

DOT US Department of Transportation
PHMSA Pipeline and Hazardous Materials Safety Administration
OPS Office of Pipeline Safety
Central Region

Principal Investigator James Bunn
Region Director David Barrett
Date of Report 05/12/2012
Subject Failure Investigation Report – Magellan 3rd Party Damage in MN

Operator, Location, & Consequences

Date of Failure 11/4/2003
Commodity Released Unleaded Gasoline
City/County & State Brandon/Douglas County, Minnesota
OpID & Operator Name 22610 Magellan Pipeline Company, LP
Unit # & Unit Name 10203 (WPL) Western MN from Rosemount [IA]
SMART Activity # 110695
Milepost / Location MP 14.23
Type of Failure Leak - Third Party Excavation Damage
Fatalities 0
Injuries 0
Description of Area Impacted Rural Farmland, non-HCA
Property Damage \$48,820

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Executive Summary

At approximately 9:00 pm on November 4, 2003, a leak occurred in Magellan's Pipeline Company, LP (Magellan) Line #1-6" Alexandria-Grand Forks pipeline. This leak occurred southwest of Brandon, MN (approximately 2 miles). The #1-6" pipeline begins at a terminal located in Marshall, MN and moves refined products to Fargo Terminal and on to the South Dakota state-line (near Watertown, SD). The leak was determined to be at MP 14.23 in Tract #5883. At this location, the #1-6" pipeline is located in a common corridor with the Magellan #2-8" pipeline. A tenant farmer operating a chisel plow struck and punctured the #1-6" pipeline. The chisel plow was initially left on the pipeline while the tenant farmer called 911. The 911 dispatcher notified the Douglas County Sheriff. The Douglas County Sheriff contacted the Magellan Control Center.

At the time of the call to the control center, the #1-6" pipeline was shutdown down due to normal operations and the #2-8" was running. The #2-8" pipeline was promptly shutdown by Magellan as a precautionary measure. The product in the pipeline did not ignite or explode when the hit transpired. The release did not happen in an HCA. No injuries, fatalities, or evacuations occurred. Approximately 24 barrels of unleaded gasoline were released and recovered resulting in 300 cubic yards of soil contamination and remediation. The pipeline leaked for approximately 6 hours before a clamp was installed.

The operator had not received prior notification of this specific excavation activity. A one-call ticket did not exist. The pipeline location was not marked with temporary flags or paint markings. Magellan was aware that Tract #5883 had shallow pipe (a minimum depth of cover of 9" was previously reported but field measurements after some ground disturbance indicated 17" in the immediate area). In September of 2003, Magellan had conversations with the tenant (approximately 6 weeks before the accident). During this conversation, the operator and tenant discussed future plans of the tenant to change plow depth from that of 13" to 18-20". The tenant indicated in an interview that he was unaware of the shallow pipe on this property but was aware that pipeline lowering projects for these pipeline assets had occurred on other properties in the area.

PHMSA Central Region Office had conversations with the landowner upon referral from the state partner. According to Magellan records, the landowner had received information about shallow pipe on an adjacent property regarding the #2-8". The landowner had not received information regarding shallow pipe on the #1-6". Magellan had identified the depth of cover on the #2-8" as a higher risk than the 1-6" and as a result the shallow cover on the #2-8" was to be addressed first. The #1-6" was scheduled for depth of cover improvements in 2004.

Both pipelines, the #1-6" and the 2-8", were later inspected for additional damages due to farming activity. The #1-6" pipeline was found to have several other excavation related damages. These were repaired with pre-tested pipe. No further damage was identified on the #2-8" pipeline.

System Details

Magellan Pipeline Company, LP operates over 5,000 miles of pipelines in 15 States. The #1-6" and the #2-8" run in parallel paths and a common corridor separated by a distance of approximately five feet in the area of the strike. The pipe used in the construction of the #1-6" pipeline was 6" diameter, 0.188" wall thickness, API 5L Grade B, 35000 SMYS, low frequency electric resistance welded (ERW) pipe manufactured by Republic Steel and installed in 1946. The pipe was coated with a coal tar enamel material and the pipeline had cathodic protection. The line was hydrostatically tested in 1987 at which time five failures occurred before the test was completed. The line was also hydrostatically tested in 2003 to a pressure of 1,470 psig without failure. There were no ILI inspections of the line prior to the

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hydro test in 2003. A computerized leak detection system did not exist for the pipeline facilities.

Both the #1-6" and the #2-8" were known by the operator to have areas of shallow pipe and the operator had implemented contact with various landowners and tenants in the area. Several pipeline relocation projects had already transpired on neighboring tracks of land.

Magellan took over the operation of these pipelines from Williams Pipe Line Company on August 19, 2003. Williams provided Magellan with a copy of their shallow line survey for these pipelines dated June 5, 1995. These surveys indicated that the depth of cover over the #1-6" pipeline in the field where the line was struck ranged from 9" to 48". This pipeline had been lowered in the fields upstream and downstream of the failure location in 1999. The pipeline was scheduled for lowering in 2004.

PHMSA data review did not reveal a significant history of excavation damage for this operator. MNOPS did investigate a previous accident involving the pipeline facilities in October of 1999. This incident occurred in Pope County near Brooten, MN (MNOPS case #2112). This investigation revealed 50 barrels of diesel were released due to a depth of cover issue. Upon further review of this case, it was determined that the policy in existence at that time of the 1999 accident was to lower all pipelines that had less than 12" of cover.

Events Leading up to the Failure

In September of 2003, Magellan had conversations with the tenant (approximately 6 weeks before the accident). During this conversation, the operator and tenant discussed future plans of the tenant to change plow depth from that of 13" to 18-20". The tenant indicated in an interview that he was unaware of the shallow pipe on this property but was aware that pipeline lowering projects for Magellan had occurred on other properties in the area.

According to Magellan records, the landowner had received information about shallow pipe on an adjacent property, Tract #5885, regarding the #2-8". The landowner had not received information regarding shallow pipe on the #1-6". Magellan had identified the depth of cover on the #2-8" as a higher risk than the 1-6" and as a result the #2-8" depth of cover was addressed first. The #1-6" was prioritized for depth of cover improvements in 2004. At the leak location, the #2-8" had been assessed previously and was determined to have adequate depth. The #2-8" would not require specific action at the leak location due to depth of cover.

The operator had not received prior notification of this specific excavation activity.

A tenant farmer who was operating a chisel plow in a field near Brandon, MN struck the Magellan #1-6" Alexandria –Grand Forks pipeline at approximately 9:00 pm on November 4, 2003. The tenant abandoned the plow and his tractor where it had struck the pipeline and called 911.

The MOP of the pipeline at the time of the failure was 1,062 psig and was established based on the 2003 hydrostatic test pressure (8 hour test). The metallurgical report indicated an MOP of 950 psig but this was an error. The 950 psig was actually the Alexandria's pump station discharge pressure maximum. The pressure at the time of failure was 163 psig at the location of the failure and the line was in a static condition when it was struck by the plow.

Emergency Response

The 911 dispatch notified the Douglas County Sheriff (Sheriff) of the reported leak shortly after 9:00 pm on November 4, 2003. The Sheriff contacted the Magellan Control Center concerning the leak at 9:20 pm and the Control Center shut down the #2-8" pipeline as a precautionary measure. The Control Center then contacted Magellan field personnel and made them aware of the situation. At 9:30 pm, the

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Control Center contacted the Fargo Terminal and opened a valve on the #1-6" pipeline to relieve pressure on the line and allow drain-up activities. Total drain-up activities were 457 barrels.

Field personnel closed the manual line isolation valve upstream of the leak location (MP 6+02) at 10:10 pm. Information gathering was started for the NRC report at 10:30 pm. The manual isolation valve downstream of the leak location was closed at 10:32 pm (MP 14+44). The portion of the line that was isolated was just over eight miles in length. The Minnesota Duty Officer was called at 10:45 pm and Magellan personnel arrived at the leak site at 11:00 pm. Atmospheric monitoring equipment was in place by 11:40 pm and by 12:01 am on November 5, 2003 the Sheriff, Fire Department and Magellan personnel had established hot, warm, and cold zones around the leak site. A boom truck with vacuum trailer was on site at 12:15 am. The NRC was contacted at 12:31 am (central time has been used for all time elements in this report). At 3:50 am, the tractor and plow were removed from the right-of-way and by 4:20 am a temporary clamp was placed over the puncture area. The estimated leak duration was around 6 hours.

Summary of Return to Service

Magellan stripped the cover from both the #1-6" and the #2-8" pipelines upstream of the leak site. This section of the line was exposed as previous depth of cover surveys indicated that this was the portion of the field where the depth of cover was likely to be insufficient. There was evidence that the #1-6" pipeline had been struck several times prior to this accident. The #2-8" pipeline did not reveal any previous sustained damage. The damaged portion of the #1-6" pipeline was removed and replaced with pretested pipe. The portion of the line that contained the leak or puncture was sent to a metallurgical laboratory for analysis. The pipeline was returned to service after the repairs were complete.

The landowner and Magellan agreed that Magellan would be notified anytime agricultural operations would take place on the right-of way. Magellan did a detailed depth of cover survey on both pipelines in this tract immediately following the accident.

Central Region inspectors continue to review depth of cover surveys during various types of inspections to confirm that Magellan has an adequate program in place to mitigate this type of risk.

Investigation Details

MNOPS conducted the investigation on behalf of PHMSA Central Region and MNOPS personnel arrived at the site on November 5, 2003. PHMSA Central Region office had conversations with the landowner upon referral from the state partner. A one-call ticket did not exist and the pipeline location was not marked with temporary flags or paint markings. Information and basic training regarding one-call was provided to the landowner by PHMSA Central Region.

Findings & Contributing Factors

Based on the Magellan internal investigation and MNOPS independent investigation efforts, it was determined that Magellan had been aware for some time that the depth of cover over the #1-6-inch line on Tract #5883 was not sufficient to support normal agricultural operations. The depth of cover in the area of the strike was between 9" and 17".

Magellan's procedures require a separation of at least 6" between the top of the pipe and the maximum depth of penetration by agricultural equipment. Magellan's procedures require them to notify the landowner when this separation cannot be maintained and require them to make arrangements to mitigate the potential hazard. Magellan had contact with the tenant where the line was struck in

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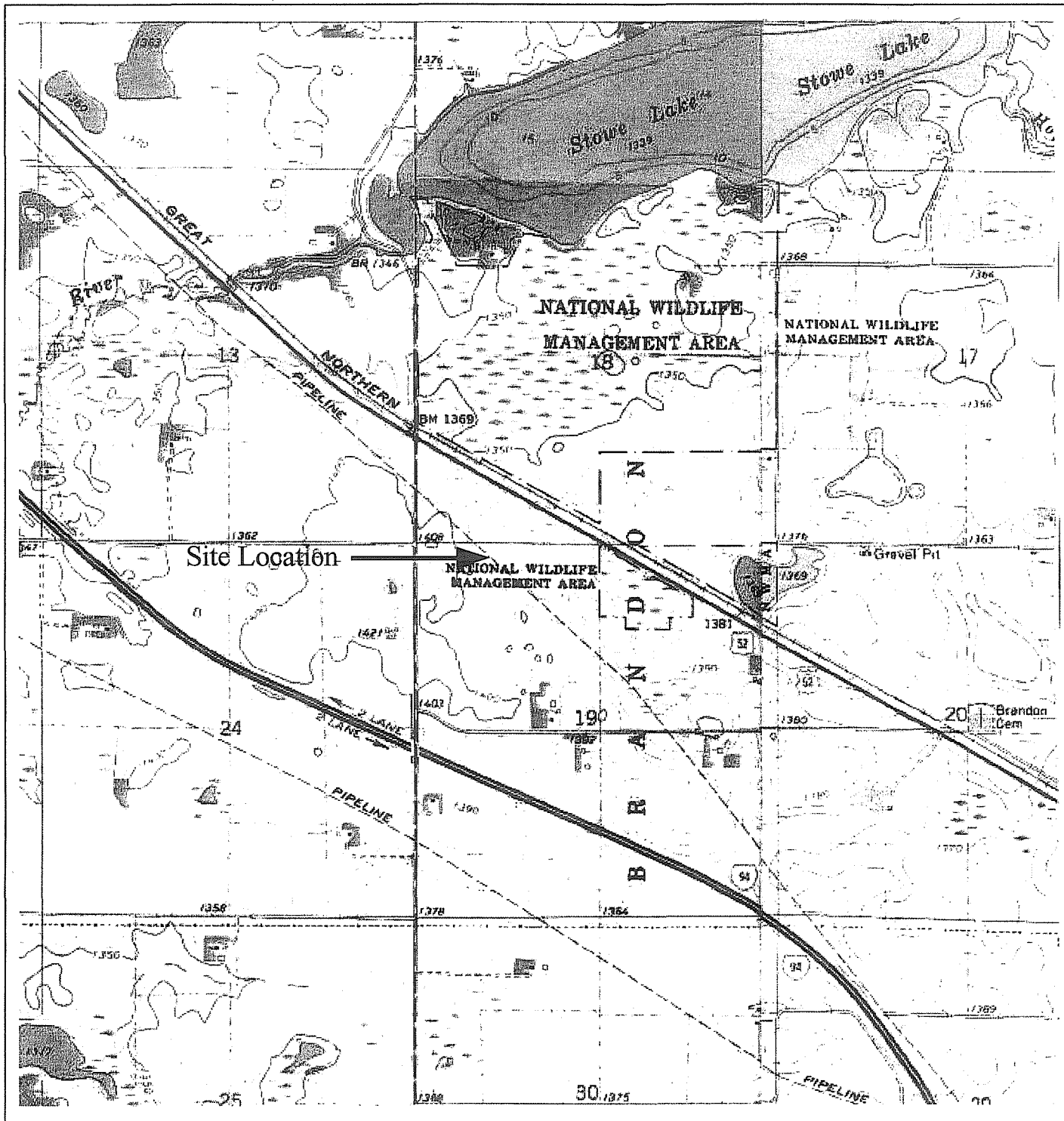
September 2003. Magellan had not informed the land owner or the tenant of the potential hazard of shallow pipe on the #1-6" on Tract #5883 although they had provided information to the landowner of shallow pipe on the #2-8 for Tract #5885. Magellan had not made arrangements to mitigate the potential hazard as per their procedures on Tract #5883.

The tenant, land owner, and Magellan all agreed that a communication breakdown had occurred regarding shallow pipe considerations. A compromise was reached with all parties to prevent this communication breakdown from happening in the future. The tenant agreed to prior notification regarding plowing activities and provided information on upcoming planned activities. The landowner communicated future planned chisel plow activities. Magellan indicated that procedures would be revised so that each contact with the landowners and/or tenant would provide concise exchanges of information regarding depth of cover and agricultural practices. Magellan also accepted and entered into a Consent Decree (several years after this release) with the EPA and DOJ that had specific provisions to improve the depth of cover in agricultural areas. Central Region staff assisted with the technical review requirements of this Consent Decree.

The metallurgical laboratory confirmed that the cause of the failure was "solely from the impact of a sharp-nosed tool that originally indented and then penetrated the pipe wall by a shearing action. No other contributing cause of the failure was identified" thru metallurgical laboratory analysis. "Examination of the fracture surfaces showed only shearing and ductile tearing of the pipe wall." The metallurgical laboratory also identified that "the pipe material met the requirements of the API specifications that were in effect the year the pipeline was installed" (API Specification 5L, 10th Edition, August 1945).

Appendices

- Appendix A Map and Photographs
- Appendix B NRC Report #704461
- Appendix C Magellan Accident Report
- Appendix D Metallurgical Report

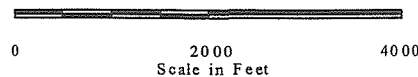


Reference

7.5 Minute Series Topographic Quadrangle
 Quam Lake & Brandon, Minnesota, US
 Photo revised 1966 & 1977. Scale 1:24,000



Quadrangle Location



ENVIRONMENTAL STRATEGIES CONSULTING LLC
 123 NORTH THIRD STREET, SUITE 706
 MINNEAPOLIS, MINNESOTA 55401
 (612) 343-0510

Figure 1
Site Location
MPC – MP 14 Pipeline Release
Brandon, Minnesota

Appendix B NRC Report #704461

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 704461

INCIDENT DESCRIPTION

*Report taken at 01:31 on 05-NOV-03

Incident Type: PIPELINE

Incident Cause: OTHER

Affected Area:

The incident occurred on 04-NOV-03 at 22:27 local time.

Affected Medium: SUBSURFACE SUBSURFACE SOIL

SUSPECTED RESPONSIBLE PARTY

Organization: MAGELLAN MIDSTREAM PARTNERS
XX

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

7766 COUNTY ROAD 15 County: DOUGLAS

City: BRANDON TWP State: MN

PIPELINE RIGHT-OF-WAY ON FARM PROPERTY

RELEASED MATERIAL(S)

CHRIS Code: GAS Official Material Name: GASOLINE: AUTOMOTIVE (UNLEADED)

Also Known As:

Qty Released: 100 BARREL(S)

DESCRIPTION OF INCIDENT

CALLER REPORTS THAT A GASOLINE PIPELINE WAS DAMAGED WHEN A FARMER PLOWED OVER A PIPELINE RIGHT-OF-WAY. CALLER ESTIMATES 50-100 BARRELS OF AUTOMOTIVE GASOLINE DISCHARGED INTO SOIL BELOW THE SURFACE. NO WATERWAYS WERE IMPACTED.

INCIDENT DETAILS

Pipeline Type: UNKNOWN

DOT Regulated: YES

Pipeline Above/Below Ground: BELOW

Exposed or Under Water: NO

Pipeline Covered: UNKNOWN

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: NO Hospitalized: Empl/Crew: Passenger:

FATALITIES: NO Empl/Crew: Passenger: Occupant:

EVACUATIONS: NO Who Evacuated: Radius/Area:

Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN

REMEDIAL ACTIONS

SECURED THE LINE AND WAITING FOR CONTRACTED EMERGENCY RESPONSE CREWS TO ARRIVE
Release Secured: YES
Release Rate:
Estimated Release Duration:

WEATHER

Weather: PARTLY CLOUDY, 26°F Wind speed: 12 MPH Wind direct

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local: SERC
State/Local On Scene:
State Agency Number: 55023

NOTIFICATIONS BY NRC

ATLANTIC STRIKE TEAM (PRIMARY)
05-NOV-03 01:47
ATSDR MN (PRIMARY)
05-NOV-03 01:47
EPA OFFICE OF EMERG RESPONSE(OERR) (PRIMARY)
05-NOV-03 02:00
U.S. EPA V (PRIMARY)
05-NOV-03 01:50
FEDERAL EMERGENCY MANAGEMENT AGENCY (PRIMARY)
05-NOV-03 01:51
NOAA 1ST CLASS BB RPTS FOR MN (PRIMARY)
05-NOV-03 01:47
NATIONAL RESPONSE CENTER HQ (PRIMARY)
05-NOV-03 01:48
OFFICE OF ENV. POLICY & COMPLIANCE (PRIMARY)
05-NOV-03 01:47
MN DEM ATTN: MS. GOELZ (PRIMARY)
05-NOV-03 01:47

ADDITIONAL INFORMATION

CALLER WILL NOTIFY LEPC.

*** END INCIDENT REPORT # 704461 ***

The National Response Center is strictly an initial report taking agency and does not participate in the investigation or incident response. The NRC receives initial reporting information only and notifies Federal and State On-Scene Coordinators for response. The NRC does not verify nor does it take follow-on incident information. Verification of data and incident response is the sole responsibility of Federal/State On-Scene Coordinators. Data contained within the FOIA Web Database is initial information only. All reports provided via this server are for informational purposes only. Data to be used in legal proceedings must be obtained via written correspondence from the NRC.



U.S. Department of Transportation
Research and Special Programs
Administration

**ACCIDENT REPORT – HAZARDOUS LIQUID
PIPELINE SYSTEMS**

Report Date _____

No. _____
(DOT Use Only)

INSTRUCTIONS

Important: Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the Office Of Pipeline Safety Web Page at <http://ops.dot.gov>.

PART A – GENERAL REPORT INFORMATION

Check one or more boxes as appropriate:

Original Report Supplemental Report Final Report

1. a. Operator's OPS 5-digit Identification Number (if known) / _____ /
2. b. If Operator does not own the pipeline, enter Owner's OPS 5-digit Identification Number (if known) / _____ /
- c. Name of Operator _____
- d. Operator street address _____
- e. Operator address _____
City, County, State and Zip Code

IMPORTANT: IF THE SPILL IS SMALL, THAT IS, THE AMOUNT IS AT LEAST 5 GALLONS BUT IS LESS THAN 5 BARRELS, COMPLETE THIS PAGE ONLY, UNLESS THE SPILL IS TO WATER AS DESCRIBED IN 49 CFR §195.52(A)(4) OR IS OTHERWISE REPORTABLE UNDER §195.50 AS REVISED IN CY 2001.

2. Time and date of the accident
 / / / /
 hr. month day year

3. Location of accident
(If offshore, do not complete a through d. See Part C.1)

a. Latitude: _____ Longitude: _____
(if not available, see instructions for how to provide specific location)

b. _____
City, and County or Parish

c. _____
State and Zip Code

d. Mile post/valve station or survey station no.
(whichever gives more accurate location)

4. Telephone report
 / / / /
 NRC Report Number month day year

5. Losses (Estimated)

Public/Community Losses reimbursed by operator:

Public/private property damage \$ _____

Cost of emergency response phase \$ _____

Cost of environmental remediation \$ _____

Other Costs \$ _____
(describe) _____

Operator Losses:

Value of product lost \$ _____

Value of operator property damage \$ _____

Other Costs \$ _____
(describe) _____

Total Costs \$ _____

6. Commodity Spilled Yes No
(If Yes, complete Parts a through c where applicable)

a. Name of commodity spilled _____

b. Classification of commodity spilled:
 HVLs /other flammable or toxic fluid which is a gas at ambient conditions
 CO₂ or other non-flammable, non-toxic fluid which is a gas at ambient conditions
 Gasoline, diesel, fuel oil or other petroleum product which is a liquid at ambient conditions
 Crude oil

c. Estimated amount of commodity involved :

Barrels

Gallons (check only if spill is less than one barrel)

Amounts:

Spilled : _____

Recovered: _____

CAUSES FOR SMALL SPILLS ONLY (5 gallons to under 5 barrels) : (For large spills [5 barrels or greater] see Part H)

Corrosion	Natural Forces	Excavation Damage	Other Outside Force Damage
Material and/or Weld Failures	Equipment	Incorrect Operation	Other

PART B – PREPARER AND AUTHORIZED SIGNATURE

(type or print) Preparer's Name and Title

Preparer's E-mail Address

(type or print) Name and Title

Date

Area Code and Telephone Number

Area Code and Facsimile Number

Area Code and Telephone Number

PART C – ORIGIN OF THE ACCIDENT (Check all that apply)

- 1. Additional location information
 - a. Line segment name or ID _____
 - b. Accident on Federal land other than Outer Continental Shelf Yes No
 - c. Is pipeline interstate? Yes No

Offshore: Yes No (complete d if offshore)
 d. Area _____ Block # _____
 State /_____/ or Outer Continental Shelf

- 2. Location of system involved (check all that apply)
 - Operator's Property
 - Pipeline Right of Way
 - High Consequence Area (HCA)?
 - Describe HCA _____

- a. Type of leak or rupture
 - Leak: Pinhole Connection Failure (complete sec. H5)
 - Puncture, diameter (inches) _____
 - Rupture: Circumferential – Separation
 - Longitudinal – Tear/Crack, length (inches) _____
 - Propagation Length, total, both sides (feet) _____
 - N/A
 - Other _____

- 3. Part of system involved in accident
 - Above Ground Storage Tank
 - Cavern or other below ground storage facility
 - Pump/meter station; terminal/tank farm piping and equipment, including sumps
 - Other Specify: _____

- b. Type of block valve used for isolation of immediate section:
 - Upstream: Manual Automatic Remote Control
 - Check Valve
 - Downstream: Manual Automatic Remote Control
 - Check Valve

Onshore **pipeline**, including valve sites
 Offshore **pipeline**, including platforms

If failure occurred on **Pipeline**, complete items a - g:

- 4. Failure occurred on

Body of Pipe	Pipe Seam	Scraper Trap
Pump	Sump	Joint
Component	Valve	Metering Facility
Repair Sleeve	Welded Fitting	Bolted Fitting
Girth Weld		
Other (specify) _____		

- c. Length of segment isolated _____ ft
- d. Distance between valves _____ ft
- e. Is segment configured for internal inspection tools? Yes No
- f. Had there been an in-line inspection device run at the point of failure? Yes No Don't Know
- Not Possible due to physical constraints in the system
- g. If Yes, type of device run (check all that apply)

Year the component that failed was installed: /_____/

- 5. Maximum operating pressure (MOP)
 - a. Estimated pressure at point and time of accident: _____ PSIG
 - b. MOP at time of accident: _____ PSIG
 - c. Did an overpressurization occur relating to the accident? Yes No

- High Resolution Magnetic Flux tool Year run: _____
- Low Resolution Magnetic Flux tool Year run: _____
- UT tool Year run: _____
- Geometry tool Year run: _____
- Caliper tool Year run: _____
- Crack tool Year run: _____
- Hard Spot tool Year run: _____
- Other tool Year run: _____

PART E – ENVIRONMENT

- 1. Nominal pipe size (NPS) /_____/ in.
- 2. Wall thickness /_____/ in.
- 3. Specification _____ SMYS /_____/
- 4. Seam type _____
- 5. Valve type _____
- 6. Manufactured by _____ in year /_____/

- 1. Area of accident

In open ditch	
Under pavement	Above ground
Underground	Under water
Inside/under building	Other _____
- 2. Depth of cover: _____ inches

PART F – CONSEQUENCES

- 1. Consequences (check and complete all that apply)
 - a.

	Fatalities	Injuries
Number of operator employees:	_____	_____
Contractor employees working for operator:	_____	_____
General public:	_____	_____
Totals:	_____	_____
 - b. Was pipeline/segment shutdown due to leak? Yes No
 - If Yes, how long? _____ days _____ hours _____ minutes

- c. Product ignited Yes No
- d. Explosion Yes No
- e. Evacuation (general public only) _____ / people
- Reason for Evacuation:
 - Precautionary by company
 - Evacuation required or initiated by public official
- f. Elapsed time until area was made safe: _____ / hr. _____ / min.

- 2. Environmental Impact
 - a. Wildlife Impact:

Fish/aquatic	Yes	No
Birds	Yes	No
Terrestrial	Yes	No
 - b. Soil Contamination Yes No
 - If Yes, estimated number of cubic yards: _____
 - c. Long term impact assessment performed: Yes No
 - d. Anticipated remediation Yes No
 - If Yes, check all that apply:

Surface water	Groundwater	Soil	Vegetation	Wildlife
---------------	-------------	------	------------	----------

- e. Water Contamination: Yes No (If Yes, provide the following)
- Amount in water _____ barrels
- Ocean/Seawater No Yes
- Surface No Yes
- Groundwater No Yes
- Drinking water No Yes (If Yes, check below.)
- Private well Public water intake

PART G – LEAK DETECTION INFORMATION

1. Computer based leak detection capability in place? Yes No
2. Was the release initially detected by? (check one):
 CPM/SCADA-based system with leak detection
 Static shut-in test or other pressure or leak test
 Local operating personnel, procedures or equipment
 Remote operating personnel, including controllers
 Air patrol or ground surveillance
 A third party Other (specify) _____
3. Estimated leak duration days ____ hours ____

PART H – APPARENT CAUSE

Important: There are 25 numbered causes in this Part H. Check the box corresponding to the primary cause of the accident. Check one circle in each of the supplemental categories corresponding to the cause you indicate. See the instructions for guidance.

H1 – CORROSION

- | | | | |
|---|--|--|--|
| <p>1. External Corrosion</p> <p>2. Internal Corrosion</p> <p>(Complete items a – e where applicable.)</p> | <p>a. Pipe Coating
Bare
Coated</p> | <p>b. Visual Examination
Localized Pitting
General Corrosion
Other _____</p> | <p>c. Cause of Corrosion
Galvanic Atmospheric
Stray Current Microbiological
Cathodic Protection Disrupted
Stress Corrosion Cracking
Selective Seam Corrosion
Other _____</p> |
|---|--|--|--|
- d. Was corroded part of pipeline considered to be under cathodic protection prior to discovering accident?
 No Yes, Year Protection Started: _____
- e. Was pipe previously damaged in the area of corrosion?
 No Yes => Estimated time prior to accident: / _____ / years / _____ / months Unknown

H2 – NATURAL FORCES

3. Earth Movement => Earthquake Subsidence Landslide Other _____
4. Lightning
5. Heavy Rains/Floods => Washouts Flotation Mudslide Scouring Other _____
6. Temperature => Thermal stress Frost heave Frozen components Other _____
7. High Winds

H3 – EXCAVATION DAMAGE

8. Operator Excavation Damage (including their contractors/Not Third Party)
9. Third Party (complete a-f)
- a. Excavator group
 General Public Government Excavator other than Operator/subcontractor
- b. Type: Road Work Pipeline Water Electric Sewer Phone/Cable
 Landowner-not farming related Farming Railroad
 Other liquid or gas transmission pipeline operator or their contractor
 Nautical Operations Other _____
- c. Excavation was: Open Trench Sub-strata (boring, directional drilling, etc...)
- d. Excavation was an ongoing activity (Month or longer) Yes No If Yes, Date of last contact / _____ /
- e. Did operator get prior notification of excavation activity?
 Yes; Date received: / _____ / mo. / _____ / day / _____ / yr. No
 Notification received from: One Call System Excavator Contractor Landowner
- f. Was pipeline marked as result of location request for excavation? No Yes (If Yes, check applicable items i - iv)
- i. Temporary markings: Flags Stakes Paint
- ii. Permanent markings:
- iii. Marks were (check one) : Accurate Not Accurate
- iv. Were marks made within required time? Yes No

H4 – OTHER OUTSIDE FORCE DAMAGE

10. Fire/Explosion as primary cause of failure => Fire/Explosion cause: Man made Natural
11. Car, truck or other vehicle not relating to excavation activity damaging pipe
12. Rupture of Previously Damaged Pipe
13. Vandalism

H5 – MATERIAL AND/OR WELD FAILURES

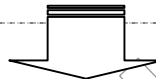
Material

- 14. Body of Pipe => Dent Gouge Bend Arc Burn Other _____
- 15. Component => Valve Fitting Vessel Extruded Outlet Other _____
- 16. Joint => Gasket O-Ring Threads Other _____

Weld

- 17. Butt => Pipe Fabrication Other _____
- 18. Fillet => Branch Hot Tap Fitting Repair Sleeve Other _____
- 19. Pipe Seam => LF ERW DSAW Seamless Flash Weld Other _____
HF ERW SAW Spiral

Complete a-g if you indicate **any** cause in part H5.



- a. Type of failure:
 Construction Defect => Poor Workmanship Procedure not followed Poor Construction Procedures
 Material Defect
- b. Was failure due to pipe damage sustained in transportation to the construction or fabrication site? Yes No
- c. Was part which leaked pressure tested before accident occurred? Yes, complete d-g No
- d. Date of test: _____ / yr. _____ / mo. _____ / day
- e. Test medium: Water Inert Gas Other _____
- f. Time held at test pressure: _____ / hr.
- g. Estimated test pressure at point of accident: _____ PSIG

H6 – EQUIPMENT

- 20. Malfunction of Control/Relief Equipment => Control-valve Instrumentation SCADA Communications
Block valve Relief valve Power failure Other _____
- 21. Threads Stripped, Broken Pipe Coupling => Nipples Valve Threads Dresser Couplings Other _____
- 22. Seal Failure => Gasket O-Ring Seal/Pump Packing Other _____

H7 – INCORRECT OPERATION

- 23. Incorrect Operation
 a. Type: Inadequate Procedures Inadequate Safety Practices Failure to Follow Procedures
 Other _____
- b. Number of employees involved who failed a post-accident test: drug test: _____ / alcohol test: _____ /

H8 – OTHER

- 24. Miscellaneous, describe: _____
- 25. Unknown
 Investigation Complete Still Under Investigation (submit a supplemental report when investigation is complete)

PART I – NARRATIVE DESCRIPTION OF FACTORS CONTRIBUTING TO THE EVENT

(Attach additional sheets as necessary)

Blank area for narrative description of factors contributing to the event.

Appendix D Metallurgical Report

This document is on file at PHMSA