.06	0.05				0.01		0.01	0.01	0.04		0.01					
Harding	353.466	353.540	0.074	390	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes			0.07		0.02	0.00		0.04		0.04	0.07			0.07					
Harding	353.540	353.575	0.035	185	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes			0.03	0.02	0.01		0.01	0.00		0.01	0.01			0.01					
Harding	353.575	353.612	0.038	199	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes			0.04		0.01	0.00		0.02		0.02	0.04			0.04					
Harding	353.612	353.858	0.246	1,297	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes			0.25	0.08	0.02		0.02	0.09		0.11	0.09			0.02					
Harding	353.858	353.883	0.025	132	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes				0.00		0.00		0.02		0.02	0.02								
Harding	353.883	353.905	0.022	116	SD063	355724	BsA	Bullock-Slickspots complex, 0 to 4 percent slopes			0.02	0.00		0.00		0.02		0.02	0.02								
Butte	353.905	353.975	0.070	367	SD019	353136	AeB	Absher-Slickspots complex, 0 to 9 percent slopes			0.03	0.01		0.04		0.06		0.06	0.07			0.04					
Butte	353.975	354.096	0.121	641	SD019	353257	ZeB	Zeona loamy fine sand, 0 to 6 percent slopes			0.01	0.10				0.02		0.02	0.02	0.10							
Butte	354.096	354.294	0.198	1,047	SD019	353136	AeB	Absher-Slickspots complex, 0 to 9 percent slopes			0.08	0.02		0.11		0.17		0.17	0.19			0.11					
Butte	354.294	354.321	0.027	142	SD019	353257	ZeB	Zeona loamy fine sand, 0 to 6 percent slopes			0.00	0.02				0.01		0.01	0.01	0.02							
Butte	354.321	354.370	0.049	259	SD019	353136	AeB	Absher-Slickspots complex, 0 to 9 percent slopes			0.02	0.00		0.03		0.04		0.04	0.06			0.03					
Butte	354.370	354.616	0.246	1,298	SD019	353257	ZeB	Zeona loamy fine sand, 0 to 6 percent slopes			0.01	0.20				0.05		0.05	0.05	0.20							
Butte	354.616	354.759	0.143	756	SD019	353147	Bd	Badland			0.13	0.01	0.12		0.01	0.01		0.01	0.02			0.13	0.11				
Butte	354.759	354.948	0.189	998	SD019	353249	TfD	Twilight fine sandy loam, 3 to 25 percent slopes			0.14	0.15	0.13	0.02	0.01	0.03		0.04	0.04			0.16					

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Butte	354.948	355.240	0.292	1,541	SD019	353147	Bd	Badland		0.27	0.03	0.24		0.01	0.01		0.02	0.05		0.27	0.22			
Butte	355.240	355.653	0.412	2,178	SD019	353242	SnB	Sorum fine sandy loam, 0 to 6 percent slopes			0.04				0.35		0.35	0.37						
Butte	355.653	355.716	0.063	332	SD019	353141	AnA	Archin-Slickspots complex, 0 to 3 percent slopes		0.02	0.00				0.06		0.06	0.06						
Butte	355.716	355.913	0.197	1,042	SD019	353249	TfD	Twilight fine sandy loam, 3 to 25 percent slopes		0.15	0.16	0.14	0.02	0.01	0.03		0.04	0.04		0.17				
Butte	355.913	356.233	0.320	1,690	SD019	353242	SnB	Sorum fine sandy loam, 0 to 6 percent slopes			0.03				0.27		0.27	0.29						
Butte	356.233	356.292	0.059	313	SD019	353251	ThD	Twilight-Blackhall fine sandy loams, 6 to 18 percent slopes		0.05	0.03	0.03	0.00	0.02	0.00		0.02	0.01		0.05				
Butte	356.292	356.408	0.116	610	SD019	353242	SnB	Sorum fine sandy loam, 0 to 6 percent slopes			0.01				0.10		0.10	0.10						
Butte	356.408	356.505	0.097	513	SD019	353178	Ha	Hanly loamy fine sand,			0.09		0.00				0.00	0.01	0.08						0.00
Butte	356.505	357.481	0.976	5,152	SD019	353257	ZeB	Zeona loamy fine sand, 0 to 6 percent slopes		0.05	0.78				0.20		0.20	0.20	0.78					
Butte	357.481	357.542	0.061	324	SD019	353141	AnA	Archin-Slickspots complex, 0 to 3 percent slopes		0.02	0.00				0.06		0.06	0.06						
Butte	357.542	357.607	0.065	344	SD019	353147	Bd	Badland		0.06	0.01	0.05		0.00	0.00		0.01	0.01		0.08	0.05			
Butte	357.607	357.638	0.030	160	SD019	353249	TfD	Twilight fine sandy loam, 3 to 25 percent slopes		0.02	0.02	0.02	0.00	0.00	0.00		0.01	0.01		0.03				
Perkins	357.638	357.669	0.032	167	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.03	0.02	0.00	0.00	0.00	0.01		0.01	0.02		0.01				0.00
Perkins	357.669	357.762	0.093	491	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.09	0.00	0.01		0.00	0.08		0.08	0.09		0.01				
Perkins	357.762	358.199	0.436	2,304	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.43	0.28	0.02	0.01	0.01	0.12		0.14	0.25		0.14				0.00
Perkins	358.199	358.378	0.180	949	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.18	0.01	0.01		0.01	0.15		0.16	0.17		0.02				
Perkins	358.378	358.416	0.037	197	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.04	0.02	0.00	0.00	0.00	0.01		0.01	0.02		0.01				0.00
Perkins	358.416	358.454	0.038	202	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.04	0.00	0.00		0.00	0.03		0.03	0.04		0.00				
Perkins	358.454	358.570	0.116	614	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.12	0.08	0.00	0.00	0.00	0.03		0.04	0.07		0.04				0.00
Perkins	358.570	359.498	0.928	4,897	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.93	0.03	0.07		0.04	0.79		0.83	0.86		0.11				
Perkins	359.498	359.763	0.266	1,403	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.26	0.17	0.01	0.01	0.01	0.07		0.09	0.15		0.08				0.00
Perkins	359.763	359.836	0.073	383	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.07	0.00	0.01		0.00	0.06		0.06	0.07		0.01				
Perkins	359.836	360.034	0.198	1,046	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.20	0.06				0.19		0.19	0.20						
Perkins	360.034	360.063	0.029	153	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.03	0.02	0.00	0.00	0.00	0.01		0.01	0.02		0.01				0.00
Perkins	360.063	360.154	0.091	479	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.09	0.03				0.09		0.09	0.09						
Perkins	360.154	360.563	0.409	2,161	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.41	0.27	0.02	0.01	0.01	0.11		0.14	0.24		0.13				0.00
Perkins	360.563	360.647	0.083	441	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.08	0.03				0.08		0.08	0.08						
Perkins	360.647	360.656	0.009	49	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.01	0.01	0.00	0.00	0.00	0.00		0.00	0.01		0.00				0.00
Perkins	360.656	360.695	0.039	208	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.04	0.01				0.04		0.04	0.04						
Perkins	360.695	360.930	0.235	1,240	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.23	0.15	0.01	0.01	0.00	0.07		0.08	0.14		0.07				0.00
Perkins	360.930	360.958	0.028	146	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.03	0.01				0.03		0.03	0.03						
Perkins	360.958	361.115	0.157	828	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.16	0.10	0.01	0.00	0.00	0.04		0.05	0.09		0.05				0.00
Perkins	361.115	361.370	0.256	1,351	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.26	0.08				0.24		0.24	0.26						
Perkins	361.370	361.398	0.028	146	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.03	0.02	0.00	0.00	0.00	0.01		0.01	0.02		0.01				0.00
Perkins	361.398	361.510	0.112	593	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.11	0.03				0.11		0.11	0.11						
Perkins	361.510	361.532	0.021	112	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.02	0.00	0.00		0.00	0.02		0.02	0.02		0.00				
Perkins	361.532	361.577	0.045	240	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.05	0.01				0.04		0.04	0.05						
Perkins	361.577	361.685	0.108	569	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.11	0.00	0.01		0.00	0.09		0.10	0.10		0.01				
Perkins	361.685	361.834	0.149	785	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.15	0.04				0.14		0.14	0.15						
Perkins	361.834	361.974	0.140	742	SD105	354661	Sd	Shambo loam, channeled		0.00	0.01		0.01		0.01		0.01	0.01				0.01		0.00
Perkins	361.974	362.248	0.274	1,448	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.27	0.08				0.26		0.26	0.27						
Perkins	362.248	362.433	0.185	977	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.18	0.12	0.01	0.01	0.00	0.06		0.06	0.11		0.06				0.00
Perkins	362.433	362.660	0.227	1,196	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.23	0.07				0.22		0.22	0.23						
Perkins	362.660	362.759	0.099	523	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.10	0.00	0.01		0.00	0.08		0.09	0.09		0.01				
Perkins	362.759	362.849	0.089	472	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.09	0.03				0.09		0.09	0.09						
Perkins	362.849	362.889	0.041	215	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.04	0.00	0.00		0.00	0.03		0.04	0.04		0.00				
Perkins	362.889	363.097	0.208	1,097	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.21	0.06				0.20		0.20	0.21						
Perkins	363.097	363.340	0.243	1,282	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.24	0.01	0.02		0.01	0.21		0.22	0.23		0.03				
Perkins	363.340	363.836	0.497	2,622	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.50	0.15				0.47		0.47	0.50						
Perkins	363.836	364.060	0.224	1,180	SD105	354670	WaD	Wabek sandy loam, 9 to 35 percent slopes		0.01	0.21	0.20								0.20	0.21			
Perkins	364.060	364.295	0.235	1,240	SD105	354663	Sh	Lohler-Trembles complex			0.01		0.17				0.17	0.16	0.01		0.01	0.23	0.00	
Perkins	364.295	364.352	0.057	302	SD105	354664	Ta	Trembles fine sandy loam			0.00		0.00				0.00		0.00			0.06	0.00	
Perkins	364.352	364.484	0.132	695	SD105	354613	Bb	Banks loamy fine sand			0.13		0.13				0.13		0.13				0.00	
Perkins	364.484	364.519	0.035	187	SD105	354664	Ta	Trembles fine sandy loam			0.00		0.00				0.00		0.00			0.04	0.00	
Perkins	364.519	364.677	0.159	837	SD105	354663	Sh	Lohler-Trembles complex			0.01		0.11				0.11	0.11	0.01		0.01	0.16	0.00	
Perkins	364.677	365.087	0.410	2,164	SD105	354618	BhE	Blackhall-Cabbart complex, 15 to 40 percent slopes		0.39	0.02	0.33		0.16	0.04		0.20	0.23		0.35				
Perkins	365.087	365.175	0.088	463	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.09	0.03				0.08		0.08	0.09						
Perkins	365.175	365.254	0.079	418	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.08	0.00	0.01		0.00	0.07		0.07	0.07		0.01				
Perkins	365.254	365.340	0.086	454	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.09	0.03				0.08		0.08	0.09						
Perkins	365.340	365.397	0.057	299	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.06	0.00	0.00		0.00	0.05		0.05	0.05		0.01				
Perkins	365.397	365.600	0.203	1,073	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.20	0.06				0.19		0.19	0.20						
Perkins	365.600	365.612	0.012	61	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.01	0.00	0.00		0.00	0.01		0.01	0.01		0.00				
Perkins	365.612	365.633	0.021	112	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.02	0.01				0.02		0.02	0.02						
Perkins	365.633	365.929	0.297	1,566	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.30	0.01	0.02		0.01	0.25		0.26	0.28		0.04				

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Perkins	365.929	365.930	0.001	3	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.00	0.00				0.00		0.00	0.00							
Perkins	365.930	366.072	0.142	752	SD105	354665	Tb	Trembles soils, channeled					0.01				0.01	0.01							0.01
Perkins	366.072	366.237	0.165	871	SD105	354660	Sc	Shambo loam			0.00							0.16				0.16	0.16		
Perkins	366.237	366.469	0.231	1,222	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.23	0.01	0.02		0.01	0.20		0.21	0.22		0.03					
Perkins	366.469	366.542	0.074	389	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.07	0.05	0.00	0.00	0.00	0.02		0.02	0.04		0.02				0.00
Perkins	366.542	366.602	0.059	313	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.06	0.00	0.00		0.00	0.05		0.05	0.06		0.01				
Perkins	366.602	366.665	0.064	337	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.06	0.04	0.00	0.00	0.00	0.02		0.02	0.04		0.02				0.00
Perkins	366.665	366.700	0.035	183	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.03	0.00	0.00		0.00	0.03		0.03	0.03		0.00				
Perkins	366.700	366.720	0.019	103	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.02	0.01	0.00	0.00	0.00	0.01		0.01	0.01		0.01				0.00
Perkins	366.720	367.155	0.436	2,301	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.44	0.01	0.03		0.02	0.37		0.39	0.41		0.05				
Perkins	367.155	367.273	0.118	621	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.12	0.08	0.00	0.00	0.00	0.03		0.04	0.07		0.04				0.00
Perkins	367.273	367.586	0.313	1,650	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.31	0.01	0.03		0.01	0.27		0.28	0.29		0.04				
Perkins	367.586	367.856	0.270	1,425	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.27	0.18	0.01	0.01	0.01	0.08		0.09	0.16		0.08				0.00
Perkins	367.856	367.893	0.038	199	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.04	0.00	0.00		0.00	0.03		0.03	0.04		0.00				
Perkins	367.893	368.101	0.208	1,097	SD105	354656	RnD	Rhoades-Rock outcrop complex, 6 to 20 percent slopes		0.20		0.01	0.10		0.12		0.12	0.12		0.20				
Perkins	368.101	368.135	0.034	177	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.03	0.01				0.03		0.03	0.03						
Perkins	368.135	368.178	0.044	231	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.04	0.00	0.00		0.00	0.04		0.04	0.04		0.01				
Perkins	368.178	368.268	0.090	473	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.09	0.03				0.09		0.09	0.09						
Perkins	368.268	368.463	0.195	1,030	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.20	0.01	0.02		0.01	0.17		0.17	0.18		0.02				
Perkins	368.463	368.545	0.082	432	SD105	354656	RnD	Rhoades-Rock outcrop complex, 6 to 20 percent slopes		0.08		0.00	0.04		0.05		0.05	0.05		0.08				
Perkins	368.545	369.044	0.499	2,634	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.50	0.01	0.04		0.02	0.42		0.44	0.46		0.06				
Perkins	369.044	369.161	0.118	621	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.12	0.08	0.00	0.00	0.00	0.03		0.04	0.07		0.04				0.00
Perkins	369.161	369.240	0.079	416	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.08	0.02				0.07		0.07	0.08						
Perkins	369.240	369.368	0.128	675	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.13	0.00	0.01		0.01	0.11		0.11	0.12		0.02				
Perkins	369.368	369.809	0.441	2,328	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.44	0.13				0.42		0.42	0.44						
Perkins	369.809	369.953	0.144	758	SD105	354618	BhE	Blackhall-Cabbart complex, 15 to 40 percent slopes		0.14	0.01	0.11		0.06	0.01		0.07	0.08		0.12				
Perkins	369.953	370.050	0.098	516	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.10	0.00	0.01		0.00	0.08		0.09	0.09		0.01				
Perkins	370.050	370.237	0.187	986	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.18	0.12	0.01	0.01	0.00	0.05		0.06	0.11		0.06				0.00
Perkins	370.237	370.509	0.272	1,436	SD105	354656	RnD	Rhoades-Rock outcrop complex, 6 to 20 percent slopes		0.26		0.02	0.14		0.16		0.16	0.16		0.26				
Perkins	370.509	370.566	0.057	298	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.06	0.02				0.05		0.05	0.06						
Perkins	370.566	370.744	0.179	944	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.18	0.12	0.01	0.01	0.00	0.05		0.06	0.10		0.06				0.00
Perkins	370.744	370.960	0.215	1,137	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.22	0.06				0.20		0.20	0.22						
Perkins	370.960	370.970	0.010	54	SD105	354618	BhE	Blackhall-Cabbart complex, 15 to 40 percent slopes		0.01	0.00	0.01		0.00	0.00		0.01	0.01		0.01				
Perkins	370.970	371.185	0.215	1,136	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.21	0.14	0.01	0.01	0.00	0.06		0.07	0.12		0.07				0.00
Perkins	371.185	371.272	0.087	459	SD105	354618	BhE	Blackhall-Cabbart complex, 15 to 40 percent slopes		0.08	0.00	0.07		0.03	0.01		0.04	0.05		0.07				
Perkins	371.272	371.285	0.013	70	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.01	0.00				0.01		0.01	0.01						
Perkins	371.285	371.337	0.052	273	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.05	0.03	0.00	0.00	0.00	0.01		0.02	0.03		0.02				0.00
Perkins	371.337	371.413	0.076	404	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.08	0.02				0.07		0.07	0.08						
Perkins	371.413	371.804	0.390	2,061	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.39	0.25	0.02	0.01	0.01	0.11		0.13	0.23		0.12				0.00
Perkins	371.804	372.137	0.333	1,760	SD105	354652	RfB	Regent-Savage silty clay loams, 2 to 6 percent slopes		0.22			0.31		0.01		0.32	0.33		0.01			0.33	0.00
Perkins	372.137	372.261	0.123	652	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.12	0.08	0.00	0.00	0.00	0.03		0.04	0.07		0.04				0.00
Perkins	372.261	372.572	0.312	1,646	SD105	354652	RfB	Regent-Savage silty clay loams, 2 to 6 percent slopes		0.21			0.29		0.01		0.30	0.31		0.01			0.31	0.00
Perkins	372.572	372.636	0.064	336	SD105	354637	MbB	Marmarth loam, 2 to 6 percent slopes		0.06	0.00	0.01		0.00	0.00		0.01	0.06		0.01			0.06	
Perkins	372.636	372.740	0.104	551	SD105	354652	RfB	Regent-Savage silty clay loams, 2 to 6 percent slopes		0.07			0.10		0.00		0.10	0.10		0.00			0.10	0.00
Perkins	372.740	372.857	0.117	616	SD105	354637	MbB	Marmarth loam, 2 to 6 percent slopes		0.12	0.01	0.01		0.00	0.00		0.01	0.11		0.01			0.12	
Perkins	372.857	372.883	0.026	136	SD105	354652	RfB	Regent-Savage silty clay loams, 2 to 6 percent slopes		0.02			0.02		0.00		0.02	0.03		0.00			0.03	0.00
Meade	372.883	372.910	0.028	147	SD601	355471	TsB	Tanna-Savo complex, 2 to 6 percent slopes		0.02			0.02				0.02	0.03		0.00			0.03	
Meade	372.910	373.043	0.132	699	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.03			0.12				0.12	0.13					0.13	
Meade	373.043	373.233	0.190	1,003	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.19	0.06		0.00		0.16		0.17	0.18						0.00
Meade	373.233	373.524	0.291	1,535	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.29	0.06			0.02	0.08		0.10	0.15		0.07				
Meade	373.524	373.762	0.238	1,258	SD601	355434	EdB	Eapa-Delridge loams, 2 to 6 percent slopes		0.08			0.18				0.16	0.24		0.02			0.24	
Meade	373.762	373.865	0.103	544	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.02			0.09				0.09	0.10					0.10	
Meade	373.865	373.994	0.129	682	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.01			0.00		0.12		0.12	0.13						
Meade	373.994	374.293	0.299	1,577	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.06			0.27				0.27	0.30					0.30	
Meade	374.293	374.347	0.055	289	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.00			0.00		0.05		0.05	0.05						
Meade	374.347	374.558	0.211	1,112	SD601	355434	EdB	Eapa-Delridge loams, 2 to 6 percent slopes		0.07			0.14				0.14	0.21		0.02			0.21	
Meade	374.558	374.765	0.207	1,093	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.21	0.12			0.01	0.18		0.19	0.19						
Meade	374.765	374.856	0.091	480	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.02			0.08				0.08	0.09					0.09	
Meade	374.856	374.905	0.049	258	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.05	0.03			0.00	0.04		0.04	0.04						
Meade	374.905	375.027	0.122	645	SD601	355472	TsC	Tanna-Savo complex, 6 to 9 percent slopes		0.08			0.07				0.07	0.12		0.12				
Meade	375.027	375.248	0.221	1,169	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.04			0.20				0.20	0.22					0.22	
Meade	375.248	375.551	0.303	1,599	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.30	0.18			0.02	0.26		0.27	0.27						

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Meade	375.551	375.579	0.028	147	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.03	0.01			0.00	0.01		0.01	0.01		0.01				
Meade	375.579	375.610	0.031	166	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.03	0.01		0.00		0.03		0.03	0.03						0.00
Meade	375.610	376.150	0.540	2,850	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.54	0.11			0.04	0.15		0.19	0.28		0.13				
Meade	376.150	376.397	0.247	1,303	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.24	0.07		0.00		0.21		0.21	0.23						0.00
Meade	376.397	376.422	0.025	132	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.03	0.02			0.00	0.02		0.02	0.02						
Meade	376.422	376.469	0.048	251	SD601	355427	BsB	Bullock-Slickspots complex, 0 to 4 percent slopes		0.05	0.00		0.00		0.04		0.04	0.05						0.00
Meade	376.469	376.986	0.516	2,725	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.52	0.31			0.03	0.44		0.46	0.46						
Meade	376.986	377.048	0.063	332	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.06	0.02		0.00		0.05		0.05	0.06						0.00
Meade	377.048	377.141	0.093	491	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.09	0.06			0.00	0.08		0.08	0.08						
Meade	377.141	377.217	0.076	399	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.07	0.02		0.00		0.06		0.07	0.07						0.00
Meade	377.217	377.376	0.159	838	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.16	0.10			0.01	0.13		0.14	0.14						
Meade	377.376	377.479	0.103	544	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.10	0.03		0.00		0.09		0.09	0.10						0.00
Meade	377.479	377.715	0.236	1,246	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.24	0.14			0.01	0.20		0.21	0.21						
Meade	377.715	377.794	0.079	419	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.08	0.02		0.00		0.07		0.07	0.07						0.00
Meade	377.794	377.930	0.136	717	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.14	0.03			0.01	0.04		0.05	0.07		0.03				
Meade	377.930	377.983	0.053	280	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.05	0.02		0.00		0.05		0.05	0.05						0.00
Meade	377.983	378.060	0.077	406	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.08	0.02			0.01	0.02		0.03	0.04		0.02				
Meade	378.060	378.216	0.156	826	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.15	0.05		0.00		0.13		0.14	0.15						0.00
Meade	378.216	378.371	0.155	817	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.15	0.09			0.01	0.13		0.14	0.14						
Meade	378.371	378.716	0.345	1,823	SD601	355427	BsB	Bullock-Slickspots complex, 0 to 4 percent slopes		0.33	0.01		0.01		0.30		0.32	0.34						0.00
Meade	378.716	378.907	0.191	1,010	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.19	0.04			0.02	0.05		0.07	0.10		0.05				
Meade	378.907	379.033	0.125	662	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.13	0.08			0.01	0.11		0.11	0.11						
Meade	379.033	379.059	0.026	139	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.03	0.01			0.00	0.01		0.01	0.01		0.01				
Meade	379.059	379.163	0.104	548	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.10	0.03		0.00		0.09		0.09	0.10						0.00
Meade	379.163	379.316	0.153	806	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.15	0.09			0.01	0.13		0.14	0.14						
Meade	379.316	379.570	0.254	1,342	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.25	0.08		0.00		0.22		0.22	0.24						0.00
Meade	379.570	379.796	0.226	1,196	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.23	0.14			0.01	0.19		0.20	0.20						
Meade	379.796	379.981	0.185	974	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.18	0.06		0.00		0.16		0.16	0.17						0.00
Meade	379.981	380.099	0.119	626	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.12	0.02			0.01	0.03		0.04	0.06		0.03				
Meade	380.099	380.137	0.037	198	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.04	0.01		0.00		0.03		0.03	0.04						0.00
Meade	380.137	380.175	0.038	201	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.04	0.02			0.00	0.03		0.03	0.03						
Meade	380.175	380.240	0.065	344	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.06	0.02		0.00		0.06		0.06	0.06						0.00
Meade	380.240	380.316	0.076	403	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.08	0.05			0.00	0.06		0.07	0.07						
Meade	380.316	380.514	0.197	1,041	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.20	0.06		0.00		0.17		0.17	0.19						0.00
Meade	380.514	380.526	0.013	66	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.01	0.01			0.00	0.01		0.01	0.01						
Meade	380.526	380.559	0.033	176	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.03	0.01		0.00		0.03		0.03	0.03						0.00
Meade	380.559	380.624	0.064	339	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.06	0.04			0.00	0.05		0.06	0.06						
Meade	380.624	380.764	0.140	741	SD601	355427	BsB	Bullock-Slickspots complex, 0 to 4 percent slopes		0.13	0.00		0.01		0.12		0.13	0.14						0.00
Meade	380.764	380.912	0.148	783	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.15	0.04		0.00		0.13		0.13	0.14						0.00
Meade	380.912	381.401	0.488	2,579	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.49	0.29			0.02	0.42		0.44	0.44						
Meade	381.401	382.182	0.781	4,122	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.77	0.23		0.01		0.67		0.68	0.73						0.01
Meade	382.182	382.264	0.082	434	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.08	0.05			0.00	0.07		0.07	0.07						
Meade	382.264	382.818	0.554	2,927	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.05			0.02		0.50		0.50	0.54						
Meade	382.818	383.023	0.205	1,084	SD601	355420	AtC	Assiniboine-Twilight fine sandy loams, 6 to 9 percent slopes		0.08			0.01	0.02			0.03	0.13		0.13		0.21		
Meade	383.023	383.168	0.144	762	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.01			0.00		0.13		0.13	0.14						
Meade	383.168	383.290	0.123	648	SD601	355442	Hc	Havre loam, channeled					0.12				0.12	0.12						0.00
Meade	383.290	383.567	0.277	1,462	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.02			0.01		0.25		0.25	0.27						
Meade	383.567	383.848	0.281	1,485	SD601	355450	LcA	Loburn-Gerdrum loams, 0 to 3 percent slopes		0.02			0.17		0.25		0.25	0.28						
Meade	383.848	383.904	0.055	293	SD601	355418	AsB	Assiniboine fine sandy loam, 2 to 6 percent slopes		0.00			0.00				0.00	0.06				0.06	0.00	
Meade	383.904	384.034	0.130	687	SD601	355450	LcA	Loburn-Gerdrum loams, 0 to 3 percent slopes		0.01			0.08		0.11		0.11	0.13						
Meade	384.034	384.532	0.498	2,630	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.49	0.15		0.00		0.43		0.43	0.47						0.00
Meade	384.532	384.664	0.132	700	SD601	355450	LcA	Loburn-Gerdrum loams, 0 to 3 percent slopes		0.01			0.08		0.12		0.12	0.13						
Meade	384.664	384.866	0.202	1,066	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.02			0.01		0.18		0.18	0.20						
Meade	384.866	384.995	0.128	678	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.13	0.03			0.01	0.03		0.04	0.07		0.03				
Meade	384.995	385.008	0.014	72	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.00			0.00		0.01		0.01	0.01						
Meade	385.008	385.209	0.200	1,057	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.20	0.06		0.00		0.17		0.17	0.19						0.00

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Meade	385.209	385.350	0.142	748	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.14	0.03			0.01	0.04		0.05	0.07		0.04				
Meade	385.350	385.395	0.045	237	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.04	0.01		0.00		0.04		0.04	0.04						0.00
Meade	385.395	385.486	0.091	481	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.09	0.02			0.01	0.02		0.03	0.05		0.02				
Meade	385.486	385.560	0.074	390	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		0.07	0.04			0.00	0.06		0.07	0.07						
Meade	385.560	385.627	0.067	353	SD601	355427	BsB	Bullock-Slickspots complex, 0 to 4 percent slopes		0.06	0.00		0.00		0.06		0.06	0.07						0.00
Meade	385.627	385.728	0.101	534	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.10	0.02			0.01	0.03		0.04	0.05		0.03				
Meade	385.728	385.866	0.138	727	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.01			0.00		0.13		0.13	0.13						
Meade	385.866	385.949	0.083	438	SD601	355450	LcA	Loburn-Gerdrum loams, 0 to 3 percent slopes		0.01			0.05		0.07		0.07	0.08						
Meade	385.949	385.994	0.045	239	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.00			0.00		0.04		0.04	0.04						
Meade	385.994	386.053	0.059	312	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.06	0.02		0.00		0.05		0.05	0.06						0.00
Meade	386.053	386.134	0.081	428	SD601	355432	EaB	Eapa loam, 2 to 6 percent slopes		0.00			0.08				0.08	0.08					0.08	0.00
Meade	386.134	386.257	0.123	647	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.12	0.04		0.00		0.11		0.11	0.12						0.00
Meade	386.257	386.318	0.062	326	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.06	0.01			0.00	0.02		0.02	0.03		0.02				
Meade	386.318	386.525	0.206	1,090	SD601	355450	LcA	Loburn-Gerdrum loams, 0 to 3 percent slopes		0.01			0.12		0.18		0.18	0.21						
Meade	386.525	386.578	0.053	281	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.05	0.01			0.00	0.01		0.02	0.03		0.01				
Meade	386.578	386.661	0.083	439	SD601	355450	LcA	Loburn-Gerdrum loams, 0 to 3 percent slopes		0.01			0.05		0.07		0.07	0.08						
Meade	386.661	387.211	0.550	2,905	SD601	355434	EdB	Eapa-Delridge loams, 2 to 6 percent slopes		0.18			0.37				0.37	0.55		0.04			0.55	
Meade	387.211	387.223	0.012	64	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.01	0.00			0.00	0.00		0.00	0.01		0.00				
Meade	387.223	387.398	0.174	920	SD601	355440	Gr	Grail silt loam		0.01			0.17				0.17	0.17					0.17	
Meade	387.398	387.440	0.042	222	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.04	0.01			0.00	0.01		0.01	0.02		0.01				
Meade	387.440	387.476	0.036	191	SD601	355450	LcA	Loburn-Gerdrum loams, 0 to 3 percent slopes		0.00			0.02		0.03		0.03	0.04						
Meade	387.476	387.523	0.047	249	SD601	355440	Gr	Grail silt loam		0.00			0.05				0.05	0.05					0.05	
Meade	387.523	387.829	0.306	1,616	SD601	355450	LcA	Loburn-Gerdrum loams, 0 to 3 percent slopes		0.02			0.18		0.27		0.27	0.31						
Meade	387.829	388.547	0.718	3,789	SD601	355418	AsB	Assiniboine fine sandy loam, 2 to 6 percent slopes		0.05			0.06				0.06	0.72					0.72	0.01
Meade	388.547	388.743	0.197	1,038	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.20	0.04			0.02	0.05		0.07	0.10		0.05				
Meade	388.743	388.798	0.054	288	SD601	355450	LcA	Loburn-Gerdrum loams, 0 to 3 percent slopes		0.00			0.03		0.05		0.05	0.05						
Meade	388.798	388.853	0.055	292	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		0.06	0.01			0.00	0.01		0.02	0.03		0.01				
Meade	388.853	389.599	0.746	3,939	SD601	355418	AsB	Assiniboine fine sandy loam, 2 to 6 percent slopes		0.05			0.06				0.06	0.75					0.75	0.01
Meade	389.599	389.738	0.139	734	SD601	355420	AtC	Assiniboine-Twilight fine sandy loams, 6 to 9 percent slopes		0.05			0.01	0.01			0.02	0.09		0.09			0.14	
Meade	389.738	389.993	0.255	1,348	SD601	355418	AsB	Assiniboine fine sandy loam, 2 to 6 percent slopes		0.02			0.02				0.02	0.28					0.26	0.00
Meade	389.993	390.200	0.207	1,092	SD601	355424	BmE	Blackhall-Twilight fine sandy loams, 9 to 40 percent slopes		0.19		0.12	0.02	0.10			0.12	0.02		0.13	0.01			
Meade	390.200	390.366	0.166	874	SD601	355418	AsB	Assiniboine fine sandy loam, 2 to 6 percent slopes		0.01			0.01				0.01	0.17					0.17	0.00
Meade	390.366	390.400	0.035	183	SD601	355424	BmE	Blackhall-Twilight fine sandy loams, 9 to 40 percent slopes		0.03		0.02	0.00	0.02			0.02	0.00		0.02	0.00			
Meade	390.400	390.510	0.109	578	SD601	355418	AsB	Assiniboine fine sandy loam, 2 to 6 percent slopes		0.01			0.01				0.01	0.11					0.11	0.00
Meade	390.510	390.552	0.042	224	SD601	355420	AtC	Assiniboine-Twilight fine sandy loams, 6 to 9 percent slopes		0.02			0.00	0.00			0.01	0.03		0.03			0.04	
Meade	390.552	390.588	0.035	186	SD601	355418	AsB	Assiniboine fine sandy loam, 2 to 6 percent slopes		0.00			0.00				0.00	0.04					0.04	0.00
Meade	390.588	390.658	0.071	374	SD601	355420	AtC	Assiniboine-Twilight fine sandy loams, 6 to 9 percent slopes		0.03			0.00	0.01			0.01	0.04		0.04			0.07	
Meade	390.658	390.880	0.221	1,168	SD601	355418	AsB	Assiniboine fine sandy loam, 2 to 6 percent slopes		0.02			0.02				0.02	0.22					0.22	0.00
Meade	390.880	391.240	0.360	1,903	SD601	355420	AtC	Assiniboine-Twilight fine sandy loams, 6 to 9 percent slopes		0.14			0.03	0.03			0.05	0.22		0.22			0.36	
Meade	391.240	391.752	0.512	2,704	SD601	355418	AsB	Assiniboine fine sandy loam, 2 to 6 percent slopes		0.04			0.04				0.04	0.51					0.51	0.01
Meade	391.752	391.758	0.006	32	SD601	355420	AtC	Assiniboine-Twilight fine sandy loams, 6 to 9 percent slopes		0.00			0.00	0.00			0.00	0.00		0.00			0.01	
Meade	391.758	391.821	0.062	329	SD601	355418	AsB	Assiniboine fine sandy loam, 2 to 6 percent slopes		0.00			0.00				0.00	0.06					0.06	0.00
Meade	391.821	391.970	0.149	788	SD601	355420	AtC	Assiniboine-Twilight fine sandy loams, 6 to 9 percent slopes		0.06			0.01	0.01			0.02	0.09		0.09			0.15	
Meade	391.970	392.168	0.199	1,049	SD601	355424	BmE	Blackhall-Twilight fine sandy loams, 9 to 40 percent slopes		0.18		0.11	0.02	0.10			0.12	0.02		0.13	0.01			
Meade	392.168	392.441	0.272	1,438	SD601	355418	AsB	Assiniboine fine sandy loam, 2 to 6 percent slopes		0.02			0.02				0.02	0.27					0.27	0.00
Meade	392.441	392.533	0.092	484	SD601	355424	BmE	Blackhall-Twilight fine sandy loams, 9 to 40 percent slopes		0.08		0.05	0.01	0.05			0.05	0.01		0.06	0.01			
Meade	392.533	392.626	0.093	493	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.09		0.08						0.09		0.09				
Meade	392.626	392.664	0.038	200	SD601	355424	BmE	Blackhall-Twilight fine sandy loams, 9 to 40 percent slopes		0.03		0.02	0.00	0.02			0.02	0.00		0.02	0.00			
Meade	392.664	392.784	0.120	634	SD601	355420	AtC	Assiniboine-Twilight fine sandy loams, 6 to 9 percent slopes		0.05			0.01	0.01			0.02	0.07		0.07			0.12	
Meade	392.784	392.915	0.132	695	SD601	355424	BmE	Blackhall-Twilight fine sandy loams, 9 to 40 percent slopes		0.12		0.07	0.01	0.07			0.08	0.01		0.09	0.01			
Meade	392.915	393.075	0.160	845	SD601	355419	AsC	Assiniboine fine sandy loam, 6 to 9 percent slopes		0.02			0.01	0.01			0.02	0.15		0.15			0.16	
Meade	393.075	393.268	0.193	1,018	SD601	355424	BmE	Blackhall-Twilight fine sandy loams, 9 to 40 percent slopes		0.18		0.11	0.02	0.10			0.11	0.02		0.13	0.01			
Meade	393.268	393.556	0.287	1,517	SD601	355419	AsC	Assiniboine fine sandy loam, 6 to 9 percent slopes		0.03			0.01	0.01			0.03	0.27		0.27			0.29	
Meade	393.556	393.785	0.229	1,210	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.23	0.01		0.01		0.02		0.03	0.23		0.22				
Meade	393.785	393.904	0.119	629	SD601	355419	AsC	Assiniboine fine sandy loam, 6 to 9 percent slopes		0.01			0.01	0.01			0.01	0.11		0.11			0.12	

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Meade	393.904	394.064	0.160	843	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.16		0.14						0.16		0.16					
Meade	394.064	394.201	0.137	724	SD601	355469	TdB	Tanna-Delridge complex, 2 to 6 percent slopes		0.12			0.10				0.10	0.14		0.01		0.14		
Meade	394.201	394.444	0.243	1,285	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.24		0.21						0.24		0.24					
Meade	394.444	394.532	0.088	463	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.09	0.00		0.00		0.01		0.01	0.09		0.08					
Meade	394.532	394.548	0.016	86	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.02		0.01						0.02		0.02					
Meade	394.548	394.643	0.095	502	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.10	0.00		0.00		0.01		0.01	0.10		0.09					
Meade	394.643	394.680	0.037	193	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.04		0.03						0.04		0.04					
Meade	394.680	394.818	0.138	730	SD601	355418	AsB	Assiniboine fine sandy loam, 2 to 6 percent slopes		0.01			0.01				0.01	0.14					0.14		0.00
Meade	394.818	394.879	0.061	323	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.06		0.05						0.06		0.06					
Meade	394.879	395.003	0.124	653	SD601	355420	AtC	Assiniboine-Twilight fine sandy loams, 6 to 9 percent slopes		0.05			0.01	0.01			0.02	0.08		0.08			0.12		
Meade	395.003	395.496	0.493	2,602	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.49		0.42						0.49		0.49					
Meade	395.496	395.661	0.166	876	SD601	355424	BmE	Blackhall-Twilight fine sandy loams, 9 to 40 percent slopes		0.15		0.09	0.01	0.08			0.10	0.01		0.11	0.01				
Meade	395.661	395.750	0.089	469	SD601	355423	BlE	Blackhall-Rock outcrop complex, 15 to 40 percent slopes		0.09		0.08		0.05			0.05			0.08					
Meade	395.750	395.888	0.137	726	SD601	355424	BmE	Blackhall-Twilight fine sandy loams, 9 to 40 percent slopes		0.13		0.08	0.01	0.07			0.08	0.01		0.09	0.01				
Meade	395.888	396.090	0.202	1,068	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.20	0.01		0.01		0.02		0.03	0.20		0.19					
Meade	396.090	396.244	0.154	814	SD601	355433	EaC	Eapa loam, 6 to 9 percent slopes		0.01			0.15				0.15	0.15		0.15			0.15		
Meade	396.244	396.709	0.465	2,457	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.47		0.40						0.47		0.47					
Meade	396.709	396.767	0.058	306	SD601	355435	EdC	Eapa-Delridge loams, 6 to 9 percent slopes		0.01			0.04				0.04	0.06		0.06					
Meade	396.767	397.368	0.600	3,171	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.60		0.51						0.60		0.60					
Meade	397.368	397.390	0.022	117	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.00			0.00		0.02		0.02	0.02							
Meade	397.390	397.419	0.029	151	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.03		0.02						0.03		0.03					
Meade	397.419	397.775	0.356	1,882	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.03			0.01		0.32		0.32	0.35							
Meade	397.775	397.907	0.132	695	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.13		0.11						0.13		0.13					
Meade	397.907	398.233	0.326	1,724	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.03			0.01		0.30		0.30	0.32							
Meade	398.233	398.258	0.025	130	SD601	355451	Ld	Lohmiller silty clay loam			0.00		0.02		0.00		0.02	0.02	0.00				0.02		0.00
Meade	398.258	398.287	0.029	156	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.00			0.00		0.03		0.03	0.03							
Meade	398.287	398.533	0.246	1,298	SD601	355451	Ld	Lohmiller silty clay loam			0.01		0.22		0.01		0.23	0.23	0.01				0.25		0.00
Meade	398.533	398.913	0.380	2,005	SD601	355415	AbB	Abor silty clay, 2 to 6 percent slopes		0.36			0.36		0.02		0.36	0.38		0.02			0.38		
Meade	398.913	399.072	0.159	841	SD601	355451	Ld	Lohmiller silty clay loam			0.00		0.14		0.00		0.15	0.15	0.00				0.15		0.00
Meade	399.072	399.429	0.357	1,883	SD601	355441	Hb	Havre loam					0.36				0.36	0.36					0.36		0.00
Meade	399.429	399.586	0.157	830	SD601	355442	Hc	Havre loam, channeled					0.16				0.16	0.16							0.00
Meade	399.586	400.054	0.468	2,469	SD601	355448	LaB	Lawther silty clay, 2 to 6 percent slopes		0.03			0.43		0.04		0.43	0.47		0.03			0.47		
Meade	400.054	400.113	0.060	315	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.06	0.02		0.00		0.06		0.05	0.06							0.00
Meade	400.113	400.155	0.042	221	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.04	0.00		0.00		0.00		0.01	0.04		0.04					
Meade	400.155	400.182	0.027	142	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.03	0.01		0.00		0.02		0.02	0.03							0.00
Meade	400.182	400.409	0.227	1,198	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.23		0.19						0.23		0.23					
Meade	400.409	400.596	0.188	991	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.19	0.01		0.01		0.02		0.03	0.19		0.18					
Meade	400.596	400.658	0.062	326	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.06		0.05						0.06		0.06					
Meade	400.658	400.668	0.010	52	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.01	0.00		0.00		0.00		0.00	0.01		0.01					
Meade	400.668	401.150	0.482	2,543	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.48		0.41						0.48		0.48					
Meade	401.150	401.887	0.737	3,893	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.74	0.04		0.04		0.07		0.11	0.74		0.70					
Meade	401.887	401.895	0.008	40	SD601	355432	EaB	Eapa loam, 2 to 6 percent slopes		0.00			0.01				0.01	0.01					0.01		0.00
Meade	401.895	403.352	1.458	7,697	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		1.46	0.07		0.07		0.15		0.22	1.46		1.38					
Meade	403.352	403.611	0.259	1,366	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.05			0.23				0.23	0.28					0.28		
Meade	403.611	403.639	0.028	150	SD601	355437	EgC	Eapa-Grail complex, 6 to 9 percent slopes		0.01			0.03				0.03	0.03		0.03			0.03		
Meade	403.639	403.702	0.063	331	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.06	0.00		0.00		0.01		0.01	0.06		0.06					
Meade	403.702	403.993	0.291	1,539	SD601	355437	EgC	Eapa-Grail complex, 6 to 9 percent slopes		0.06			0.26				0.26	0.29		0.29			0.29		
Meade	403.993	404.732	0.739	3,900	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.15			0.66				0.66	0.74					0.74		
Meade	404.732	404.846	0.114	601	SD601	355437	EgC	Eapa-Grail complex, 6 to 9 percent slopes		0.02			0.10				0.10	0.11		0.11			0.11		
Meade	404.846	404.882	0.036	190	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.01			0.03				0.03	0.04					0.04		
Meade	404.882	404.982	0.100	526	SD601	355437	EgC	Eapa-Grail complex, 6 to 9 percent slopes		0.02			0.09				0.09	0.10		0.10			0.10		
Meade	404.982	405.046	0.064	340	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.01			0.06				0.06	0.06					0.06		
Meade	405.046	405.264	0.218	1,152	SD601	355437	EgC	Eapa-Grail complex, 6 to 9 percent slopes		0.04			0.20				0.20	0.22		0.22			0.22		
Meade	405.264	406.002	0.738	3,898	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.74	0.04		0.04		0.07		0.11	0.74		0.70					
Meade	406.002	406.010	0.008	43	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.01		0.01						0.01		0.01					
Meade	406.010	406.037	0.026	140	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.03	0.00		0.00		0.00		0.00	0.03		0.03					
Meade	406.037	406.099	0.062	328	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.06		0.06						0.06		0.06					
Meade	406.099	406.135	0.036	188	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.04	0.00		0.00		0.00		0.01	0.04		0.03					
Meade	406.135	406.336	0.202	1,064	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.04			0.18				0.18	0.20					0.20		
Meade	406.336	406.650	0.314	1,659	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.31	0.02		0.02		0.03		0.05	0.31		0.30					
Meade	406.650	406.840	0.190	1,001	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.04			0.17				0.17	0.19					0.19		
Meade	406.840	407.032	0.192	1,012	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.19	0.01		0.01		0.02		0.03	0.19		0.18					
Meade	407.032	407.055	0.024	124	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.00			0.02				0.02	0.02					0.02		
Meade	407.055	407.143	0.087	462	SD601	355432	EaB	Eapa loam, 2 to 6 percent slopes		0.00			0.08				0.08	0.09					0.09		0.00

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Meade	407.143	407.840	0.697	3,682	SD601	355431	EaA	Eapa loam, 0 to 2 percent slopes					0.70				0.70	0.70					0.70	0.01
Meade	407.840	407.889	0.049	260	SD601	355453	NaD	Nihill-Attewan complex, 4 to 20 percent slopes		0.01	0.01	0.02	0.02	0.00			0.03	0.05		0.03	0.04			
Meade	407.889	407.954	0.064	340	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.01			0.00		0.06		0.06	0.06						
Meade	407.954	408.006	0.052	276	SD601	355442	Hc	Havre loam, channeled					0.05				0.05	0.05						0.00
Meade	408.006	408.313	0.307	1,623	SD601	355441	Hb	Havre loam					0.31				0.31	0.31					0.31	0.00
Meade	408.313	408.510	0.197	1,041	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.04			0.18				0.18	0.20					0.20	
Meade	408.510	408.571	0.060	318	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		0.06	0.02		0.00		0.05		0.05	0.06						0.00
Meade	408.571	408.612	0.041	219	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.04	0.00		0.00		0.00		0.01	0.04		0.04				
Meade	408.612	408.799	0.187	989	SD601	355471	TsB	Tanna-Savo complex, 2 to 6 percent slopes		0.13			0.11				0.11	0.19		0.01		0.19	
Meade	408.799	409.090	0.291	1,534	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.06			0.26				0.26	0.29					0.29	
Meade	409.090	409.189	0.099	525	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.10	0.00		0.00		0.01		0.01	0.10		0.09				
Meade	409.189	409.537	0.348	1,837	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.07			0.31				0.31	0.35					0.35	
Meade	409.537	409.709	0.172	908	SD601	355428	CaD	Cabbart loam, 9 to 40 percent slopes		0.17		0.15						0.17		0.17				
Meade	409.709	410.035	0.326	1,719	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.03			0.01		0.30		0.30	0.32						
Meade	410.035	410.267	0.232	1,227	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.23	0.01		0.01		0.02		0.03	0.23		0.22				
Meade	410.267	410.472	0.205	1,082	SD601	355471	TsB	Tanna-Savo complex, 2 to 6 percent slopes		0.14			0.13				0.13	0.20		0.01		0.20	
Meade	410.472	410.685	0.213	1,126	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		0.04			0.19				0.19	0.21					0.21	
Meade	410.685	410.732	0.047	246	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.05	0.00		0.00		0.00		0.01	0.05		0.04				
Meade	410.732	410.908	0.176	930	SD601	355471	TsB	Tanna-Savo complex, 2 to 6 percent slopes		0.12			0.11				0.11	0.18		0.01		0.18	
Meade	410.908	411.160	0.252	1,330	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.25	0.01		0.01		0.03		0.04	0.25		0.24				
Meade	411.160	411.273	0.113	598	SD601	355416	AbC	Abor silty clay, 6 to 9 percent slopes		0.11			0.10				0.10	0.11		0.11		0.11	
Meade	411.273	411.365	0.092	486	SD601	355448	LaB	Lawther silty clay, 2 to 6 percent slopes		0.01			0.09		0.01		0.09	0.09		0.01		0.09	
Meade	411.365	411.568	0.203	1,073	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.20	0.01		0.01		0.02		0.03	0.20		0.19				
Meade	411.568	411.626	0.058	306	SD601	355415	AbB	Abor silty clay, 2 to 6 percent slopes		0.05			0.05		0.00		0.05	0.06		0.00		0.06	
Meade	411.626	411.744	0.118	622	SD601	355448	LaB	Lawther silty clay, 2 to 6 percent slopes		0.01			0.11		0.01		0.11	0.12		0.01		0.12	
Meade	411.744	411.750	0.006	33	SD601	355415	AbB	Abor silty clay, 2 to 6 percent slopes		0.01			0.01		0.00		0.01	0.01		0.00		0.01	
Meade	411.750	411.816	0.066	346	SD601	355448	LaB	Lawther silty clay, 2 to 6 percent slopes		0.00			0.06		0.01		0.06	0.07		0.00		0.07	
Meade	411.816	411.894	0.078	411	SD601	355415	AbB	Abor silty clay, 2 to 6 percent slopes		0.07			0.07		0.00		0.07	0.08		0.00		0.08	
Meade	411.894	411.922	0.028	148	SD601	355448	LaB	Lawther silty clay, 2 to 6 percent slopes		0.00			0.03		0.00		0.03	0.03		0.00		0.03	
Meade	411.922	412.136	0.214	1,131	SD601	355415	AbB	Abor silty clay, 2 to 6 percent slopes		0.20			0.20		0.01		0.20	0.21		0.01		0.21	
Meade	412.136	412.178	0.042	223	SD601	355448	LaB	Lawther silty clay, 2 to 6 percent slopes		0.00			0.04		0.00		0.04	0.04		0.00		0.04	
Meade	412.178	412.220	0.042	219	SD601	355415	AbB	Abor silty clay, 2 to 6 percent slopes		0.04			0.04		0.00		0.04	0.04		0.00		0.04	
Meade	412.220	412.346	0.126	668	SD601	355448	LaB	Lawther silty clay, 2 to 6 percent slopes		0.01			0.12		0.01		0.12	0.13		0.01		0.13	
Meade	412.346	412.379	0.033	176	SD601	355415	AbB	Abor silty clay, 2 to 6 percent slopes		0.03			0.03		0.00		0.03	0.03		0.00		0.03	
Meade	412.379	413.151	0.771	4,073	SD601	355416	AbC	Abor silty clay, 6 to 9 percent slopes		0.77			0.69				0.69	0.77		0.77		0.77	
Meade	413.151	413.263	0.112	590	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.11	0.01		0.01		0.01		0.02	0.11		0.11				
Meade	413.263	413.461	0.198	1,048	SD601	355416	AbC	Abor silty clay, 6 to 9 percent slopes		0.20			0.18				0.18	0.20		0.20		0.20	
Meade	413.461	413.495	0.034	181	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.03	0.00		0.00		0.00		0.01	0.03		0.03				
Meade	413.495	413.736	0.241	1,272	SD601	355416	AbC	Abor silty clay, 6 to 9 percent slopes		0.24			0.22				0.22	0.24		0.24		0.24	
Meade	413.736	413.839	0.103	544	SD601	355415	AbB	Abor silty clay, 2 to 6 percent slopes		0.10			0.10		0.01		0.10	0.10		0.01		0.10	
Meade	413.839	414.759	0.919	4,854	SD601	355416	AbC	Abor silty clay, 6 to 9 percent slopes		0.92			0.83				0.83	0.92		0.92		0.92	
Meade	414.759	414.887	0.128	675	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.13	0.01		0.01		0.01		0.02	0.13		0.12				
Meade	414.887	415.020	0.133	703	SD601	355448	LaB	Lawther silty clay, 2 to 6 percent slopes		0.01			0.12		0.01		0.12	0.13		0.01		0.13	
Meade	415.020	415.177	0.157	829	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.16	0.01		0.01		0.02		0.02	0.16		0.15				
Meade	415.177	415.210	0.033	176	SD601	355416	AbC	Abor silty clay, 6 to 9 percent slopes		0.03			0.03				0.03	0.03		0.03		0.03	
Meade	415.210	415.392	0.182	961	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.02			0.01		0.17		0.17	0.18						
Meade	415.392	415.477	0.085	447	SD601	355469	TdB	Tanna-Delridge complex, 2 to 6 percent slopes		0.08			0.08				0.08	0.08		0.00		0.08	
Meade	415.477	415.512	0.036	189	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.00			0.00		0.03		0.03	0.03						
Meade	415.512	415.526	0.013	71	SD601	355472	TsC	Tanna-Savo complex, 6 to 9 percent slopes		0.01			0.01				0.01	0.01		0.01				
Meade	415.526	415.566	0.040	210	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.00			0.00		0.04		0.04	0.04						
Meade	415.566	415.897	0.332	1,752	SD601	355472	TsC	Tanna-Savo complex, 6 to 9 percent slopes		0.23			0.20				0.20	0.33		0.33				
Meade	415.897	416.086	0.188	994	SD601	355469	TdB	Tanna-Delridge complex, 2 to 6 percent slopes		0.17			0.13				0.13	0.19		0.01		0.19	
Meade	416.086	416.154	0.069	362	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.07	0.00		0.00		0.01		0.01	0.07		0.07				
Meade	416.154	416.189	0.035	184	SD601	355469	TdB	Tanna-Delridge complex, 2 to 6 percent slopes		0.03			0.02				0.02	0.03		0.00		0.03	
Meade	416.189	416.478	0.289	1,524	SD601	355415	AbB	Abor silty clay, 2 to 6 percent slopes		0.27			0.27		0.01		0.27	0.29		0.01		0.29	
Meade	416.478	416.487	0.009	49	SD601	355462	SaD	Samsil clay, 6 to 25 percent slopes		0.01		0.01	0.01		0.00		0.01	0.01		0.01	0.00			
Meade	416.487	416.828	0.341	1,800	SD601	355415	AbB	Abor silty clay, 2 to 6 percent slopes		0.32			0.32		0.02		0.32	0.34		0.02		0.34	
Meade	416.828	416.975	0.147	774	SD601	355469	TdB	Tanna-Delridge complex, 2 to 6 percent slopes		0.13			0.10				0.10	0.15		0.01		0.15	
Meade	416.975	417.147	0.172	909	SD601	355455	NuB	Nunn clay loam, 2 to 6 percent slopes					0.00		0.01		0.01	0.17			0.15	0.17	0.00
Meade	417.147	417.386	0.240	1,266	SD601	355462	SaD	Samsil clay, 6 to 25 percent slopes		0.22		0.21	0.21		0.01		0.22	0.23		0.22	0.01			
Meade	417.386	417.467	0.081	427	SD601	355469	TdB	Tanna-Delridge complex, 2 to 6 percent slopes		0.07			0.06				0.06	0.08		0.00		0.08	
Meade	417.467	417.650	0.182	963	SD601	355455	NuB	Nunn clay loam, 2 to 6 percent slopes					0.00		0.01		0.01	0.18			0.16	0.18	0.00
Meade	417.650	418.021	0.372	1,963	SD601	355460	PsC	Pierre-Samsil clays, 6 to 15 percent slopes		0.33			0.13		0.02		0.15	0.35		0.32	0.02			
Meade	418.021	418.123	0.102	537	SD601	355455	NuB	Nunn clay loam, 2 to 6 percent slopes					0.00		0.01		0.01	0.10			0.09	0.10	0.00

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Meade	418.123	418.324	0.201	1,061	SD601	355471	TsB	Tanna-Savo complex, 2 to 6 percent slopes		0.14			0.12				0.12	0.20		0.01		0.20	
Meade	418.324	419.074	0.750	3,959	SD601	355462	SaD	Samsil clay, 6 to 25 percent slopes		0.69		0.68	0.67		0.03		0.70	0.73		0.69	0.02		
Meade	419.074	419.117	0.043	229	SD601	355466	St	Stetter clay					0.04		0.00		0.04	0.04				0.04	0.00
Meade	419.117	419.466	0.349	1,840	SD601	355462	SaD	Samsil clay, 6 to 25 percent slopes		0.32		0.31	0.31		0.01		0.32	0.34		0.32	0.01		
Meade	419.466	419.573	0.107	564	SD601	355463	SbE	Samsil-Rock outcrop complex, 15 to 40 percent slopes		0.10		0.10	0.08		0.00		0.06	0.06		0.10	0.04		
Meade	419.573	419.904	0.331	1,749	SD601	355466	St	Stetter clay					0.31		0.02		0.33	0.33				0.33	0.00
Meade	419.904	420.223	0.320	1,688	SD601	355462	SaD	Samsil clay, 6 to 25 percent slopes		0.29		0.28	0.28		0.01		0.30	0.31		0.29	0.01		
Meade	420.223	420.314	0.091	479	SD601	355466	St	Stetter clay					0.09		0.00		0.09	0.09				0.09	0.00
Meade	420.314	420.494	0.179	948	SD601	355463	SbE	Samsil-Rock outcrop complex, 15 to 40 percent slopes		0.17		0.17	0.10		0.01		0.10	0.11		0.17	0.07		
Meade	420.494	420.739	0.245	1,295	SD601	355462	SaD	Samsil clay, 6 to 25 percent slopes		0.23		0.22	0.22		0.01		0.23	0.24		0.23	0.01		
Meade	420.739	420.780	0.041	217	SD601	355463	SbE	Samsil-Rock outcrop complex, 15 to 40 percent slopes		0.04		0.04	0.02		0.00		0.02	0.02		0.04	0.02		
Meade	420.780	420.901	0.121	637	SD601	355462	SaD	Samsil clay, 6 to 25 percent slopes		0.11		0.11	0.11		0.00		0.11	0.12		0.11	0.00		
Meade	420.901	420.942	0.042	219	SD601	355460	PsC	Pierre-Samsil clays, 6 to 15 percent slopes		0.04			0.01		0.00		0.02	0.04		0.04	0.00		
Meade	420.942	421.677	0.734	3,878	SD601	355462	SaD	Samsil clay, 6 to 25 percent slopes		0.68		0.65	0.65		0.03		0.68	0.71		0.68	0.02		
Meade	421.677	421.760	0.083	440	SD601	355452	Lg	Lohmiller silty clay loam, channeled					0.08				0.08	0.08					0.00
Meade	421.760	421.852	0.093	489	SD601	355462	SaD	Samsil clay, 6 to 25 percent slopes		0.09		0.08	0.08		0.00		0.09	0.09		0.09	0.00		
Meade	421.852	422.104	0.251	1,328	SD601	355452	Lg	Lohmiller silty clay loam, channeled					0.25				0.25	0.25					0.00
Meade	422.104	422.267	0.163	859	SD601	355451	Ld	Lohmiller silty clay loam			0.00		0.15		0.00		0.15	0.15	0.00			0.15	0.00
Meade	422.267	422.658	0.392	2,068	SD601	355462	SaD	Samsil clay, 6 to 25 percent slopes		0.36		0.34	0.35		0.02		0.36	0.38		0.36	0.01		
Meade	422.658	422.750	0.092	485	SD601	355452	Lg	Lohmiller silty clay loam, channeled					0.09				0.09	0.09					0.00
Meade	422.750	422.952	0.202	1,067	SD601	355451	Ld	Lohmiller silty clay loam			0.01		0.18		0.01		0.19	0.19	0.01			0.20	0.00
Meade	422.952	423.283	0.331	1,746	SD601	355452	Lg	Lohmiller silty clay loam, channeled					0.33				0.33	0.33					0.00
Meade	423.283	423.329	0.046	245	SD601	355462	SaD	Samsil clay, 6 to 25 percent slopes		0.04		0.04	0.04		0.00		0.04	0.06		0.04	0.00		
Meade	423.329	423.607	0.278	1,468	SD601	355452	Lg	Lohmiller silty clay loam, channeled					0.28				0.28	0.28					0.00
Meade	423.607	423.667	0.059	313	SD601	355460	PsC	Pierre-Samsil clays, 6 to 15 percent slopes		0.05			0.02		0.00		0.02	0.06		0.05	0.00		
Meade	423.667	423.878	0.211	1,116	SD601	355445	KyA	Kyle clay, 0 to 2 percent slopes					0.02		0.19		0.21	0.21					0.00
Meade	423.878	424.155	0.277	1,460	SD601	355446	KyB	Kyle clay, 2 to 6 percent slopes		0.01			0.03		0.25		0.28	0.28		0.01			0.00
Meade	424.155	424.431	0.277	1,461	SD601	355460	PsC	Pierre-Samsil clays, 6 to 15 percent slopes		0.25			0.10		0.01		0.11	0.26		0.24	0.01		
Meade	424.431	424.496	0.064	339	SD601	355457	PeB	Pierre clay, 2 to 6 percent slopes		0.06			0.00		0.00		0.01	0.06		0.00			
Meade	424.496	424.655	0.160	844	SD601	355452	Lg	Lohmiller silty clay loam, channeled					0.16				0.16	0.16					0.00
Meade	424.655	424.670	0.015	78	SD601	355451	Ld	Lohmiller silty clay loam			0.00		0.01		0.00		0.01	0.01	0.00			0.01	0.00
Meade	424.670	424.695	0.025	134	SD601	355467	SwA	Swanboy clay		0.00			0.02		0.00		0.03	0.03					0.00
Meade	424.695	424.769	0.074	390	SD601	355451	Ld	Lohmiller silty clay loam			0.00		0.07		0.00		0.07	0.07	0.00			0.07	0.00
Meade	424.769	424.852	0.083	436	SD601	355467	SwA	Swanboy clay		0.00			0.08		0.01		0.08	0.08					0.00
Meade	424.852	424.912	0.060	319	SD601	355451	Ld	Lohmiller silty clay loam			0.00		0.06		0.00		0.06	0.06	0.00			0.06	0.00
Meade	424.912	425.058	0.146	769	SD601	355446	KyB	Kyle clay, 2 to 6 percent slopes		0.01			0.01		0.13		0.15	0.15		0.01			0.00
Meade	425.058	425.177	0.119	630	SD601	355451	Ld	Lohmiller silty clay loam			0.00		0.11		0.00		0.11	0.11	0.00			0.12	0.00
Meade	425.177	425.422	0.244	1,291	SD601	355439	Gc	Glenberg fine sandy loam			0.02		0.02				0.02	0.02	0.02			0.24	
Meade	425.422	425.544	0.122	645	SD601	355421	Ba	Bankard loamy fine sand			0.11		0.01				0.01	0.01	0.11				
Meade	425.544	425.597	0.053	279	SD601	355422	Bb	Bankard gravelly loamy sand			0.05								0.05		0.05		
Meade	425.597	425.605	0.008	43	SD601	355477	W	Water															
Pennington	425.605	425.629	0.024	128	SD605	356130	W	Water															
Pennington	425.629	425.927	0.299	1,577	SD605	356101	Rv	Riverwash			0.28								0.28		0.02		0.25
Pennington	425.927	425.987	0.059	312	SD605	356062	Lo	Lohmiller silty clay					0.06	0.00	0.01	0.00	0.06	0.06			0.00	0.06	0.00
Haakon	425.987	426.048	0.061	324	SD055	354111	Lo	Lohmiller silty clay					0.06	0.00	0.00	0.00	0.06	0.06			0.00	0.06	
Haakon	426.048	426.056	0.008	42	SD055	354141	PkE	Pierre-Samsil clays, 15 to 25 percent slopes		0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01		0.01	0.00		
Haakon	426.056	426.340	0.285	1,503	SD055	354141	PkE	Pierre-Samsil clays, 15 to 25 percent slopes		0.26	0.01	0.28	0.12	0.01	0.01	0.01	0.12	0.28		0.28	0.02		
Haakon	426.340	426.443	0.102	541	SD055	354155	SbF	Samsil clay, 25 to 60 percent slopes		0.10	0.00	0.10	0.10		0.00		0.10	0.10		0.10	0.01		
Haakon	426.443	426.500	0.057	303	SD055	354141	PkE	Pierre-Samsil clays, 15 to 25 percent slopes		0.06	0.00	0.06	0.02	0.00	0.00	0.00	0.02	0.05		0.06	0.00		
Haakon	426.500	426.746	0.246	1,296	SD055	354155	SbF	Samsil clay, 25 to 60 percent slopes		0.23	0.01	0.24	0.23		0.01		0.23	0.23		0.24	0.02		
Haakon	426.746	426.819	0.073	385	SD055	354162	StF	Schamber-Samsil complex, 6 to 60 percent slopes		0.03	0.04	0.07	0.03				0.03	0.03		0.07	0.04		
Haakon	426.819	427.701	0.882	4,657	SD055	354094	KeA	Kirley clay loam, 0 to 2 percent slopes					0.04		0.04		0.04	0.88				0.88	0.04
Haakon	427.701	428.047	0.347	1,830	SD055	354153	RkD	Ree-Vivian complex, 6 to 15 percent slopes		0.12	0.21							0.24		0.24	0.12		
Haakon	428.047	428.092	0.045	237	SD055	354148	ReA	Ree loam, 0 to 2 percent slopes			0.04		0.00		0.00		0.00	0.04				0.04	0.00
Haakon	428.092	428.216	0.124	653	SD055	354162	StF	Schamber-Samsil complex, 6 to 60 percent slopes		0.06	0.07	0.12	0.05				0.05	0.06		0.12	0.07		
Haakon	428.216	428.466	0.251	1,324	SD055	354155	SbF	Samsil clay, 25 to 60 percent slopes		0.23	0.01	0.24	0.23		0.01		0.23	0.23		0.24	0.02		
Haakon	428.466	428.684	0.218	1,149	SD055	354141	PkE	Pierre-Samsil clays, 15 to 25 percent slopes		0.20	0.01	0.21	0.09	0.01	0.01	0.01	0.09	0.20		0.21	0.02		
Haakon	428.684	428.730	0.046	241	SD055	354106	KyB	Kyle clay, 3 to 6 percent slopes					0.00	0.00	0.05	0.00	0.05	0.05				0.05	0.00
Haakon	428.730	428.735	0.005	26	SD055	354141	PkE	Pierre-Samsil clays, 15 to 25 percent slopes		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		
Haakon	428.735	428.864	0.129	683	SD055	354106	KyB	Kyle clay, 3 to 6 percent slopes					0.01	0.01	0.13	0.01	0.13	0.13				0.13	0.00
Haakon	428.864	428.949	0.085	449	SD055	354112	Lp	Lohmiller silty clay, channeled		0.00			0.08	0.00	0.00	0.00	0.08	0.09		0.00			0.00
Haakon	428.949	429.076	0.127	672	SD055	354106	KyB	Kyle clay, 3 to 6 percent slopes					0.01	0.01	0.13	0.01	0.13	0.13				0.13	0.00
Haakon	429.076	429.101	0.025	130	SD055	354112	Lp	Lohmiller silty clay, channeled		0.00			0.02	0.00	0.00	0.00	0.02	0.02		0.00			0.00
Haakon	429.101	429.141	0.040	210	SD055	354106	KyB	Kyle clay, 3 to 6 percent slopes					0.00	0.00	0.04	0.00	0.04	0.04				0.04	0.00

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Haakon	429.141	429.562	0.421	2,225	SD055	354141	PkE	Pierre-Samsil clays, 15 to 25 percent slopes		0.39		0.02		0.41	0.18	0.01	0.03	0.01	0.18	0.39		0.41	0.03			
Haakon	429.562	429.707	0.145	767	SD055	354157	SdF	Samsil-Rock outcrop complex, 15 to 60 percent slopes		0.13		0.01		0.15	0.08				0.08	0.09		0.15	0.06			
Haakon	429.707	429.863	0.155	819	SD055	354162	StF	Schamber-Samsil complex, 6 to 60 percent slopes		0.07		0.08		0.15	0.06				0.06	0.07		0.16	0.09			
Haakon	429.863	430.008	0.145	766	SD055	354152	Rh	Ree-Hoven complex				0.12			0.00		0.03		0.03	0.15					0.15	0.02
Haakon	430.008	431.762	1.754	9,261	SD055	354148	ReA	Ree loam, 0 to 2 percent slopes				1.67			0.04		0.05		0.05	1.75					1.75	0.02
Haakon	431.762	431.951	0.189	1,000	SD055	354151	RfC	Ree-Canning loams, 6 to 9 percent slopes		0.02		0.17								0.17		0.17	0.09		0.19	
Haakon	431.951	432.158	0.207	1,093	SD055	354149	ReB	Ree loam, 2 to 6 percent slopes				0.19			0.01		0.01		0.01	0.21					0.21	0.01
Haakon	432.158	432.975	0.817	4,315	SD055	354148	ReA	Ree loam, 0 to 2 percent slopes				0.78			0.02		0.02		0.02	0.82					0.82	0.01
Haakon	432.975	435.130	2.155	11,377	SD055	354101	KmB	Kirley-Ottumwa complex, 2 to 6 percent slopes		0.22					0.19		0.19		0.19	2.15					2.15	0.02
Haakon	435.130	435.164	0.034	178	SD055	354155	SbF	Samsil clay, 25 to 60 percent slopes		0.03		0.00		0.03	0.03		0.00		0.03	0.09		0.03	0.00			
Haakon	435.164	435.574	0.411	2,169	SD055	354101	KmB	Kirley-Ottumwa complex, 2 to 6 percent slopes		0.04					0.04		0.04		0.04	0.41					0.41	0.00
Haakon	435.574	435.696	0.122	644	SD055	354095	KeB	Kirley clay loam, 2 to 6 percent slopes		0.01					0.00		0.00		0.00	0.12					0.12	0.00
Haakon	435.696	435.815	0.118	625	SD055	354133	OvA	Ottumwa-Capa complex, 0 to 3 percent slopes		0.00							0.04		0.04	0.12						0.00
Haakon	435.815	436.760	0.945	4,989	SD055	354101	KmB	Kirley-Ottumwa complex, 2 to 6 percent slopes		0.09					0.09		0.09		0.09	0.94					0.94	0.01
Haakon	436.760	436.934	0.174	920	SD055	354083	CbA	Capa silt loam, 0 to 6 percent slopes		0.01					0.01		0.16		0.17	0.17						
Haakon	436.934	437.152	0.218	1,151	SD055	354101	KmB	Kirley-Ottumwa complex, 2 to 6 percent slopes		0.02					0.02		0.02		0.02	0.22					0.22	0.00
Haakon	437.152	437.237	0.085	448	SD055	354133	OvA	Ottumwa-Capa complex, 0 to 3 percent slopes		0.00							0.03		0.03	0.08						0.00
Haakon	437.237	437.329	0.092	486	SD055	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.03					0.00		0.00		0.00	0.09					0.09	0.00
Haakon	437.329	437.595	0.266	1,403	SD055	354133	OvA	Ottumwa-Capa complex, 0 to 3 percent slopes		0.01							0.09		0.09	0.27						0.01
Haakon	437.595	437.821	0.227	1,197	SD055	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.01							0.01		0.01	0.23					0.23	0.01
Haakon	437.821	437.922	0.101	534	SD055	354133	OvA	Ottumwa-Capa complex, 0 to 3 percent slopes		0.00							0.04		0.04	0.10						0.00
Haakon	437.922	438.008	0.085	450	SD055	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.03					0.00		0.01		0.01	0.09		0.08				
Haakon	438.008	438.368	0.360	1,902	SD055	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.02							0.02		0.02	0.36					0.36	0.02
Haakon	438.368	438.583	0.215	1,135	SD055	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.19				0.01	0.01		0.01		0.02	0.21		0.20				0.01
Haakon	438.583	438.952	0.369	1,950	SD055	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.02							0.02		0.02	0.37					0.37	0.02
Haakon	438.952	439.293	0.341	1,801	SD055	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.12					0.02		0.03		0.03	0.34		0.31				
Haakon	439.293	440.256	0.963	5,083	SD055	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.29					0.02		0.04		0.04	0.96					0.96	0.01
Haakon	440.256	440.611	0.355	1,875	SD055	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.12					0.02		0.04		0.04	0.36		0.32				
Haakon	440.611	440.876	0.266	1,402	SD055	354131	OtA	Ottumwa silty clay, 0 to 3 percent slopes									0.02		0.02	0.27					0.27	0.02
Haakon	440.876	440.906	0.030	156	SD055	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.01					0.00		0.00		0.00	0.03					0.03	0.00
Haakon	440.906	441.016	0.110	580	SD055	354131	OtA	Ottumwa silty clay, 0 to 3 percent slopes									0.01		0.01	0.11					0.11	0.01
Haakon	441.016	441.056	0.041	214	SD055	354133	OvA	Ottumwa-Capa complex, 0 to 3 percent slopes		0.00							0.01		0.01	0.04						0.00
Haakon	441.056	441.149	0.092	488	SD055	354166	Wd	Wendte-Herdcamp silty clays, channeled							0.04		0.00		0.04	0.09						0.03
Haakon	441.149	441.181	0.032	167	SD055	354133	OvA	Ottumwa-Capa complex, 0 to 3 percent slopes		0.00							0.01		0.01	0.03						0.00
Haakon	441.181	441.230	0.049	259	SD055	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.00							0.00		0.00	0.05					0.05	0.00
Haakon	441.230	442.739	1.510	7,972	SD055	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.45					0.03		0.06		0.06	1.51					1.51	0.02
Haakon	442.739	442.800	0.060	319	SD055	354104	Ko	Kolls clay									0.01		0.01	0.06						0.05
Haakon	442.800	443.255	0.455	2,404	SD055	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.14					0.01		0.02		0.02	0.46					0.46	0.00
Haakon	443.255	443.399	0.144	759	SD055	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.05					0.01		0.01		0.01	0.14		0.13				
Haakon	443.399	443.582	0.183	966	SD055	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.16				0.01	0.01		0.01		0.01	0.18		0.17				0.01
Haakon	443.582	443.694	0.112	593	SD055	354166	Wd	Wendte-Herdcamp silty clays, channeled							0.04		0.01		0.04	0.11						0.04
Haakon	443.694	443.805	0.111	586	SD055	354141	PkE	Pierre-Samsil clays, 15 to 25 percent slopes		0.10		0.00		0.11	0.05	0.00	0.00	0.00	0.05	0.10		0.11	0.01			
Haakon	443.805	443.999	0.194	1,025	SD055	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.18				0.00	0.00		0.01		0.01	0.19		0.18				0.00
Haakon	443.999	444.019	0.020	105	SD055	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.00							0.00		0.00	0.02					0.02	0.00
Haakon	444.019	444.039	0.020	105	SD055	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.02				0.00	0.00		0.00		0.00	0.02		0.02				0.00
Haakon	444.039	444.353	0.314	1,659	SD055	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.02							0.02		0.02	0.31					0.31	0.02
Haakon	444.353	444.781	0.428	2,258	SD055	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.39				0.01	0.01		0.01		0.02	0.43		0.41				0.01
Haakon	444.781	444.993	0.212	1,118	SD055	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.01							0.01		0.01	0.21					0.21	0.01
Haakon	444.993	445.091	0.098	518	SD055	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.09				0.00	0.00		0.00		0.00	0.10		0.09				0.00
Haakon	445.091	446.243	1.152	6,081	SD055	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.06							0.06		0.06	1.15					1.15	0.06
Haakon	446.243	446.282	0.040	210	SD055	354131	OtA	Ottumwa silty clay, 0 to 3 percent slopes									0.00		0.00	0.04					0.04	0.00
Haakon	446.282	446.773	0.491	2,591	SD055	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.02							0.02		0.02	0.49					0.49	0.02
Haakon	446.773	447.229	0.456	2,405	SD055	354137	OyC	Ottumwa-Razor-Savo complex, 6 to 15 percent slopes		0.16					0.05		0.02		0.05	0.46		0.43				
Haakon	447.229	447.348	0.119	630	SD055	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.01							0.01		0.01	0.12					0.12	0.01
Haakon	447.348	447.417	0.069	365	SD055	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.02					0.00		0.01		0.01	0.07		0.08				
Haakon	447.417	447.628	0.211	1,112	SD055	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.06					0.00		0.01		0.01	0.21					0.21	0.00
Haakon	447.628	447.881	0.253	1,335	SD055	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.22				0.01	0.01		0.01		0.02	0.25		0.24				0.01
Haakon	447.881	448.154	0.274	1,446	SD055	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.25				0.01	0.01		0.01		0.01	0.27		0.26				0.01
Haakon	448.154	448.206	0.051	272	SD055	354133	OvA	Ottumwa-Capa complex, 0 to 3 percent slopes		0.00							0.02		0.02	0.05						0.00
Haakon	448.206	448.271	0.065	345	SD055	354085	Ct	Capa-Wendte, channeled, complex		0.00					0.00		0.04		0.04	0.07						0.00
Haakon	448.271	448.344	0.073	387	SD055	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.07				0.00	0.00		0.00		0.01	0.07		0.07				0.00
Haakon	448.344	448.622	0.278	1,467	SD055	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.08					0.01		0.01		0.01	0.28					0.28	0.00
Haakon	448.622	448.642	0.019	103	SD055	354128	OeC	Opal-Promise clays, 6 to 9 percent slopes		0.01					0.02		0.00		0.02	0.02		0.02				
Haakon	448.642	448.783	0.141	744	SD055	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.04					0.00		0.01		0.01	0.14					0.14	0.00

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Haakon	448.783	448.861	0.078	412	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.07		0.00	0.00		0.00		0.01	0.08		0.07			0.00
Haakon	448.861	449.136	0.275	1,455	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.08			0.01		0.01		0.01	0.28				0.28	0.00
Haakon	449.136	449.247	0.110	583	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.10		0.00	0.00		0.00		0.01	0.11		0.10			0.00
Haakon	449.247	449.425	0.179	943	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.05			0.00		0.01		0.01	0.18				0.18	0.00
Haakon	449.425	449.529	0.104	550	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.09		0.00	0.00		0.00		0.01	0.10		0.10			0.00
Haakon	449.529	449.701	0.172	909	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.05			0.00		0.01		0.01	0.17				0.17	0.00
Haakon	449.701	449.906	0.204	1,078	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.18		0.01	0.01		0.01		0.01	0.20		0.19			0.01
Haakon	449.906	449.963	0.058	305	SD05S	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.05		0.00	0.00		0.00		0.00	0.06		0.05			0.00
Haakon	449.963	450.451	0.487	2,573	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.02					0.02		0.02	0.49				0.49	0.02
Haakon	450.451	450.692	0.242	1,276	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.07			0.00		0.01		0.01	0.24				0.24	0.00
Haakon	450.692	450.752	0.060	317	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.02			0.00		0.01		0.01	0.06		0.05			
Haakon	450.752	451.187	0.434	2,294	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.13			0.01		0.02		0.02	0.43				0.43	0.00
Haakon	451.187	451.565	0.379	1,999	SD05S	354101	KmB	Kirley-Ottumwa complex, 2 to 6 percent slopes		0.04			0.03		0.03		0.03	0.38				0.38	0.00
Haakon	451.565	451.619	0.053	280	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.00					0.00		0.00	0.05				0.05	0.00
Haakon	451.619	451.760	0.142	747	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.05			0.01		0.01		0.01	0.14		0.13			
Haakon	451.760	452.046	0.286	1,509	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.09			0.01		0.01		0.01	0.29				0.29	0.00
Haakon	452.046	452.499	0.453	2,393	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.02					0.02		0.02	0.45				0.45	0.02
Haakon	452.499	452.591	0.092	487	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.08		0.00	0.00		0.00		0.01	0.09		0.09			0.00
Haakon	452.591	453.578	0.987	5,210	SD05S	354101	KmB	Kirley-Ottumwa complex, 2 to 6 percent slopes		0.10			0.09		0.09		0.09	0.99				0.99	0.01
Haakon	453.578	453.754	0.175	926	SD05S	354131	OtA	Ottumwa silty clay, 0 to 3 percent slopes							0.01		0.01	0.18				0.18	0.01
Haakon	453.754	453.857	0.103	546	SD05S	354101	KmB	Kirley-Ottumwa complex, 2 to 6 percent slopes		0.01			0.01		0.01		0.01	0.10				0.10	0.00
Haakon	453.857	454.055	0.198	1,045	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.06			0.00		0.01		0.01	0.20				0.20	0.00
Haakon	454.055	454.520	0.465	2,455	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.16			0.02		0.05		0.05	0.46		0.42			
Haakon	454.520	454.690	0.170	899	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.15					0.01		0.01	0.17					
Haakon	454.690	454.957	0.267	1,411	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.09			0.01		0.03		0.03	0.27		0.24			
Haakon	454.957	455.131	0.173	916	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.15		0.01	0.01		0.01		0.01	0.17		0.16			0.01
Haakon	455.131	455.247	0.116	612	SD05S	354085	Ct	Capa-Wendte, channeled, complex		0.01			0.01		0.06		0.07	0.12					0.01
Haakon	455.247	455.285	0.039	204	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.03		0.00	0.00		0.00		0.00	0.04		0.04			0.00
Haakon	455.285	455.370	0.085	447	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.03			0.00		0.01		0.01	0.08		0.08			
Haakon	455.370	455.700	0.330	1,742	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.29		0.01	0.01		0.01		0.02	0.33		0.31			0.01
Haakon	455.700	455.803	0.103	542	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.03			0.00		0.00		0.00	0.10				0.10	0.00
Haakon	455.803	456.026	0.224	1,181	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.08			0.01		0.02		0.02	0.22		0.20			
Haakon	456.026	456.148	0.122	642	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.01					0.01		0.01	0.12				0.12	0.01
Haakon	456.148	456.248	0.100	526	SD05S	354127	OeB	Opal-Promise clays, 3 to 6 percent slopes		0.05			0.09		0.01		0.09	0.10				0.10	0.00
Haakon	456.248	456.329	0.082	431	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.00					0.00		0.00	0.08				0.08	0.00
Haakon	456.329	456.515	0.186	982	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.17					0.01		0.01	0.19					
Haakon	456.515	456.566	0.051	267	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.02			0.00		0.01		0.01	0.05		0.05			
Haakon	456.566	456.626	0.060	319	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.05					0.00		0.00	0.06					
Haakon	456.626	456.850	0.223	1,180	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.08			0.01		0.02		0.02	0.22		0.20			
Haakon	456.850	457.073	0.223	1,177	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.20					0.01		0.01	0.22					
Haakon	457.073	457.387	0.314	1,659	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.28		0.01	0.01		0.01		0.02	0.31		0.29			0.01
Haakon	457.387	457.536	0.150	790	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.05			0.01		0.01		0.01	0.15		0.13			
Haakon	457.536	457.663	0.126	668	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.01					0.01		0.01	0.13				0.13	0.01
Haakon	457.663	457.718	0.055	292	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.02			0.00		0.01		0.01	0.06		0.05			
Haakon	457.718	457.946	0.228	1,204	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.07			0.00		0.01		0.01	0.23				0.23	0.00
Haakon	457.946	457.989	0.043	225	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.01			0.00		0.00		0.00	0.04		0.04			
Haakon	457.989	458.237	0.248	1,309	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.07			0.00		0.01		0.01	0.25				0.25	0.00
Haakon	458.237	458.380	0.144	759	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.05			0.01		0.01		0.01	0.14		0.13			
Haakon	458.380	458.462	0.082	433	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.02			0.00		0.00		0.00	0.08				0.08	0.00
Haakon	458.462	458.485	0.022	116	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.01			0.00		0.00		0.00	0.02		0.02			
Haakon	458.485	458.527	0.043	226	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.01			0.00		0.00		0.00	0.04				0.04	0.00
Haakon	458.527	458.580	0.053	278	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.02			0.00		0.01		0.01	0.05		0.05			
Haakon	458.580	459.000	0.420	2,219	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.37		0.02	0.01		0.02		0.03	0.42		0.39			0.01
Haakon	459.000	459.016	0.016	86	SD05S	354170	W	Water															
Haakon	459.016	459.321	0.304	1,607	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.27		0.01	0.01		0.01		0.02	0.30		0.28			0.01
Haakon	459.321	459.425	0.104	551	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.03			0.00		0.00		0.00	0.10				0.10	0.00
Haakon	459.425	459.789	0.364	1,922	SD05S	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.33		0.01	0.01		0.01		0.02	0.36		0.35			0.01
Haakon	459.789	460.285	0.496	2,620	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.15			0.01		0.02		0.02	0.50				0.50	0.00
Haakon	460.285	460.660	0.374	1,976	SD05S	354094	KeA	Kirley clay loam, 0 to 2 percent slopes					0.02		0.02		0.02	0.37				0.37	0.02
Haakon	460.660	460.708	0.049	256	SD05S	354103	KnD	Kirley-Vivian complex, 6 to 15 percent slopes		0.02		0.00						0.03		0.03	0.01		
Haakon	460.708	460.766	0.058	304	SD05S	354085	Ct	Capa-Wendte, channeled, complex		0.00			0.00		0.03		0.03	0.06					0.00
Haakon	460.766	461.005	0.239	1,264	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.08			0.01		0.02		0.02	0.24		0.22			
Haakon	461.005	461.034	0.029	152	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.01			0.00		0.00		0.00	0.03				0.03	0.00
Haakon	461.034	461.101	0.067	353	SD05S	354103	KnD	Kirley-Vivian complex, 6 to 15 percent slopes		0.03		0.00						0.05		0.05	0.02		

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Haakon	461.101	461.208	0.107	563	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.03			0.00		0.00		0.00	0.11					0.11	0.00
Haakon	461.208	461.259	0.051	270	SD05S	354094	KeA	Kirley clay loam, 0 to 2 percent slopes					0.00		0.00		0.00	0.05					0.05	0.00
Haakon	461.259	461.375	0.116	612	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.03			0.00		0.00		0.00	0.12					0.12	0.00
Haakon	461.375	461.493	0.119	627	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.11		0.00	0.00		0.00		0.01	0.12		0.11				0.00
Haakon	461.493	461.573	0.079	418	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.07					0.00		0.00	0.08						
Haakon	461.573	461.584	0.011	59	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.01		0.00	0.00		0.00		0.00	0.01		0.01				0.00
Haakon	461.584	461.958	0.374	1,976	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.34					0.02		0.02	0.37						
Haakon	461.958	462.120	0.162	854	SD05S	354131	OtA	Ottumwa silty clay, 0 to 3 percent slopes							0.01		0.01	0.18					0.16	0.01
Haakon	462.120	462.149	0.029	153	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.00					0.00		0.00	0.03					0.03	0.00
Haakon	462.149	462.199	0.050	264	SD05S	354131	OtA	Ottumwa silty clay, 0 to 3 percent slopes							0.00		0.00	0.05					0.05	0.00
Haakon	462.199	462.432	0.233	1,229	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.01					0.01		0.01	0.23					0.23	0.01
Haakon	462.432	462.655	0.224	1,181	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.20					0.01		0.01	0.22						
Haakon	462.655	462.694	0.038	201	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.00					0.00		0.00	0.04					0.04	0.00
Haakon	462.694	462.766	0.072	382	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.07					0.00		0.00	0.07						
Haakon	462.766	462.912	0.146	769	SD05S	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.13		0.00	0.00		0.00		0.01	0.15		0.14				0.00
Haakon	462.912	462.943	0.031	166	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.03		0.00	0.00		0.00		0.00	0.03		0.03				0.00
Haakon	462.943	463.485	0.542	2,864	SD05S	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.50		0.01	0.01		0.02		0.03	0.54		0.52				0.01
Haakon	463.485	463.747	0.261	1,380	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.08			0.01		0.01		0.01	0.26					0.26	0.00
Haakon	463.747	463.997	0.250	1,319	SD05S	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.23		0.00	0.00		0.01		0.01	0.25		0.24				0.00
Haakon	463.997	464.418	0.421	2,225	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.13			0.01		0.02		0.02	0.42					0.42	0.00
Haakon	464.418	464.617	0.199	1,048	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.07			0.01		0.02		0.02	0.20		0.18				
Haakon	464.617	464.779	0.163	860	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.01					0.01		0.01	0.16					0.16	0.01
Haakon	464.779	464.916	0.136	719	SD05S	354087	Eg	Egas silty clay loam					0.13	0.01	0.01	0.01	0.13	0.14						0.12
Haakon	464.916	465.086	0.171	903	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.15		0.01	0.01		0.01		0.01	0.17		0.16				0.01
Haakon	465.086	465.211	0.125	659	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.04			0.01		0.01		0.01	0.12		0.11				
Haakon	465.211	465.372	0.160	847	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.01					0.01		0.01	0.16					0.16	0.01
Haakon	465.372	465.501	0.130	685	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.12					0.01		0.01	0.13						
Haakon	465.501	465.564	0.063	330	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.02			0.00		0.00		0.00	0.06					0.06	0.00
Haakon	465.564	465.787	0.223	1,177	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.20		0.01	0.01		0.01		0.02	0.22		0.21				0.01
Haakon	465.787	465.853	0.066	346	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.06					0.00		0.00	0.07						
Haakon	465.853	466.503	0.651	3,436	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.58		0.03	0.02		0.03		0.05	0.65		0.61				0.02
Haakon	466.503	466.567	0.064	337	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.06					0.00		0.00	0.06						
Haakon	466.567	466.644	0.077	404	SD05S	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		0.02			0.00		0.00		0.00	0.08					0.08	0.00
Haakon	466.644	466.992	0.349	1,840	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.31					0.02		0.02	0.35						
Haakon	466.992	468.096	1.104	5,827	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.06					0.06		0.06	1.10					1.10	0.06
Haakon	468.096	468.110	0.014	76	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.01					0.00		0.00	0.01						
Haakon	468.110	468.233	0.123	650	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.11		0.00	0.00		0.00		0.01	0.12		0.11				0.00
Haakon	468.233	468.272	0.039	204	SD05S	354085	Ct	Capa-Wendte, channeled, complex		0.00			0.00		0.02		0.02	0.04						0.00
Haakon	468.272	468.461	0.189	1,000	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.17		0.01	0.01		0.01		0.01	0.19		0.18				0.01
Haakon	468.461	468.705	0.244	1,288	SD05S	354103	KnD	Kirley-Vivian complex, 6 to 15 percent slopes		0.11		0.02						0.17		0.17	0.07			
Haakon	468.705	468.959	0.254	1,340	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.01					0.01		0.01	0.25					0.25	0.01
Haakon	468.959	469.013	0.054	287	SD05S	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.05			0.00	0.00	0.00		0.00	0.05		0.05				0.00
Haakon	469.013	469.220	0.207	1,090	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.18			0.01	0.01	0.01		0.01	0.21		0.19				0.01
Haakon	469.220	469.289	0.069	366	SD05S	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.06			0.00	0.00	0.00		0.00	0.07		0.07				0.00
Haakon	469.289	469.584	0.294	1,555	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.26			0.01	0.01	0.01		0.02	0.29		0.27				0.01
Haakon	469.584	469.915	0.331	1,750	SD05S	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.30			0.01	0.01	0.01		0.02	0.33		0.31				0.01
Haakon	469.915	469.976	0.061	323	SD05S	354131	OtA	Ottumwa silty clay, 0 to 3 percent slopes							0.00		0.00	0.06					0.06	0.00
Haakon	469.976	470.216	0.240	1,266	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.01					0.01		0.01	0.24					0.24	0.01
Haakon	470.216	470.500	0.284	1,501	SD05S	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.26			0.01	0.01	0.01		0.01	0.28		0.27				0.01
Haakon	470.500	470.613	0.113	594	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.10			0.00	0.00	0.00		0.01	0.11		0.10				0.00
Haakon	470.613	470.710	0.097	513	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.00					0.00		0.00	0.10					0.10	0.00
Haakon	470.710	470.870	0.160	843	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.14			0.01	0.00	0.01		0.01	0.16		0.15				0.00
Haakon	470.870	471.050	0.180	952	SD05S	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.17			0.00	0.00	0.01		0.01	0.18		0.17				0.00
Haakon	471.050	471.325	0.275	1,451	SD05S	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		0.01					0.01		0.01	0.27					0.27	0.01
Haakon	471.325	471.401	0.076	401	SD05S	354102	KmC	Kirley-Ottumwa complex, 6 to 9 percent slopes		0.01				0.00	0.00		0.00	0.08		0.07				
Haakon	471.401	471.673	0.272	1,437	SD05S	354095	KeB	Kirley clay loam, 2 to 6 percent slopes		0.01				0.01	0.01		0.01	0.27					0.27	0.00
Haakon	471.673	471.851	0.178	940	SD05S	354122	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.17			0.17	0.01	0.01		0.01	0.17		0.17	0.01			
Haakon	471.851	471.874	0.023	122	SD05S	354110	LbE	Lakoma-Vivian complex, 9 to 25 percent slopes		0.02	0.00	0.01						0.02		0.02	0.01			
Haakon	471.874	472.128	0.254	1,341	SD05S	354095	KeB	Kirley clay loam, 2 to 6 percent slopes		0.01				0.01	0.01		0.01	0.25					0.25	0.00
Haakon	472.128	472.257	0.129	679	SD05S	354094	KeA	Kirley clay loam, 0 to 2 percent slopes						0.01	0.01		0.01	0.13					0.13	0.01
Haakon	472.257	472.333	0.076	401	SD05S	354110	LbE	Lakoma-Vivian complex, 9 to 25 percent slopes		0.07	0.00	0.03						0.05		0.08	0.02			
Haakon	472.333	472.514	0.181	954	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.16		0.01	0.01		0.01		0.01	0.18		0.17				0.01
Haakon	472.514	472.562	0.048	254	SD05S	354085	Ct	Capa-Wendte, channeled, complex		0.00			0.00		0.03		0.03	0.06						0.00
Haakon	472.562	472.594	0.032	171	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.03		0.00	0.00		0.00		0.00	0.03		0.03				0.00

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Haakon	472.594	472.649	0.055	291	SD05S	354135	OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes		0.02			0.00		0.01		0.01		0.06		0.05				
Haakon	472.649	472.926	0.277	1,460	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.25		0.01	0.01		0.01		0.02		0.28		0.26				0.01
Haakon	472.926	473.050	0.124	654	SD05S	354110	LbE	Lakoma-Vivian complex, 9 to 25 percent slopes		0.11	0.01	0.05							0.09		0.12	0.04			
Haakon	473.050	473.137	0.087	459	SD05S	354095	KeB	Kirley clay loam, 2 to 6 percent slopes		0.00			0.00		0.00		0.00		0.09					0.09	0.00
Haakon	473.137	473.550	0.413	2,181	SD05S	354094	KeA	Kirley clay loam, 0 to 2 percent slopes					0.02		0.02		0.02		0.41					0.41	0.02
Haakon	473.550	473.774	0.224	1,183	SD05S	354110	LbE	Lakoma-Vivian complex, 9 to 25 percent slopes		0.19	0.01	0.08							0.16		0.22	0.07			
Haakon	473.774	473.928	0.154	814	SD05S	354138	PeC	Pierre clay, 6 to 9 percent slopes		0.15		0.01	0.02				0.02		0.15		0.15				
Haakon	473.928	474.150	0.222	1,174	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.20		0.01	0.01		0.01		0.02		0.22		0.21				0.01
Haakon	474.150	474.207	0.057	302	SD05S	354110	LbE	Lakoma-Vivian complex, 9 to 25 percent slopes		0.05	0.00	0.02							0.04		0.06	0.02			
Haakon	474.207	474.414	0.207	1,091	SD05S	354095	KeB	Kirley clay loam, 2 to 6 percent slopes		0.01			0.01		0.01		0.01		0.21					0.21	0.00
Haakon	474.414	474.677	0.263	1,388	SD05S	354122	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.24		0.24	0.01		0.01		0.01		0.25		0.24	0.01			
Haakon	474.677	474.889	0.212	1,122	SD05S	354097	KfB	Kirley-Canning complex, 2 to 6 percent slopes		0.01	0.08								0.20			0.10	0.21		
Haakon	474.889	474.922	0.033	175	SD05S	354122	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.03		0.03	0.00		0.00		0.00		0.03		0.03	0.00			
Haakon	474.922	475.420	0.497	2,626	SD05S	354097	KfB	Kirley-Canning complex, 2 to 6 percent slopes		0.02	0.20								0.47			0.22	0.50		
Haakon	475.420	476.205	0.785	4,144	SD05S	354094	KeA	Kirley clay loam, 0 to 2 percent slopes					0.04		0.04		0.04		0.78					0.78	0.04
Haakon	476.205	476.279	0.074	391	SD05S	354097	KfB	Kirley-Canning complex, 2 to 6 percent slopes		0.00	0.03								0.07			0.03	0.07		
Haakon	476.279	476.421	0.143	753	SD05S	354094	KeA	Kirley clay loam, 0 to 2 percent slopes					0.01		0.01		0.01		0.14					0.14	0.01
Haakon	476.421	476.515	0.094	495	SD05S	354097	KfB	Kirley-Canning complex, 2 to 6 percent slopes		0.00	0.04								0.09			0.04	0.09		
Haakon	476.515	476.606	0.090	477	SD05S	354094	KeA	Kirley clay loam, 0 to 2 percent slopes					0.00		0.00		0.00		0.09					0.09	0.00
Haakon	476.606	476.885	0.280	1,477	SD05S	354098	KhA	Kirley-Mosher complex, 0 to 2 percent slopes					0.08		0.11		0.11		0.28						0.01
Haakon	476.885	477.028	0.142	751	SD05S	354097	KfB	Kirley-Canning complex, 2 to 6 percent slopes		0.01	0.06								0.14			0.08	0.14		
Haakon	477.028	477.169	0.142	749	SD05S	354094	KeA	Kirley clay loam, 0 to 2 percent slopes					0.01		0.01		0.01		0.14					0.14	0.01
Haakon	477.169	477.347	0.178	939	SD05S	354115	Mo	Mosher silt loam					0.15		0.16		0.16		0.18						
Haakon	477.347	477.478	0.131	690	SD05S	354094	KeA	Kirley clay loam, 0 to 2 percent slopes					0.01		0.01		0.01		0.13					0.13	0.01
Haakon	477.478	477.613	0.135	711	SD05S	354093	Hv	Hoven silt loam							0.13		0.13		0.13						0.12
Haakon	477.613	478.012	0.400	2,111	SD05S	354094	KeA	Kirley clay loam, 0 to 2 percent slopes					0.02		0.02		0.02		0.40					0.40	0.02
Haakon	478.012	478.324	0.312	1,645	SD05S	354103	KnD	Kirley-Vivian complex, 6 to 15 percent slopes		0.14		0.02							0.22		0.22	0.09			
Haakon	478.324	478.621	0.297	1,568	SD05S	354110	LbE	Lakoma-Vivian complex, 9 to 25 percent slopes		0.26	0.02	0.11							0.21		0.30	0.09			
Haakon	478.621	478.798	0.177	935	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.18		0.01	0.01		0.01		0.01		0.18		0.18				0.01
Haakon	478.798	478.908	0.110	579	SD05S	354133	OwA	Ottumwa-Cape complex, 0 to 3 percent slopes		0.00					0.04		0.04		0.11						0.00
Haakon	478.908	479.091	0.183	968	SD05S	354117	Nc	Nimbro silty clay loam, channeled					0.01		0.01		0.01		0.18						0.00
Haakon	479.091	479.126	0.036	188	SD05S	354116	Nb	Nimbro silty clay loam					0.00				0.00		0.04					0.04	0.00
Haakon	479.126	479.260	0.133	702	SD05S	354143	PrB	Promise clay, 3 to 6 percent slopes					0.12		0.01		0.13		0.13					0.13	0.00
Haakon	479.260	479.554	0.294	1,554	SD05S	354122	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.27		0.27	0.01		0.01		0.01		0.29		0.27	0.01			
Haakon	479.554	479.690	0.137	721	SD05S	354110	LbE	Lakoma-Vivian complex, 9 to 25 percent slopes		0.12	0.01	0.05							0.10		0.14	0.04			
Haakon	479.690	480.065	0.375	1,980	SD05S	354103	KnD	Kirley-Vivian complex, 6 to 15 percent slopes		0.17		0.03							0.26		0.26	0.11			
Haakon	480.065	480.275	0.209	1,105	SD05S	354162	StF	Schamber-Samsil complex, 6 to 60 percent slopes		0.10	0.11	0.20	0.08				0.08		0.10		0.21	0.12			
Haakon	480.275	480.702	0.427	2,257	SD05S	354158	SoE	Sansarc-Opal clays, 9 to 40 percent slopes		0.38		0.38	0.13		0.03		0.15		0.43		0.38				0.01
Haakon	480.702	480.756	0.054	287	SD05S	354069	Ab	Albaton silty clay, depressional											0.05						0.05
Haakon	480.756	480.858	0.102	539	SD05S	354117	Nc	Nimbro silty clay loam, channeled					0.01		0.00		0.01		0.10						0.00
Haakon	480.858	481.289	0.430	2,273	SD05S	354116	Nb	Nimbro silty clay loam					0.03				0.03		0.43					0.43	0.00
Haakon	481.289	481.348	0.059	311	SD05S	354117	Nc	Nimbro silty clay loam, channeled					0.00		0.00		0.00		0.06						0.00
Haakon	481.348	481.544	0.196	1,037	SD05S	354077	Bu	Bullcreek clay, 0 to 6 percent slopes					0.19		0.17		0.20		0.20						0.01
Haakon	481.544	482.009	0.465	2,453	SD05S	354158	SoE	Sansarc-Opal clays, 9 to 40 percent slopes		0.42		0.42	0.14		0.03		0.16		0.48		0.42				0.01
Haakon	482.009	482.386	0.377	1,993	SD05S	354122	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.35		0.36	0.02		0.02		0.02		0.37		0.35	0.01			
Haakon	482.386	482.486	0.100	526	SD05S	354097	KfB	Kirley-Canning complex, 2 to 6 percent slopes		0.00	0.04								0.09			0.04	0.10		
Haakon	482.486	482.604	0.118	623	SD05S	354122	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.11		0.11	0.00		0.00		0.00		0.11		0.11	0.00			
Haakon	482.604	482.690	0.086	455	SD05S	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.08		0.00	0.00		0.00		0.01		0.09		0.08				0.00
Haakon	482.690	482.701	0.011	60	SD05S	354122	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.01		0.01	0.00		0.00		0.00		0.01		0.01	0.00			
Haakon	482.701	482.797	0.096	507	SD05S	354158	SoE	Sansarc-Opal clays, 9 to 40 percent slopes		0.09		0.09	0.03		0.01		0.03		0.10		0.09				0.00
Haakon	482.797	483.033	0.236	1,245	SD05S	354122	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.22		0.22	0.01		0.01		0.01		0.23		0.22	0.01			
Haakon	483.033	483.396	0.363	1,916	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.33					0.02		0.02		0.38						
Haakon	483.396	483.427	0.030	160	SD05S	354122	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.03		0.03	0.00		0.00		0.00		0.03		0.03	0.00			
Haakon	483.427	484.135	0.709	3,743	SD05S	354107	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.64					0.04		0.04		0.71						
Haakon	484.135	484.245	0.110	579	SD05S	354110	LbE	Lakoma-Vivian complex, 9 to 25 percent slopes		0.10	0.01	0.04							0.08		0.11	0.03			
Haakon	484.245	484.300	0.055	293	SD05S	354095	KeB	Kirley clay loam, 2 to 6 percent slopes		0.00			0.00		0.00		0.00		0.06					0.06	0.00
Haakon	484.300	484.353	0.052	276	SD05S	354096	KeD	Kirley clay loam, 6 to 15 percent slopes		0.00			0.00		0.00		0.00		0.05		0.05				
Haakon	484.353	484.484	0.131	693	SD05S	354103	KnD	Kirley-Vivian complex, 6 to 15 percent slopes		0.06		0.01							0.09		0.09	0.04			
Haakon	484.484	484.797	0.313	1,654	SD05S	354095	KeB	Kirley clay loam, 2 to 6 percent slopes		0.02			0.01		0.01		0.01		0.31					0.31	0.00
Haakon	484.797	484.874	0.076	403	SD05S	354096	KeD	Kirley clay loam, 6 to 15 percent slopes		0.00			0.00		0.00		0.00		0.08		0.07				
Haakon	484.874	484.931	0.057	301	SD05S	354103	KnD	Kirley-Vivian complex, 6 to 15 percent slopes		0.03		0.00							0.04		0.04	0.02			
Jones	484.931	484.953	0.023	119	SD07S	353640	KnD	Kirley-Vivian complex, 9 to 25 percent slopes		0.01		0.01							0.02		0.02	0.01			
Jones	484.953	485.092	0.139	732	SD07S	353637	KmB	Kirley-Mosher complex, 0 to 6 percent slopes					0.04		0.05		0.05		0.14						0.01
Jones	485.092	485.132	0.040	214	SD07S	353657	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.04		0.04	0.00		0.00		0.00		0.04		0.04	0.00			0.00

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Jones	485.132	485.208	0.075	398	SD075	353637	KmB	Kirley-Mosher complex, 0 to 6 percent slopes					0.02		0.03		0.03	0.08						0.00
Jones	485.208	485.647	0.439	2,319	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.40			0.04		0.02		0.04	0.42		0.37	0.02			0.02
Jones	485.647	485.708	0.061	325	SD075	353640	KnD	Kirley-Vivian complex, 9 to 25 percent slopes		0.03		0.02						0.04		0.06	0.02			
Jones	485.708	485.848	0.140	738	SD075	353637	KmB	Kirley-Mosher complex, 0 to 6 percent slopes					0.04		0.05		0.05	0.14						0.01
Jones	485.848	485.957	0.109	576	SD075	353636	KeD	Kirley clay loam, 9 to 15 percent slopes		0.01			0.00		0.00		0.00	0.11		0.10	0.00			
Jones	485.957	486.066	0.109	576	SD075	353637	KmB	Kirley-Mosher complex, 0 to 6 percent slopes					0.03		0.04		0.04	0.11						0.01
Jones	486.066	486.238	0.172	908	SD075	353636	KeD	Kirley clay loam, 9 to 15 percent slopes		0.01			0.01		0.01		0.01	0.17		0.16	0.00			
Jones	486.238	486.684	0.445	2,352	SD075	353658	OkE	Okaton-Wendte-Bullcreek complex, 0 to 45 percent slopes		0.24		0.20	0.14		0.09		0.14	0.45		0.25				0.01
Jones	486.684	486.830	0.146	772	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.13			0.01		0.01		0.01	0.14		0.12	0.01			0.01
Jones	486.830	486.944	0.114	600	SD075	353643	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.11			0.00		0.00		0.01	0.11					0.11	0.00
Jones	486.944	487.234	0.291	1,535	SD075	353634	KeB	Kirley clay loam, 2 to 6 percent slopes					0.01		0.01		0.01	0.29					0.29	0.01
Jones	487.234	487.261	0.027	142	SD075	353643	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.03			0.00		0.00		0.00	0.03					0.03	0.00
Jones	487.261	487.431	0.170	897	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.15			0.01		0.01		0.02	0.17		0.15				0.01
Jones	487.431	487.592	0.161	850	SD075	353657	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.15		0.15	0.01		0.00		0.01	0.16		0.15	0.00			0.00
Jones	487.592	487.715	0.123	652	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.11			0.01		0.01		0.01	0.12		0.10	0.01			0.01
Jones	487.715	488.243	0.527	2,784	SD075	353657	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.49		0.49	0.03		0.02		0.03	0.51		0.49	0.02			0.01
Jones	488.243	489.163	0.921	4,862	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.83			0.09		0.05		0.09	0.87		0.78	0.05			0.05
Jones	489.163	489.293	0.130	685	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.12			0.01		0.01		0.01	0.13		0.12				0.00
Jones	489.293	489.463	0.170	895	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.16			0.02		0.01		0.02	0.16		0.14	0.01			0.01
Jones	489.463	489.720	0.257	1,359	SD075	353634	KeB	Kirley clay loam, 2 to 6 percent slopes					0.01		0.01		0.01	0.26					0.26	0.01
Jones	489.720	489.736	0.016	85	SD075	353657	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.01		0.01	0.00		0.00		0.00	0.02		0.01	0.00			0.00
Jones	489.736	489.935	0.199	1,050	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.18			0.02		0.01		0.02	0.19		0.17	0.01			0.01
Jones	489.935	490.138	0.203	1,071	SD075	353657	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.19		0.19	0.01		0.01		0.01	0.20		0.19	0.01			0.00
Jones	490.138	490.543	0.405	2,140	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.36			0.04		0.02		0.04	0.39		0.34	0.02			0.02
Jones	490.543	490.788	0.245	1,292	SD075	353634	KeB	Kirley clay loam, 2 to 6 percent slopes					0.00		0.00		0.00	0.24					0.24	0.01
Jones	490.788	490.866	0.078	414	SD075	353675	ReB	Ree loam, 2 to 6 percent slopes					0.01		0.01		0.01	0.08					0.08	0.00
Jones	490.866	491.004	0.138	728	SD075	353674	ReA	Ree loam, 0 to 2 percent slopes					0.01		0.00		0.01	0.14					0.14	0.00
Jones	491.004	491.210	0.206	1,087	SD075	353675	ReB	Ree loam, 2 to 6 percent slopes					0.01		0.01		0.02	0.21					0.21	0.01
Jones	491.210	491.220	0.010	53	SD075	353640	KnD	Kirley-Vivian complex, 9 to 25 percent slopes		0.00		0.00						0.01		0.01	0.00			
Jones	491.220	491.263	0.043	228	SD075	353675	ReB	Ree loam, 2 to 6 percent slopes					0.00		0.00		0.00	0.04					0.04	0.00
Jones	491.263	491.457	0.194	1,022	SD075	353640	KnD	Kirley-Vivian complex, 9 to 25 percent slopes		0.09		0.07						0.14		0.19	0.06			
Jones	491.457	491.847	0.390	2,058	SD075	353636	KeD	Kirley clay loam, 9 to 15 percent slopes		0.03			0.01		0.01		0.01	0.38		0.37	0.01			
Jones	491.847	492.153	0.306	1,615	SD075	353661	OlD	Opal clay loam, 6 to 15 percent slopes		0.28			0.29		0.02		0.29	0.31		0.28				0.02
Jones	492.153	492.271	0.119	626	SD075	353660	OlC	Opal clay loam, 6 to 9 percent slopes		0.11			0.12				0.12	0.12		0.11			0.12	0.01
Jones	492.271	492.364	0.093	489	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.08			0.01		0.00		0.01	0.09		0.08	0.00			0.00
Jones	492.364	492.454	0.091	479	SD075	353648	LvE	Lakoma-Vivian complex, 9 to 25 percent slopes		0.08		0.03						0.06		0.09	0.03			
Jones	492.454	492.480	0.026	137	SD075	353660	OlC	Opal clay loam, 6 to 9 percent slopes		0.02			0.03				0.03	0.03		0.02			0.03	0.00
Jones	492.480	493.177	0.697	3,678	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.63			0.07		0.03		0.07	0.86		0.59	0.03			0.03
Jones	493.177	493.468	0.291	1,537	SD075	353633	KeA	Kirley clay loam, 0 to 2 percent slopes					0.01		0.01		0.01	0.29					0.29	0.01
Jones	493.468	493.589	0.120	636	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.11			0.01		0.01		0.01	0.11		0.10	0.01			0.01
Jones	493.589	493.634	0.045	239	SD075	353673	Pu	Promise-Capa complex					0.03		0.02		0.04	0.05						0.00
Jones	493.634	493.850	0.216	1,143	SD075	353658	OkE	Okaton-Wendte-Bullcreek complex, 0 to 45 percent slopes		0.11		0.10	0.07		0.04		0.07	0.22		0.12				0.01
Jones	493.850	493.959	0.108	572	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.10			0.01		0.01		0.01	0.10		0.09	0.01			0.01
Jones	493.959	493.987	0.028	148	SD075	353657	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.03		0.03	0.00		0.00		0.00	0.03		0.03	0.00			0.00
Jones	493.987	494.156	0.170	896	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.15			0.02		0.01		0.02	0.16		0.14	0.01			0.01
Jones	494.156	494.262	0.106	561	SD075	353643	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.10			0.00		0.00		0.01	0.11					0.11	0.00
Jones	494.262	494.347	0.084	446	SD075	353652	Mo	Mosher silt loam					0.08		0.08		0.08	0.08						0.00
Jones	494.347	494.420	0.073	385	SD075	353633	KeA	Kirley clay loam, 0 to 2 percent slopes					0.00		0.00		0.00	0.07					0.07	0.00
Jones	494.420	494.555	0.135	713	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.12			0.01		0.01		0.01	0.13		0.11	0.01			0.01
Jones	494.555	494.935	0.380	2,007	SD075	353634	KeB	Kirley clay loam, 2 to 6 percent slopes					0.01		0.01		0.01	0.38					0.38	0.01
Jones	494.935	495.225	0.290	1,532	SD075	353653	Mp	Mosher-Capa silt loams		0.01			0.19		0.27		0.27	0.28						0.01
Jones	495.225	495.355	0.129	684	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					0.12		0.01		0.13	0.13					0.13	0.00
Jones	495.355	495.373	0.018	96	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.02			0.00		0.00		0.00	0.02		0.02				0.00
Jones	495.373	495.556	0.183	966	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					0.17		0.01		0.18	0.18					0.18	0.00
Jones	495.556	496.233	0.677	3,575	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.61			0.07		0.03		0.07	0.64		0.58	0.03			0.03
Jones	496.233	496.312	0.079	415	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.07			0.01		0.01		0.01	0.08		0.07				0.00
Jones	496.312	496.341	0.029	154	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.03		0.00		0.03	0.03					0.03	0.00
Jones	496.341	496.346	0.006	30	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.01			0.00		0.00		0.00	0.01		0.01				0.00
Jones	496.346	496.668	0.322	1,701	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.29			0.03		0.02		0.03	0.31		0.27	0.02			0.02
Jones	496.668	496.782	0.114	600	SD075	353634	KeB	Kirley clay loam, 2 to 6 percent slopes					0.00		0.00		0.00	0.11					0.11	0.00
Jones	496.782	497.126	0.344	1,817	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.31			0.02		0.03		0.04	0.34		0.31				0.01
Jones	497.126	497.274	0.148	780	SD075	353658	OkE	Okaton-Wendte-Bullcreek complex, 0 to 45 percent slopes		0.08		0.07	0.05		0.03		0.05	0.15		0.08				0.00
Jones	497.274	497.346	0.072	382	SD075	353636	KeD	Kirley clay loam, 9 to 15 percent slopes		0.01			0.00		0.00		0.00	0.07		0.07	0.00			
Jones	497.346	497.746	0.399	2,109	SD075	353640	KnD	Kirley-Vivian complex, 9 to 25 percent slopes		0.18		0.15						0.28		0.40	0.12			

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (*continued*)

Jones	497.746	497.754	0.008	45	SD075	353634	KeB	Kirley clay loam, 2 to 6 percent slopes					0.00		0.00		0.00	0.01				0.01	0.00
Jones	497.754	498.290	0.535	2,827	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.51		0.03		0.52	0.54				0.54	0.01
Jones	498.290	498.454	0.165	870	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.15			0.02		0.01		0.02	0.16		0.14	0.01		0.01
Jones	498.454	498.595	0.140	741	SD075	353634	KeB	Kirley clay loam, 2 to 6 percent slopes					0.00		0.00		0.00	0.14				0.14	0.00
Jones	498.595	498.771	0.176	930	SD075	353670	PrC	Promise clay, 6 to 9 percent slopes		0.01		0.01	0.16		0.01		0.17	0.18		0.16			
Jones	498.771	498.811	0.040	212	SD075	353675	ReB	Ree loam, 2 to 6 percent slopes					0.00		0.00		0.00	0.04				0.04	0.00
Jones	498.811	499.044	0.233	1,231	SD075	353652	Mo	Mosher silt loam					0.21		0.22		0.22	0.23					0.01
Jones	499.044	499.132	0.088	463	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.08		0.01		0.09	0.09				0.09	0.00
Jones	499.132	499.414	0.282	1,489	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.27			0.28		0.01		0.28	0.28				0.28	0.00
Jones	499.414	499.741	0.327	1,726	SD075	353634	KeB	Kirley clay loam, 2 to 6 percent slopes					0.01		0.01		0.01	0.33				0.33	0.01
Jones	499.741	499.838	0.097	512	SD075	353684	Wt	Witten silty clay					0.10		0.00		0.10	0.10				0.10	0.00
Jones	499.838	500.242	0.405	2,136	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.38		0.02		0.40	0.40				0.40	0.01
Jones	500.242	500.348	0.106	561	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.10			0.01		0.01		0.01	0.10		0.09	0.01		0.01
Jones	500.348	500.499	0.151	797	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.14		0.01		0.15	0.15				0.15	0.00
Jones	500.499	500.939	0.439	2,320	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.40			0.04		0.02		0.04	0.42		0.37	0.02		0.02
Jones	500.939	501.052	0.113	596	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.11		0.01		0.11	0.11				0.11	0.00
Jones	501.052	501.238	0.186	982	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					0.18		0.01		0.18	0.19				0.19	0.00
Jones	501.238	501.386	0.149	785	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.13		0.00	0.14		0.01		0.14	0.15		0.13			0.01
Jones	501.386	501.484	0.098	517	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.09		0.01		0.10	0.10				0.10	0.00
Jones	501.484	501.614	0.130	685	SD075	353658	OkE	Okaton-Wendte-Bullcreek complex, 0 to 45 percent slopes		0.07		0.06	0.04		0.03		0.04	0.13		0.07			0.00
Jones	501.614	501.816	0.202	1,065	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.18			0.02		0.01		0.02	0.19		0.17	0.01		0.01
Jones	501.816	501.978	0.163	859	SD075	353670	PrC	Promise clay, 6 to 9 percent slopes		0.00		0.00	0.15		0.01		0.16	0.16		0.15			
Jones	501.978	502.067	0.089	470	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.08		0.01		0.09	0.09				0.09	0.00
Jones	502.067	502.162	0.095	501	SD075	353678	SoE	Sansarc-Opal clays, 9 to 40 percent slopes		0.09		0.09	0.04		0.01		0.04	0.09		0.09	0.00		
Jones	502.162	502.194	0.032	169	SD075	353681	W	Water															
Jones	502.194	502.241	0.046	245	SD075	353678	SoE	Sansarc-Opal clays, 9 to 40 percent slopes		0.04		0.04	0.02		0.00		0.02	0.06		0.04	0.00		
Jones	502.241	502.306	0.065	345	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					0.06		0.00		0.06	0.07				0.07	0.00
Jones	502.306	502.725	0.419	2,214	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.40		0.03		0.41	0.42				0.42	0.01
Jones	502.725	502.799	0.074	390	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.07		0.00	0.07		0.01		0.07	0.07		0.07			0.00
Jones	502.799	503.905	1.106	5,839	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		1.00			0.11		0.06		0.11	1.05		0.94	0.06		0.06
Jones	503.905	504.024	0.119	628	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.11			0.01		0.01		0.01	0.12		0.11			0.00
Jones	504.024	504.880	0.856	4,521	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.77			0.09		0.04		0.09	0.81		0.73	0.04		0.04
Jones	504.880	504.953	0.072	383	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.06		0.00	0.07		0.01		0.07	0.07		0.06			0.00
Jones	504.953	505.127	0.174	918	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.16			0.02		0.01		0.02	0.17		0.15	0.01		0.01
Jones	505.127	505.397	0.271	1,429	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.24		0.01	0.25		0.02		0.26	0.27		0.24			0.01
Jones	505.397	505.422	0.024	127	SD075	353664	OpC	Opal clay, 6 to 9 percent slopes		0.02		0.00	0.02		0.00		0.02	0.02		0.02			0.00
Jones	505.422	505.686	0.264	1,396	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.24			0.02		0.02		0.03	0.26		0.24			0.01
Jones	505.686	505.783	0.097	513	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.09		0.00	0.09		0.01		0.09	0.10		0.09			0.00
Jones	505.783	506.138	0.355	1,873	SD075	353664	OpC	Opal clay, 6 to 9 percent slopes		0.34		0.00	0.35		0.01		0.35	0.35		0.34			0.00
Jones	506.138	506.185	0.047	250	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.04		0.00	0.04		0.00		0.05	0.05		0.04			0.00
Jones	506.185	506.221	0.036	189	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.03			0.00		0.00		0.00	0.03		0.03	0.00		0.00
Jones	506.221	506.245	0.024	126	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.02		0.00	0.02		0.00		0.02	0.02		0.02			0.00
Jones	506.245	506.409	0.164	867	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.15			0.02		0.01		0.02	0.16		0.14	0.01		0.01
Jones	506.409	506.574	0.165	873	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.16		0.01		0.18	0.17				0.17	0.00
Jones	506.574	506.628	0.054	284	SD075	353683	Wd	Wendte silty clay, channeled					0.00		0.00		0.01	0.05					0.00
Jones	506.628	506.678	0.050	265	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.04		0.00	0.05		0.00		0.05	0.05		0.04			0.00
Jones	506.678	506.882	0.203	1,073	SD075	353664	OpC	Opal clay, 6 to 9 percent slopes		0.20		0.00	0.20		0.01		0.20	0.20		0.20			0.00
Jones	506.882	507.177	0.296	1,561	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.28		0.02		0.28	0.30				0.30	0.01
Jones	507.177	507.274	0.097	513	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.09			0.10		0.00		0.10	0.10				0.10	0.00
Jones	507.274	507.381	0.106	560	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.09		0.00	0.10		0.01		0.10	0.11		0.09			0.00
Jones	507.381	507.504	0.124	653	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.11			0.01		0.01		0.01	0.12		0.11	0.01		0.01
Jones	507.504	507.606	0.102	540	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.10			0.10		0.00		0.10	0.10				0.10	0.00
Jones	507.606	507.649	0.043	226	SD075	353657	ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.04		0.04	0.00		0.00		0.00	0.04		0.04	0.00		0.00
Jones	507.649	507.700	0.051	269	SD075	353627	Hb	Herdcamp-Bullcreek complex		0.00			0.05		0.02		0.05	0.05		0.00			0.03
Jones	507.700	507.752	0.052	273	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.05		0.00	0.05		0.00		0.05	0.05		0.05			0.00
Jones	507.752	507.822	0.070	370	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.07			0.07		0.00		0.07	0.07				0.07	0.00
Jones	507.822	507.929	0.107	564	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.09		0.00	0.10		0.01		0.10	0.11		0.09			0.00
Jones	507.929	508.104	0.175	924	SD075	353664	OpC	Opal clay, 6 to 9 percent slopes		0.17		0.00	0.17		0.01		0.17	0.18		0.17			0.00
Jones	508.104	508.177	0.074	388	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.07			0.01		0.01		0.01	0.07		0.07			0.00
Jones	508.177	508.276	0.099	521	SD075	353664	OpC	Opal clay, 6 to 9 percent slopes		0.09		0.00	0.10		0.00		0.10	0.10		0.09			0.00
Jones	508.276	508.452	0.176	930	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.17			0.17		0.00		0.18	0.18				0.18	0.00
Jones	508.452	508.527	0.075	394	SD075	353664	OpC	Opal clay, 6 to 9 percent slopes		0.07		0.00	0.07		0.00		0.07	0.07		0.07			0.00
Jones	508.527	508.856	0.329	1,737	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.29		0.01	0.31		0.03		0.32	0.33		0.29			0.01
Jones	508.856	509.331	0.476	2,512	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.43			0.06		0.02		0.05	0.45		0.40	0.02		0.02

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Jones	509.331	509.613	0.282	1,488	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.27			0.28		0.01		0.28	0.28					0.28	0.00
Jones	509.613	509.865	0.252	1,329	SD075	353664	OpC	Opal clay, 6 to 9 percent slopes		0.24		0.00	0.25		0.01		0.25	0.25		0.24				0.00
Jones	509.865	509.925	0.060	317	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.06			0.06		0.00		0.06	0.06					0.06	0.00
Jones	509.925	510.334	0.409	2,159	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.36		0.01	0.38		0.03		0.40	0.41		0.36				0.02
Jones	510.334	510.433	0.099	525	SD075	353664	OpC	Opal clay, 6 to 9 percent slopes		0.10		0.00	0.10		0.00		0.10	0.10		0.10				0.00
Jones	510.433	510.851	0.418	2,205	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.37		0.01	0.39		0.03		0.41	0.42		0.37				0.02
Jones	510.851	511.965	1.114	5,883	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		1.00			0.11		0.06		0.11	1.06		0.95	0.06			0.06
Jones	511.965	512.007	0.042	219	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.04		0.00		0.04	0.04					0.04	0.00
Jones	512.007	512.093	0.086	456	SD075	353664	OpC	Opal clay, 6 to 9 percent slopes		0.08		0.00	0.08		0.00		0.09	0.09		0.08				0.00
Jones	512.093	512.283	0.190	1,004	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.18		0.01		0.19	0.19					0.19	0.00
Jones	512.283	512.362	0.079	415	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.07			0.08		0.00		0.08	0.08					0.08	0.00
Jones	512.362	512.501	0.139	736	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.13		0.01		0.14	0.14					0.14	0.00
Jones	512.501	512.641	0.140	739	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.13			0.14		0.00		0.14	0.14					0.14	0.00
Jones	512.641	512.854	0.213	1,126	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.20		0.01		0.21	0.21					0.21	0.00
Jones	512.854	512.915	0.061	319	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.05			0.00		0.00		0.01	0.06		0.05				0.00
Jones	512.915	512.990	0.075	396	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.07			0.01		0.00		0.01	0.07		0.06	0.00			0.00
Jones	512.990	513.364	0.374	1,977	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.33		0.01	0.35		0.03		0.36	0.37		0.33				0.01
Jones	513.364	513.548	0.184	970	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.16			0.01		0.01		0.02	0.18		0.16				0.01
Jones	513.548	513.671	0.124	653	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.11			0.01		0.01		0.01	0.12		0.11	0.01			0.01
Jones	513.671	513.769	0.098	517	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.09		0.01		0.10	0.10					0.10	0.00
Jones	513.769	513.885	0.116	611	SD075	353664	OpC	Opal clay, 6 to 9 percent slopes		0.11		0.00	0.11		0.00		0.11	0.12		0.11				0.00
Jones	513.885	514.299	0.414	2,185	SD075	353665	OpD	Opal clay, 6 to 15 percent slopes		0.36		0.01	0.38		0.03		0.40	0.41		0.36				0.02
Jones	514.299	515.328	1.029	5,432	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.93			0.10		0.05		0.10	0.98		0.87	0.05			0.05
Jones	515.328	515.677	0.349	1,843	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.33			0.34		0.01		0.35	0.35					0.35	0.00
Jones	515.677	515.789	0.112	594	SD075	353671	PsA	Promise-Bullcreek clays		0.01			0.10		0.04		0.10	0.11		0.00				0.00
Jones	515.789	516.066	0.277	1,463	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.26			0.27		0.01		0.28	0.28					0.28	0.00
Jones	516.066	516.122	0.055	292	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					0.05		0.00		0.06	0.06					0.06	0.00
Jones	516.122	516.176	0.055	289	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.05			0.00		0.00		0.01	0.05		0.05				0.00
Jones	516.176	516.323	0.147	775	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.14			0.14		0.00		0.15	0.15					0.15	0.00
Jones	516.323	516.402	0.079	418	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					0.08		0.00		0.08	0.08					0.08	0.00
Jones	516.402	516.523	0.120	636	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.11			0.12		0.00		0.12	0.12					0.12	0.00
Jones	516.523	516.726	0.203	1,074	SD075	353643	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.19			0.01		0.01		0.01	0.20					0.20	0.00
Jones	516.726	516.983	0.257	1,358	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.23			0.02		0.02		0.03	0.28		0.23				0.01
Jones	516.983	517.233	0.250	1,319	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.24			0.24		0.00		0.25	0.25					0.25	0.00
Jones	517.233	517.277	0.045	235	SD075	353627	Hb	Herdcamp-Bullcreek complex		0.00			0.04		0.02		0.04	0.04		0.00				0.03
Jones	517.277	517.367	0.090	473	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.08			0.01		0.00		0.01	0.09		0.08	0.00			0.00
Jones	517.367	517.513	0.146	773	SD075	353664	OpC	Opal clay, 6 to 9 percent slopes		0.14		0.00	0.14		0.00		0.15	0.15		0.14				0.00
Jones	517.513	517.984	0.470	2,483	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.45			0.46		0.01		0.47	0.47					0.47	0.00
Jones	517.984	518.088	0.104	548	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.10		0.01		0.10	0.10					0.10	0.00
Jones	518.088	518.181	0.094	495	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.09			0.09		0.00		0.09	0.09					0.09	0.00
Jones	518.181	518.270	0.088	467	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.08			0.01		0.01		0.01	0.09		0.08				0.00
Jones	518.270	518.874	0.604	3,191	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.54			0.06		0.03		0.06	0.57		0.51	0.03			0.03
Jones	518.874	518.898	0.024	125	SD075	353643	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.02			0.00		0.00		0.00	0.02					0.02	0.00
Jones	518.898	519.378	0.480	2,535	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.43			0.05		0.02		0.05	0.46		0.41	0.02			0.02
Jones	519.378	519.604	0.226	1,192	SD075	353661	OfD	Opal clay loam, 6 to 15 percent slopes		0.20			0.21		0.01		0.21	0.23		0.20				0.01
Jones	519.604	519.944	0.340	1,797	SD075	353660	OfC	Opal clay loam, 6 to 9 percent slopes		0.32			0.34				0.34	0.34		0.32			0.34	0.02
Jones	519.944	520.041	0.098	515	SD075	353622	Bu	Bullcreek clay, 0 to 6 percent slopes		0.00			0.09		0.09		0.10	0.10						
Jones	520.041	520.135	0.093	493	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					0.09		0.01		0.09	0.09					0.09	0.00
Jones	520.135	520.307	0.173	911	SD075	353660	OfC	Opal clay loam, 6 to 9 percent slopes		0.16			0.17				0.17	0.17		0.16			0.17	0.01
Jones	520.307	520.325	0.018	94	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					0.02		0.00		0.02	0.02					0.02	0.00
Jones	520.325	520.422	0.097	512	SD075	353671	PsA	Promise-Bullcreek clays		0.01			0.08		0.04		0.09	0.10		0.00				0.00
Jones	520.422	520.706	0.284	1,499	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					0.27		0.02		0.28	0.28					0.28	0.01
Jones	520.706	520.807	0.101	531	SD075	353622	Bu	Bullcreek clay, 0 to 6 percent slopes		0.00			0.09		0.10		0.10	0.10						
Jones	520.807	521.198	0.391	2,066	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					0.37		0.02		0.38	0.39					0.39	0.01
Jones	521.198	521.429	0.231	1,220	SD075	353650	MIB	Millboro silty clay loam, 3 to 6 percent slopes					0.23		0.00		0.23	0.23					0.23	0.00
Jones	521.429	521.793	0.364	1,921	SD075	353649	MIA	Millboro silty clay loam, 0 to 3 percent slopes					0.36		0.01		0.36	0.36					0.36	0.01
Jones	521.793	522.003	0.210	1,109	SD075	353671	PsA	Promise-Bullcreek clays		0.01			0.18		0.08		0.19	0.21		0.01				0.01
Jones	522.003	522.085	0.083	436	SD075	353643	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.08			0.00		0.00		0.00	0.08					0.08	0.00
Jones	522.085	522.305	0.219	1,158	SD075	353622	Bu	Bullcreek clay, 0 to 6 percent slopes		0.00			0.20		0.21		0.21	0.22						
Jones	522.305	522.539	0.235	1,238	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					0.22		0.01		0.23	0.23					0.23	0.00
Jones	522.539	522.593	0.053	282	SD075	353622	Bu	Bullcreek clay, 0 to 6 percent slopes		0.00			0.05		0.05		0.05	0.05						
Jones	522.593	522.868	0.275	1,454	SD075	353649	MIA	Millboro silty clay loam, 0 to 3 percent slopes					0.27		0.01		0.27	0.28					0.28	0.01
Jones	522.868	523.008	0.140	739	SD075	353671	PsA	Promise-Bullcreek clays		0.01			0.12		0.05		0.12	0.14		0.00				0.01
Jones	523.008	523.089	0.082	431	SD075	353649	MIA	Millboro silty clay loam, 0 to 3 percent slopes					0.08		0.00		0.08	0.08					0.08	0.00

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Jones	523.089	523.203	0.114	601	SD075	353643	LaB	Lakoma silty clay, 3 to 6 percent slopes		0.11			0.00		0.00		0.01	0.11					0.11	0.00
Jones	523.203	523.371	0.168	885	SD075	353650	MlB	Millboro silty clay loam, 3 to 6 percent slopes					0.16		0.00		0.16	0.17					0.17	0.00
Jones	523.371	523.392	0.021	109	SD075	353649	MlA	Millboro silty clay loam, 0 to 3 percent slopes					0.02		0.00		0.02	0.02					0.02	0.00
Jones	523.392	523.769	0.378	1,993	SD075	353684	Wt	Witten silty clay					0.37		0.01		0.37	0.38					0.38	0.00
Jones	523.769	523.887	0.118	622	SD075	353650	MlB	Millboro silty clay loam, 3 to 6 percent slopes					0.12		0.00		0.12	0.12					0.12	0.00
Jones	523.887	524.126	0.239	1,261	SD075	353651	MlC	Millboro silty clay loam, 6 to 9 percent slopes		0.01			0.23		0.01		0.23	0.24		0.22				
Jones	524.126	524.605	0.480	2,532	SD075	353650	MlB	Millboro silty clay loam, 3 to 6 percent slopes					0.47		0.01		0.47	0.48					0.48	0.01
Jones	524.605	525.017	0.412	2,176	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					0.39		0.02		0.40	0.41					0.41	0.01
Lyman	525.017	525.662	0.645	3,406	SD085	355608	PoA	Promise clay, 0 to 3 percent slopes		0.02			0.63		0.04		0.65	0.65					0.65	0.01
Lyman	525.662	525.718	0.056	296	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.00			0.05		0.00		0.05	0.06					0.06	0.00
Lyman	525.718	526.245	0.527	2,784	SD085	355590	MmA	Millboro silty clay, 0 to 3 percent slopes		0.02			0.49		0.02		0.51	0.53					0.53	0.02
Lyman	526.245	526.300	0.054	287	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.00			0.05		0.00		0.05	0.05					0.05	0.00
Lyman	526.300	526.380	0.080	421	SD085	355590	MmA	Millboro silty clay, 0 to 3 percent slopes		0.00			0.07		0.00		0.08	0.08					0.08	0.00
Lyman	526.380	526.487	0.108	569	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.00			0.10		0.00		0.10	0.11					0.11	0.00
Lyman	526.487	526.488	0.000	2	SD085	355626	Wt	Witten silty clay		0.00			0.00		0.00		0.00	0.00					0.00	0.00
Lyman	526.488	526.600	0.113	595	SD085	355574	Ko	Kolls silty clay					0.01		0.01		0.01	0.11						0.11
Lyman	526.600	526.714	0.114	599	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.00			0.11		0.00		0.11	0.11					0.11	0.00
Lyman	526.714	527.008	0.294	1,554	SD085	355626	Wt	Witten silty clay		0.01			0.28		0.02		0.29	0.29					0.29	0.01
Lyman	527.008	527.250	0.242	1,279	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.01			0.23		0.01		0.23	0.24					0.24	0.01
Lyman	527.250	527.525	0.274	1,449	SD085	355626	Wt	Witten silty clay		0.01			0.26		0.02		0.27	0.27					0.27	0.01
Lyman	527.525	528.156	0.631	3,330	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.03			0.59		0.03		0.61	0.63					0.63	0.02
Lyman	528.156	528.234	0.079	416	SD085	355608	PoA	Promise clay, 0 to 3 percent slopes		0.00			0.08		0.00		0.08	0.08					0.08	0.00
Lyman	528.234	528.245	0.011	57	SD085	355626	Wt	Witten silty clay		0.00			0.01		0.00		0.01	0.01					0.01	0.00
Lyman	528.245	528.644	0.399	2,107	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.02			0.37		0.02		0.39	0.40					0.40	0.01
Lyman	528.644	528.796	0.151	799	SD085	355593	MnC	Millboro-Boro silty clays, 6 to 9 percent slopes		0.02			0.08				0.08	0.15		0.15				
Lyman	528.796	529.697	0.901	4,758	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.04			0.84		0.04		0.87	0.90					0.90	0.03
Lyman	529.697	529.832	0.135	713	SD085	355593	MnC	Millboro-Boro silty clays, 6 to 9 percent slopes		0.02			0.07				0.07	0.14		0.14				
Lyman	529.832	529.948	0.116	614	SD085	355563	BuA	Bullcreek clay, 0 to 6 percent slopes		0.01			0.11		0.10		0.11	0.12						0.00
Lyman	529.948	530.611	0.662	3,498	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.03			0.62		0.03		0.64	0.66					0.66	0.02
Lyman	530.611	530.721	0.111	584	SD085	355563	BuA	Bullcreek clay, 0 to 6 percent slopes		0.01			0.10		0.10		0.11	0.11						0.00
Lyman	530.721	530.752	0.031	163	SD085	355577	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.03			0.00				0.00	0.03		0.03				0.00
Lyman	530.752	531.321	0.569	3,004	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.02			0.53		0.02		0.55	0.57					0.57	0.02
Lyman	531.321	531.536	0.215	1,136	SD085	355590	MmA	Millboro silty clay, 0 to 3 percent slopes		0.01			0.20		0.01		0.21	0.22					0.22	0.01
Lyman	531.536	532.026	0.490	2,587	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.02			0.46		0.02		0.48	0.49					0.49	0.01
Lyman	532.026	532.419	0.393	2,073	SD085	355590	MmA	Millboro silty clay, 0 to 3 percent slopes		0.02			0.37		0.02		0.38	0.39					0.39	0.01
Lyman	532.419	532.556	0.137	726	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.01			0.13		0.01		0.13	0.14					0.14	0.00
Lyman	532.556	532.786	0.229	1,212	SD085	355593	MnC	Millboro-Boro silty clays, 6 to 9 percent slopes		0.03			0.12				0.12	0.23		0.23				
Lyman	532.786	532.965	0.179	946	SD085	355619	SbE	Sansarc-Opal clays, 9 to 40 percent slopes		0.17		0.17	0.08		0.01		0.08	0.17		0.17	0.01			0.00
Lyman	532.965	533.041	0.077	405	SD085	355563	BuA	Bullcreek clay, 0 to 6 percent slopes		0.01			0.07		0.07		0.07	0.08						0.00
Lyman	533.041	533.216	0.174	919	SD085	355619	SbE	Sansarc-Opal clays, 9 to 40 percent slopes		0.17		0.16	0.08		0.01		0.08	0.17		0.17	0.01			0.00
Lyman	533.216	533.443	0.228	1,203	SD085	355578	LbD	Lakoma-Okaton silty clays, 6 to 15 percent slopes		0.21			0.03				0.03	0.23		0.23				0.00
Lyman	533.443	533.681	0.238	1,255	SD085	355593	MnC	Millboro-Boro silty clays, 6 to 9 percent slopes		0.04			0.12				0.12	0.24		0.24				
Lyman	533.681	533.738	0.057	301	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.00			0.06		0.00		0.06	0.06					0.06	0.00
Lyman	533.738	533.863	0.125	659	SD085	355619	SbE	Sansarc-Opal clays, 9 to 40 percent slopes		0.12		0.12	0.06		0.00		0.06	0.12		0.12	0.00			0.00
Lyman	533.863	533.995	0.133	700	SD085	355578	LbD	Lakoma-Okaton silty clays, 6 to 15 percent slopes		0.12			0.02				0.02	0.13		0.13				0.00
Lyman	533.995	534.124	0.128	678	SD085	355593	MnC	Millboro-Boro silty clays, 6 to 9 percent slopes		0.02			0.07				0.07	0.13		0.13				
Lyman	534.124	534.283	0.159	841	SD085	355578	LbD	Lakoma-Okaton silty clays, 6 to 15 percent slopes		0.15			0.02				0.02	0.18		0.18				0.00
Lyman	534.283	534.651	0.368	1,941	SD085	355593	MnC	Millboro-Boro silty clays, 6 to 9 percent slopes		0.08			0.19				0.19	0.37		0.37				
Lyman	534.651	535.246	0.595	3,142	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.02			0.55		0.02		0.58	0.60					0.60	0.02
Lyman	535.246	535.500	0.254	1,343	SD085	355572	HrA	Capa silt loam, 0 to 6 percent slopes		0.01			0.04		0.23		0.25	0.25						0.00
Lyman	535.500	535.586	0.086	454	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.00			0.08		0.00		0.08	0.09					0.09	0.00
Lyman	535.586	535.774	0.188	992	SD085	355597	OhE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.18	0.01	0.19	0.01				0.01	0.18		0.19	0.01			
Lyman	535.774	535.821	0.047	250	SD085	355619	SbE	Sansarc-Opal clays, 9 to 40 percent slopes		0.05		0.04	0.02		0.00		0.02	0.06		0.06	0.00			0.00
Lyman	535.821	535.834	0.013	70	SD085	355597	OhE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.01	0.00	0.01	0.00				0.00	0.01		0.01	0.00			
Lyman	535.834	535.926	0.092	484	SD085	355619	SbE	Sansarc-Opal clays, 9 to 40 percent slopes		0.09		0.09	0.04		0.00		0.04	0.09		0.09	0.00			0.00
Lyman	535.926	536.025	0.099	521	SD085	355597	OhE	Okaton-Lakoma silty clays, 15 to 40 percent slopes		0.09	0.00	0.10	0.00				0.00	0.09		0.10	0.00			
Lyman	536.025	536.612	0.587	3,102	SD085	355619	SbE	Sansarc-Opal clays, 9 to 40 percent slopes		0.56		0.55	0.28		0.02		0.28	0.57		0.56	0.02			0.01
Lyman	536.612	536.668	0.055	293	SD085	355563	BuA	Bullcreek clay, 0 to 6 percent slopes		0.00			0.05		0.05		0.05	0.06						0.00
Lyman	536.668	536.749	0.081	428	SD085	355608	PoA	Promise clay, 0 to 3 percent slopes		0.00			0.08		0.00		0.08	0.08					0.08	0.00
Lyman	536.749	536.814	0.065	345	SD085	355570	Hm	Hilmoe silty clay			0.00		0.06				0.06	0.06					0.07	0.00
Lyman	536.814	536.845	0.031	165	SD085	355562	Bg	Bigbend silt loam			0.00		0.00				0.00	0.03	0.00				0.03	0.00
Lyman	536.845	536.875	0.030	156	SD085	355595	Mr	Munjor fine sandy loam			0.03		0.00				0.00	0.00	0.00				0.03	0.00
Lyman	536.875	536.918	0.043	229	SD085	355627	W	Water																
Tripp	536.918	536.971	0.053	281	SD123	354467	W	Water																

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Tripp	536.971	537.160	0.188	994	SD123	354417	Mu	Munjor fine sandy loam			0.18							0.01				0.19	0.00
Tripp	537.160	537.326	0.167	880	SD123	354394	Ha	Bigbend soils			0.01							0.15				0.17	0.00
Tripp	537.326	537.349	0.022	117	SD123	354430	PtA	Hilmoe clay, 0 to 2 percent slopes					0.02			0.02		0.02				0.02	0.00
Tripp	537.349	537.614	0.266	1,402	SD123	354424	OsE	Opal-Sansarc clays, 9 to 25 percent slopes		0.24		0.24	0.03			0.03		0.27		0.24			0.00
Tripp	537.614	537.759	0.145	764	SD123	354445	SAE	Sansarc-Opal association, 15 to 40 percent slopes		0.13	0.01	0.14	0.00			0.00		0.13		0.14	0.01		
Tripp	537.759	537.784	0.025	132	SD123	354459	WeE	Westover loam, 9 to 25 percent slopes		0.00	0.02	0.02	0.00			0.00		0.00		0.02	0.02		0.00
Tripp	537.784	537.925	0.141	745	SD123	354407	LwA	Lowry silt loam, 0 to 4 percent slopes		0.00					0.00	0.00		0.01				0.14	0.00
Tripp	537.925	538.019	0.094	496	SD123	354459	WeE	Westover loam, 9 to 25 percent slopes		0.00	0.09	0.09	0.00			0.00		0.01		0.09	0.09		0.00
Tripp	538.019	538.176	0.157	828	SD123	354433	RaB	Ree loam, 3 to 6 percent slopes		0.01			0.00		0.00	0.00		0.16		0.00		0.16	0.00
Tripp	538.176	538.211	0.035	186	SD123	354459	WeE	Westover loam, 9 to 25 percent slopes		0.00	0.03	0.03	0.00			0.00		0.00		0.03	0.03		0.00
Tripp	538.211	538.253	0.042	221	SD123	354433	RaB	Ree loam, 3 to 6 percent slopes		0.00			0.00		0.00	0.00		0.04		0.00		0.04	0.00
Tripp	538.253	538.429	0.176	929	SD123	354407	LwA	Lowry silt loam, 0 to 4 percent slopes		0.00					0.00	0.00		0.02				0.18	0.00
Tripp	538.429	538.767	0.339	1,789	SD123	354433	RaB	Ree loam, 3 to 6 percent slopes		0.02			0.01		0.01	0.01		0.34		0.01		0.34	0.01
Tripp	538.767	538.926	0.159	839	SD123	354459	WeE	Westover loam, 9 to 25 percent slopes		0.01	0.15	0.15	0.00			0.00		0.01		0.16	0.15		0.00
Tripp	538.926	538.965	0.039	207	SD123	354419	OBE	Okaton-Lakoma association, 15 to 40 percent slopes		0.04	0.00	0.04	0.00			0.00		0.04		0.04	0.00		0.00
Tripp	538.965	539.067	0.102	538	SD123	354445	SAE	Sansarc-Opal association, 15 to 40 percent slopes		0.09	0.01	0.10	0.00			0.00		0.09		0.10	0.01		
Tripp	539.067	539.184	0.117	616	SD123	354450	Sw	Bullcreek clay					0.12		0.10	0.12		0.12					0.00
Tripp	539.184	539.990	0.806	4,255	SD123	354445	SAE	Sansarc-Opal association, 15 to 40 percent slopes		0.73	0.06	0.77	0.02			0.02		0.75		0.78	0.08		
Tripp	539.990	540.226	0.236	1,247	SD123	354419	OBE	Okaton-Lakoma association, 15 to 40 percent slopes		0.21	0.00	0.21	0.01			0.01		0.23		0.23	0.00		0.00
Tripp	540.226	540.307	0.081	426	SD123	354447	ShE	Schamber-Murdo complex, 15 to 40 percent slopes		0.01	0.07	0.07						0.04		0.08	0.07		
Tripp	540.307	540.345	0.038	203	SD123	354459	WeE	Westover loam, 9 to 25 percent slopes		0.00	0.04	0.04	0.00			0.00		0.00		0.04	0.04		0.00
Tripp	540.345	541.045	0.700	3,694	SD123	354432	RaA	Ree loam, 0 to 3 percent slopes					0.02		0.02	0.02		0.70				0.70	0.06
Tripp	541.045	541.091	0.046	242	SD123	354459	WeE	Westover loam, 9 to 25 percent slopes		0.00	0.04	0.04	0.00			0.00		0.00		0.05	0.04		0.00
Tripp	541.091	541.630	0.540	2,849	SD123	354419	OBE	Okaton-Lakoma association, 15 to 40 percent slopes		0.49	0.01	0.49	0.02			0.02		0.53		0.53	0.01		0.01
Tripp	541.630	542.136	0.505	2,668	SD123	354445	SAE	Sansarc-Opal association, 15 to 40 percent slopes		0.45	0.04	0.49	0.02			0.02		0.47		0.49	0.04		
Tripp	542.136	542.188	0.052	276	SD123	354450	Sw	Bullcreek clay					0.05		0.05	0.05		0.05					0.00
Tripp	542.188	542.334	0.146	771	SD123	354445	SAE	Sansarc-Opal association, 15 to 40 percent slopes		0.13	0.01	0.14	0.00			0.00		0.14		0.14	0.01		
Tripp	542.334	542.397	0.063	331	SD123	354450	Sw	Bullcreek clay					0.06		0.06	0.06		0.06					0.00
Tripp	542.397	542.671	0.275	1,450	SD123	354445	SAE	Sansarc-Opal association, 15 to 40 percent slopes		0.25	0.02	0.26	0.01			0.01		0.26		0.27	0.02		
Tripp	542.671	542.970	0.299	1,579	SD123	354450	Sw	Bullcreek clay					0.30		0.27	0.30		0.30					0.00
Tripp	542.970	543.060	0.090	475	SD123	354423	OpC	Opal clay, 3 to 9 percent slopes		0.09			0.00		0.00	0.01		0.09		0.09			0.00
Tripp	543.060	543.197	0.137	721	SD123	354450	Sw	Bullcreek clay					0.14		0.12	0.14		0.14					0.00
Tripp	543.197	543.460	0.264	1,391	SD123	354445	SAE	Sansarc-Opal association, 15 to 40 percent slopes		0.24	0.02	0.25	0.01			0.01		0.25		0.26	0.02		
Tripp	543.460	543.916	0.455	2,404	SD123	354419	OBE	Okaton-Lakoma association, 15 to 40 percent slopes		0.41	0.01	0.41	0.02			0.02		0.45		0.45	0.01		0.00
Tripp	543.916	544.067	0.151	800	SD123	354434	RaC	Ree loam, 6 to 9 percent slopes		0.00	0.00		0.00		0.00	0.00		0.15		0.14	0.00	0.15	0.01
Tripp	544.067	544.211	0.144	759	SD123	354419	OBE	Okaton-Lakoma association, 15 to 40 percent slopes		0.13	0.00	0.13	0.01			0.01		0.14		0.14	0.00		0.00
Tripp	544.211	544.758	0.547	2,889	SD123	354406	LoD	Lakoma-Okaton silty clays, 9 to 15 percent slopes		0.47	0.02		0.03			0.03		0.53		0.52	0.02		0.01
Tripp	544.758	544.863	0.105	554	SD123	354434	RaC	Ree loam, 6 to 9 percent slopes		0.00	0.00		0.00		0.00	0.00		0.10		0.09	0.00	0.10	0.00
Tripp	544.863	544.923	0.060	317	SD123	354406	LoD	Lakoma-Okaton silty clays, 9 to 15 percent slopes		0.06	0.00		0.00			0.00		0.06		0.06	0.00		0.00
Tripp	544.923	545.100	0.177	935	SD123	354419	OBE	Okaton-Lakoma association, 15 to 40 percent slopes		0.16	0.00	0.16	0.01			0.01		0.17		0.18	0.00		0.00
Tripp	545.100	545.209	0.109	577	SD123	354406	LoD	Lakoma-Okaton silty clays, 9 to 15 percent slopes		0.09	0.00		0.01			0.01		0.10		0.10	0.00		0.00
Tripp	545.209	546.009	0.799	4,221	SD123	354419	OBE	Okaton-Lakoma association, 15 to 40 percent slopes		0.72	0.02	0.72	0.03			0.03		0.78		0.79	0.02		0.01
Tripp	546.009	546.049	0.040	214	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.02			0.02		0.00	0.02		0.04		0.04			0.00
Tripp	546.049	546.050	0.001	5	SD123	354419	OBE	Okaton-Lakoma association, 15 to 40 percent slopes		0.00	0.00	0.00	0.00			0.00		0.00		0.00	0.00		0.00
Tripp	546.050	546.619	0.569	3,007	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.29			0.22		0.01	0.23		0.67		0.61			0.01
Tripp	546.619	546.811	0.191	1,011	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.01	0.00		0.17		0.02	0.18		0.19			0.00	0.19	0.00
Tripp	546.811	546.961	0.150	793	SD123	354415	Mr	Mosher silt loam					0.14		0.14	0.14		0.15					0.00
Tripp	546.961	547.088	0.127	669	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.13		0.01	0.13		0.13				0.13	0.00
Tripp	547.088	547.204	0.116	611	SD123	354415	Mr	Mosher silt loam					0.11		0.11	0.11		0.12					0.00
Tripp	547.204	547.442	0.239	1,259	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.24		0.02	0.24		0.24				0.24	0.00
Tripp	547.442	547.540	0.098	516	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.00	0.00		0.09		0.01	0.09		0.10			0.00	0.10	0.00
Tripp	547.540	547.646	0.106	562	SD123	354372	BmC	Boro-Millboro silty clays, 5 to 9 percent slopes		0.01			0.04			0.04		0.11		0.09		0.11	0.00
Tripp	547.646	548.179	0.533	2,812	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.02	0.01		0.48		0.04	0.50		0.53			0.01	0.53	0.01
Tripp	548.179	548.271	0.092	486	SD123	354465	Wn	Witten silty clay					0.09		0.00	0.09		0.09				0.09	0.00
Tripp	548.271	548.400	0.129	682	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.00	0.00		0.12		0.01	0.12		0.13			0.00	0.13	0.00
Tripp	548.400	548.417	0.017	89	SD123	354372	BmC	Boro-Millboro silty clays, 5 to 9 percent slopes		0.00			0.01			0.01		0.02		0.01		0.02	0.00
Tripp	548.417	548.420	0.003	17	SD123	354433	RaB	Ree loam, 3 to 6 percent slopes		0.00			0.00		0.00	0.00		0.00		0.00		0.00	0.00
Tripp	548.420	548.598	0.177	937	SD123	354372	BmC	Boro-Millboro silty clays, 5 to 9 percent slopes		0.02			0.07			0.07		0.18		0.15		0.18	0.00
Tripp	548.598	548.634	0.036	189	SD123	354433	RaB	Ree loam, 3 to 6 percent slopes		0.00			0.00		0.00	0.00		0.04		0.00		0.04	0.00
Tripp	548.634	548.816	0.182	963	SD123	354437	ReB	Reliance silty clay loam, 3 to 6 percent slopes		0.00	0.01		0.01		0.00	0.01		0.18			0.01	0.18	0.01
Tripp	548.816	549.399	0.583	3,081	SD123	354438	ReC	Reliance silty clay loam, 6 to 9 percent slopes		0.01	0.01		0.02		0.01	0.03		0.58		0.56	0.01	0.58	0.01
Tripp	549.399	549.660	0.260	1,375	SD123	354437	ReB	Reliance silty clay loam, 3 to 6 percent slopes		0.01	0.01		0.01		0.01	0.02		0.25			0.01	0.26	0.01
Tripp	549.660	549.807	0.148	779	SD123	354421	On	Onita silt loam		0.00			0.00		0.00	0.00		0.16				0.15	0.00
Tripp	549.807	550.186	0.379	2,001	SD123	354437	ReB	Reliance silty clay loam, 3 to 6 percent slopes		0.01	0.01		0.02		0.01	0.03		0.37			0.01	0.38	0.02

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Tripp	550.186	550.288	0.102	538	SD123	354404	Ko	Kolls clay		0.00			0.01		0.01		0.01	0.10						0.09
Tripp	550.288	550.852	0.563	2,975	SD123	354437	ReB	Reliance silty clay loam, 3 to 6 percent slopes		0.01		0.02	0.03		0.01		0.04	0.55				0.02	0.56	0.03
Tripp	550.852	551.015	0.163	860	SD123	354414	MoC	Millboro silty clay, 6 to 9 percent slopes		0.01		0.00	0.14		0.00		0.14	0.16			0.15	0.00	0.16	
Tripp	551.015	551.076	0.062	325	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.00		0.00	0.06		0.00		0.06	0.06				0.00	0.06	0.00
Tripp	551.076	551.296	0.220	1,163	SD123	354379	Cc	Carter silty clay loam		0.01			0.21		0.19		0.22	0.22						0.00
Tripp	551.296	551.355	0.058	308	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.06		0.00		0.06	0.06					0.06	0.00
Tripp	551.355	551.512	0.157	829	SD123	354379	Cc	Carter silty clay loam		0.01			0.15		0.13		0.16	0.16						0.00
Tripp	551.512	551.602	0.090	477	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.00		0.00	0.08		0.01		0.08	0.09				0.00	0.09	0.00
Tripp	551.602	551.783	0.181	953	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.18		0.01		0.18	0.18					0.18	0.00
Tripp	551.783	551.962	0.180	948	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.01		0.00	0.16		0.01		0.17	0.18				0.00	0.18	0.00
Tripp	551.962	552.160	0.198	1,043	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.20		0.01		0.20	0.20					0.20	0.00
Tripp	552.160	552.404	0.245	1,291	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.01		0.00	0.22		0.02		0.23	0.24				0.00	0.24	0.00
Tripp	552.404	552.442	0.038	200	SD123	354465	Wn	Witten silty clay					0.04		0.00		0.04	0.04					0.04	0.00
Tripp	552.442	552.573	0.131	692	SD123	354372	BmC	Boro-Millboro silty clays, 5 to 9 percent slopes		0.02			0.08				0.08	0.13			0.11		0.13	0.00
Tripp	552.573	552.629	0.056	296	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.00		0.00	0.05		0.00		0.05	0.06				0.00	0.06	0.00
Tripp	552.629	553.029	0.399	2,109	SD123	354372	BmC	Boro-Millboro silty clays, 5 to 9 percent slopes		0.05			0.17				0.17	0.40			0.35		0.40	0.01
Tripp	553.029	553.107	0.078	412	SD123	354379	Cc	Carter silty clay loam		0.00			0.07		0.07		0.08	0.08						0.00
Tripp	553.107	554.369	1.262	6,665	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.04		0.01	1.14		0.10		1.17	1.25				0.01	1.26	0.01
Tripp	554.369	554.588	0.219	1,156	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.11			0.09		0.00		0.09	0.22			0.19			0.00
Tripp	554.588	554.649	0.061	323	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.00		0.00	0.06		0.00		0.06	0.06				0.00	0.06	0.00
Tripp	554.649	554.800	0.151	795	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.08			0.06		0.00		0.06	0.15			0.13			0.00
Tripp	554.800	554.934	0.134	710	SD123	354378	CbD	Canning-Murdo loams, 6 to 15 percent slopes				0.12						0.13			0.12	0.12		
Tripp	554.934	555.024	0.090	474	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.05			0.04		0.00		0.04	0.09			0.08			0.00
Tripp	555.024	555.042	0.018	95	SD123	354378	CbD	Canning-Murdo loams, 6 to 15 percent slopes				0.02						0.02			0.02	0.02		
Tripp	555.042	555.191	0.149	786	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.08			0.06		0.00		0.06	0.16			0.13			0.00
Tripp	555.191	555.320	0.130	685	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.00		0.00	0.12		0.01		0.12	0.13				0.00	0.13	0.00
Tripp	555.320	555.487	0.166	879	SD123	354465	Wn	Witten silty clay					0.16		0.01		0.16	0.17					0.17	0.00
Tripp	555.487	556.311	0.825	4,354	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.02		0.01	0.74		0.07		0.77	0.82				0.01	0.82	0.01
Tripp	556.311	556.659	0.348	1,838	SD123	354465	Wn	Witten silty clay					0.34		0.02		0.34	0.35					0.35	0.01
Tripp	556.659	556.985	0.326	1,721	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.32		0.02		0.32	0.33					0.33	0.01
Tripp	556.985	557.033	0.048	254	SD123	354465	Wn	Witten silty clay					0.05		0.00		0.05	0.05					0.05	0.00
Tripp	557.033	557.142	0.109	575	SD123	354391	Er	Erd clay					0.11		0.00	0.00	0.11	0.11						0.00
Tripp	557.142	557.348	0.206	1,088	SD123	354392	Es	Erd-Capa complex					0.15		0.06		0.20	0.20						0.00
Tripp	557.348	557.662	0.314	1,657	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.01		0.00	0.28		0.03		0.29	0.31				0.00	0.31	0.00
Tripp	557.662	557.721	0.058	309	SD123	354379	Cc	Carter silty clay loam		0.00			0.05		0.05		0.08	0.08						0.00
Tripp	557.721	557.875	0.154	814	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.00		0.00	0.14		0.01		0.14	0.15				0.00	0.15	0.00
Tripp	557.875	558.003	0.128	678	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.07			0.05		0.00		0.05	0.13			0.11			0.00
Tripp	558.003	558.300	0.297	1,570	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.29		0.02		0.29	0.30					0.30	0.01
Tripp	558.300	558.367	0.066	350	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.00		0.00	0.06		0.01		0.06	0.07				0.00	0.07	0.00
Tripp	558.367	558.460	0.093	492	SD123	354465	Wn	Witten silty clay					0.09		0.00		0.09	0.09					0.09	0.00
Tripp	558.460	558.649	0.189	996	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.19		0.01		0.19	0.19					0.19	0.00
Tripp	558.649	558.716	0.068	357	SD123	354465	Wn	Witten silty clay					0.07		0.00		0.07	0.07					0.07	0.00
Tripp	558.716	559.080	0.364	1,922	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.36		0.03		0.36	0.36					0.36	0.01
Tripp	559.080	559.229	0.148	784	SD123	354465	Wn	Witten silty clay					0.15		0.01		0.15	0.15					0.15	0.00
Tripp	559.229	560.120	0.891	4,704	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.88		0.06		0.88	0.89					0.89	0.02
Tripp	560.120	560.250	0.131	689	SD123	354392	Es	Erd-Capa complex					0.10		0.04		0.13	0.13						0.00
Tripp	560.250	560.341	0.091	481	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.09		0.01		0.09	0.09					0.09	0.00
Tripp	560.341	560.441	0.099	525	SD123	354392	Es	Erd-Capa complex					0.07		0.03		0.10	0.10						0.00
Tripp	560.441	560.938	0.497	2,627	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.49		0.03		0.49	0.50					0.50	0.01
Tripp	560.938	561.033	0.094	498	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.00		0.00	0.08		0.01		0.09	0.09				0.00	0.09	0.00
Tripp	561.033	561.213	0.180	950	SD123	354414	MoC	Millboro silty clay, 6 to 9 percent slopes		0.01		0.00	0.15		0.00		0.15	0.18			0.17	0.00	0.18	
Tripp	561.213	561.424	0.211	1,115	SD123	354406	LoD	Lakoma-Okaton silty clays, 9 to 15 percent slopes		0.18		0.01	0.01				0.01	0.20			0.20	0.01		0.00
Tripp	561.424	561.628	0.205	1,080	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.10			0.08		0.00		0.08	0.20			0.18			0.00
Tripp	561.628	561.970	0.342	1,804	SD123	354414	MoC	Millboro silty clay, 6 to 9 percent slopes		0.02		0.01	0.29		0.01		0.29	0.33			0.31	0.01	0.34	
Tripp	561.970	562.041	0.071	375	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.04			0.03		0.00		0.03	0.07			0.06			0.00
Tripp	562.041	562.503	0.462	2,442	SD123	354414	MoC	Millboro silty clay, 6 to 9 percent slopes		0.03		0.01	0.39		0.01		0.40	0.45			0.43	0.01	0.48	
Tripp	562.503	562.624	0.121	637	SD123	354465	Wn	Witten silty clay					0.12		0.01		0.12	0.12					0.12	0.00
Tripp	562.624	562.833	0.209	1,103	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.01		0.00	0.19		0.02		0.19	0.21				0.00	0.21	0.00
Tripp	562.833	563.021	0.188	995	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.19		0.01		0.19	0.19					0.19	0.00
Tripp	563.021	563.105	0.084	443	SD123	354465	Wn	Witten silty clay					0.08		0.00		0.08	0.08					0.08	0.00
Tripp	563.105	563.260	0.155	818	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.15		0.01		0.15	0.15					0.15	0.00
Tripp	563.260	563.483	0.223	1,176	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.11			0.09		0.00		0.09	0.22			0.20			0.00
Tripp	563.483	563.537	0.054	286	SD123	354467	W	Water																
Tripp	563.537	563.649	0.112	592	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.08			0.04		0.00		0.04	0.11			0.10			0.00

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Tripp	563.649	563.778	0.129	682	SD123	354406	LoD	Lakoma-Okaton silty clays, 9 to 15 percent slopes		0.11	0.01		0.01				0.01	0.12		0.12	0.01		0.00
Tripp	563.778	563.879	0.101	531	SD123	354378	CbD	Canning-Murdo loams, 6 to 15 percent slopes			0.09							0.09		0.09	0.09		
Tripp	563.879	563.954	0.075	395	SD123	354377	CaB	Canning loam, 2 to 5 percent slopes			0.07							0.07			0.07	0.07	0.00
Tripp	563.954	563.962	0.008	44	SD123	354378	CbD	Canning-Murdo loams, 6 to 15 percent slopes			0.01							0.01		0.01	0.01		
Tripp	563.962	563.983	0.021	110	SD123	354377	CaB	Canning loam, 2 to 5 percent slopes			0.02							0.02			0.02	0.02	0.00
Tripp	563.983	564.051	0.068	361	SD123	354378	CbD	Canning-Murdo loams, 6 to 15 percent slopes			0.06							0.06		0.06	0.06		
Tripp	564.051	564.303	0.252	1,328	SD123	354406	LoD	Lakoma-Okaton silty clays, 9 to 15 percent slopes		0.21	0.01		0.02				0.02	0.24		0.24	0.01		0.00
Tripp	564.303	564.535	0.232	1,224	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.12			0.09		0.00		0.09	0.23		0.21			0.00
Tripp	564.535	564.567	0.033	172	SD123	354406	LoD	Lakoma-Okaton silty clays, 9 to 15 percent slopes		0.03	0.00		0.00				0.00	0.03		0.03	0.00		0.00
Tripp	564.567	564.619	0.051	271	SD123	354378	CbD	Canning-Murdo loams, 6 to 15 percent slopes			0.04							0.05		0.04	0.04		
Tripp	564.619	564.759	0.140	741	SD123	354406	LoD	Lakoma-Okaton silty clays, 9 to 15 percent slopes		0.12	0.01		0.01				0.01	0.13		0.13	0.01		0.00
Tripp	564.759	564.858	0.099	520	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.05			0.04		0.00		0.04	0.10		0.09			0.00
Tripp	564.858	565.049	0.191	1,009	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.01	0.00		0.17		0.02		0.18	0.19			0.00	0.19	0.00
Tripp	565.049	565.299	0.250	1,322	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.13			0.10		0.00		0.10	0.25		0.22			0.01
Tripp	565.299	565.395	0.096	506	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.00	0.00		0.09		0.01		0.09	0.09			0.00	0.10	0.00
Tripp	565.395	565.452	0.058	305	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.06		0.00		0.06	0.06				0.06	0.00
Tripp	565.452	565.554	0.101	533	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.00	0.00		0.09		0.01		0.09	0.10			0.00	0.10	0.00
Tripp	565.554	565.623	0.070	368	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.04			0.03		0.00		0.03	0.07		0.06			0.00
Tripp	565.623	565.721	0.098	517	SD123	354400	Ic	Inavale complex, channeled			0.08							0.01	0.08				0.00
Tripp	565.721	566.083	0.362	1,913	SD123	354375	Bp	Bridgeport complex			0.01		0.10		0.05	0.00	0.10	0.35				0.38	
Tripp	566.083	566.108	0.025	132	SD123	354370	AvA	Anselmo-Vetal fine sandy loams, 0 to 3 percent slopes		0.00	0.02		0.00		0.00	0.00	0.00	0.00				0.03	0.00
Tripp	566.108	566.245	0.136	720	SD123	354375	Bp	Bridgeport complex			0.00		0.04		0.02	0.00	0.04	0.13				0.14	
Tripp	566.245	566.534	0.289	1,526	SD123	354370	AvA	Anselmo-Vetal fine sandy loams, 0 to 3 percent slopes		0.01	0.19		0.01		0.01	0.01	0.01	0.01				0.29	0.01
Tripp	566.534	566.659	0.126	663	SD123	354375	Bp	Bridgeport complex			0.00		0.04		0.02	0.00	0.04	0.12				0.13	
Tripp	566.659	566.965	0.305	1,612	SD123	354465	Wn	Witten silty clay					0.30		0.02		0.30	0.31				0.31	0.01
Tripp	566.965	567.171	0.206	1,089	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.20		0.01		0.20	0.21				0.21	0.00
Tripp	567.171	567.255	0.084	445	SD123	354465	Wn	Witten silty clay					0.08		0.00		0.08	0.08				0.08	0.00
Tripp	567.255	567.418	0.163	859	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.16		0.01		0.16	0.16				0.16	0.00
Tripp	567.418	567.689	0.271	1,433	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.01	0.00		0.24		0.02		0.25	0.27			0.00	0.27	0.00
Tripp	567.689	567.847	0.157	831	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					0.16		0.01		0.16	0.16				0.16	0.00
Tripp	567.847	567.860	0.013	68	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.00	0.00		0.01		0.00		0.01	0.01			0.00	0.01	0.00
Tripp	567.860	567.930	0.071	372	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.04			0.03		0.00		0.03	0.07		0.06			0.00
Tripp	567.930	568.619	0.689	3,639	SD123	354406	LoD	Lakoma-Okaton silty clays, 9 to 15 percent slopes		0.59	0.03		0.04				0.04	0.66		0.65	0.03		0.01
Tripp	568.619	568.894	0.274	1,448	SD123	354434	RaC	Ree loam, 6 to 9 percent slopes		0.01	0.01		0.01		0.01		0.01	0.27		0.25	0.01	0.27	0.01
Tripp	568.894	568.913	0.020	104	SD123	354414	MoC	Millboro silty clay, 6 to 9 percent slopes		0.00	0.00		0.02		0.00		0.02	0.02		0.02	0.00	0.02	
Tripp	568.913	569.279	0.365	1,929	SD123	354434	RaC	Ree loam, 6 to 9 percent slopes		0.01	0.01		0.01		0.01		0.01	0.37		0.33	0.01	0.37	0.01
Tripp	569.279	569.361	0.082	433	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.04			0.03		0.00		0.03	0.08		0.07			0.00
Tripp	569.361	569.546	0.185	975	SD123	354434	RaC	Ree loam, 6 to 9 percent slopes		0.01	0.01		0.01		0.01		0.01	0.18		0.17	0.01	0.18	0.01
Tripp	569.546	569.647	0.101	534	SD123	354435	RaD	Ree loam, 9 to 15 percent slopes		0.01	0.01	0.01						0.09		0.10	0.01		0.00
Tripp	569.647	569.801	0.154	815	SD123	354434	RaC	Ree loam, 6 to 9 percent slopes		0.00	0.00		0.00		0.00		0.00	0.15		0.14	0.00	0.15	0.01
Tripp	569.801	569.944	0.143	753	SD123	354428	PrC	Promise clay, 6 to 9 percent slopes		0.00			0.13		0.00		0.14	0.14		0.14			0.00
Tripp	569.944	570.016	0.073	384	SD123	354414	MoC	Millboro silty clay, 6 to 9 percent slopes		0.00	0.00		0.06		0.00		0.06	0.07		0.07	0.00	0.07	
Tripp	570.016	570.101	0.084	446	SD123	354369	AtD	Anselmo-Longpine fine sandy loams, 10 to 20 percent slopes	0.00	0.03	0.07	0.00							0.01	0.07	0.02		
Tripp	570.101	570.518	0.418	2,205	SD123	354434	RaC	Ree loam, 6 to 9 percent slopes		0.01	0.01		0.01		0.01		0.01	0.42		0.38	0.01	0.42	0.02
Tripp	570.518	570.641	0.123	647	SD123	354409	MaB	Manter fine sandy loam, 3 to 9 percent slopes		0.01	0.12							0.00	0.00		0.00	0.12	0.00
Tripp	570.641	570.732	0.092	483	SD123	354408	MaA	Manter fine sandy loam, 0 to 3 percent slopes			0.09							0.00			0.00	0.09	0.00
Tripp	570.732	570.882	0.150	792	SD123	354409	MaB	Manter fine sandy loam, 3 to 9 percent slopes		0.01	0.14							0.00	0.00		0.00	0.15	0.00
Tripp	570.882	571.093	0.211	1,112	SD123	354365	AbB	Anselmo fine sandy loam, 3 to 6 percent slopes		0.01	0.21								0.01			0.21	0.00
Tripp	571.093	571.197	0.104	548	SD123	354370	AvA	Anselmo-Vetal fine sandy loams, 0 to 3 percent slopes		0.01	0.07		0.00		0.00	0.00	0.00	0.00				0.10	0.00
Tripp	571.197	571.326	0.129	680	SD123	354385	OgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.12		0.00		0.00	0.00	0.00	0.00	0.12		0.00		
Tripp	571.326	571.329	0.003	16	SD123	354388	DuC	Dunday-Doger loamy fine sands, 3 to 9 percent slopes			0.00								0.00				0.00
Tripp	571.329	571.390	0.062	325	SD123	354385	OgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.06		0.00		0.00	0.00	0.00	0.00	0.06		0.00		
Tripp	571.390	571.439	0.049	259	SD123	354388	DuC	Dunday-Doger loamy fine sands, 3 to 9 percent slopes			0.05								0.05				0.00
Tripp	571.439	571.609	0.170	895	SD123	354364	AaB2	Anselmo loamy fine sand, 0 to 9 percent slopes, eroded			0.15								0.15				0.00
Tripp	571.609	572.182	0.573	3,025	SD123	354454	VdC	Valentine-Dunday complex, 3 to 9 percent slopes	0.01	0.02	0.56								0.64		0.02		0.01
Tripp	572.182	572.241	0.060	316	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.00	0.03			0.00	0.00	0.00	0.00	0.00	0.03				0.00
Tripp	572.241	572.354	0.113	596	SD123	354454	VdC	Valentine-Dunday complex, 3 to 9 percent slopes	0.00	0.00	0.11								0.11		0.00		0.00
Tripp	572.354	572.542	0.187	989	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.00	0.10			0.00	0.00	0.00	0.00	0.01	0.10				0.01
Tripp	572.542	572.657	0.116	613	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		0.06			0.05		0.00		0.05	0.12		0.10			0.00
Tripp	572.657	573.083	0.426	2,248	SD123	354462	WgB	Wewela fine sandy loam, 3 to 6 percent slopes		0.38	0.02		0.00		0.00	0.00	0.00	0.39			0.00		0.00
Tripp	573.083	573.238	0.155	820	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.15								0.15		0.00		0.00
Tripp	573.238	573.837	0.599	3,161	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.01	0.32			0.01	0.01	0.01	0.01	0.02	0.32				0.02
Tripp	573.837	573.935	0.098	518	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.10								0.10		0.00		0.00
Tripp	573.935	574.070	0.135	713	SD123	354389	Em	Elsmere fine sandy loam			0.01			0.01	0.01	0.01	0.01	0.01	0.01			0.13	0.01

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Tripp	574.070	574.175	0.105	555	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.10								0.10		0.00		0.00
Tripp	574.175	574.244	0.069	365	SD123	354454	VdC	Valentine-Dunday complex, 3 to 9 percent slopes	0.00	0.00	0.07								0.07		0.00		0.00
Tripp	574.244	574.315	0.071	374	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.00	0.04			0.00	0.00	0.00	0.00	0.00	0.04				0.00
Tripp	574.315	574.387	0.071	376	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.07								0.07		0.00		0.00
Tripp	574.387	574.547	0.160	847	SD123	354389	Em	Elsmere fine sandy loam			0.01			0.01	0.01	0.01	0.01	0.01	0.01			0.16	0.01
Tripp	574.547	574.613	0.066	349	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.06								0.06		0.00		0.00
Tripp	574.613	574.686	0.073	383	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.00	0.04			0.00	0.00	0.00	0.00	0.00	0.04				0.00
Tripp	574.686	575.191	0.505	2,668	SD123	354455	VnD	Valentine-Longpine complex, 6 to 15 percent slopes	0.01	0.11	0.50								0.39		0.11		
Tripp	575.191	575.195	0.004	22	SD123	354454	VdC	Valentine-Dunday complex, 3 to 9 percent slopes	0.00	0.00	0.00								0.00		0.00		0.00
Tripp	575.195	575.748	0.553	2,921	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.01	0.01	0.54								0.54		0.01		0.01
Tripp	575.748	575.953	0.205	1,080	SD123	354441	RoB	Ronson-Longpine fine sandy loams, 0 to 6 percent slopes		0.16	0.10		0.00		0.00	0.00	0.00	0.00	0.01		0.07		0.00
Tripp	575.953	576.110	0.157	829	SD123	354455	VnD	Valentine-Longpine complex, 6 to 15 percent slopes	0.00	0.03	0.15								0.12		0.03		
Tripp	576.110	576.224	0.114	600	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.11								0.11		0.00		0.00
Tripp	576.224	576.406	0.182	962	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.00	0.10			0.00	0.00	0.00	0.00	0.01	0.10				0.01
Tripp	576.406	576.444	0.038	201	SD123	354389	Em	Elsmere fine sandy loam			0.00			0.00	0.00	0.00	0.00	0.00	0.00			0.04	0.00
Tripp	576.444	576.542	0.098	519	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.00	0.05			0.00	0.00	0.00	0.00	0.00	0.05				0.00
Tripp	576.542	576.619	0.077	406	SD123	354389	Em	Elsmere fine sandy loam			0.00			0.00	0.00	0.00	0.00	0.00	0.00			0.08	0.00
Tripp	576.619	576.778	0.159	837	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.00	0.08			0.00	0.00	0.00	0.00	0.00	0.08				0.00
Tripp	576.778	576.882	0.104	549	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.10								0.10		0.00		0.00
Tripp	576.882	577.017	0.135	712	SD123	354440	RfA	Ronson fine sandy loam, 0 to 4 percent slopes		0.12	0.01		0.00		0.00	0.00	0.00	0.00	0.00				
Tripp	577.017	577.194	0.177	937	SD123	354368	AhC	Anselmo-Holt fine sandy loams, 3 to 9 percent slopes		0.08	0.17										0.01	0.18	0.00
Tripp	577.194	577.287	0.092	488	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.09		0.00		0.00	0.00	0.00	0.00	0.09		0.00		
Tripp	577.287	577.375	0.089	469	SD123	354365	AbB	Anselmo fine sandy loam, 3 to 6 percent slopes		0.00	0.09								0.00			0.09	0.00
Tripp	577.375	577.592	0.217	1,146	SD123	354389	Em	Elsmere fine sandy loam			0.01			0.01	0.01	0.01	0.01	0.01	0.01			0.22	0.01
Tripp	577.592	577.634	0.041	218	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.04		0.00		0.00	0.00	0.00	0.00	0.04		0.00		
Tripp	577.634	577.874	0.240	1,267	SD123	354368	AhC	Anselmo-Holt fine sandy loams, 3 to 9 percent slopes		0.11	0.23										0.01	0.24	0.00
Tripp	577.874	577.917	0.043	228	SD123	354456	Vt	Vetal fine sandy loam			0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.04	0.00
Tripp	577.917	578.044	0.127	673	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.12		0.00		0.00	0.00	0.00	0.00	0.12		0.00		
Tripp	578.044	578.114	0.070	367	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.07								0.07		0.00		0.00
Tripp	578.114	578.366	0.253	1,335	SD123	354368	AhC	Anselmo-Holt fine sandy loams, 3 to 9 percent slopes		0.11	0.24										0.01	0.25	0.00
Tripp	578.366	578.417	0.050	265	SD123	354395	HbA	Holt-Anselmo fine sandy loams, 0 to 3 percent slopes		0.03	0.05										0.00		0.00
Tripp	578.417	578.791	0.375	1,979	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.36								0.36		0.00		0.00
Tripp	578.791	578.884	0.093	489	SD123	354463	Wh	Whitelake fine sandy loam			0.01		0.00	0.08	0.08	0.08	0.08	0.08	0.00				0.00
Tripp	578.884	579.007	0.122	646	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.12		0.00		0.00	0.00	0.00	0.00	0.11		0.00		
Tripp	579.007	579.189	0.182	963	SD123	354463	Wh	Whitelake fine sandy loam			0.01		0.00	0.16	0.17	0.17	0.17	0.17	0.01				0.00
Tripp	579.189	579.335	0.146	768	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.14		0.00		0.00	0.00	0.00	0.00	0.13		0.00		
Tripp	579.335	579.403	0.069	364	SD123	354464	Wk	Whitelake-Lute fine sandy loams			0.01		0.02	0.03	0.06	0.06	0.06	0.06	0.01				0.00
Tripp	579.403	579.776	0.372	1,964	SD123	354395	HbA	Holt-Anselmo fine sandy loams, 0 to 3 percent slopes		0.24	0.35										0.01		0.00
Tripp	579.776	579.993	0.217	1,146	SD123	354462	WgB	Wewela fine sandy loam, 3 to 6 percent slopes		0.20	0.01		0.00		0.00	0.00	0.00	0.20			0.00		0.00
Tripp	579.993	580.051	0.058	307	SD123	354370	AvA	Anselmo-Vetal fine sandy loams, 0 to 3 percent slopes		0.00	0.04		0.00		0.00	0.00	0.00	0.00				0.06	0.00
Tripp	580.051	580.294	0.243	1,284	SD123	354462	WgB	Wewela fine sandy loam, 3 to 6 percent slopes		0.22	0.01		0.00		0.00	0.00	0.00	0.22			0.00		0.00
Tripp	580.294	580.447	0.153	808	SD123	354461	WgA	Wewela fine sandy loam, 0 to 3 percent slopes		0.13	0.01		0.00	0.00	0.01	0.01	0.01	0.14					0.00
Tripp	580.447	580.479	0.032	166	SD123	354462	WgB	Wewela fine sandy loam, 3 to 6 percent slopes		0.03	0.00		0.00		0.00	0.00	0.00	0.03			0.00		0.00
Tripp	580.479	580.531	0.053	277	SD123	354452	TrF	Longpine-Rock outcrop complex, 15 to 40 percent slopes	0.02	0.04	0.03	0.05							0.00	0.05	0.04		
Tripp	580.531	580.642	0.111	586	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.11		0.00		0.00	0.00	0.00	0.00	0.10		0.00		
Tripp	580.642	580.828	0.186	983	SD123	354463	Wh	Whitelake fine sandy loam			0.01		0.00	0.17	0.17	0.17	0.17	0.17	0.01				0.00
Tripp	580.828	580.972	0.144	759	SD123	354464	Wk	Whitelake-Lute fine sandy loams			0.03		0.04	0.07	0.12	0.12	0.12	0.12	0.01				0.00
Tripp	580.972	581.009	0.037	194	SD123	354463	Wh	Whitelake fine sandy loam			0.00		0.00	0.03	0.03	0.03	0.03	0.03	0.00				0.00
Tripp	581.009	581.035	0.026	139	SD123	354464	Wk	Whitelake-Lute fine sandy loams			0.01		0.01	0.01	0.02	0.02	0.02	0.02	0.00				0.00
Tripp	581.035	581.237	0.202	1,067	SD123	354463	Wh	Whitelake fine sandy loam			0.01		0.00	0.18	0.18	0.18	0.18	0.18	0.01				0.00
Tripp	581.237	581.330	0.093	491	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.09		0.00		0.00	0.00	0.00	0.00	0.09		0.00		
Tripp	581.330	581.476	0.145	768	SD123	354388	DuC	Dunday-Doger loamy fine sands, 3 to 9 percent slopes			0.14								0.14				0.00
Tripp	581.476	581.853	0.378	1,994	SD123	354455	VnD	Valentine-Longpine complex, 6 to 15 percent slopes	0.01	0.08	0.37								0.29		0.08		
Tripp	581.853	581.938	0.084	446	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.08		0.00		0.00	0.00	0.00	0.00	0.08		0.00		
Tripp	581.938	581.982	0.045	236	SD123	354455	VnD	Valentine-Longpine complex, 6 to 15 percent slopes	0.00	0.01	0.04								0.03		0.01		
Tripp	581.982	582.097	0.114	602	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.11		0.00		0.00	0.00	0.00	0.00	0.10		0.00		
Tripp	582.097	582.215	0.119	627	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.12								0.12		0.00		0.00
Tripp	582.215	582.267	0.052	272	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.00	0.03			0.00	0.00	0.00	0.00	0.00	0.03				0.00
Tripp	582.267	582.389	0.122	645	SD123	354455	VnD	Valentine-Longpine complex, 6 to 15 percent slopes	0.00	0.03	0.12								0.10		0.03		
Tripp	582.389	582.600	0.211	1,113	SD123	354454	VdC	Valentine-Dunday complex, 3 to 9 percent slopes	0.00	0.01	0.21								0.20		0.01		0.00
Tripp	582.600	582.644	0.044	234	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.04								0.04		0.00		0.00
Tripp	582.644	582.681	0.037	196	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.00	0.02			0.00	0.00	0.00	0.00	0.00	0.02				0.00
Tripp	582.681	582.764	0.083	438	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.08								0.08		0.00		0.00
Tripp	582.764	582.852	0.088	464	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.00	0.05			0.00	0.00	0.00	0.00	0.00	0.05				0.00

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Tripp	582.852	582.960	0.108	570	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.10								0.10			0.00		0.00
Tripp	582.960	583.013	0.054	283	SD123	354454	VdC	Valentine-Dunday complex, 3 to 9 percent slopes	0.00	0.00	0.05								0.05			0.00		0.00
Tripp	583.013	583.032	0.019	98	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.02		0.00		0.00	0.00	0.00	0.00	0.02			0.00		
Tripp	583.032	583.108	0.076	399	SD123	354454	VdC	Valentine-Dunday complex, 3 to 9 percent slopes	0.00	0.00	0.07								0.07			0.00		0.00
Tripp	583.108	583.281	0.173	914	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.16		0.00		0.00	0.00	0.00	0.00	0.16			0.00		
Tripp	583.281	583.357	0.077	404	SD123	354454	VdC	Valentine-Dunday complex, 3 to 9 percent slopes	0.00	0.00	0.07								0.07			0.00		0.00
Tripp	583.357	583.564	0.207	1,093	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.20								0.20			0.00		0.00
Tripp	583.564	583.646	0.082	431	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.00	0.04			0.00	0.00	0.00	0.00	0.00	0.04					0.00
Tripp	583.646	583.850	0.204	1,079	SD123	354388	DuC	Dunday-Doger loamy fine sands, 3 to 9 percent slopes			0.19								0.19					0.00
Tripp	583.850	583.894	0.044	232	SD123	354440	RfA	Ronson fine sandy loam, 0 to 4 percent slopes		0.04	0.00		0.00		0.00	0.00	0.00	0.00	0.00			0.00		
Tripp	583.894	583.898	0.003	18	SD123	354388	DuC	Dunday-Doger loamy fine sands, 3 to 9 percent slopes			0.00								0.00					0.00
Tripp	583.898	584.292	0.394	2,080	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.37		0.00		0.00	0.00	0.00	0.00	0.36			0.00		
Tripp	584.292	584.411	0.119	630	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.00	0.06			0.00	0.00	0.00	0.00	0.00	0.06					0.00
Tripp	584.411	584.675	0.264	1,396	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.26								0.26			0.00		0.00
Tripp	584.675	584.854	0.178	942	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.17		0.00		0.00	0.00	0.00	0.00	0.16			0.00		
Tripp	584.854	584.942	0.089	469	SD123	354395	HbA	Holt-Anselmo fine sandy loams, 0 to 3 percent slopes		0.06	0.08											0.00		0.00
Tripp	584.942	585.017	0.074	392	SD123	354388	DuC	Dunday-Doger loamy fine sands, 3 to 9 percent slopes			0.07								0.07					0.00
Tripp	585.017	585.305	0.289	1,524	SD123	354462	WgB	Wewela fine sandy loam, 3 to 6 percent slopes		0.26	0.01		0.00		0.00	0.00	0.26					0.00		0.00
Tripp	585.305	585.308	0.002	13	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.00		0.00		0.00	0.00	0.00	0.00	0.00			0.00		
Tripp	585.308	585.409	0.101	535	SD123	354368	AhC	Anselmo-Holt fine sandy loams, 3 to 9 percent slopes		0.05	0.10											0.01	0.10	0.00
Tripp	585.409	585.410	0.002	8	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.00		0.00		0.00	0.00	0.00	0.00	0.00			0.00		
Tripp	585.410	585.543	0.133	700	SD123	354368	AhC	Anselmo-Holt fine sandy loams, 3 to 9 percent slopes		0.06	0.13											0.01	0.13	0.00
Tripp	585.543	585.646	0.103	545	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.10		0.00		0.00	0.00	0.00	0.00	0.09			0.00		
Tripp	585.646	585.715	0.069	365	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.00	0.04			0.00	0.00	0.00	0.00	0.00	0.04					0.00
Tripp	585.715	585.853	0.137	725	SD123	354388	DuC	Dunday-Doger loamy fine sands, 3 to 9 percent slopes			0.13								0.13					0.00
Tripp	585.853	585.937	0.084	445	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.08								0.08			0.00		0.00
Tripp	585.937	586.175	0.239	1,260	SD123	354388	DuC	Dunday-Doger loamy fine sands, 3 to 9 percent slopes			0.23								0.23					0.00
Tripp	586.175	586.380	0.205	1,080	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.19		0.00		0.00	0.00	0.00	0.00	0.19			0.00		
Tripp	586.380	586.633	0.253	1,337	SD123	354388	DuC	Dunday-Doger loamy fine sands, 3 to 9 percent slopes			0.24								0.24					0.00
Tripp	586.633	587.126	0.492	2,600	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.47		0.00		0.00	0.00	0.00	0.00	0.45			0.00		
Tripp	587.126	587.618	0.492	2,599	SD123	354368	AhC	Anselmo-Holt fine sandy loams, 3 to 9 percent slopes		0.22	0.47											0.02	0.49	0.00
Tripp	587.618	587.717	0.099	524	SD123	354395	HbA	Holt-Anselmo fine sandy loams, 0 to 3 percent slopes		0.06	0.09											0.00		0.00
Tripp	587.717	588.197	0.480	2,534	SD123	354368	AhC	Anselmo-Holt fine sandy loams, 3 to 9 percent slopes		0.22	0.46											0.02	0.48	0.00
Tripp	588.197	588.215	0.018	95	SD123	354385	DgB	Doger loamy fine sand, 0 to 6 percent slopes	0.00	0.00	0.02		0.00		0.00	0.00	0.00	0.00	0.02			0.00		
Tripp	588.215	588.331	0.115	609	SD123	354386	DmA	Doger-Elsmere complex, 0 to 3 percent slopes		0.00	0.06			0.00	0.00	0.00	0.00	0.00	0.06					0.00
Tripp	588.331	588.418	0.087	460	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.00	0.00	0.08								0.08			0.00		0.00
Tripp	588.418	588.626	0.208	1,100	SD123	354441	RoB	Ronson-Longpine fine sandy loams, 0 to 6 percent slopes		0.17	0.10		0.00		0.00	0.00	0.00	0.00	0.01			0.07		0.00
Tripp	588.626	588.750	0.124	655	SD123	354440	RfA	Ronson fine sandy loam, 0 to 4 percent slopes		0.11	0.01		0.00		0.00	0.00	0.00	0.00	0.00			0.00		
Tripp	588.750	588.789	0.039	207	SD123	354369	AtD	Anselmo-Longpine fine sandy loams, 10 to 20 percent slopes	0.00	0.01	0.03	0.00							0.00	0.03		0.01		
Tripp	588.789	589.051	0.262	1,383	SD123	354410	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes		0.03	0.23	0.24					0.03			0.26		0.02		0.01
Tripp	589.051	589.176	0.125	662	SD123	354369	AtD	Anselmo-Longpine fine sandy loams, 10 to 20 percent slopes	0.01	0.04	0.11	0.01							0.01		0.10	0.03		
Tripp	589.176	589.240	0.063	335	SD123	354395	HbA	Holt-Anselmo fine sandy loams, 0 to 3 percent slopes		0.04	0.06											0.00		0.00
Tripp	589.240	589.336	0.096	509	SD123	354369	AtD	Anselmo-Longpine fine sandy loams, 10 to 20 percent slopes	0.00	0.03	0.08	0.00							0.01	0.08		0.02		
Tripp	589.336	589.458	0.122	644	SD123	354395	HbA	Holt-Anselmo fine sandy loams, 0 to 3 percent slopes		0.08	0.11											0.00		0.00
Tripp	589.458	589.554	0.096	506	SD123	354369	AtD	Anselmo-Longpine fine sandy loams, 10 to 20 percent slopes	0.00	0.03	0.08	0.00							0.01	0.08		0.02		
Tripp	589.554	590.019	0.464	2,452	SD123	354409	MaB	Manter fine sandy loam, 3 to 9 percent slopes		0.02	0.44						0.00		0.01			0.00	0.46	0.00
Tripp	590.019	590.189	0.171	902	SD123	354369	AtD	Anselmo-Longpine fine sandy loams, 10 to 20 percent slopes	0.01	0.05	0.14	0.01							0.02	0.13		0.04		
Tripp	590.189	590.334	0.144	762	SD123	354409	MaB	Manter fine sandy loam, 3 to 9 percent slopes		0.01	0.14						0.00	0.00				0.00	0.14	0.00
Tripp	590.334	590.495	0.161	851	SD123	354462	WgB	Wewela fine sandy loam, 3 to 6 percent slopes		0.14	0.01		0.00		0.00	0.00	0.15					0.00		0.00
Tripp	590.495	590.561	0.066	349	SD123	354410	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes		0.01	0.06	0.06					0.01			0.08		0.01		0.00
Tripp	590.561	590.756	0.195	1,031	SD123	354409	MaB	Manter fine sandy loam, 3 to 9 percent slopes		0.01	0.18						0.00	0.01				0.00	0.20	0.00
Tripp	590.756	590.867	0.110	582	SD123	354410	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes		0.01	0.10	0.10					0.01			0.11		0.01		0.00
Tripp	590.867	590.922	0.055	291	SD123	354458	Wb	Wann fine sandy loam		0.00	0.00			0.00		0.00	0.00	0.00					0.00	0.00
Tripp	590.922	591.106	0.185	975	SD123	354462	WgB	Wewela fine sandy loam, 3 to 6 percent slopes		0.17	0.01		0.00		0.00	0.00	0.17					0.00		0.00
Tripp	591.106	591.180	0.074	390	SD123	354373	BnC	Boyd clay, 5 to 9 percent slopes		0.06	0.00		0.00			0.00	0.07			0.07				0.00
Tripp	591.180	591.222	0.042	223	SD123	354458	Wb	Wann fine sandy loam		0.00	0.00			0.00		0.00	0.04	0.00			0.04			0.00
Tripp	591.222	591.487	0.264	1,396	SD123	354373	BnC	Boyd clay, 5 to 9 percent slopes		0.23	0.01		0.01			0.01	0.26			0.25				0.01
Tripp	591.487	591.541	0.054	283	SD123	354410	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes		0.01	0.05	0.05					0.01			0.05	0.00			0.00
Tripp	591.541	591.728	0.188	990	SD123	354408	MaA	Manter fine sandy loam, 0 to 3 percent slopes			0.18						0.00				0.01	0.19	0.00	0.00
Tripp	591.728	591.847	0.119	629	SD123	354410	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes		0.02	0.10	0.11					0.01			0.12	0.01			0.00
Tripp	591.847	592.307	0.459	2,426	SD123	354374	BOD	Boyd-Olaton association, 9 to 25 percent slopes		0.39	0.03	0.39	0.00			0.00	0.43			0.42				0.00
Tripp	592.307	592.712	0.406	2,142	SD123	354369	AtD	Anselmo-Longpine fine sandy loams, 10 to 20 percent slopes	0.02	0.12	0.34	0.02								0.04	0.32			
Tripp	592.712	592.731	0.019	98	SD123	354410	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes		0.00	0.02	0.02					0.00				0.02	0.10		
Tripp	592.731	592.799	0.068	359	SD123	354369	AtD	Anselmo-Longpine fine sandy loams, 10 to 20 percent slopes	0.00	0.02	0.06	0.00							0.01		0.05	0.00		0.00
																						0.02		

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Tripp	592.799	592.839	0.040	213	SD123	354452	TrF	Longpine-Rock outcrop complex, 15 to 40 percent slopes	0.01	0.03	0.03	0.04							0.00	0.04	0.03			
Tripp	592.839	592.921	0.081	430	SD123	354374	BOD	Boyd-Okaton association, 9 to 25 percent slopes		0.07	0.01	0.07	0.00				0.00	0.08		0.07				0.00
Tripp	592.921	593.009	0.088	464	SD123	354452	TrF	Longpine-Rock outcrop complex, 15 to 40 percent slopes	0.03	0.07	0.06	0.08							0.00	0.06	0.07			
Tripp	593.009	593.113	0.104	550	SD123	354366	AbC	Anselmo fine sandy loam, 6 to 9 percent slopes		0.00	0.10								0.00	0.09		0.10	0.00	
Tripp	593.113	593.227	0.114	605	SD123	354410	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes		0.01	0.10	0.11						0.01		0.11	0.01			0.00
Tripp	593.227	593.329	0.101	535	SD123	354366	AbC	Anselmo fine sandy loam, 6 to 9 percent slopes		0.00	0.10								0.00	0.09		0.10	0.00	
Tripp	593.329	593.451	0.123	648	SD123	354410	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes		0.02	0.11	0.11						0.01		0.12	0.01			0.00
Tripp	593.451	593.490	0.039	206	SD123	354366	AbC	Anselmo fine sandy loam, 6 to 9 percent slopes		0.00	0.04								0.00	0.04		0.04	0.00	
Tripp	593.490	593.646	0.156	823	SD123	354410	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes		0.02	0.14	0.14						0.02		0.15	0.01			0.00
Tripp	593.646	594.197	0.551	2,907	SD123	354369	AtD	Anselmo-Longpine fine sandy loams, 10 to 20 percent slopes	0.02	0.17	0.46	0.02							0.05	0.43	0.13			
Tripp	594.197	594.433	0.236	1,247	SD123	354410	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes		0.03	0.21	0.22						0.03		0.23	0.02			0.00
Tripp	594.433	594.533	0.101	531	SD123	354433	RaB	Ree loam, 3 to 6 percent slopes		0.01			0.00		0.00		0.00	0.10		0.00		0.10	0.00	
Tripp	594.533	594.649	0.116	612	SD123	354408	MaA	Manter fine sandy loam, 0 to 3 percent slopes			0.11							0.00			0.01	0.12	0.00	
Tripp	594.649	594.655	0.005	27	SD123	354433	RaB	Ree loam, 3 to 6 percent slopes		0.00			0.00		0.00		0.00	0.01		0.00		0.01	0.00	
Tripp	594.655	594.679	0.024	127	SD123	354408	MaA	Manter fine sandy loam, 0 to 3 percent slopes			0.02							0.00			0.00	0.02	0.00	
Tripp	594.679	594.715	0.037	195	SD123	354410	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes		0.00	0.03	0.03						0.00		0.04	0.00			0.00
Tripp	594.715	595.143	0.428	2,258	SD123	354374	BOD	Boyd-Okaton association, 9 to 25 percent slopes		0.36	0.03	0.38	0.00				0.00	0.40		0.39				0.00
Tripp	595.143	595.286	0.143	754	SD123	354410	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes		0.02	0.13	0.13						0.02		0.14	0.01			0.00
Tripp	595.286	595.511	0.225	1,188	SD123	354374	BOD	Boyd-Okaton association, 9 to 25 percent slopes		0.19	0.02	0.19	0.00				0.00	0.21		0.21				0.00
Tripp	595.511	595.588	0.078	409	SD123	354427	PrB	Promise clay, 3 to 6 percent slopes					0.08				0.08	0.08				0.08	0.00	
Tripp	595.588	595.722	0.133	703	SD123	354376	Bt	Bridgeport complex, channeled			0.01		0.02		0.01		0.02	0.11	0.01					0.00
Tripp	595.722	595.860	0.138	730	SD123	354375	Bp	Bridgeport complex			0.00		0.04		0.02	0.00	0.04	0.14				0.14		
Tripp	595.860	595.923	0.063	332	SD123	354427	PrB	Promise clay, 3 to 6 percent slopes					0.06				0.06	0.06				0.06	0.00	
Tripp	595.923	596.079	0.156	822	SD123	354384	DbD	Dix soils, 9 to 18 percent slopes			0.15									0.15	0.14			
Tripp	596.079	596.202	0.124	654	SD123	354370	AvA	Anselmo-Vetal fine sandy loams, 0 to 3 percent slopes		0.01	0.08		0.00		0.00	0.00	0.00	0.00				0.12	0.00	
Tripp	596.202	596.232	0.029	156	SD123	354384	DbD	Dix soils, 9 to 18 percent slopes			0.03									0.03	0.03			
Tripp	596.232	596.490	0.258	1,364	SD123	354370	AvA	Anselmo-Vetal fine sandy loams, 0 to 3 percent slopes		0.01	0.17		0.01		0.01	0.01	0.01	0.01				0.26	0.01	
Tripp	596.490	596.610	0.120	634	SD123	354410	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes		0.02	0.11	0.11						0.01		0.12	0.01			0.00
Tripp	596.610	596.645	0.035	186	SD123	354374	BOD	Boyd-Okaton association, 9 to 25 percent slopes		0.03	0.00	0.03	0.00				0.00	0.03		0.03				0.00

Table 1: Soil Limitations Along the Pipeline Centerline Milepasted by Soil Map Unit (continued)

Harding	CAR-041	0.000	0.066	0.066	348	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes			0.07	0.02	0.01		0.01	0.02		0.03	0.02		0.01						
Harding	CAR-041	0.066	0.210	0.144	761	SD063	355743	GhB	Glendive-Archin fine sandy loams, 2 to 6 percent slopes			0.01	0.01		0.09		0.05		0.13	0.14	0.00							
Harding	CAR-041	0.210	0.440	0.230	1,213	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes			0.23	0.06	0.02		0.02	0.08		0.10	0.08		0.02						
Harding	CAR-041	0.440	0.469	0.030	157	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes		0.01	0.03		0.02			0.00		0.00	0.02		0.03	0.01				
Harding	CAR-041	0.469	0.509	0.039	207	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes			0.04	0.01	0.00		0.00	0.01		0.02	0.01		0.00						
Harding	CAR-041	0.509	0.657	0.148	782	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes		0.04	0.14		0.12			0.01		0.01	0.09		0.14	0.04				
Harding	CAR-041	0.657	1.477	0.820	4,331	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.82	0.43	0.03		0.03	0.87		0.71	0.76		0.12						
Harding	CAR-041	1.477	1.672	0.195	1,029	SD063	355757	Kg	Korchea loam, channeled						0.02		0.01		0.03	0.19								0.01
Harding	CAR-041	1.672	1.750	0.078	411	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes			0.07		0.03	0.00		0.04		0.04	0.08		0.07						
Harding	CAR-041	1.750	1.842	0.093	490	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes				0.01		0.01		0.07		0.08	0.09								
Harding	CAR-041	1.842	1.879	0.037	194	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes			0.03		0.01	0.00		0.02		0.02	0.04		0.03						
Harding	CAR-041	1.879	2.084	0.205	1,081	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes				0.03		0.02		0.15		0.18	0.19								
Harding	CAR-041	2.084	2.218	0.134	708	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes		0.03	0.13		0.10			0.01		0.01	0.09		0.13	0.04				
Harding	CAR-041	2.218	2.281	0.063	333	SD063	355787	SaA	Sage loam						0.06		0.00		0.06	0.06								0.05
Harding	CAR-041	2.281	2.453	0.172	908	SD063	355818	ZaD	Zeona loamy fine sand, 9 to 25 percent slopes			0.03	0.16	0.15			0.02		0.02	0.02	0.16	0.17						
Harding	CAR-041	2.453	2.539	0.086	453	SD063	355742	Ge	Glendive fine sandy loam						0.08		0.01		0.09	0.09						0.09	0.00	
Harding	CAR-041	2.539	2.664	0.125	661	SD063	355752	Hh	Havre-Harlake complex						0.11		0.01		0.12	0.12						0.13	0.01	
Harding	CAR-0438	0.000	0.020	0.020	104	SD063	355770	MtD	Marmarth-Twilight fine sandy loams, 9 to 15 percent slopes			0.02	0.01	0.00		0.00	0.00		0.00	0.01		0.01						
Harding	CAR-0438	0.020	0.876	0.857	4,523	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.86	0.45	0.03		0.03	0.70		0.74	0.80		0.13						
Harding	CAR-0438	0.876	0.991	0.114	604	SD063	355769	MtC	Marmarth-Twilight fine sandy loams, 6 to 9 percent slopes			0.11	0.04	0.01		0.01	0.01		0.02	0.07		0.08		0.11				
Harding	CAR-0438	0.991	1.114	0.123	649	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.12	0.07	0.00		0.00	0.10		0.11	0.11		0.02						
Harding	CAR-0438	1.114	1.305	0.191	1,009	SD063	355769	MtC	Marmarth-Twilight fine sandy loams, 6 to 9 percent slopes			0.19	0.07	0.01		0.01	0.02		0.03	0.12		0.13		0.19				
Harding	CAR-0438	1.305	1.634	0.329	1,737	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.33	0.17	0.01		0.01	0.27		0.28	0.31		0.05						
Harding	CAR-0438	1.634	1.784	0.150	793	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes				0.02		0.02		0.11		0.13	0.14								
Harding	CAR-0438	1.784	1.797	0.013	70	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes			0.01		0.00	0.00		0.01		0.01	0.01		0.01						
Harding	CAR-044	0.000	0.323	0.323	1,708	SD063	355781	RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes			0.32	0.08	0.03		0.03	0.11		0.15	0.11		0.03						
Harding	CAR-045	0.000	0.243	0.243	1,285	SD063	355768	MpB	Marmarth-Parchin fine sandy loams, 2 to 6 percent slopes			0.24	0.07	0.01		0.01	0.07		0.08	0.21		0.03						
Harding	CAR-045	0.243	0.403	0.160	844	SD063	355767	McC	Marmarth-Cabbart complex, 6 to 9 percent slopes			0.15	0.02				0.01		0.01	0.14		0.14						
Harding	CAR-045	0.403	0.422	0.019	99	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes			0.02	0.01	0.00		0.00	0.00		0.01	0.00		0.01						
Harding	CAR-045	0.422	0.496	0.074	390	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.07	0.04	0.00		0.00	0.08		0.06	0.07		0.01						
Harding	CAR-045	0.496	0.562	0.066	350	SD063	355769	MtC	Marmarth-Twilight fine sandy loams, 6 to 9 percent slopes			0.07	0.02	0.00		0.00	0.01		0.01	0.04		0.05		0.07				
Harding	CAR-045	0.562	0.669	0.106	562	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.11	0.06	0.00		0.00	0.09		0.09	0.10		0.02						
Harding	CAR-045	0.669	0.847	0.178	942	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes			0.16	0.07				0.14		0.14	0.16		0.01						
Harding	CAR-045	0.847	1.107	0.260	1,374	SD063	355712	AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes				0.03		0.03		0.20		0.23	0.24								
Harding	CAR-045	1.107	1.250	0.143	753	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.14	0.08	0.01		0.01	0.12		0.12	0.13		0.02						
Harding	CAR-069	0.000	0.019	0.019	101	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes			0.02	0.01	0.00		0.00	0.00		0.01	0.00		0.01						
Harding	CAR-069	0.019	0.076	0.057	302	SD063	355768	MpB	Marmarth-Parchin fine sandy loams, 2 to 6 percent slopes			0.06	0.02	0.00		0.00	0.02		0.02	0.05		0.01						
Harding	CAR-069	0.076	0.132	0.056	295	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes			0.05	0.04	0.01		0.01	0.01		0.02	0.01		0.02						
Harding	CAR-069	0.132	0.441	0.308	1,628	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.31	0.16	0.01		0.01	0.25		0.27	0.29		0.06						
Harding	CAR-069	0.441	0.556	0.116	611	SD063	355768	MpB	Marmarth-Parchin fine sandy loams, 2 to 6 percent slopes			0.12	0.03	0.01		0.01	0.03		0.04	0.10		0.02						
Harding	CAR-069	0.556	0.657	0.101	534	SD063	355801	TtC	Trey-Fleak loamy fine sands, 2 to 15 percent slopes			0.10	0.09				0.02		0.02	0.02	0.08	0.02						
Harding	CAR-069	0.657	0.767	0.109	577	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.11	0.06	0.00		0.00	0.09		0.09	0.10		0.02						
Harding	CAR-069	0.767	0.859	0.092	485	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.02		0.06	0.01	0.07			0.01		0.01	0.04		0.08	0.05				
Harding	CAR-069	0.859	0.883	0.024	127	SD063	355729	CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes	0.01		0.02		0.02			0.00		0.00	0.02		0.02	0.01				
Harding	CAR-069	0.883	1.006	0.123	650	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes			0.12	0.10	0.01		0.01	0.04		0.04	0.05		0.06						
Harding	CAR-069	1.006	1.027	0.021	111	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.00		0.01	0.00	0.02			0.00		0.00	0.01		0.02	0.01				
Harding	CAR-068	1.027	1.079	0.052	275	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes			0.05	0.04	0.00		0.00	0.02		0.02	0.02		0.02						
Harding	CAR-069	1.079	1.155	0.076	402	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.02		0.05	0.01	0.06			0.01		0.01	0.03		0.07	0.04				
Harding	CAR-069	1.155	1.195	0.040	211	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.04	0.02	0.00		0.00	0.03		0.03	0.04		0.01						
Harding	CAR-069	1.195	1.256	0.061	322	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.01		0.04	0.01	0.05			0.01		0.01	0.02		0.06	0.03				
Harding	CAR-069	1.256	1.326	0.070	372	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.07	0.04	0.00		0.00	0.08		0.06	0.07		0.01						
Harding	CAR-069	1.326	1.388	0.062	326	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.01		0.04	0.01	0.05			0.01		0.01	0.02		0.06	0.03				
Harding	CAR-069	1.388	1.459	0.071	373	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.07	0.04	0.00		0.00	0.06		0.06	0.07		0.01						
Harding	CAR-069	1.459	1.633	0.175	922	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.03		0.12	0.02	0.13			0.02		0.02	0.07		0.16	0.09				
Harding	CAR-069	1.633	1.942	0.308	1,628	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes			0.28	0.12				0.25		0.25	0.27		0.01						
Harding	CAR-069	1.942	1.965	0.023	123	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.00		0.02	0.00	0.02			0.00		0.00	0.01		0.02	0.01				
Harding	CAR-069	1.965	2.318	0.353	1,863	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes			0.32	0.14				0.28		0.28	0.31		0.01						
Harding	CAR-090	0.000	0.395	0.395	2,085	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.39	0.21	0.02		0.02	0.32		0.34	0.37		0.06						
Harding	CAR-090	0.395	0.474	0.079	415	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes			0.07	0.05	0.02		0.02	0.01		0.03	0.02		0.03						
Harding	CAR-090	0.474	0.514	0.041	216	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.01		0.03	0.00	0.03			0.00		0.00	0.02		0.04	0.02				
Harding	CAR-090	0.514	0.872	0.357	1,887	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes			0.34	0.23	0.09		0.09	0.04		0.13	0.07		0.14						
Harding	CAR-090	0.872	0.967	0.095	502	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.02		0.07	0.01	0.07			0.01		0.01	0.04		0.09	0.05				
Harding	CAR-090	0.967	1.072	0.105	555	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes			0.10	0.09	0.01		0.01	0.03		0.04	0.04		0.04						
Harding	CAR-090	1.072	1.173	0.101	535	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.02		0.07	0.01	0.08			0.01		0.01	0.04		0.09	0.05				
Harding	CAR-090	1.173	1.281	0.108	568	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.11	0.08	0.00		0.00	0.09		0.09	0.10		0.02						
Harding	CAR-090	1.281	1.429	0.148	782	SD063	355755	KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes	0.03		0.10	0.01	0.11			0.01		0.01	0.08		0.13	0.07				
Harding	CAR-090	1.429	1.608	0.179	947	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes			0.16	0.07				0.14		0.14	0.15		0.01						
Harding	CAR-090	1.608	1.688	0.080	420	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes			0.08	0.04	0.00		0.00	0.07		0.07	0.07		0.01						
Harding	CAR-090	1.688	1.810	0.122	644	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes			0.11	0.06				0.10		0.10	0.11		0.00						

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Harding	CAR-090	1.810	1.826	0.016	83	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.02	0.01	0.00		0.00	0.01		0.01	0.01		0.00				
Harding	CAR-090	1.826	1.881	0.056	293	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.05	0.02				0.04		0.04	0.06		0.00				
Harding	CAR-090	1.881	1.953	0.071	376	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.07	0.04	0.00		0.00	0.06		0.06	0.07		0.01				
Harding	CAR-090	1.953	2.325	0.372	1,965	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.34	0.15				0.30		0.30	0.33		0.01				
Harding	CAR-090	2.325	2.482	0.157	830	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.15	0.13	0.01		0.01	0.05		0.06	0.06		0.06				
Harding	CAR-090	2.482	2.486	0.004	22	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00				
Perkins	CAR-046A	0.000	0.390	0.390	2,060	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.39	0.12				0.37		0.37	0.39						
Perkins	CAR-047	0.000	0.109	0.109	576	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.11	0.07	0.00	0.00	0.00	0.03		0.04	0.06		0.03				0.00
Perkins	CAR-047	0.109	0.149	0.040	212	SD105	354615	BdB	Belfield-Marmarth complex, 0 to 6 percent slopes		0.02	0.00		0.00		0.03		0.03	0.04					0.04	0.00
Perkins	CAR-047	0.149	0.496	0.347	1,831	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.35	0.10				0.33		0.33	0.35						
Perkins	CAR-047	0.496	0.897	0.400	2,114	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.40	0.26	0.02	0.01	0.01	0.11		0.13	0.23		0.12				0.00
Perkins	CAR-047	0.897	1.277	0.380	2,006	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.36	0.11				0.36		0.36	0.38						
Perkins	CAR-047	1.277	1.386	0.110	579	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.11	0.07	0.00	0.00	0.00	0.03		0.04	0.06		0.03				0.00
Perkins	CAR-047	1.386	1.421	0.035	185	SD105	354618	BhE	Blackhall-Cabbart complex, 15 to 40 percent slopes		0.03	0.00	0.03		0.01	0.00		0.02	0.02		0.03				
Perkins	CAR-047	1.421	1.511	0.090	475	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.09	0.03				0.09		0.09	0.09						
Perkins	CAR-047	1.511	1.649	0.138	730	SD105	354618	BhE	Blackhall-Cabbart complex, 15 to 40 percent slopes		0.13	0.01	0.11		0.08	0.01		0.07	0.08		0.12				
Perkins	CAR-047	1.649	1.973	0.323	1,707	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.32	0.21	0.01	0.01	0.01	0.09		0.11	0.19		0.10				0.00
Perkins	CAR-047	1.973	2.104	0.131	694	SD105	354664	Ta	Trembles fine sandy loam			0.01		0.01				0.01		0.01				0.13	0.00
Perkins	CAR-047	2.104	2.269	0.165	873	SD105	354663	Sh	Lohler-Trembles complex			0.01		0.12				0.12	0.12	0.01			0.01	0.17	0.00
Perkins	CAR-047	2.269	2.891	0.622	3,283	SD105	354618	BhE	Blackhall-Cabbart complex, 15 to 40 percent slopes		0.59	0.03	0.50		0.26	0.06		0.31	0.34		0.53				
Perkins	CAR-047	2.891	3.073	0.182	961	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.18	0.01	0.01		0.01	0.15		0.16	0.17		0.02				
Perkins	CAR-047	3.073	3.121	0.148	780	SD105	354618	BhE	Blackhall-Cabbart complex, 15 to 40 percent slopes		0.14	0.01	0.12		0.06	0.01		0.07	0.08		0.13				
Perkins	CAR-048	0.000	0.042	0.042	223	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.04	0.03	0.00	0.00	0.00	0.01		0.01	0.02		0.01				0.00
Perkins	CAR-048	0.042	0.141	0.099	524	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.10	0.00	0.01		0.00	0.08		0.09	0.09		0.01				
Perkins	CAR-048	0.141	0.579	0.438	2,311	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.44	0.13				0.42		0.42	0.44						
Perkins	CAR-048	0.579	0.659	0.080	422	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.08	0.00	0.01		0.00	0.07		0.07	0.07		0.01				
Perkins	CAR-048	0.659	0.711	0.052	276	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.05	0.02				0.05		0.05	0.05						
Perkins	CAR-048	0.711	1.090	0.379	1,999	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.38	0.01	0.03		0.02	0.32		0.34	0.35		0.05				
Perkins	CAR-048	1.090	1.313	0.223	1,176	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.22	0.07				0.21		0.21	0.22						
Perkins	CAR-048	1.313	1.360	0.047	249	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.05	0.00	0.00		0.00	0.04		0.04	0.04		0.01				
Perkins	CAR-048	1.360	1.661	0.301	1,588	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.30	0.09				0.29		0.29	0.30						
Perkins	CAR-048	1.661	2.215	0.554	2,926	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.55	0.02	0.04		0.02	0.47		0.48	0.52		0.07				
Perkins	CAR-048	2.215	2.269	0.054	284	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.05	0.02				0.05		0.05	0.05						
Perkins	CAR-048	2.269	2.339	0.071	372	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.07	0.00	0.01		0.00	0.06		0.06	0.07		0.01				
Perkins	CAR-048	2.339	2.661	0.322	1,702	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.32	0.10				0.31		0.31	0.32						
Perkins	CAR-048	2.661	2.740	0.079	415	SD105	354608	AbC	Bullock-Slickspots complex, 0 to 15 percent slopes		0.08	0.00	0.01		0.00	0.07		0.07	0.07		0.01				
Perkins	CAR-049A	0.000	0.144	0.144	761	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.14	0.09	0.01	0.00	0.00	0.04		0.05	0.08		0.04				0.00
Perkins	CAR-049A	0.144	0.328	0.183	968	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.18	0.05				0.17		0.17	0.18						
Perkins	CAR-049A	0.328	0.361	0.034	179	SD105	354666	TcD	Twilight-Marmarth-Parchin association, gently rolling		0.03	0.02	0.00	0.00	0.00	0.01		0.01	0.02		0.01				0.00
Perkins	CAR-049A	0.361	0.465	0.103	546	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.10	0.03				0.10		0.10	0.10						
Meade	CAR-077	0.179	1.071	0.893	4,714	SD601	355439	Gc	Glenberg fine sandy loam			0.07		0.06				0.06	0.06	0.07				0.89	
Meade	CAR-077	1.071	1.235	0.164	864	SD601	355451	Ld	Lohmiller silty clay loam			0.00		0.15		0.00		0.15	0.15	0.00				0.16	0.00
Meade	CAR-077	1.235	1.374	0.139	734	SD601	355446	KyB	Kyle clay, 2 to 6 percent slopes		0.01			0.01		0.13		0.14	0.14		0.01				0.00
Meade	CAR-078	0.000	0.041	0.041	219	SD601	355446	KyB	Kyle clay, 2 to 6 percent slopes		0.00			0.00		0.04		0.04	0.04		0.00				0.00
Meade	CAR-078	0.041	0.167	0.125	662	SD601	355451	Ld	Lohmiller silty clay loam			0.00		0.11		0.00		0.12	0.12	0.00				0.13	0.00
Meade	CAR-078	0.167	0.375	0.208	1,097	SD601	355452	Lg	Lohmiller silty clay loam, channeled					0.21				0.21	0.21						0.00
Meade	CAR-078	0.375	0.452	0.077	408	SD601	355457	PeB	Pierre clay, 2 to 6 percent slopes		0.08			0.00		0.00		0.01	0.08		0.00				
Meade	CAR-078	0.452	0.579	0.127	670	SD601	355452	Lg	Lohmiller silty clay loam, channeled					0.13				0.13	0.13						0.00
Meade	CAR-078	0.579	0.648	0.069	365	SD601	355445	KyA	Kyle clay, 0 to 2 percent slopes					0.01		0.06		0.07	0.07						0.00
Meade	CAR-078	0.648	0.718	0.070	370	SD601	355452	Lg	Lohmiller silty clay loam, channeled					0.07				0.07	0.07						0.00
Meade	CAR-078	0.718	1.382	0.664	3,505	SD601	355445	KyA	Kyle clay, 0 to 2 percent slopes					0.07		0.60		0.66	0.66						0.01
Meade	CAR-078	1.382	1.575	0.193	1,018	SD601	355452	Lg	Lohmiller silty clay loam, channeled					0.19				0.19	0.19						0.00
Meade	CAR-078	1.575	1.825	0.250	1,322	SD601	355451	Ld	Lohmiller silty clay loam			0.01		0.23		0.01		0.24	0.24	0.01				0.25	0.00
Meade	CAR-078	1.825	2.004	0.180	948	SD601	355452	Lg	Lohmiller silty clay loam, channeled					0.18				0.18	0.18						0.00
Meade	CAR-078	2.004	2.071	0.067	353	SD601	355446	KyB	Kyle clay, 2 to 6 percent slopes		0.00			0.01		0.06		0.07	0.07		0.00				0.00
Meade	CAR-078	2.071	2.601	0.530	2,798	SD601	355452	Lg	Lohmiller silty clay loam, channeled					0.53				0.53	0.53						0.01
Meade	CAR-078	2.601	2.694	0.092	488	SD601	355462	SaD	Samsil clay, 6 to 25 percent slopes		0.09		0.08	0.00		0.00		0.09	0.09		0.09	0.00			
Haakon	CAR-052A	0.000	0.061	0.061	323	SD055	354131	OtA	Ottumwa silty clay, 0 to 3 percent slopes							0.00		0.00	0.06					0.06	0.00
Haakon	CAR-052A	0.061	0.260	0.199	1,049	SD055	354101	KmB	Kirley-Ottumwa complex, 2 to 6 percent slopes		0.02			0.02		0.02		0.02	0.20					0.20	0.00
Haakon	CAR-052A	0.260	0.745	0.486	2,564	SD055	354110	LbE	Lakoma-Vivian complex, 9 to 25 percent slopes		0.42	0.03	0.18						0.34		0.49	0.15			
Haakon	CAR-052A	0.745	0.780	0.034	180	SD055	354095	KeB	Kirley clay loam, 2 to 6 percent slopes		0.00			0.00		0.00		0.00	0.03					0.03	0.00
Haakon	CAR-052A	0.780	0.882	0.102	540	SD055	354094	KeA	Kirley clay loam, 0 to 2 percent slopes					0.01		0.01		0.01	0.10					0.10	0.01
Haakon	CAR-079	0.000	0.249	0.249	1,313	SD055	354094	KeA	Kirley clay loam, 0 to 2 percent slopes					0.01		0.01		0.01	0.25					0.25	0.01
Haakon	CAR-079	0.249	0.513	0.265	1,398	SD055	354162	SUF	Schamber-Samsil complex, 6 to 60 percent slopes		0.12	0.14	0.28	0.11				0.11	0.12		0.26	0.15			
Haakon	CAR-079	0.513	0.693	0.180	951	SD055	354155	SbF	Samsil clay, 25 to 60 percent slopes		0.17	0.01	0.17	0.17		0.01		0.17	0.17		0.17	0.01			
Haakon	CAR-079	0.693	0.815	0.122	642	SD055	354141	PkE	Pierre-Samsil clays, 15 to 25 percent slopes		0.11	0.00	0.12	0.06	0.00	0.00	0.00	0.05	0.11		0.12	0.01			
Lyman	CAR-080	0.000	0.174	0.174	919	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.01			0.16		0.01		0.17	0.17					0.17	0.01
Lyman	CAR-080	0.174	0.350	0.176	930	SD085	355578	LbD	Lakoma-Okaton silty clays, 6 to 15 percent slopes		0.16			0.03				0.03	0.18		0.17				0.00
Lyman	CAR-080	0.350	0.500	0.149	789	SD085	355619	SbE	Sansarc-Opal clays, 9 to 40 percent slopes		0.14		0.14	0.07		0.00		0.07	0.14		0.14	0.00			0.00

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

Lyman	CAR-080	0.500	0.581	0.081	430	SD085	355578	LbD	Lakoma-Okaton silty clays, 6 to 15 percent slopes		0.07			0.01			0.01	0.08		0.08			0.00
Lyman	CAR-080	0.581	0.640	0.058	308	SD085	355607	Pg	Pits, gravel			0.06	0.06	0.00			0.00	0.00		0.06	0.06		0.00
Lyman	CAR-080	0.640	1.032	0.393	1,075	SD085	355619	SbE	Sansarc-Opal clays, 9 to 40 percent slopes		0.38		0.37	0.18	0.01		0.18	0.38		0.38	0.01		0.00
Lyman	CAR-080	1.032	1.243	0.210	1,109	SD085	355563	BuA	Bullcreek clay, 0 to 6 percent slopes		0.01			0.20	0.19		0.20	0.21					0.00
Lyman	CAR-080	1.243	1.288	0.046	241	SD085	355619	SbE	Sansarc-Opal clays, 9 to 40 percent slopes		0.04		0.04	0.02	0.00		0.02	0.04		0.04	0.00		0.00
Lyman	CAR-080	1.288	1.402	0.114	603	SD085	355563	BuA	Bullcreek clay, 0 to 6 percent slopes		0.01			0.11	0.10		0.11	0.11					0.00
Lyman	CAR-080	1.402	1.479	0.077	404	SD085	355608	PoA	Promise clay, 0 to 3 percent slopes		0.00			0.07	0.00		0.08	0.08				0.08	0.00
Lyman	CAR-080	1.479	1.504	0.025	133	SD085	355595	Mr	Munjor fine sandy loam			0.02		0.00			0.00	0.00	0.00			0.03	0.00
Lyman	CAR-080	1.504	1.658	0.154	814	SD085	355570	Hm	Hilmoe silty clay			0.01		0.14			0.14	0.15				0.15	0.00
Tripp	CAR-081	0.000	0.330	0.330	1,741	SD123	354432	RaA	Ree loam, 0 to 3 percent slopes					0.01	0.01		0.01	0.33				0.33	0.02
Tripp	CAR-081	0.330	0.399	0.070	367	SD123	354459	WeE	Westover loam, 9 to 25 percent slopes		0.00	0.07	0.07	0.00			0.00	0.01		0.07	0.07		0.00
Tripp	CAR-081	0.399	1.138	0.738	3,898	SD123	354419	OBE	Okaton-Lakoma association, 15 to 40 percent slopes		0.66	0.01	0.66	0.03			0.03	0.72		0.73	0.01		0.01
Tripp	CAR-081	1.138	1.443	0.306	1,614	SD123	354445	SAE	Sansarc-Opal association, 15 to 40 percent slopes		0.28	0.02	0.29	0.01			0.01	0.28		0.30	0.02		
Tripp	CAR-081	1.443	1.692	0.249	1,313	SD123	354450	Sw	Bullcreek clay					0.25	0.22		0.25	0.25					0.00
Tripp	CAR-081	1.692	2.004	0.312	1,650	SD123	354445	SAE	Sansarc-Opal association, 15 to 40 percent slopes		0.28	0.02	0.30	0.01			0.01	0.29		0.30	0.02		
Tripp	CAR-081	2.004	2.099	0.095	499	SD123	354419	OBE	Okaton-Lakoma association, 15 to 40 percent slopes		0.09	0.00	0.09	0.00			0.00	0.09		0.09	0.00		0.00
Tripp	CAR-081	2.099	2.141	0.043	225	SD123	354459	WeE	Westover loam, 9 to 25 percent slopes		0.00	0.04	0.04	0.00			0.00	0.00		0.04	0.04		0.00
Tripp	CAR-082	0.000	0.045	0.045	237	SD123	354432	RaA	Ree loam, 0 to 3 percent slopes					0.00	0.00		0.00	0.04				0.04	0.00
Tripp	CAR-082	0.045	0.176	0.131	693	SD123	354459	WeE	Westover loam, 9 to 25 percent slopes		0.01	0.12	0.13	0.00			0.00	0.01		0.13	0.12		0.00
Tripp	CAR-082	0.176	0.233	0.057	303	SD123	354432	RaA	Ree loam, 0 to 3 percent slopes					0.00	0.00		0.00	0.06				0.06	0.00
Tripp	CAR-091	0.000	0.256	0.256	1,352	SD123	354434	RaC	Ree loam, 6 to 9 percent slopes		0.01	0.01		0.01	0.01		0.01	0.26		0.23	0.01	0.26	0.01
Tripp	CAR-091	0.256	0.579	0.323	1,703	SD123	354406	LoD	Lakoma-Okaton silty clays, 9 to 15 percent slopes		0.27	0.01		0.02			0.02	0.31		0.31	0.01		0.00
Tripp	CAR-091	0.579	0.845	0.266	1,405	SD123	354433	RaB	Ree loam, 3 to 6 percent slopes		0.02			0.01	0.01		0.01	0.27		0.01		0.27	0.01
Tripp	CAR-091	0.845	0.923	0.078	411	SD123	354406	LoD	Lakoma-Okaton silty clays, 9 to 15 percent slopes		0.07	0.00		0.00			0.00	0.07		0.07	0.00		0.00

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

CC	Winner	Tripp	80.042	8.782	SD123	354372	BmC	Boro-Millboro silty clays, 5 to 9 percent slopes		1.05			3.89				3.89	8.78		7.84		8.78	0.18
CC	Winner	Tripp	80.042	11.454	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					11.34		0.80		11.34	11.45				11.45	0.23
CC	Winner	Tripp	80.042	1.763	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					1.75		0.12		1.75	1.76				1.76	0.04
CC	Winner	Tripp	80.042	3.274	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					3.24		0.23		3.24	3.27				3.27	0.07
CC	Winner	Tripp	80.042	54.770	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		1.64	0.55		49.29		4.38		50.94	54.22			0.55	54.77	0.55
CY	BUFFALO	Harding	30.097	11.652	SD063	355783	RnB	Rhoades-Daglum loams, 2 to 9 percent slopes		11.30			6.41		10.25		10.25	11.30		10.60			
CY	BUFFALO	Harding	30.097	10.151	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		10.15	5.38	0.41		0.41	8.32		8.73	9.44		1.52			
CY	BUFFALO	Harding	30.097	0.570	SD063	355817	ZaB	Zeona loamy fine sand, 2 to 9 percent slopes		0.09	0.55				0.05		0.05	0.05	0.51	0.05			
CY	BUFFALO	Harding	30.097	7.724	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		7.03	3.01				6.18		6.18	6.80		0.23			
CY	FAITH	Meade	30.348	9.365	SD601	355425	BoE	Bullock-Lardell-Blackhall fine sandy loams, 2 to 40 percent slopes		6.56		1.87		1.40	6.66	2.81	7.96	7.02		2.34	0.47		
CY	FAITH	Meade	30.348	8.248	SD601	355473	TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes		8.25	1.65			0.66	2.23		2.89	4.29		2.06			
CY	FAITH	Meade	30.348	12.736	SD601	355426	BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes		12.61	3.82		0.13		10.85		11.08	11.97					0.13
CY	PHILIP	Haakon	30.122	21.922	SD055	354103	KnD	Kirley-Vivian complex, 6 to 15 percent slopes		9.86		1.63						15.36		15.36	6.58		
CY	PHILIP	Haakon	30.122	7.306	SD055	354109	LaD	Lakoma silty clay, 6 to 15 percent slopes		6.50		0.29	0.22		0.29		0.51	7.31		6.79			0.22
CY	PHILIP	Haakon	30.122	0.895	SD055	354141	PkE	Pierre-Samsil clays, 15 to 25 percent slopes		0.83	0.04	0.87	0.38	0.03	0.03	0.03	0.38	0.83		0.87	0.06		
CY	MURDO	Jones	30.097	13.857	SD075	353664	OpC	Opal clay, 6 to 9 percent slopes		13.30		0.14	13.58		0.42		13.72	13.86		13.30			0.14
CY	MURDO	Jones	30.097	0.043	SD075	353663	OpB	Opal clay, 3 to 6 percent slopes		0.04			0.04		0.00		0.04	0.04				0.04	0.00
CY	MURDO	Jones	30.097	16.197	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					15.39		0.97		15.87	16.20				16.20	0.32
CY	FAIRFAX	Gregory	30.064	1.343	SD053	355285	ReA	Reliance silty clay loam, 0 to 3 percent slopes										1.34				1.34	0.09
CY	FAIRFAX	Gregory	30.064	2.209	SD053	355242	HoB	Holt fine sandy loam, 3 to 6 percent slopes		1.99	2.10							0.11		0.11		2.21	
CY	FAIRFAX	Gregory	30.064	8.590	SD053	355274	Ot	Onita silt loam, moist					0.26		0.26		0.26	8.59			0.26	8.59	0.17
CY	FAIRFAX	Gregory	30.064	0.443	SD053	355285	ReA	Reliance silty clay loam, 0 to 3 percent slopes										0.44				0.44	0.03
CY	FAIRFAX	Gregory	30.064	17.479	SD053	355286	ReB	Reliance silty clay loam, 3 to 6 percent slopes										17.48				17.48	0.87
MLV	MLV-15	Harding	0.028	0.028	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.03	0.01	0.00		0.00	0.02		0.02	0.03		0.00			
MLV	CK-MLV-16	Harding	0.028	0.028	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.03	0.01	0.00		0.00	0.02		0.02	0.03		0.00			
MLV	MLV-17	Perkins	0.028	0.028	SD105	354607	AaB	Bullock-Parchin loams, 0 to 9 percent slopes		0.03	0.01				0.03		0.03	0.03					
MLV	MLV-18	Meade	0.028	0.028	SD601	355469	TdB	Tanna-Delridge complex, 2 to 6 percent slopes		0.02			0.02				0.02	0.03		0.00		0.03	
MLV	CK-MLV-19	Haakon	0.028	0.028	SD055	354148	ReA	Ree loam, 0 to 2 percent slopes			0.03		0.00		0.00		0.00	0.03				0.03	0.00
MLV	MLV-20	Haakon	0.028	0.028	SD055	354108	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.03		0.00	0.00		0.00		0.00	0.03		0.03			0.00
MLV	MLV-21	Jones	0.028	0.028	SD075	353622	Bu	Bullcreek clay, 0 to 6 percent slopes		0.00			0.03		0.03		0.03	0.03					
MLV	MLV-22	Lyman	0.028	0.028	SD085	355591	MmB	Millboro silty clay, 3 to 6 percent slopes		0.00			0.03		0.00		0.03	0.03				0.03	0.00
MLV	MLV-23	Tripp	0.028	0.028	SD123	354434	RaC	Ree loam, 6 to 9 percent slopes		0.00	0.00		0.00		0.00		0.00	0.03		0.02	0.00	0.03	0.00
PS	PS-15	Harding	7.419	2.595	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		2.36	1.01				2.08		2.08	2.28		0.08			
PS	PS-15	Harding	7.419	4.824	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		4.82	2.56	0.19		0.19	3.96		4.15	4.49		0.72			
PS	PS-15	Harding	7.419	0.000	SD063	355805	TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes		0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00			
PS	PS-16	Harding	5.007	2.090	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		2.09	1.11	0.08		0.08	1.71		1.80	1.94		0.31			
PS	PS-16	Harding	5.007	2.291	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		2.29	1.21	0.09		0.09	1.88		1.97	2.13		0.34			
PS	PS-16	Harding	5.007	0.625	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.57	0.24				0.50		0.50	0.55		0.02			
PS	PS-16	Harding	5.007	0.001	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.00	0.00				0.00		0.00	0.00		0.00			
PS	PS-17	Meade	5.007	1.524	SD601	355450	LcA	Leburn-Gerdrum loams, 0 to 3 percent slopes		0.11			0.91		1.34		1.34	1.52					
PS	PS-17	Meade	5.007	3.483	SD601	355434	EdB	Eapa-Delridge loams, 2 to 6 percent slopes		1.15			2.33				2.33	3.48		0.28		3.48	
PS	PS-18	Haakon	4.995	4.995	SD055	354134	OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes		1.50			0.10		0.20		0.20	4.99				4.99	0.05
PS	PS-19	Jones	6.508	6.193	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		5.57			0.62		0.31		0.62	5.88		5.26	0.31		0.31
PS	PS-19	Jones	6.508	0.029	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.03		0.00		0.03	0.03				0.03	0.00
PS	PS-19	Jones	6.508	0.286	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					0.27		0.02		0.28	0.29				0.29	0.01
PS	PS-20	Tripp	7.897	6.902	SD123	354405	LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes		3.62			2.69		0.07		2.76	6.90		6.14			0.14
PS	PS-20	Tripp	7.897	0.921	SD123	354427	PrB	Promise clay, 3 to 6 percent slopes					0.91				0.91	0.92				0.92	0.02
PS	PS-20	Tripp	7.897	0.074	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.00	0.00		0.07		0.01		0.07	0.07			0.00	0.07	0.00
PS	PS-21	Tripp	5.007	4.055	SD123	354408	MaA	Manter fine sandy loam, 0 to 3 percent slopes			3.85							0.04			0.20	4.06	0.08
PS	PS-21	Tripp	5.007	0.951	SD123	354410	MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes		0.12	0.84	0.88						0.10		0.93	0.08		0.02
PY	PY-10	Harding	29.992	13.305	SD063	355722	BoD	Bullock-Cabbart complex, 6 to 25 percent slopes		12.64		4.39	0.87		6.79		7.45	12.91		12.64			
PY	PY-10	Harding	29.992	6.783	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		6.78	3.59	0.27		0.27	5.56		5.83	6.31		1.02			
PY	PY-10	Harding	29.992	7.875	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		7.17	3.07				6.30		6.30	6.93		0.24			
PY	PY-10	Harding	29.992	2.028	SD063	355734	DcC	Delridge-Cabbart loams, 6 to 15 percent slopes		2.03	0.14				0.20		0.20	1.91		1.91			
PY	PY-11	Harding	29.992	0.033	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		0.03	0.02	0.00		0.00	0.03		0.03	0.03		0.00			
PY	PY-11	Harding	29.992	13.242	SD063	355803	TwC	Twilight fine sandy loam, 6 to 9 percent slopes		12.85	12.05	0.40		0.40	0.79		1.19	1.59		1.59			
PY	PY-11	Harding	29.992	1.139	SD063	355804	TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes		1.08	0.74	0.28		0.28	0.11		0.40	0.23		0.46			
PY	PY-11	Harding	29.992	15.578	SD063	355780	RhB	Rhame fine sandy loam, 2 to 6 percent slopes		15.58	0.78	0.78		0.78	1.56		2.34	2.34		0.78		15.58	
PY	PY-12	Harding	29.992	0.006	SD063	355748	Hd	Hanly-Dogleccreek fine sandy loams		0.00			0.00		0.00		0.00	0.00					0.00
PY	PY-12	Harding	29.992	4.018	SD063	355730	ChA	Chinook fine sandy loam, 0 to 3 percent slopes			3.68		0.12		0.32		0.44	0.80			0.16	4.02	
PY	PY-12	Harding	29.992	1.740	SD063	355817	ZaB	Zeona loamy fine sand, 2 to 9 percent slopes		0.26	1.67				0.14		0.14	0.14	1.55	0.14			
PY	PY-12	Harding	29.992	5.101	SD063	355728	CdE	Cabbart-Delridge loams, 15 to 40 percent slopes		5.10	0.15	3.98			0.48		0.48	4.54		4.69	0.15		

Table 1: Soil Limitations Along the Pipeline Centerline Mileposted by Soil Map Unit (continued)

PY	PY-12	Harding	29.992	9.390	SD063	355780	RhB	Rhame fine sandy loam, 2 to 6 percent slopes		9.39	0.47	0.47		0.47	0.94		1.41	1.41		0.47		9.39	
PY	PY-12	Harding	29.992	6.502	SD063	355746	Ha	Hanly fine sandy loam					0.59		0.39		0.98	0.78						0.33
PY	PY-12	Harding	29.992	3.236	SD063	355749	He	Hanly-Slickspots complex		0.65	1.94		0.32		0.97		1.29	1.29	1.94					0.03
PY	PY-13	Meade	30.891	24.408	SD601	355436	EgB	Eapa-Grail complex, 2 to 6 percent slopes		4.88			21.97				21.97	24.41				24.41		
PY	PY-13	Meade	30.891	4.956	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.45			0.15		4.51		4.51	4.81						
PY	PY-13	Meade	30.891	0.056	SD601	355434	EdB	Eapa-Delridge loams, 2 to 6 percent slopes		0.02			0.04				0.04	0.06		0.00		0.06		
PY	PY-13	Meade	30.891	1.471	SD601	355456	PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes		1.47	0.88			0.07	1.25		1.32	1.32						
PY	PY-14	Meade	26.904	22.216	SD601	355431	EaA	Eapa loam, 0 to 2 percent slopes					22.22				22.22	22.22				22.22	0.22	
PY	PY-14	Meade	26.904	4.377	SD601	355432	EaB	Eapa loam, 2 to 6 percent slopes		0.22			4.16				4.16	4.38				4.38	0.04	
PY	PY-14	Meade	26.904	0.311	SD601	355432	EaB	Eapa loam, 2 to 6 percent slopes		0.02			0.30				0.30	0.31				0.31	0.00	
PY	PY-15	Haakon	30.072	8.305	SD055	354131	OtA	Ottumwa silty clay, 0 to 3 percent slopes							0.58		0.58	8.30				8.30	0.66	
PY	PY-15	Haakon	30.072	1.179	SD055	354101	KmB	Kirley-Ottumwa complex, 2 to 6 percent slopes		0.12			0.11		0.11		0.11	1.18				1.18	0.01	
PY	PY-15	Haakon	30.072	11.366	SD055	354133	OvA	Ottumwa-Capa complex, 0 to 3 percent slopes		0.34					3.98		3.98	11.37					0.34	
PY	PY-15	Haakon	30.072	0.730	SD055	354083	CbA	Capa silt loam, 0 to 6 percent slopes		0.03			0.05		0.67		0.70	0.73						
PY	PY-15	Haakon	30.072	1.322	SD055	354094	KeA	Kirley clay loam, 0 to 2 percent slopes					0.07		0.07		0.07	1.32				1.32	0.07	
PY	PY-15	Haakon	30.072	3.069	SD055	354095	KeB	Kirley clay loam, 2 to 6 percent slopes		0.15			0.12		0.12		0.12	3.07				3.07	0.03	
PY	PY-15	Haakon	30.072	4.100	SD055	354101	KmB	Kirley-Ottumwa complex, 2 to 6 percent slopes		0.41			0.37		0.37		0.37	4.10				4.10	0.04	
PY	PY-16	Haakon	30.421	24.272	SD055	354132	OtB	Ottumwa silty clay, 3 to 6 percent slopes		1.21					1.21		1.21	24.27				24.27	1.21	
PY	PY-16	Haakon	30.421	4.172	SD055	354131	OtA	Ottumwa silty clay, 0 to 3 percent slopes							0.29		0.29	4.17				4.17	0.33	
PY	PY-16	Haakon	30.421	1.977	SD055	354131	OtA	Ottumwa silty clay, 0 to 3 percent slopes							0.14		0.14	1.98				1.98	0.16	
PY	PY-17	Jones	30.062	2.838	SD075	353643	LaB	Lakoma silty clay, 3 to 6 percent slopes		2.70			0.09		0.11		0.14	2.84				2.84	0.03	
PY	PY-17	Jones	30.062	0.894	SD075	353644	LaC	Lakoma silty clay, 6 to 9 percent slopes		0.80			0.06		0.07		0.10	0.89		0.80			0.03	
PY	PY-17	Jones	30.062	0.302	SD075	353652	Mo	Mosher silt loam					0.27		0.28		0.28	0.30					0.01	
PY	PY-17	Jones	30.062	3.160	SD075	353642	Kp	Kolls silty clay, ponded										3.16					3.16	
PY	PY-17	Jones	30.062	4.648	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					4.42		0.28		4.55	4.65				4.65	0.09	
PY	PY-17	Jones	30.062	0.308	SD075	353641	Ko	Kolls silty clay					0.02		0.01		0.02	0.31					0.29	
PY	PY-17	Jones	30.062	10.233	SD075	353634	KeB	Kirley clay loam, 2 to 6 percent slopes					0.20		0.20		0.20	10.23				10.23	0.31	
PY	PY-17	Jones	30.062	5.401	SD075	353635	KeC	Kirley clay loam, 6 to 9 percent slopes		0.54								5.13		5.13	0.27	5.40		
PY	PY-17	Jones	30.062	0.181	SD075	353645	LaD	Lakoma silty clay, 6 to 15 percent slopes		0.16			0.02		0.01		0.02	0.17		0.15	0.01		0.01	
PY	PY-17	Jones	30.062	2.098	SD075	353633	KeA	Kirley clay loam, 0 to 2 percent slopes					0.04		0.04		0.04	2.10				2.10	0.06	
PY	PY-18	Jones	29.992	10.971	SD075	353622	Bu	Bullcreek clay, 0 to 6 percent slopes		0.22			10.20		10.42		10.75	10.97						
PY	PY-18	Jones	29.992	19.021	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					18.07		1.14		18.64	19.02				19.02	0.38	
PY	PY-19	Tripp	30.005	23.686	SD123	354413	MoB	Millboro silty clay, 3 to 6 percent slopes		0.71	0.24		21.32		1.89		22.03	23.45			0.24	23.69	0.24	
PY	PY-19	Tripp	30.005	1.111	SD123	354372	BmC	Boro-Millboro silty clays, 5 to 9 percent slopes		0.13			0.47				0.47	1.11		0.97		1.11	0.02	
PY	PY-19	Tripp	30.005	4.309	SD123	354412	MoA	Millboro silty clay, 0 to 3 percent slopes					4.27		0.30		4.27	4.31				4.31	0.09	
PY	PY-19	Tripp	30.005	0.112	SD123	354465	Wn	Witten silty clay					0.11		0.01		0.11	0.11				0.11	0.00	
PY	PY-19	Tripp	30.005	0.786	SD123	354379	Cc	Carter silty clay loam		0.04			0.74		0.67		0.78	0.79					0.02	
PY	PY-20	Tripp	30.005	1.485	SD123	354454	VdC	Valentine-Dunday complex, 3 to 9 percent slopes	0.01	0.06	1.46								1.41		0.06		0.01	
PY	PY-20	Tripp	30.005	1.371	SD123	354395	HbA	Holt-Anselmo fine sandy loams, 0 to 3 percent slopes		0.88	1.29										0.05		0.01	
PY	PY-20	Tripp	30.005	25.418	SD123	354387	DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded	0.25	0.25	24.66								24.66		0.25		0.25	
PY	PY 20	Tripp	30.005	1.731	SD123	354454	VdC	Valentine-Dunday complex, 3 to 9 percent slopes	0.02	0.07	1.70								1.64		0.07		0.02	
SA	SA-05	Harding	5.017	2.090	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		2.09	1.11	0.08		0.06	1.71		1.80	1.94		0.31				
SA	SA-05	Harding	5.017	0.925	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.84	0.36				0.74		0.74	0.81		0.03				
SA	SA-05	Harding	5.017	1.377	SD063	355772	PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes		1.38	0.73	0.06		0.06	1.13		1.18	1.28		0.21				
SA	SA-05	Harding	5.017	0.625	SD063	355723	BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes		0.57	0.24				0.50		0.50	0.55		0.02				
SA	SA-06	Meade	5.013	1.115	SD601	355416	AbC	Abor silty clay, 6 to 9 percent slopes		1.12			1.00				1.00	1.12		1.12		1.12		
SA	SA-06	Meade	5.013	0.005	SD601	355430	DeC	Delridge-Cabbart loams, 6 to 15 percent slopes		0.00	0.00		0.00		0.00		0.00	0.00		0.00				
SA	SA-06	Meade	5.013	3.873	SD601	355438	GaA	Gerdrum loam, 0 to 4 percent slopes		0.35			0.12		3.52		3.52	3.76						
SA	SA-06	Meade	5.013	0.020	SD601	355416	AbC	Abor silty clay, 6 to 9 percent slopes		0.02			0.02				0.02	0.02		0.02		0.02		
SA	SA-07	Jones	4.986	3.220	SD075	353669	PrB	Promise clay, 3 to 6 percent slopes					3.06		0.19		3.16	3.22				3.22	0.06	
SA	SA-07	Jones	4.986	1.766	SD075	353668	PrA	Promise clay, 0 to 3 percent slopes					1.66		0.11		1.73	1.77				1.77	0.04	
SA	SA-08	Tripp	5.026	1.270	SD123	354395	HbA	Holt-Anselmo fine sandy loams, 0 to 3 percent slopes		0.81	1.19										0.05		0.01	
SA	SA-08	Tripp	5.026	3.756	SD123	354462	WgB	Wewela fine sandy loam, 3 to 6 percent slopes		3.38	0.19		0.04		0.04	0.04	0.04	3.42			0.04		0.04	

Keystone XL Steele City Segment
South Dakota Soils Summary
Prepared: 2009-08-14

Centerline Summary

County	Length (mi)	Shallow Bedrock (mi)	Percent of County	All Shallow Restictive Layers (mi)	Percent of County	Drought Prone (mi)	Percent of County	Steeply Sloping (mi)	Percent of County	Saline (mi)	Percent of County	Sodic (mi)	Percent of County	Saline-Sodic (mi)	Percent of County	Low or High pH (mi)	Percent of County	Low Revegetation Potential (mi)	Percent of County	Compaction Prone (mi)	Percent of County	Severe Wind Erodible (mi)	Percent of County	Severe Water Erodible (mi)	Percent of County	Stony or Rocky (mi)	Percent of County	Prime Farmland (mi)	Percent of County	Hydric (mi)	Percent of County
Harding	71.39	0.96	1.3%	58.19	81.5%	31.15	43.6%	9.44	13.2%	2.73	3.8%	2.77	3.9%	31.17	43.8%		0.0%	36.56	51.2%	44.87	62.8%	3.94	5.5%	20.81	29.1%	1.88	2.6%	4.26	6.0%	0.52	0.7%
Butte	3.73		0.0%	1.04	28.0%	1.71	45.8%	0.74	19.7%	0.22	6.0%	0.06	1.6%	1.48	39.6%		0.0%	1.54	41.3%	1.65	44.2%	1.18	31.7%	1.04	27.9%	0.38	10.1%		0.0%	0.00	0.1%
Perkins	15.34		0.0%	13.61	88.3%	4.10	26.9%	1.27	8.3%	1.54	10.1%	0.52	3.4%	8.68	57.0%		0.0%	10.46	68.6%	11.99	78.6%	0.15	1.0%	2.99	19.6%	0.39	2.5%	1.61	10.5%	0.06	0.4%
Meade	52.72		0.0%	31.82	60.4%	4.00	7.6%	6.83	13.0%	20.33	38.6%	1.12	2.1%	12.52	23.8%		0.0%	32.93	62.5%	48.56	92.1%	0.21	0.4%	19.62	37.2%	0.83	1.6%	20.74	39.3%	0.14	0.3%
Pennington	0.38		0.0%		0.0%	0.28	72.7%		0.0%	0.06	14.8%	0.00	0.8%	0.01	1.4%	0.00	0.8%	0.06	15.5%	0.06	15.5%	0.28	72.7%		0.0%	0.03	7.0%	0.06	15.5%	0.25	66.6%
Haakon	58.94		0.0%	22.28	37.8%	4.06	6.9%	5.49	9.3%	4.30	7.3%	0.08	0.1%	4.23	7.2%	0.08	0.1%	6.77	11.5%	57.54	97.6%		0.0%	19.93	33.8%	1.95	3.3%	91.36	53.2%	1.59	2.7%
Jones	40.09		0.0%	23.41	58.4%		0.0%	1.90	4.7%	19.74	49.2%		0.0%	3.33	8.3%		0.0%	20.40	50.9%	39.17	97.7%		0.0%	20.87	52.1%	0.89	2.2%	14.47	36.1%	1.29	3.2%
Lyman	11.90		0.0%	2.46	20.7%	0.05	0.4%	1.42	11.9%	8.95	75.2%		0.0%	0.93	7.8%		0.0%	9.48	79.7%	11.77	98.9%	0.00	0.0%	3.35	27.3%	0.05	0.4%	7.83	65.8%	0.35	2.9%
Tripp	58.73	0.21	0.4%	14.53	24.3%	20.08	33.5%	7.72	12.9%	16.32	27.3%	0.83	1.4%	3.52	5.9%	0.98	1.6%	17.55	29.4%	36.53	61.7%	9.85	16.5%	19.27	32.3%	2.86	4.8%	25.81	43.2%	0.96	1.6%
Grand Total	314.13	1.17	0.4%	167.85	53.3%	65.36	20.8%	34.81	11.1%	74.18	23.6%	5.37	1.7%	65.97	21.0%	1.06	0.3%	135.75	43.2%	252.14	80.3%	15.60	5.0%	107.79	34.3%	9.24	2.9%	106.12	33.8%	5.17	1.6%

Access Road Summary

County	Length (mi)	Shallow Bedrock (mi)	Percent of County	All Shallow Restictive Layers (mi)	Percent of County	Drought Prone (mi)	Percent of County	Steeply Sloping (mi)	Percent of County	Saline (mi)	Percent of County	Sodic (mi)	Percent of County	Saline-Sodic (mi)	Percent of County	Low or High pH (mi)	Percent of County	Low Revegetation Potential (mi)	Percent of County	Compaction Prone (mi)	Percent of County	Severe Wind Erodible (mi)	Percent of County	Severe Water Erodible (mi)	Percent of County	Stony or Rocky (mi)	Percent of County	Prime Farmland (mi)	Percent of County	Hydric (mi)	Percent of County
Harding	10.84	0.26	2.4%	8.90	82.2%	4.19	38.7%	1.54	14.2%	0.44	4.0%	0.41	3.8%	5.73	52.9%		0.0%	6.58	60.7%	8.10	74.7%	0.22	2.1%	2.96	27.3%	0.54	5.0%	0.58	5.4%	0.08	0.7%
Perkins	6.82		0.0%	6.44	94.5%	1.73	25.4%	0.92	13.5%	0.16	2.3%	0.46	6.7%	4.45	65.3%		0.0%	5.07	74.4%	5.62	82.4%	0.01	0.2%	1.34	19.7%	0.01	0.1%	0.34	4.9%	0.01	0.2%
Meade	3.89		0.0%	0.17	4.5%	0.09	2.3%	0.08	2.1%	2.05	52.6%		0.0%	0.91	23.3%		0.0%	2.95	75.9%	3.02	77.7%	0.09	2.3%	0.10	2.6%	0.00	0.1%	1.43	36.8%	0.03	0.7%
Haakon	1.70		0.0%	0.85	50.0%	0.18	10.7%	0.73	43.0%	0.36	21.4%	0.00	0.2%	0.05	3.0%	0.00	0.2%	0.37	21.6%	1.39	81.7%		0.0%	1.04	61.5%	0.32	18.7%	0.64	38.0%	0.02	1.5%
Lyman	1.66		0.0%	0.83	50.3%	0.09	5.2%	0.60	36.5%	0.99	59.9%		0.0%	0.32	19.2%		0.0%	1.02	61.2%	1.55	93.7%	0.00	0.1%	0.88	52.9%	0.08	4.6%	0.43	25.9%	0.02	1.2%
Tripp	3.30		0.0%	1.68	51.0%	0.31	9.5%	1.58	47.8%	0.36	10.8%		0.0%	0.25	7.7%		0.0%	0.36	10.8%	3.00	91.0%		0.0%	2.28	69.3%	0.31	9.5%	0.95	28.9%	0.07	2.0%
Grand Total	28.20	0.26	0.9%	18.86	67.0%	6.59	23.4%	5.45	19.3%	4.33	15.4%	0.87	3.1%	11.71	41.5%	0.00	0.0%	16.33	57.9%	22.68	80.4%	0.33	1.2%	8.61	30.5%	1.26	4.5%	4.36	15.5%	0.22	0.8%

Facilities Summary

Type	County	Mapunit Acres	Shallow Bedrock (ac)	Percent of County	All Shallow Restictive Layers (ac)	Percent of County	Drought Prone (ac)	Percent of County	Steeply Sloping (ac)	Percent of County	Saline (ac)	Percent of County	Sodic (ac)	Percent of County	Saline-Sodic (ac)	Percent of County	Low or High pH (ac)	Percent of County	Low Revegetation Potential (ac)	Percent of County	Compaction Prone (ac)	Percent of County	Severe Wind Erodible (ac)	Percent of County	Severe Water Erodible (ac)	Percent of County	Stony or Rocky (ac)	Percent of County	Prime Farmland (ac)	Percent of County	Hydric (ac)	Percent of County
CC	Tripp	80.04		0.0%	2.70	3.4%	0.55	0.7%		0.0%	69.31	86.6%		0.0%	5.54	6.9%		0.0%	70.95	88.6%	79.49	99.3%		0.0%	7.64	9.5%	0.55	0.7%	80.04	100.0%	1.05	1.3%
	Total	80.04		0.0%	2.70	3.4%	0.55	0.7%		0.0%	69.31	86.6%		0.0%	5.54	6.9%		0.0%	70.95	88.6%	79.49	99.3%		0.0%	7.64	9.5%	0.55	0.7%	80.04	100.0%	1.05	1.3%
CY	Harding	30.10		0.0%	28.57	94.9%	8.94	29.7%	0.41	1.3%	6.41	21.3%	0.41	1.3%	24.80	82.4%		0.0%	25.21	83.8%	27.59	91.7%	0.51	1.7%	12.40	41.2%		0.0%		0.0%		0.0%
	Meade	30.35		0.0%	27.41	90.3%	5.47	18.0%	1.87	6.2%	0.13	0.4%	2.06	6.8%	19.73	65.0%	2.81	9.3%	21.93	72.3%	23.28	76.7%		0.0%	4.40	14.5%	0.47	1.5%		0.0%	0.13	0.4%
	Haakon	30.12		0.0%	17.20	57.1%	0.04	0.1%	2.69	8.9%	0.60	2.0%	0.03	0.1%	0.32	1.1%	0.03	0.1%	0.90	3.0%	23.48	78.0%		0.0%	23.01	76.4%	6.84	22.0%		0.0%	0.22	0.7%
	Total	90.57		0.0%	73.18	80.8%	14.45	16.0%	4.97	5.5%	7.14	7.9%	2.50	2.8%	44.86	49.5%	2.84	3.1%	48.03	53.0%	74.35	82.1%	0.51	0.6%	39.81	44.0%	7.11	7.8%		0.0%	0.35	0.4%
MLV	Harding	0.06		0.0%	0.06	100.0%	0.03	53.0%	0.00	4.0%		0.0%	0.00	4.0%	0.05	82.0%		0.0%	0.05	86.0%	0.05	93.0%		0.0%	0.01	15.0%		0.0%		0.0%		0.0%
	Perkins	0.03		0.0%	0.03	100.0%	0.01	30.0%		0.0%		0.0%		0.0%	0.03	95.0%		0.0%	0.03	95.0%	0.03	100.0%		0.0%		0.0%		0.0%		0.0%		0.0%
	Meade	0.68		0.0%	0.02	90.0%		0.0%		0.0%	0.02	70.0%		0.0%		0.0%		0.0%	0.02	70.0%	0.03	100.0%		0.0%	0.00	5.0%		0.0%	0.08	100.0%		0.0%
	Haakon	0.06		0.0%	0.03	46.0%	0.03	47.5%	0.00	3.0%	0.00	2.0%		0.0%	0.00	3.0%		0.0%	0.00	4.0%	0.06	100.0%		0.0%	0.03	47.5%		0.0%	0.03	50.0%	0.00	1.5%
	Lyman	0.03		0.0%	0.00	4.0%		0.0%		0.0%	0.03	93.0%		0.0%	0.00	4.0%		0.0%	0.03	97.0%	0.03	100.0%		0.0%		0.0%		0.0%	0.03	100.0%	0.00	3.0%
	Tripp	0.03		0.0%	0.00	3.0%	0.00	3.0%		0.0%	0.00	3.0%		0.0%	0.00	3.0%		0.0%	0.00	3.0%	0.03	100.0%		0.0%	0.02	90.0%	0.00	3.0%	0.03	100.0%	0.00	4.0%
	Total	0.32		0.0%	0.18	61.1%	0.06	20.3%	0.00	1.3%	0.05	21.2%	0.00	1.0%	0.07	24.0%		0.0%	0.32	55.0%	0.22	98.2%		0.0%	0.06	27.5%	0.00	0.4%	0.11	50.0%	0.00	1.3%
PS	Harding	12.43		0.0%	12.14	97.7%	0.13	49.4%	0.37	3.0%		0.0%	0.37	3.0%	10.12	81.5%		0.0%	10.49	84.4%	11.39	91.7%		0.0%	1.48	11.9%		0.0%		0.0%		0.0%
	Meade	5.01		0.0%	1.26	25.1%		0.0%		0.0%	3.25	64.9%		0.0%	1.34	26.8%		0.0%	3.87	77.4%	5.01	100.0%		0.0%	0.28	5.6%		0.0%	3.48	69.6%		0.0%
	Haakon	4.99		0.0%	1.50	30.0%		0.0%		0.0%	0.10	2.0%		0.0%	0.20	4.0%		0.0%	0.20	4.0%	4.99	100.0%		0.0%		0.0%		0.0%	4.99	100.0%	0.05	1.0%
	Tripp	12.90		0.0%	3.61	28.0%	4.88	36.3%	0.88	6.9%	3.67	28.6%		0.0%	0.07	0.6%		0.0%	3.74	29.0%	8.04	62.3%		0.0%	7.08	54.8%	0.28	2.2%	5.05	39.1%	0.26	2.0%
	Total	35.33		0.0%	18.54	52.5%	10.62	30.6%	1.25	3.5%	7.02	19.9%	0.37	1.0%	13.74	38.9%		0.0%	18.11	51.3%	29.44	88.8%		0.0%	8.83	25.0%	0.28	0.8%	13.58	38.3%	0.31	0.9%
PY	Harding	88.89		0.0%	73.55	81.7%	28.21	31.3%	10.57	11.8%	1.70	1.9%	2.20	2.4%	24.56	27.3%		0.0%	28.46	31.8%	40.97	45.5%	3.49	3.9%	23.93	26.6%	0.31	0.3%	28.99	32.2%	0.36	0.4%
	Meade	57.79		0.0%	7.05	12.2%	0.68	1.5%		0.0%	48.82	84.5%	0.07	0.1%	5.76	10.0%		0.0%	54.51	94.3%	57.50	99.5%		0.0%	0.00	0.0%		0.0%	51.37	88.9%	0.17	0.3%
	Haakon	60.49		0.0%	2.27	3.7%		0.0%		0.0%	0.72	1.2%		0.0%	7.54	12.5%		0.0%	7.57	12.5%	60.48	100.0%		0.0%		0.0%		0.0%	48.40	80.0%	2.86	4.7%
	Tripp	80.01	0.29	0.5%	2.14	3.6%	29.33	48.9%		0.0%	26.90	44.8%		0.0%	2.87	4.8%		0.0%	27.65	46.1%	29.77	49.6%	27.71	46.2%	0.87	1.6%	0.67	1.1%	29.22	48.7%	0.66	1.1%
	Total	268.27	0.29	0.1%	85.01	31.7%	58.42	21.8%	10.57	3.9%	78.14	29.1%	2.28	0.8%	40.73	15.2%		0.0%	116.19	44.1%	188.73	70.3%	31.20	11.6%	24.80	9.3%	0.99	0.4%	157.97	58.9%	4.15	1.5%
GA	Harding	5.02		0.0%	4.88	97.2%	2.44	48.7%	0.14	2.8%		0.0%	0.14	2.8%	4.08	81.4%		0.0%	4.22	84.1%	4.59	91.5%		0.0%	0.57	11.3%		0.0%		0.0%		0.0%
	Meade	5.01		0.0%	1.49	29.7%	0.00	0.0%		0.0%	1.14	22.7%		0.0%	3.53	70.5%		0.0%	4.55	90.7%	4.90	97.7%		0.0%	1.14	22.7%		0.0%	1.14	22.6%		0.0%
	Tripp	5.03		0.0%	4.19	83.4%	1.38	27.5%		0.0%	0.04	0.7%		0.0%	0.04	0.7%	0.04	0.7%	0.04	0.7%	3.42	68.0%		0.0%		0.0%	0.09	1.8%		0.0%	0.05	1.0%
	Total	15.06		0.0%	10.56	70.1%	3.82	25.4%	0.14	0.9%	1.18	7.8%	0.14	0.9%	7.65	50.8%	0.04	0.2%	8.81	58.5%	12.90	85.7%		0.0%	1.71	11.3%	0.09	0.6%	1.14	7.5%	0.05	0.3%
	Grand Total	489.49	0.29	0.1%	190.12	38.8%	88.13	18.0%	16.94	3.5%	162.82	33.3%	5.28	1.1%	110.99	22.6%	2.87	0.6%	264.21	54.0%	385.13	78.7%	31.71	6.5%	82.95	16.9%	3.01	1.8%	352.78	51.6%	5.91	1.2%

3-24

Data Request:

Provide definitions of the soil limitations discussed in the application. The definitions should identify the soil properties and ranges in properties used to place soils within a certain limitation category (e.g., slight, moderate, and severe limitations due to slope, ranges in electrical conductivity for salinity, and Sodium Adsorption Ratio for sodicity).

Response:

The soil assessment for the proposed project is based on SSURGO database review and analyses. As noted in DR 3-23, a table generated from GIS for the updated centerline (2/15/09) provided soil limitation information. The following soil limitation categories provided in the application are:

Severe Wind Erodible Soils - Includes all soils in WEG of 1, 2, 3.

Severe Water Erodible Soils - Slopes >8% with a Kw>0.24 and all slope greater than 15%

Low Reclamation Potential Soils – pH less than 3.5 (very acidic) greater than 8.5 (very alkaline)

Criteria	Saline	Sodic	Saline-Sodic
EC (mmhos/cm)	> 4	< 4	> 4
SAR	< 13	> 13	> 13

Prime Farmland - Includes land listed by the NRCS (2007) as potential prime farmland if adequate protection from flooding and adequate drainage are provided.

Hydric Soils – As designated by the NRCS (yes/no)

Compaction Prone Soils- Includes soils that have clay loam or finer textures

Response prepared by: Scott Patti, AECOM

3-24 (Continued)

Stony/Rocky Soils - Includes soils that have either: 1) a cobbly, stony, bouldery, gravelly, channery, flaggy, or shaly modifier to the textural class, or 2) have >five percent (weight basis) of stones larger than three inches in the surface layer.

Shallow Bedrock - Includes soils that have lithic bedrock within 60 inches of the soil surface.

Droughty Soils - Includes coarse-textured soils (sandy loams and coarser) that are well drained or excessively drained.

These interpretations were based on data available within the SSURGO database. SSURGO data were downloaded for each county crossed and run in GIS for the proposed project locations. Soil characteristics, identified above, for each soil component within a map unit were then identified within the Access database. The Soil Data Viewer extension for SSURGO only allows limited analysis and can get as specific as the Access data base (not able to pull out information on minor components), and therefore was not used for this in-depth analysis.

Response prepared by: Scott Patti, AECOM