

Pipeline Failure Investigation Report

Pipeline System: Dell Rapids Distribution **Operator:** MidAmerican Energy
Operator ID: 30750 **Unit Number:** _____ **Activity Number:** _____
Location: 400 Block of Beach Ave, Dell Rapids, SD **Date of Occurrence:** 9/24/2020
Material Released: Natural Gas **Quantity:** 10.7 Mcfh
PHMSA Arrival Time & Date: NA **Total Damages \$:** 350,000
Investigation Responsibility: State PHMSA NTSB Other _____

	Company Reported Apparent Cause:	Company Reported Sub-Cause (from PHMSA Form 7000-1/7100.2):
	Corrosion	
	Natural Force Damage	
x	Excavation Damage	Operator error (contractor error)
	Other Outside Force Damage	
	Material Failure (Pipe, Joint, Weld)	
	Equipment Failure	
	Incorrect Operation	
	Other	

	Accident/Incident Resulted in (check all that apply):	Comments:
	Rupture	
x	Leak	
x	Fire	
	Explosion	
x	Evacuation (by bx Civil & Construction)	Number of Persons: <u>3</u> Area: _____

<i>Narrative Summary</i>
<p>Short summary of the Incident/Accident scenario</p> <p>A third-party contractor (BX Civil & Construction) was installing curb and gutter when the machine they were using struck a 2" PE gas main operating at 45 psig causing blowing gas. The gas ignited and damaged the curb and gutter machine. There were no injuries or explosions. One residence was evacuated briefly for a precaution. One customer (LG Everest) was affected by the squeeze off to isolate the damage but were not currently using gas.</p> <p>The fire department responded to a fire on site. MEC was not initially notified of the fire and responded when notified at approximately 9:36 p.m. The main was isolated that evening at 11:15 pm by completing a squeeze of and then cutting and capping the main.</p> <p>MidAmerican confirmed the contractor's estimate of damage of \$350,000 at 10:45 a.m. 9/25/20.</p> <p>Repairs complete 9/25/20, which consisted of installing a new segment of main.</p>

Region/State: South Dakota

Reviewed by: _____

Principal Investigator: Mary Zanter

Title: Pipeline Safety Program Manager

Date: 9/28/2020

Date: _____

Pipeline Failure Investigation Report

Failure Location & Response			
Location (City, Township, Range, County/Parish): Dell Rapids, Minnehaha County			(Acquire Map)
Address or M.P. on Pipeline: 400 Block of Beach Ave	(1)	Type of Area (Rural, City): City	(1)
Coordinates of failure location (Latitude):		(Longitude):	
Date: 9/24/2020	Time of Failure: 9:19 pm (911 call)		
Time Detected: 9:19 pm (911 call)		Time Located:	
How Located:			
NRC Report #: 1288446	(Attach Report)	Time Reported to NRC: 12:38 pm ET	Reported by: Chris Payer, MEC
Type of Pipeline:			
Gas Distribution	Gas Transmission	Hazardous Liquid	___ LNG
<input type="checkbox"/> LP	<input type="checkbox"/> Interstate Gas	<input type="checkbox"/> Interstate Liquid	
<input type="checkbox"/> Municipal	<input type="checkbox"/> Intrastate Gas	<input type="checkbox"/> Intrastate Liquid	
<input checked="" type="checkbox"/> Public Utility	<input type="checkbox"/> Gas Gathering	<input type="checkbox"/> Offshore Liquid	
<input type="checkbox"/> Master Meter	<input type="checkbox"/> Offshore Gas	<input type="checkbox"/> Liquid Gathering	
	<input type="checkbox"/> Offshore Gas - High H ₂ S	<input type="checkbox"/> CO ₂	
		<input type="checkbox"/> Low Stress Liquid	
		<input type="checkbox"/> HVL	
Pipeline Configuration (Regulator Station, Pump Station, Pipeline, etc.):			

Operator/Owner Information			
Owner: MidAmerican Energy	Operator: same		
Address: 666 Grand Avenue, Suite 500 P.O. Box 657 Des Moines, IA 50306-0657 Timothy.Whipple@midamerican.com	Address:		
Company Official: Timothy Whipple	Company Official:		
Phone No.: 515-242-4047 Fax No.:	Phone No.	Fax No.	
<u>Drug and Alcohol Testing Program Contacts</u>			_x_ N/A
Drug Program Contact & Phone:			
Alcohol Program Contact & Phone:			

Pipeline Failure Investigation Report

Damages	
Product/Gas Loss or Spill ⁽²⁾ 10.7 Mcfh Amount Recovered NA Estimated Amount \$21.63	Estimated Property Damage \$350000 Associated Damages ⁽³⁾ \$5,255.40 (Emergency response and repair)
Description of Property Damage: Fire damaged a Power Curber 5700 C which is used to prepare an area of installation of curb and gutter.	
Customers out of Service: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Number: 1 Suppliers out of Service: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Number:	

Fatalities and Injuries					<input checked="" type="checkbox"/> N/A
Fatalities:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Company:	Contractor:	Public:
Injuries - Hospitalization:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Company:	Contractor:	Public:
Injuries - Non-Hospitalization:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Company:	Contractor:	Public:
Total Injuries (including Non-Hospitalization):			Company:	Contractor:	Public:
Name	Job Function	Yrs. w/ Comp.	Yrs. Exp.	Type of Injury	

Drug/Alcohol Testing					<input checked="" type="checkbox"/> N/A
Were all employees that could have contributed to the incident, post-accident tested within the 2 hour time frame for alcohol or the 32 hour time frame for all other drugs? <input type="checkbox"/> Yes <input type="checkbox"/> No					
Job Function	Test Date & Time	Location	Results		Type of Drug
			Pos	Neg	

System Description

 2 Initial volume lost or spilled
 3 Including cleanup cost

Pipeline Failure Investigation Report

<i>System Description</i>	
Describe the Operator's System:	

<i>Pipe Failure Description</i>		_x_ N/A
Length of Failure (inches, feet, miles):		(1)
Position (Top, Bottom, include position on pipe, 6 O'clock): (1)	Description of Failure (Corrosion Gouge, Seam Split):	(1)
Laboratory Analysis: ___ Yes ___ No		
Performed by:		
Preservation of Failed Section or Component: ___ Yes ___ No		
If Yes - Method:		
In Custody of:		
Develop a sketch of the area including distances from roads, houses, stress inducing factors, pipe configurations, direction of flow, etc. Bar Hole Test Survey Plot, if included, should be outlined with concentrations at test points.		

<i>Component Failure Description</i>		_x_ N/A
N/A		
Component Failed:	(1)	
Manufacturer:	Model:	
Pressure Rating:	Size:	
Other (Breakout Tank, Underground Storage):		

<i>Pipe Data</i>		_x_ N/A
Material: Polyethylene	Wall Thickness/SDR: 11.0 SDR	
Diameter (O.D.): 2"	Installation Date: 11/14/1994	
SMYS: NA	Manufacturer: Plexco	
Longitudinal Seam: NA	Type of Coating: NA	
Pipe Specifications (API 5L, ASTM A53, etc.): ASTM D2513		

<i>Joining</i>		_x_ N/A
Type:	Procedure:	
NDT Method:	Inspected: ___ Yes ___ No	

Pipeline Failure Investigation Report

<i>Pressure @ Time of Failure @ Failure Site</i> ___ N/A				
Pressure @ Failure Site: 45 psig			Elevation @ Failure Site: NA	
Pressure Readings @ Various Locations:				Direction from Failure Site
Location/M.P./Station #	Pressure (psig)	Elevation (ft msl)	Upstream	Downstream

<i>Upstream Pump Station Data</i> ___x___ N/A	
Type of Product:	API Gravity:
Specific Gravity:	Flow Rate:
Pressure @ Time of Failure ⁽⁴⁾	Distance to Failure Site:
High Pressure Set Point:	Low Pressure Set Point:

<i>Upstream Compressor Station Data</i> ___x___ N/A	
Specific Gravity:	Flow Rate:
Pressure @ Time of Failure ⁽⁴⁾	Distance to Failure Site:
High Pressure Set Point:	Low Pressure Set Point:

<i>Operating Pressure</i> ___ N/A	
Max. Allowable Operating Pressure: 50 psig	Determination of MAOP: 50.00 PSIG Pressure determined to be maximum safe pressure after considering the history particularly known corrosion and the actual operating pressure 192.619(a)(4)
Actual Operating Pressure: 45 psig	
Method of Over Pressure Protection: Regulator-Relief	
Relief Valve Set Point: 51 psig	Capacity Adequate? <input checked="" type="checkbox"/> Yes ___ No

<i>Integrity Test After Failure</i> ___x___ N/A	
Pressure test conducted in place? (Conducted on Failed Components or Associated Piping): ___ Yes ___ No	
If No, tested after removal? ___ Yes ___ No	
Method:	
Describe any failures during the test.	

<i>Soil/water Conditions @ Failure Site</i> ___x___ N/A	
Condition of and Type of Soil around Failure Site (Color, Wet, Dry, Frost Depth):	

⁴ Obtain event logs and pressure recording charts

Pipeline Failure Investigation Report

<i>Internal Pipe or Component Examination</i>		<u> x </u> <i>N/A</i>
Results of Gas and/or Liquid Analysis ⁽⁶⁾		
Internal Inspection Survey: <input type="checkbox"/> Yes <input type="checkbox"/> No	Results ⁽⁷⁾	
Did the Operator have knowledge of Corrosion before the Incident? <input type="checkbox"/> Yes <input type="checkbox"/> No		
How Discovered? (Instrumented Pig, Coupon Testing, ICDA, etc.):		

<i>Outside Force Damage</i>		<u> </u> <i>N/A</i>
Responsible Party: BX Civil & Construction	Telephone No.: (605) 428-5483	
Address: 24663 475 th Avenue, Dell Rapids, SD 57022		
Work Being Performed: Preparing surface for curb and gutter.		
Equipment Involved: 5700C Power Curber ⁽¹⁾	Called One Call System? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
One Call Name: NA	One Call Report # ⁽⁸⁾ NA	
Notice Date: NA	Time: NA	
Response Date: NA	Time: NA	
Details of Response: NA		
Was Location Marked According to Procedures? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA – One Call was not contacted		
Pipeline Marking Type: ⁽¹⁾	Location: ⁽¹⁾	
State Law Damage Prevention Program Followed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> No State Law		
Notice Required: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Response Required: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Was Operator Member of State One Call? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Was Operator on Site? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Did a deficiency in the Public Awareness Program contribute to the accident? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Is OSHA Notification Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

<i>Natural Forces</i>	<u> x </u> <i>N/A</i>
Description (Earthquake, Tornado, Flooding, Erosion):	

6 Attach copy of gas and/or liquid analysis report
 7 Attach copy of internal inspection survey report
 8 Attach copy of one-call report

Pipeline Failure Investigation Report

Natural Forces	<u> </u> <i>x</i> <u> </u> N/A

Failure Isolation	<u> </u> N/A
Squeeze Off/Stopple Location and Method: Main was squeezed off approximately 50 feet north of the north curb line of 4 th Avenue to isolate the break. To the north was single fed so only one squeeze off was needed and the line was capped 95 feet north of the north curb line. (1)	
Valve Closed - Upstream: NA Time:	I.D.: M.P.:
Valve Closed - Downstream: NA Time:	I.D.: M.P.:
Pipeline Shutdown Method: <u> </u> <i>x</i> Manual <u> </u> Automatic <u> </u> SCADA <u> </u> Controller <u> </u> ESD	
Failed Section Bypassed or Isolated: NA	
Performed By: Toby Huber	Valve Spacing: NA

Odorization	<u> </u> N/A
Gas Odorized: <u> </u> <i>X</i> <u> </u> Yes <u> </u> No	Concentration of Odorant (Post Incident at Failure Site): 0.30
Method of Determination: <u> </u> <i>X</i> <u> </u> Yes <u> </u> No	% LEL: <u> </u> Yes <u> </u> <i>X</i> <u> </u> No % Gas In Air: <i>X</i> Yes <u> </u> No
Odor level test on 9/26/20	Time Taken: <u> </u> <i>X</i> <u> </u> Yes <u> </u> No 12:53 pm
Was Odorizer Working Prior to the Incident? <u> </u> <i>X</i> <u> </u> Yes <u> </u> No	Type of Odorizer (Wick, By-Pass): Pulse Bypass
Odorant Manufacturer: Arkema Model: Spotleak 1009	Type of Odorant: Mercaptan
Amount Injected: 1.01 pounds/Mmcf	Monitoring Interval (Weekly): Monthly
Odorization History (Leaks Complaints, Low Odorant Levels, Monitoring Locations, Distances from Failure Site): No history of leaks in area. 10/26/94 leak repair due to a contractor hit line at 613 North Beach Ave.	

Weather Conditions	<u> </u> N/A
Temperature: approx.. 70 degrees	Wind (Direction & Speed): from east approx. 2 mph
Climate (Snow, Rain): clear	Humidity:
Was Incident preceded by a rapid weather change? <u> </u> Yes <u> </u> <i>x</i> <u> </u> No	
Weather Conditions Prior to Incident (Cloud Cover, Ceiling Heights, Snow, Rain, Fog): Nothing significant	

Pipeline Failure Investigation Report

Gas Migration Survey __ N/A	
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Bar Hole Test of Area: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Equipment Used: BTI Gas Rover CGI 0303-053598
Method of Survey (Foundations, Curbs, Manholes, Driveways, Mains, Services) ⁽⁹⁾ (1) Mobile Leak Survey performed 9/26/20 with OMD 250 1095. No leaks found. A walking leak survey of main and services was completed with FI unit 10102 on 9/26/20 with no leaks found. Bar hole survey along Beach Avenue from 4 th street north on 10/1/20 did not find any leaks.	

Environment Sensitivity Impact _x_ N/A	
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Location (Nearest Rivers, Body of Water, Marshlands, Wildlife Refuge, City Water Supplies that could be or were affected by the medium loss) (1)	
OPA Contingency Plan Available? <input type="checkbox"/> Yes <input type="checkbox"/> No	Followed? <input type="checkbox"/> Yes <input type="checkbox"/> No

Class Location/High Consequence Area __ N/A	
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Class Location: 1 __ 2 __ 3 <input checked="" type="checkbox"/> 4 __ Determination:	HCA Area? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Determination:
Odorization Required? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	

Pressure Test History __ N/A <i>(Expand List as Necessary)</i>						
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	Req'd ⁽¹⁰⁾ Assessment Deadline Date	Test Date	Test Medium	Pressure (psig)	Duration (hrs)	% SMYS
Installation	N/A	11/11/94	Unk	100 psig	1	N/A
Next	N/A					
Next						
Most Recent						

Describe any problems experienced during the pressure tests. None

Internal Line Inspection/Other Assessment History x_ N/A <i>(Expand List as Necessary)</i>					
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	Req'd ⁽¹⁰⁾ Assessment Deadline Date	Assessment Date	Type of ILI Tool ⁽¹¹⁾	Other Assessment Method ⁽¹²⁾	Indicated Anomaly If yes, describe below
Initial					<input type="checkbox"/> Yes <input type="checkbox"/> No
Next					<input type="checkbox"/> Yes <input type="checkbox"/> No
Next					<input type="checkbox"/> Yes <input type="checkbox"/> No

9 Plot on site description page

10 As required of Pipeline Integrity Management regulations in 49CFR Parts 192 and 195

11 MFL, TFI, UT, Combination, Geometry, etc.

12 ECDA, ICDA, SCCDA, "other technology," etc.

Pipeline Failure Investigation Report

<i>Internal Line Inspection/Other Assessment History</i> <input checked="" type="checkbox"/> N/A					
<i>(Expand List as Necessary)</i>					
Most Recent					__ Yes __ No
Describe any previously indicated anomalies at the failed pipe, and any subsequent pipe inspections (anomaly digs) and remedial actions.					

<i>Pre-Failure Conditions and Actions</i> <input checked="" type="checkbox"/> N/A
Was there a known pre-failure condition requiring ⁽¹⁰⁾ the operator to schedule evaluation and remediation? __ Yes (describe below or on attachment) __ No
If there was such a known pre-failure condition, had the operator established and adhered to a required ⁽¹⁰⁾ evaluation and remediation schedule? Describe below or on attachment. __ Yes __ No __ N/A
Prior to the failure, had the operator performed the required ⁽¹⁰⁾ actions to address the threats that are now known to be related to the cause of this failure? __ Yes __ No __ N/A List below or on an attachment such operator-identified threats, and operator actions taken prior to the accident.
Describe any previously indicated anomalies at the failed pipe, and any subsequent pipe inspections (anomaly digs) and remedial actions.

<i>Maps & Records</i> N/A
Are Maps and Records Current? ⁽¹³⁾ __x Yes __ No
Comments:

<i>Leak Survey History</i> <input checked="" type="checkbox"/> N/A
Leak Survey History (Trend Analysis, Leak Plots):

<i>Pipeline Operation History</i> <input checked="" type="checkbox"/> N/A
Description (Repair or Leak Reports, Exposed Pipe Reports):
Did a Safety Related Condition Exist Prior to Failure? __ Yes __ No Reported? __ Yes __ No
Unaccounted For Gas:

13 Obtain copies of maps and records

Pipeline Failure Investigation Report

Pipeline Operation History	<u> x </u> N/A
Over & Short/Line Balance (24 hr., Weekly, Monthly/Trend):	

Operator/Contractor Error					<u> x </u> N/A
Name:		Job Function:			
Title:		Years of Experience:			
Training (Type of Training, Background):					
Was the person "Operator Qualified" as applicable to a precursor abnormal operating condition? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A					
Was qualified individual suspended from performing covered task <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A					
Type of Error (Inadvertent Operation of a Valve):					
Procedures that are required:					
Actions that were taken:					
Pre-Job Meeting (Construction, Maintenance, Blow Down, Purging, Isolation):					
Prevention of Accidental Ignition (Tag & Lock Out, Hot Weld Permit):					
Procedures conducted for Accidental Ignition:					
Was a Company Inspector on the Job? <input type="checkbox"/> Yes <input type="checkbox"/> No					
Was an Inspection conducted on this portion of the job? <input type="checkbox"/> Yes <input type="checkbox"/> No					
Additional Actions (Contributing factors may include number of hours at work prior to failure or time of day work being conducted):					
Training Procedures:					
Operation Procedures:					
Controller Activities:					
Name	Title	Years Experience	Hours on Duty Prior to Failure	Shift	
Alarm Parameters:					
High/Low Pressure Shutdown:					
Flow Rate:					
Procedures for Clearing Alarms:					

Pipeline Failure Investigation Report

<i>Operator/Contractor Error</i>		<u> x </u> N/A
Type of Alarm:		
Company Response Procedures for Abnormal Operations:		
Over/Short Line Balance Procedures:		
Frequency of Over/Short Line Balance:		
Additional Actions:		

Pipeline Failure Investigation Report

Additional Actions Taken by the Operator

N/A

Make notes regarding the emergency and Failure Investigation Procedures (Pressure reduction, Reinforced Squeeze Off, Clean Up, Use of Evacuators, Line Purging, closing Additional Valves, Double Block and Bleed, Continue Operating downstream Pumps):

On 9/25/20, crew installed end caps on both portions of severed main. Later that day, 20 feet of 2" plastic main was replaced and a total of 90 feet relocated to deconflict with the paving project. 549 feet of main and service were pressure tested at 120 psig with air for 90 minutes and service was restored to one customer at 5:00 pm.

Photo Documentation ⁽¹⁾

Overall Area from best possible view. Pictures from the four points of the compass. Failed Component, Operator Action, Damages in Area, Address Markings, etc.

Photo No.	Description	Photo No.	Description
1		16	
2		17	
3		18	
4		19	
5		20	
6		21	
7		22	
8		23	
9		24	
10		25	
11		26	
12		27	
13		28	
14		29	
15		30	

Camera Type:

Pipeline Failure Investigation Report

Site Description

Provide a sketch of the area including distances from roads, houses, stress inducing factors, pipe configurations, etc. Bar Hole Test Survey Plot should be outlined with concentrations at test points. Photos should be taken from all angles with each photo documented. Additional areas may be needed in any area of this guideline.