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

Principal Investigator	Michael Yazemboski
Senior Accident Investigator	Michael Yazemboski
Region Director	Byron E. Coy
Date of Report	1/13/2016
Subject	Failure Investigation Report – Williams Partners L.P./Transco 24" Leidy Line B Failure, Unityville, PA

Operator, Location, & Consequences

Date of Failure	6/9/2015
Commodity Released	Natural Gas
City/County & State	Unityville, Lycoming County, Pennsylvania
OpID & Operator Name	19570 Williams Pipeline L.P./ Transcontinental Gas
Unit # & Unit Name	2841 White Haven
SMART Activity #	150663
Milepost / Location	Station # 4693+50 (MP 118.6) ; [redacted] - [redacted]
Type of Failure	Rupture; Near-neutral Stress Corrosion Cracking (SCC)
Fatalities	0
Injuries	0
Description of area impacted	Non-HCA, Rural Class 1 Area
Total Costs	$751,154

Executive Summary

On June 9, 2015, at approximately 21:30 Eastern Standard Time (EST), a rupture occurred on the Transcontinental's Leidy line B, resulting in the release of approximately 96,379 Mcf[1] of natural gas in a rural class 1 area near Unityville, PA. Approximately 150 people in the surrounding area were evacuated by local emergency response personnel as a precaution. Pursuant to 49 U.S.C. § 60117, the Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), initiated an investigation on June 10, 2015. As a result of the investigation, PHMSA issued a Corrective Action Order on June 12, 2015, requiring Williams Partners, L.P, operator of the Transcontinental Pipeline, to take certain corrective actions with respect to the Leidy line B failure (CPF No. 1-2015-1013H). The cause of the failure was near-neutral stress corrosion cracking (SCC) of the pipe. Localized shielding and coating failure, in addition to cyclic pressures during bidirectional flow, were identified as possible contributing factors to the incident. The incident caused minimal environmental damage to the surrounding area. Damage consisted of soil and rock debris ejected onto the right-of-way by the pipeline rupture. Waterways were not impacted. Williams Partners L.P., operator of the Transcontinental Pipeline (Transco) made a notification to the National Response Center reporting the incident. There were no fires, injuries, or significant property damage resulting from the release.

System Details

Transcontinental Gas Pipe Line Co. LLC, an affiliate of Williams Partners, L.P., is a 10,500-mile interstate natural gas pipeline system extending from Texas, Louisiana, Mississippi, and the Gulf of Mexico through Alabama, Georgia, South Carolina, North Carolina, Virginia, Maryland, Pennsylvania, and New Jersey to the New York City metropolitan area. The system's total delivery capacity is approximately 8.4 million dekatherms.

Leidy line B is a 24-inch diameter pipeline, 194.06 miles in length, that originates at station 505 at milepost (mp) 0.14 and terminates at the Leidy Storage Field located in Tamarack, PA. Line B passes through Potter, Clinton, Lycoming, Columbia, Luzerne, and Monroe Counties in Pennsylvania and Warren, Hunterdon, and Somerset Counties in New Jersey (Appendix A).

The *"Affected Segment"*, a term used throughout this report, is the segment of Leidy line B from compressor station 517 main line valve [redacted] to Leidy Storage Field (MP 194.06). The length of *Affected Segment* is 78.9 miles.

The "*Isolated Segment"* is the 14.3-mile segment of Leidy line B from compressor station 517 main line valve MLV 517LB0 to MLV 517LB10. The *Isolated Segment* is the portion of the *Affected Segment* that was shut-in after the failure.

There is no history of previous incidents or significant releases from the failed pipeline.

[1] Mcf = thousand cubic feet

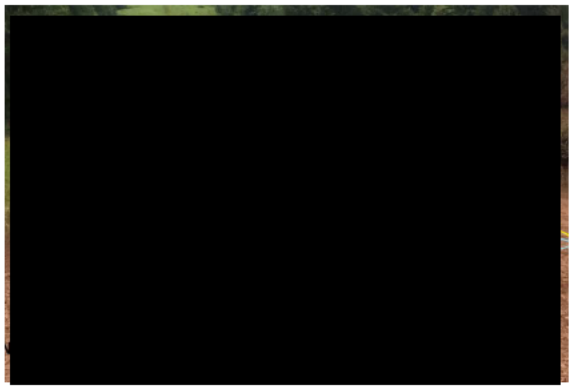
Events Leading up to the Failure

On the morning of Tuesday, June 9, 2015, Williams' personnel repositioned valves on line B to allow gas to flow west to Leidy Storage. According to SCADA pressure records, the switch took place at 09:24. Prior to the incident, gas was flowing east under compression from the turbines at station 520. When the turbines are not in operation, gas from producers flows into line B, moving west toward Leidy. The records also show station 520 was shut down on Monday, June 8, 2015, and bypassed in preparation for the flow reversal on June 9. A review of the pressure records leading up to the failure showed pressure slowly increasing in line B throughout the day on June 9. The operating pressure in line B at the time of failure was 1,141 psig, which was below the 1,200 psig Maximum Allowable Operating Pressure (MAOP).

Emergency Response

On June 9, 2015, at approximately 21:30 EST, Pipeline Control in Houston, Texas was alerted by a SCADA low pressure alarm on line B, and proceeded to isolate the line by remotely closing [redacted] near the town of Benton, PA. Local operations responded and verified that valves 517LB0 and S4 at station 517 were closed, and confirmed that the failed section of pipeline had been isolated. Valves 517LBO and S4 had been closed prior to the incident due to construction activities at station 517. Isolation of the failed pipeline segment was completed within approximately 30 minutes and Transco personnel, including emergency managers, were on-site within 1 hour. Emergency responders, including seven local fire companies, responded and began evacuating a 2-mile radius around the failure site. The nearest home was located approximately 0.2 miles away from the failure location. Approximately 150 people were evacuated as a precaution due to the escaping natural gas. State Routes 118 and 42 were temporarily closed to traffic in the affected area. There were no fires or injuries reported as a result of the pipeline rupture. Williams Pipeline notified the National Response Center (NRC) at 22:41 EST on June 9, 2015 (NRC No. 1119244).

Summary of Return-to-Service



There are three pipelines, lines A, B, and C, within the Transco Pipeline right-of-way. Due to the proximity of line C to the line B rupture, Williams conducted an integrity assessment of line C on June 11, 2015, by exposing 100 feet of line closest to the failure location. No damage was identified. Line A was not exposed. Lines A and C were returned to normal operating pressures on June 12, 2015. Following the assessment of lines A and C, PHMSA issued a corrective action order (CAO) on June 12, 2015, requiring Williams Partners, L.P, operator of the Transcontinental Pipeline, to take certain corrective actions with respect to Leidy line B (CPF No. 1-2015-1013H). The CAO imposed a 20% reduction in pressure on the *Affected Segment* and imposed an operating restriction on the *Isolated Segment* of Leidy line B. The CAO also required the development

and submittal of a restart plan, prior to operation of the isolated segment. The order also required an instrumented leakage survey, confirmation of MAOP, review of prior inline inspection (ILI) results, mechanical and metallurgical testing, failure analysis of the failed pipe, root cause failure analysis, and a review of the effectiveness of its Emergency Response Plan and Public Awareness Program with regards to the failure.

The *Isolated Segment* of line B will remain out of operation and the 20% reduction in operating pressure on the *Affected Segment* will remain in place pending completion of the CAO requirements and PHSMA approval to remove the operating restrictions.

Investigation Details

The failure occurred on line B in a rural, non-HCA area within Transco's right-of-way approximately 1,000 feet west of Bradley Road at mile post 118.6. There are 3 Transco pipelines, line A (24 inch diameter), line B (24-inch diameter), and line C (36-inch diameter), within the common right-of-way at this location. The section of line B that failed was constructed in 1963, and consists of 24-inch diameter, 0.344 inch wall thickness, Grade X60, electric flash welded (EFW) seam pipe.

At the time of the failure, line B was operating at a pressure of 1,141 psig, which is below the Maximum Allowable Operating Pressure (MAOP) of 1,200 psig, as established by a hydrostatic test in 1987.

The rupture consisted of a 34-foot longitudinal fracture originating at the one-o'clock position on the pipeline. Based on visual and laboratory examination of the pipe, the failure was not near or associated with the longitudinal weld seam on the pipe. The incident occurred between stations 4701+33 and 4683+36. Minimum cover over the pipe was measured to be 43 inches on the upper slope of the failure site.

Operation and Maintenance records for line B were reviewed from 2010 through 2015. The records included Cathodic Protection, Leak Survey/Patrolling, performed by Eagle Sky Patrol Inc. No issues were identified. Launchers and receivers are located at station 515 at mp 68.95, Picture Rocks at mp 129.52, and station 520 at mp 157.68

Line B was installed in 1963 and is EFW X60 pipe with an external coal tar coating. There is no history of internal corrosion. Based on a review of the SCADA system pressure data, there is no excessive pressure cycling. The majority of the line B is located in a class 1-2 area with some class 3 areas between station 515 and station 505. There are no class 3 areas west of station 515.

Line A was installed in the 1950's and it has an external coal tar coating. According to the Williams Root Cause Analysis (Appendix E) "the Leidy A and B Lines on the Pennsylvania System should be assessed with in line inspection crack (Electro Magnetic Acoustic Transducer or EMAT) tools as the pipeline and coating vintage are all similar on the west side of the Delaware River."

Line C was installed in 1987 and it has a 3 layer external phenolic epoxy coating.

Prior Assessments of the Failed Pipeline:

The original hydrostatic test on line B was conducted in 1963. The pipe was retested in 1987 from mile post 113.76 to 123.79 due to a class location change from 1 to 2 on the segment. The minimum pressure during the retest was 1,795 psig.

On September 30, 2010, a mag flux leakage tool (MFL), caliper tool, and internal mapping unit tool (IMU) was run on 88.73 miles of the Leidy loop line B from station 515 to station 520. A total of 29 locations were selected for digs (mp 0 to 44.84, and mp 113.74 to 157.63 for total of 87.73 miles). Remediation work was completed in 2011.

A third-party review of the ILI run from 2010 was performed by Enduro Pipeline Services on June 10, 2015. The results of the data review did not show any metal loss, cracking, or denting that would have contributed to the failure. There were no anomalies identified associated with seams, wrinkles, buckles or strain in the area of the failure.

Findings and Contributing Factors

Root Cause:

The SES metallurgical analysis report, dated August 25, 2015, identified the cause of the rupture to be the result of near-neutral pH SCC that initiated on the external surface of the pipe (Appendix D). The report also indicates that groups of SCC colonies were found adjacent to the rupture origin, as well as several locations remote from the rupture origin. Pits of depths that were less than 10% of the wall thickness of the pipe were present on the outside surface of the pipe in the vicinity of the SCC colonies. The pits were observed in areas where the exterior coating had locally disbonded from the pipe. The combination of transgranular cracking, corrosion of the crack sides, external corrosion pitting, and corrosion deposits containing iron carbonate (siderite) indicates that the cracking was the result of near-neutral pH SCC. The pipe analysis found no evidence of mechanical or third party damage that could have contributed to the failure, and the properties of the pipe material met the requirements of API 5LX, Grade X60, confirming that the pipe properties did not contribute to the rupture.

Contributing Factors:

Localized Coating Failure Combined with Shielding: Corrosion and rust staining on the area surrounding the cracks were observed, indicating areas of coating failure. The coating failure could be due to inadequate surface preparation prior to applying the coating or soil stresses on the coating.

Cyclical Stresses and Bidirectional Flow: In the past, the Leidy System was utilized as a storage lateral moving gas from the southwestern United States to storage fields in Pennsylvania. The gas would then be sent back to markets on the East Coast at times of peak delivery. Currently, the Leidy System is used more as a Transmission pipeline moving gas from the Marcellus Shale production to New Jersey and New York. The bidirectional flow and pressure variations may have been a contributing factor to the formation of near-neutral pH SCC on the pipeline.

Appendices

A Maps and Photographs

B NRC Report 1119244

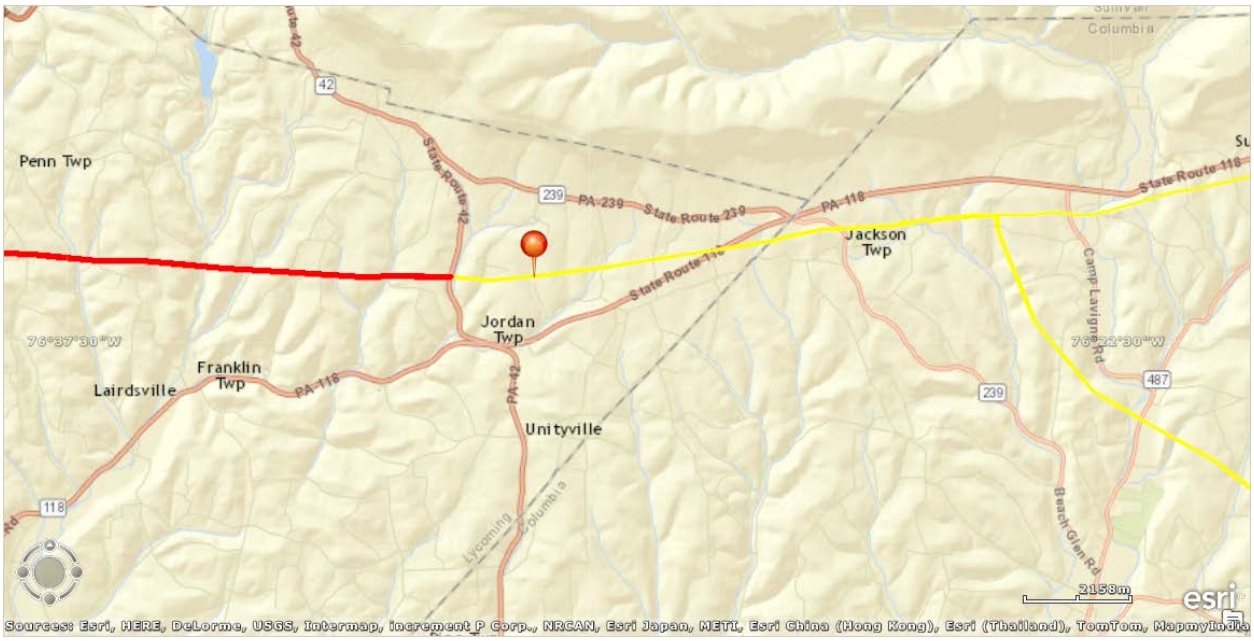
C Incident Report Form 7100.2 20150091 - 16805

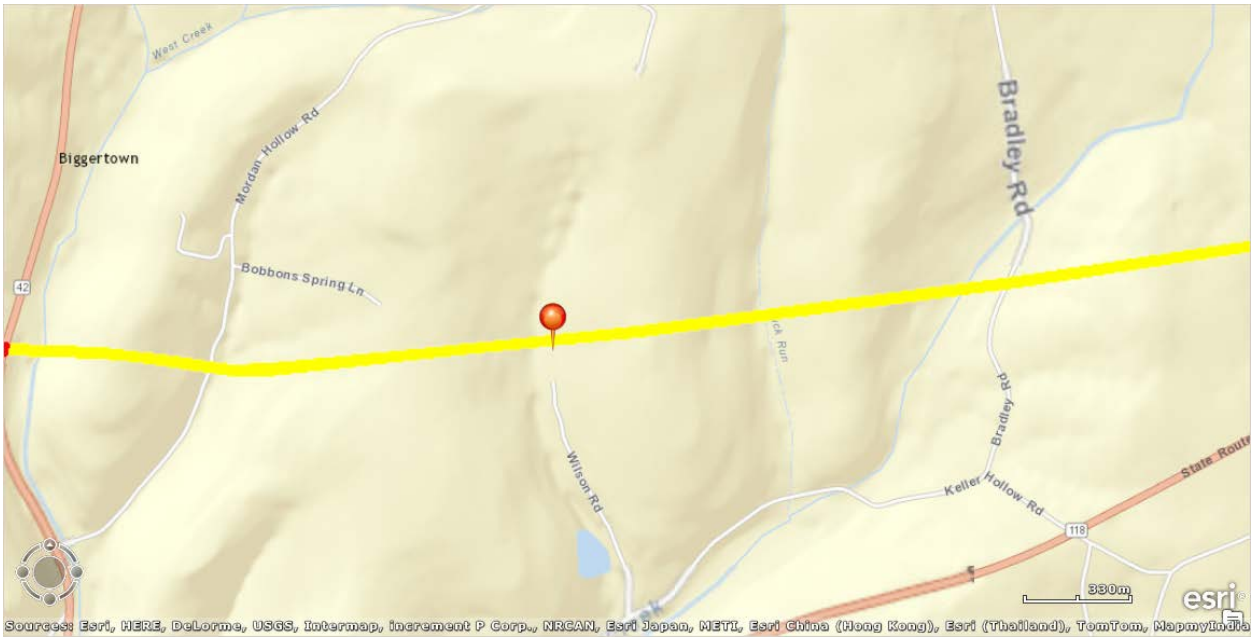
D Stress Engineering Services, Inc. Metallurgical Analysis Report

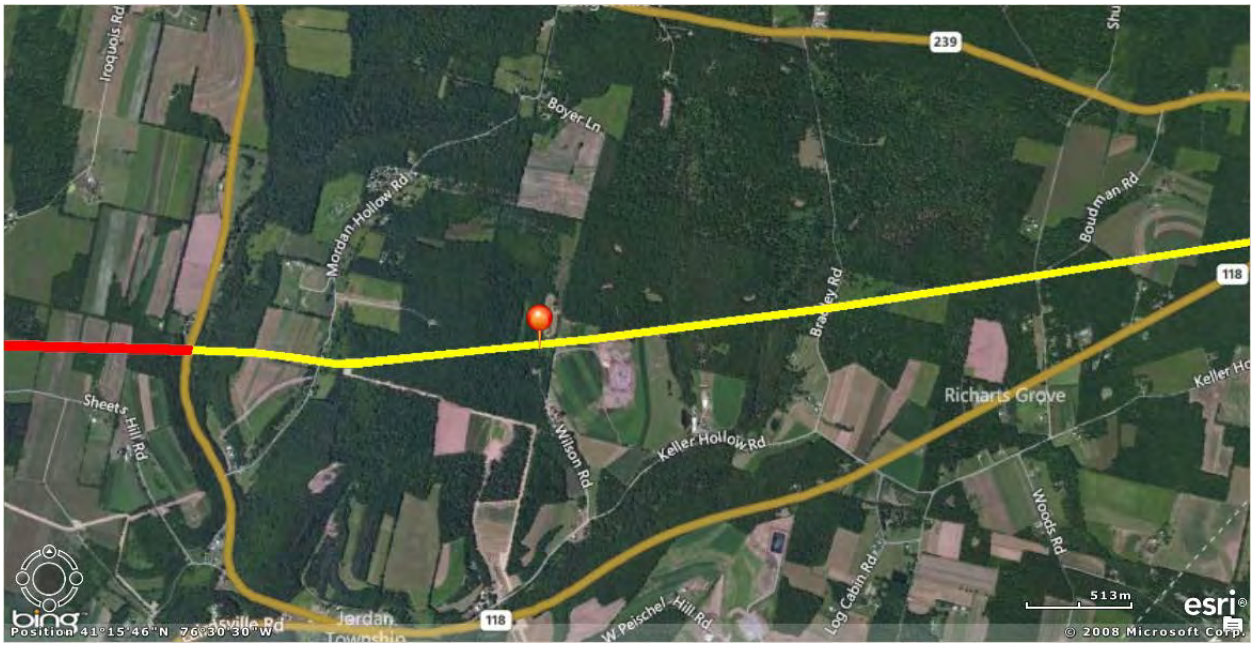
E Williams Root Cause Analysis

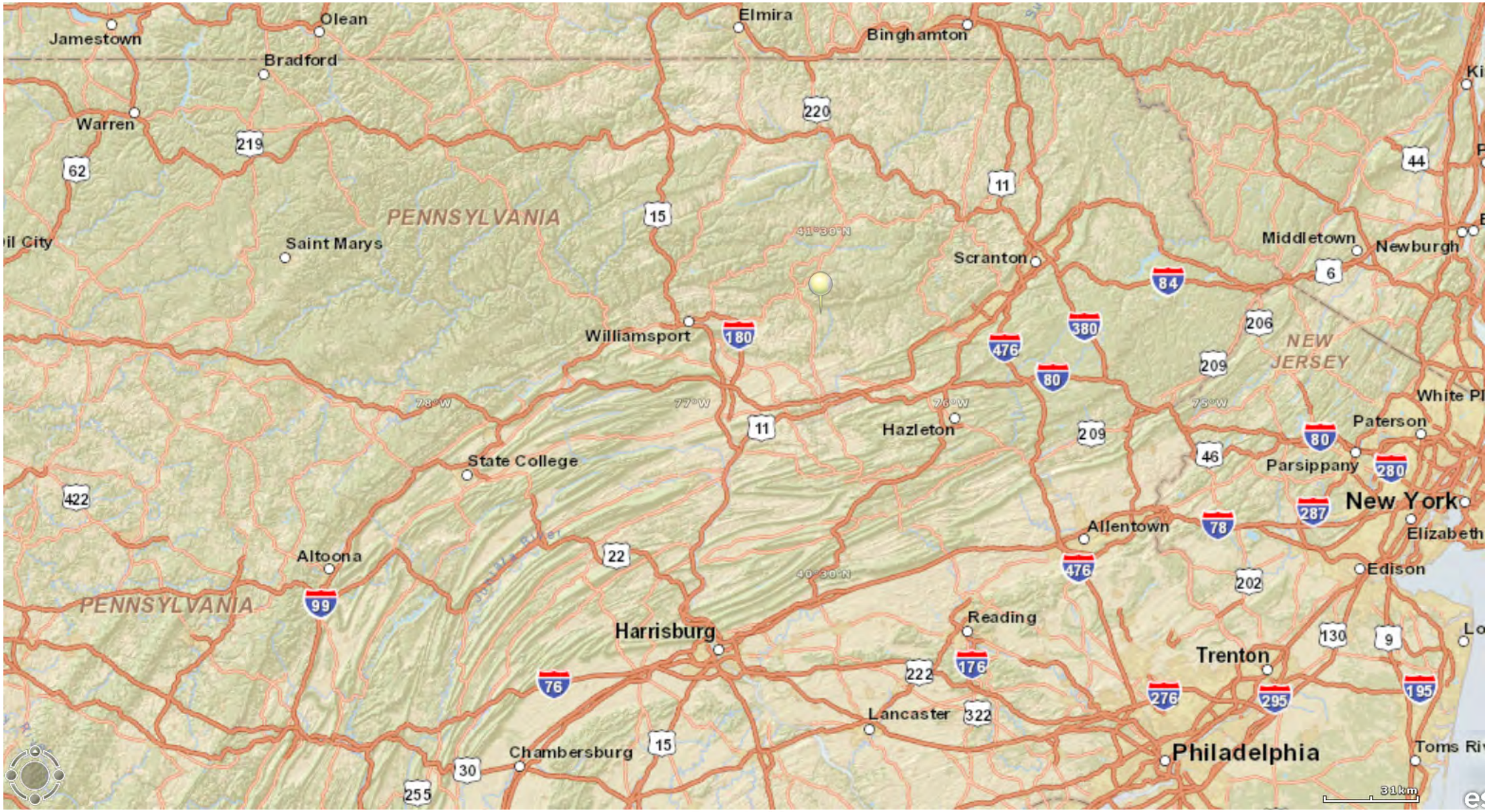

System 1287
Unit 2841
Approx Failure location
Rochester
Buffalo
Syracuse
Utica
Albany
Binghamton
Scranton
PENNSYLVANIA
New York
Philadelphia
Pittsburgh
Harrisburg
Allentown
Reading
Trenton
Edison
Toms River
Atlantic City
State College
Altoona
Youngstown
Bridgeport
Hartford
Providence
Springfield
Worcester
Lowell
Nashua
Waterbury
MASSACHUSETTS
CONNECTICUT
RHODE ISLAND
MARYLAND
NEW JERSEY
75km
esri


Olean
Bradford
Elmira
Binghamton
Kingston
Poughkeepsie
Beacon
Middletown
Newburgh
PENNSYLVANIA
Saint Marys
Scranton
Williamsport
Hazleton
State College
Altoona
Harrisburg
Reading
Allentown
Trenton
Edison
Elizabeth
Parsippany
Paterson
White Plains
New York
NEW JERSEY
37km
esri


Penn Twp
Jackson Twp
Jordan Twp
Franklin Twp
Lairdsville
Unityville
Columbia
State Route 42
State Route 239
PA-239
PA-118
PA-42
State Route 118
Camp Lavigne Rd
Beach Glen Rd
Lycoming
76°37'30"W
76°32'30"W
42
239
487
118
2158m
esri
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia


Biggertown
Mordan Hollow Rd
Bobbons Spring Ln
Bradley Rd
Wilson Rd
Keller Hollow Rd
State Route
42
118
330m
esri
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia

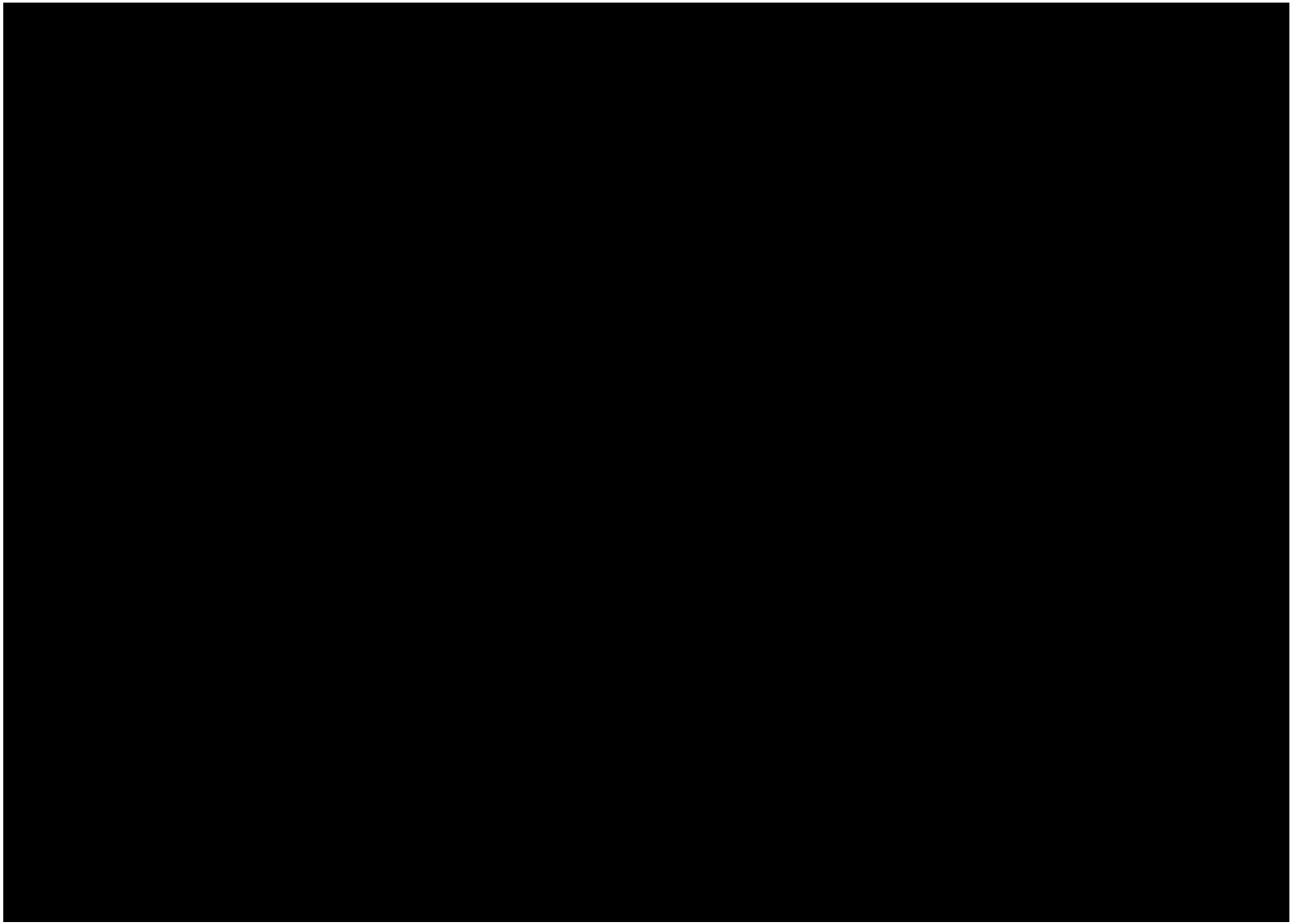

Iroquois Rd
Boyer Ln
239
Mordan Hollow Rd
Boudman Rd
118
Richards Grove
Sheets Hill Rd
Keller Hollow Rd
Wilson Rd
Woods Rd
Log Cabin Rd
W Peischel Hill Rd
Jordan Township
513m
esri
bing
Position 41°15'46"N 76°30'30"W
© 2008 Microsoft Corp.

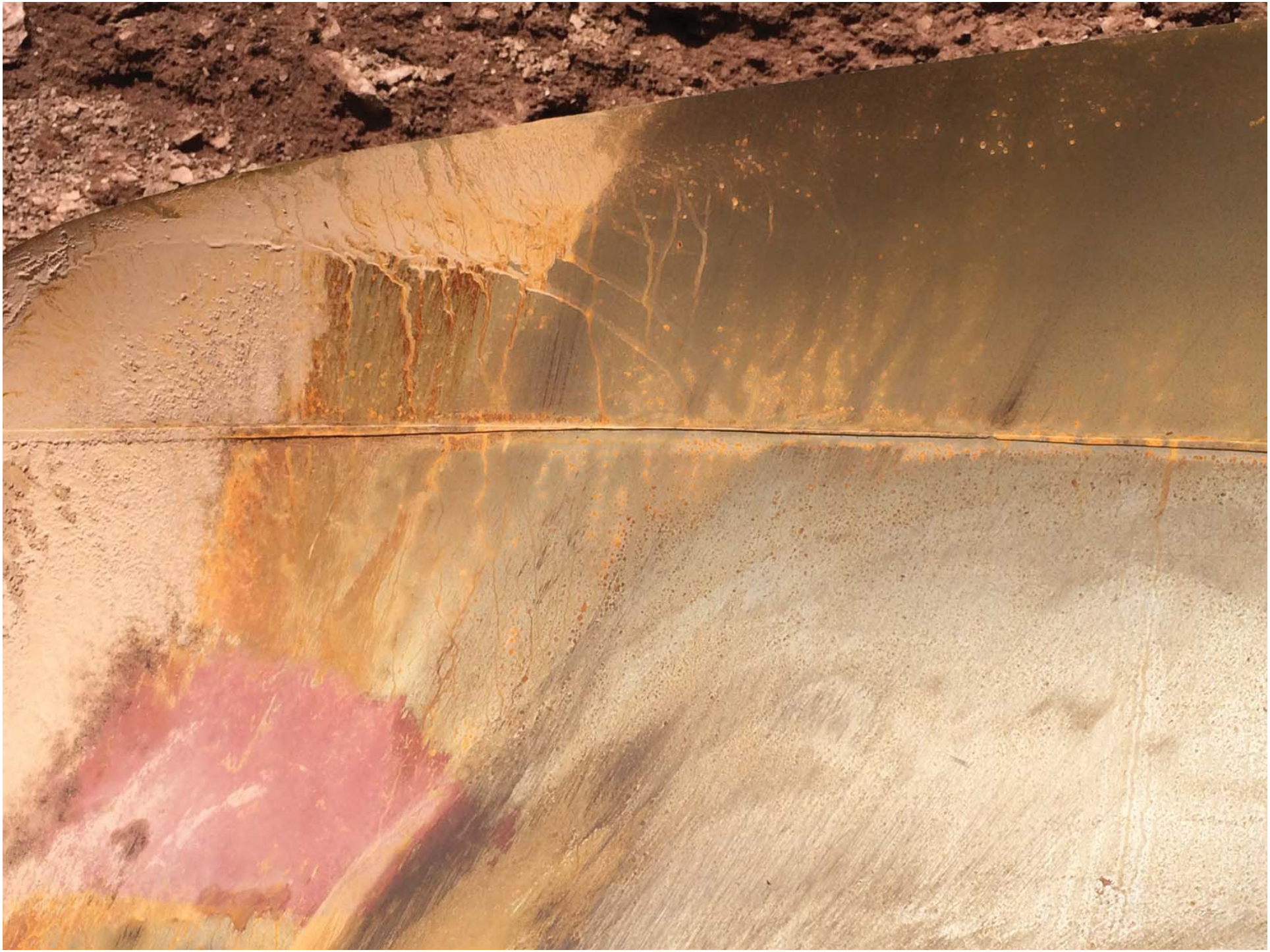

Jamestown
Olean
Bradford
Warren
Elmira
Binghamton
220
219
62
PENNSYLVANIA
15
11
44
Saint Marys
Scranton
Middletown
Newburgh
84
6
Williamsport
180
476
380
206
NEW
JERSEY
209
80
78°W
77°W
76°W
75°W
White Pl
Hazleton
11
209
Paterson
80
46
Parsippany
280
State College
422
287
New York
Allentown
78
Elizabeth
Altoona
22
476
Edison
202
40°30'N
PENNSYLVANIA
99
Reading
Harrisburg
130
9
Trenton
176
222
76
276
295
195
Lancaster
322
Chambersburg
15
Philadelphia
30
255
31km


Plunketts Creek Twp
Shrewsbury Twp
Brunnerdale Rd
PA-3005
220
42
41°22'30"N
Muncy Valley
Davidson Twp
Ricketts Glen State Park
Sullivan
Mill Creek Twp
Upper Fairfield Twp
864
Wolf Twp
Picture Rocks
Penn Twp
Fairmount Twp
118
Sugarloaf Twp
239
Jackson Twp
Camp Lavigne Rd
Mossville Rd
Red Hill Rd
Bethel Hill Rd
Broadway
Fairfield Twp
Muncy Twp
Hughesville
76°37'30"W
Franklin Twp
Lairdsville
Jordan Twp
Lycoming
Columbia
Unityville
Lycoming Mall Dr
Laird sville Rd
Moreland Twp
Muncy Creek Twp
Muncy
Old Tioga Tpke
Hunlock Harveyville Rd
Benton Twp
Benton
Shickshinny Rd
Huntington Mills
Pine Twp
442
Montgomery
Lycoming
Northumberland
New Columbus
Sunshine Rd
Stillwater
Waterton Rd
Greenwood Twp
Millville
Rohrsburg Rd
Winding Rd
Ridge Rd
Shickshinny Valley
405
Delaware Twp
180
Anthony Twp
White Hall Rd
Dewart
Turbotville
44
Madison Twp
Briar Creek Twp
Columbia
Lewis Twp
Watsontown
487
Mt Pleasant
4km


Bradley Rd
Bradley Rd
Keller Hollow Rd
118
118
N Woods Rd
Keller Hollow Rd
Keller Hollow Rd
118
165m


Bradley Rd
Bradley Rd
Appalachian Mountains
23m





150663 Appendix B NRC Report 1119244

Pipeline & Hazardous Materials Safety Administration

(Version 4.0.0 PROD)

HMIS->INCI

Rules of Beha

[Return to Search]

NRC Number: **1119244**

Call Date: **06/09/2015** **Call Time:** **22:41:00**

Caller Information

First Name:	WILLIAM	Last Name:	NEUBAUER
Company Name:	WILLIAMS GAS PIPELINE		
Address:	2800 POST OAK BLVD		
City:	HOUSTON	State:	TX
Country:	USA	Zip:	77056
Phone 1:	8002311290	Phone 2:	7135918409
Organization Type:	PRIVA	Is caller the spiller?	◉ Yes ○ No ○ No Response
Confidential:	○ Yes ◉ No ○ No Response		

Discharger Information

First Name:	WILLIAM	Last Name:	NEUBAUER
Company Name:	WILLIAMS GAS PIPELINE		
Address:	2800 POST OAK BLVD		
City:	HOUSTON	State:	TX
Country:	USA	Zip:	77056
Phone 1:	8002311290	Phone 2:	7135918409
Organization Type:	PRIVA		

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Spill Information

State: PA County: MERCER

Nearest City: UNITYVILLE Zip Code:

Location

Spill Date: 06/09/2015 (mm/dd/yyyy) Spill Time: 20:40:00 (24hh:mm:ss)

DTG Type: <- Select DTG Type ->

Incident Type: ALL Reported Incident Type: PIPELINE

Description

NATURAL GAS RELEASED FROM A 24 INCH PIPELINE DUE TO AN UNKNOWN CAUSE AT THIS TIME.

Materials Involved

Material / Chris Name	Chris Code	Total Qty.	Water Qty.
NATURAL GAS	ONG	0 UNKNOWN AMOUNT	

Medium Type: <- Select Medium Type

Additional Medium Information:

ATMOSPHERE

Injuries: Fatalites:

Evacuations: ○ Yes ◉ No ○ Unknown No. of Evacuations:

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Damages: ○ Yes ○ No ◉ Unknown Damage Amount:

Federal Agency Notified: ○ Yes ○ No ◉ Unknown State Agency Notified: ○ Yes ○ No ◉ Unknown

Other Agency Notified: ○ Yes ○ No ◉ Unknown

Remedial Actions

THEY CLOSED REMOTE VALVES TO ISOLATE THE SECTION.

Additional Info

THE ROAD CLOSURE IS STILL ONGOING.

Latitude

Degrees: Minutes: Seconds: Quadrant:

Longitude

Degrees: Minutes: Seconds: Quadrant:

Distance from City: Direction:

Section: Township:

Range: Milepost:

☐ Rescinded **Comments** (max 250 characters)

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150663 Appendix B NRC Report 1119244

<< Previous << Save >>

NOTICE: This report is required by 49 CFR Part 191. Failure to report can result in a civil penalty not to exceed 100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122.		OMB NO: 2137-0522 EXPIRATION DATE: 10/31/2016
U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	**Original Report Date:**	07/09/2015
	No.	20150091 - 16805 (DOT Use Only)

INCIDENT REPORT - GAS TRANSMISSION AND GATHERING PIPELINE SYSTEMS

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0522. All responses to this collection of information are mandatory. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.

INSTRUCTIONS

Important: *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline/library/forms.*

PART A - KEY REPORT INFORMATION

Report Type: *(select all that apply)*	**Original:**	**Supplemental:**	**Final:**
	Yes		
Last Revision Date:			
1. Operator's OPS-issued Operator Identification Number (OPID):	19570		
2. Name of Operator	TRANSCONTINENTAL GAS PIPE LINE COMPANY		
3. Address of Operator:			
3a. Street Address	2800 POST OAK BLVD		
3b. City	HOUSTON		
3c. State	Texas		
3d. Zip Code:	77056		
4. Local time *(24-hr clock)* and date of the Incident:	06/09/2015 21:30		
5. Location of Incident:			
Latitude:	[redacted]		
Longitude:			
6. National Response Center Report Number (if applicable):	1119244		
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	06/09/2015 22:41		
8. Incident resulted from:	Unintentional release of gas		
9. Gas released: (select only one, based on predominant volume released)	Natural Gas		
- Other Gas Released Name:			
10. Estimated volume of commodity released unintentionally - Thousand Cubic Feet (MCF):	96,379.00		
11. Estimated volume of intentional and controlled release/blowdown - Thousand Cubic Feet (MCF)	16,812.00		
12. Estimated volume of accompanying liquid release (Barrels):			
13. Were there fatalities?	No		
- If Yes, specify the number in each category:			
13a. Operator employees			
13b. Contractor employees working for the Operator			
13c. Non-Operator emergency responders			
13d. Workers working on the right-of-way, but NOT associated with this Operator			
13e. General public			
13f. Total fatalities (sum of above)			
14. Were there injuries requiring inpatient hospitalization?	No		
- If Yes, specify the number in each category:			
14a. Operator employees			
14b. Contractor employees working for the Operator			
14c. Non-Operator emergency responders			
14d. Workers working on the right-of-way, but NOT associated with this Operator			
14e. General public			
14f. Total injuries (sum of above)			
15. Was the pipeline/facility shut down due to the incident?	Yes		
- If No, Explain:			

- If Yes, complete Questions 15a and 15b: *(use local time, 24-hr clock)*	
15a. Local time and date of shutdown	06/09/2015 22:07
15b. Local time pipeline/facility restarted	
- Still shut down? (* Supplemental Report Required)	Yes
16. Did the gas ignite?	No
17. Did the gas explode?	No
18. Number of general public evacuated:	150
19. Time sequence *(use local time, 24-hour clock)*:	
19a. Local time operator identified Incident– effective 10-2014, changed from "Incident" to "failure"	06/09/2015 21:30
19b. Local time operator resources arrived on site	06/09/2015 23:03

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the origin of the Incident onshore?	Yes
- Yes (Complete Questions 2-12)	
- No (Complete Questions 13-15)	
If Onshore:	
2. State:	Pennsylvania
3. Zip Code:	17814-7935
4. City	Benton
5. County or Parish	Lycoming County
6. Operator designated location	Milepost/Valve Station
Specify:	MP 118.6
7. Pipeline/Facility name:	Leidy Line B
8. Segment name/ID:	517LB10 to 517LB0
9. Was Incident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Incident :	Pipeline Right-of-way
11. Area of Incident (as found) :	Underground
Specify:	Under soil
Other – Describe:	
Depth-of-Cover (in):	43
12. Did Incident occur in a crossing?	No
- If Yes, specify type below:	
- If Bridge crossing –	
Cased/ Uncased:	
- If Railroad crossing –	
Cased/ Uncased/ Bored/drilled	
- If Road crossing –	
Cased/ Uncased/ Bored/drilled	
- If Water crossing –	
Cased/ Uncased	
Name of body of water (If commonly known):	
Approx. water depth (ft) at the point of the Incident:	
Select:	
If Offshore:	
13. Approx. water depth (ft) at the point of the Incident:	
14. Origin of Incident:	
- If "In State waters":	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- If "On the Outer Continental Shelf (OCS)":	
- Area:	
- Block #:	
15. Area of Incident:	

PART C - ADDITIONAL FACILITY INFORMATION

1. Is the pipeline or facility: - Interstate - Intrastate	Interstate
2. Part of system involved in Incident:	Onshore Pipeline, Including Valve Sites
3. Item involved in Incident:	Pipe
- If Pipe – Specify:	Pipe Body
3a. Nominal diameter of pipe (in):	24
3b. Wall thickness (in):	.344
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	1,720

3d. Pipe specification:	60000
3e. Pipe Seam – Specify:	Flash Welded
- If Other, Describe:	
3f. Pipe manufacturer:	AO SMITH
3g. Year of manufacture:	Unknown
3h. Pipeline coating type at point of Incident – Specify:	Coal Tar
- If Other, Describe:	
- If Weld, including heat-affected zone – Specify:	
- If Other, Describe:	
- If Valve – Specify:	
- If Mainline – Specify:	
- If Other, Describe:	
3i. Mainline valve manufacturer:	
3j. Year of manufacture:	
- If Other, Describe:	
4. Year item involved in Incident was installed:	1963
5. Material involved in Incident:	Carbon Steel
- If Material other than Carbon Steel or Plastic – Specify:	
6. Type of Incident involved:	Rupture
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	
- If Other – Describe:	
- If Rupture - Select Orientation:	Longitudinal
- If Other – Describe:	
Approx. size: in. (widest opening):	408
by in. (length circumferentially or axially):	24
- If Other – Describe:	

PART D - ADDITIONAL CONSEQUENCE INFORMATION

1. Class Location of Incident:	Class 1 Location
2. Did this Incident occur in a High Consequence Area (HCA)?	No
- If Yes:	
2a. Specify the Method used to identify the HCA:	
3. What is the PIR (Potential Impact Radius) for the location of this Incident? Feet:	574
4. Were any structures outside the PIR impacted or otherwise damaged due to heat/fire resulting from the Incident?	No
5. Were any structures outside the PIR impacted or otherwise damaged NOT by heat/fire resulting from the Incident?	No
6. Were any of the fatalities or injuries reported for persons located outside the PIR?	No
7. Estimated Property Damage :	
7a. Estimated cost of public and non-Operator private property damage paid/reimbursed by the Operator – effective 6-2011, "paid/reimbursed by the Operator" removed	$ 0
Estimated cost of gas released unintentionally – effective 6-2011, moved to item 7f	
Estimated cost of gas released during intentional and controlled blowdown – effective 6-2011, moved to item 7g	
7b. Estimated cost of Operator's property damage & repairs	$ 420,000
7c. Estimated cost of Operator's emergency response	$ 10,000
7d. Estimated other costs	$ 0
Describe:	
7e. Property damage subtotal (sum of above)	$ 430,000
Cost of Gas Released	
7f. Estimated cost of gas released unintentionally	$ 273,454
7g. Estimated cost of gas released during intentional and controlled blowdown	$ 47,700
7h. Total estimated cost of gas released (sum of 7.f & 7.g above)	$ 321,154
Total of all costs	$ 751,154

PART E - ADDITIONAL OPERATING INFORMATION	
1. Estimated pressure at the point and time of the Incident (psig):_	1,141.00
2. Maximum Allowable Operating Pressure (MAOP) at the point and time of the Incident (psig):	1,200.00
Added 10-2014 2a. MAOP established by 49 CFR section:	192.619(a)(1)
- If Other, specify:	
3. Describe the pressure on the system or facility relating to the Incident:	Pressure did not exceed MAOP
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Incident operating under an established pressure restriction with pressure limits below those normally allowed by the MAOP?	No
- If Yes - (*Complete 4a and 4b below)*	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	Yes
- If Yes - (*Complete 5a. – 5e. below):*	
5a. Type of upstream valve used to initially isolate release source:	Remotely Controlled
5b. Type of downstream valve used to initially isolate release source:	Remotely Controlled
5c. Length of segment isolated between valves (ft):	75,504
5d. Is the pipeline configured to accommodate internal inspection tools?	Yes
- If No – Which physical features limit tool accommodation? *(select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	No
- If Yes, which operational factors complicate execution? *(select all that apply)*	
- Excessive debris or scale, wax, or other wall build-up	
- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other	
- If Other, Describe:	
5f. Function of pipeline system:	Transmission System
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Incident?	Yes
- If Yes:	
6a. Was it operating at the time of the Incident?	Yes
6b. Was it fully functional at the time of the Incident?	Yes
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume or pack calculations) assist with the detection of the Incident?	Yes
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Incident?	Yes
7. How was the Incident initially identified for the Operator?	SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume or pack calculations)
- If Other – Describe:	
7a. If "Controller", "Local Operating Personnel, including contractors", "Air Patrol", or "Ground Patrol by Operator or its contractor" is selected in Question 7, specify:	
8. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Incident?	No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: (provide an explanation for why the Operator did not

	investigate)
- If No, the operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)*	Controller Actions did not appear to cause the incident
- If Yes, Descr be investigation result(s) *(select all that apply)*:	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator) and other factors associated with fatigue	
- Provide an explanation for why not:	
- Investigation identified no control room issues	
- Investigation identified no controller issues	
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above –	
Describe:	

PART F - DRUG & ALCOHOL TESTING INFORMATION

1. As a result of this Incident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	Yes
- If Yes:	
1a. How many were tested:	3
1b. How many failed:	0
2. As a result of this Incident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	Yes
- If Yes:	
2a. How many were tested:	3
2b. How many failed:	0

PART G - APPARENT CAUSE

Select only one box from PART G in the shaded column on the left representing the APPARENT Cause of the Incident, and answer the questions on the right. Describe secondary, contributing, or root causes of the Incident in the narrative (PART H).

Apparent Cause:	G5 - Material Failure of Pipe or Weld

G1 - Corrosion Failure - *only one **sub-cause** can be picked from shaded left-hand column*

Corrosion Failure – Sub-cause:	
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other	
- If Other – Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other	
- If Other – Describe:	

4. Was the failed item buried under the ground?	
- If Yes:	
4a. Was failed item considered to be under cathodic protection at the time of the incident?	
- If Yes, Year protection started:	
4b. Was shielding, tenting, or disbonding of coating evident at the point of the incident?	
4c. Has one or more Cathodic Protection Survey been conducted at the point of the incident?	
If "Yes, CP Annual Survey" – Most recent year conducted:	
If "Yes, Close Interval Survey" – Most recent year conducted:	
If "Yes, Other CP Survey" – Most recent year conducted:	
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	
- If Internal Corrosion:	
6. Results of visual examination:	
- If Other, Describe:	
7. Cause of corrosion *(select all that apply)*:	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	
- Erosion	
- Other	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following *(select all that apply)*:	
- Field examination	
- Determined by metallurgical analysis	
- Other	
- If Other, Describe:	
9. Location of corrosion *(select all that apply)*:	
- Low point in pipe	
- Elbow	
- Drop-out	
- Other	
- If Other, Describe:	
10. Was the gas/fluid treated with corrosion inh bitors or biocides?	
11. Was the interior coated or lined with protective coating?	
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	
13. Were corrosion coupons routinely utilized?	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Incident" (from PART C, Question 3) is Pipe or Weld.	
14. Has one or more internal inspection tool collected data at the point of the Incident?	
14a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage Tool	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	
If Other, Describe:	
15. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Incident?	

- If Yes,	
Most recent year tested:	
Test pressure (psig):	
16. Has one or more Direct Assessment been conducted on this segment?	
- If Yes, and an investigative dig was conducted at the point of the Incident:	
Most recent year conducted:	
- If Yes, but the point of the Incident was not identified as a dig site:	
Most recent year conducted:	
17. Has one or more non-destructive examination been conducted at the point of the Incident since January 1, 2002?	
17a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year examined:	
- Guided Wave Ultrasonic	
Most recent year examined:	
- Handheld Ultrasonic Tool	
Most recent year examined:	
- Wet Magnetic Particle Test	
Most recent year examined:	
- Dry Magnetic Particle Test	
Most recent year examined:	
- Other	
Most recent year examined:	
If Other, Describe:	
G2 - Natural Force Damage - *only one **sub-cause** can be picked from shaded left-handed column*	
Natural Force Damage – Sub-Cause:	
- If Earth Movement, NOT due to Heavy Rains/Floods:	
1. Specify:	
- If Other, Descr be:	
- If Heavy Rains/Floods:	
2. Specify:	
- If Other, Descr be:	
- If Lightning:	
3. Specify:	
- If Temperature:	
4. Specify:	
- If Other, Descr be:	
- If Other Natural Force Damage:	
5. Describe:	
Complete the following if any Natural Force Damage sub-cause is selected.	
6. Were the natural forces causing the Incident generated in conjunction with an extreme weather event?	
6a. If yes, specify: *(select all that apply)*:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Describe:	
G3 - Excavation Damage *only one **sub-cause** can be picked from shaded left-hand column*	
Excavation Damage – Sub-Cause:	
- If Previous Damage Due to Excavation Activity: Complete Questions 1-5 ONLY IF the "Item Involved in Incident" (From Part C, Question 3) is Pipe or Weld.	
1. Has one or more internal inspection tool collected data at the point of the Incident?	
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Year:	
- Ultrasonic	
Year:	
- Geometry	
Year:	

- Caliper	
Year:	
- Crack	
Year:	
- Hard Spot	
Year:	
- Combination Tool	
Year:	
- Transverse Field/Triaxial	
Year:	
- Other:	
Year:	
Describe:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Incident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
4. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Incident:	
Most recent year conducted:	
- If Yes, but the point of the Incident was not identified as a dig site:	
Most recent year conducted:	
5. Has one or more non-destructive examination been conducted at the point of the Incident since January 1, 2002?	
5a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Year:	
- Guided Wave Ultrasonic	
Year:	
- Handheld Ultrasonic Tool	
Year:	
- Wet Magnetic Particle Test	
Year:	
- Dry Magnetic Particle Test	
Year:	
- Other	
Year:	
Describe:	
Complete the following if Excavation Damage by Third Party is selected as the sub-cause.	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from *(select all that apply)*:	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred *(select all that apply)*:	
- Public	
- If Public, Specify:	
- Private	
- If Private, Specify:	
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator :	
10. Type of excavation equipment :	
11. Type of work performed :	

12. Was the One-Call Center notified? - Yes - No	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks vis ble in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption: (hours)	
17. Description of the **CGA-DIRT Root Cause** (*select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, then one predominant second level CGA-DIRT Root Cause as well*):	
- Predominant first level CGA-DIRT Root Cause:	
- If One-Call Notification Practices Not Sufficient, Specify:	
- If Locating Practices Not Sufficient, Specify:	
- If Excavation Practices Not Sufficient, Specify:	
- If Other/None of the Above, Explain:	
G4 - Other Outside Force Damage - only one **sub-cause** can be selected from the shaded left-hand column	
Other Outside Force Damage – Sub-Cause:	
- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:	
1. Vehicle/Equipment operated by:	
- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring:	
2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Heavy Rains/Flood	
- Other	
- If Other, Descr be:	
- If Previous Mechanical Damage NOT Related to Excavation: Complete Questions 3-7 ONLY IF the "Item Involved in Incident" (from PART C, Question 3) is Pipe or Weld.	
3. Has one or more internal inspection tool collected data at the point of the Incident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other:	
Most recent year run:	
Describe:	
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Incident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
6. Has one or more Direct Assessment been conducted on the pipeline segment?	

- If Yes, and an investigative dig was conducted at the point of the Incident :	
Most recent year conducted:	
- If Yes, but the point of the Incident was not identified as a dig site:	
Most recent year conducted:	
7. Has one or more non-destructive examination been conducted at the point of the Incident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
- If Intentional Damage:	
8. Specify:	
- If Other, Describe:	
- If Other Outside Force Damage:	
9. Describe:	

G5 - Pipe, Weld, or Joint Failure	**Use this section to report material failures ONLY IF the "Item Involved in Incident" (from PART C, Question 3) is "Pipe" or "Weld."**
	Only one **sub-cause** can be selected from the shaded left-hand column

Pipe, Weld or Join Failure – Sub-Cause:	Original Manufacturing-related (NOT girth weld or other welds formed in the field)
1. The sub-cause shown above is based on the following *(select all that apply)*:	
- Field Examination	Yes
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe	
- Sub-cause is Tentative or Suspected; Still Under Investigation *(Supplemental Report required)*	Yes
- If Construction-, Installation- or Fabrication	
2. List contr buting factors: *(select all that apply)*	
- Fatigue or Vibration related:	
Specify:	
- If Other, Describe:	
- Mechanical Stress	
- Other	
- If Other, Describe:	
- If Environmental Cracking-related:	
3. Specify:	
- If Other, Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional Factors (*select all that apply*):	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	Yes
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other	
- If Other, Describe:	

5. Has one or more internal inspection tool collected data at the point of the Incident?	Yes
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	Yes
Most recent year run:	2010
- Ultrasonic	
Most recent year run:	
- Geometry	Yes
Most recent year run:	2010
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	
Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Incident?	Yes
- If Yes:	
Most recent year tested:	1987
Test pressure (psig):	1,555.00
7. Has one or more Direct Assessment been conducted on the pipeline segment?	No
- If Yes, and an investigative dig was conducted at the point of the Incident:	
Most recent year conducted:	
- If Yes, but the point of the Incident was not identified as a dig site:	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Incident since January 1,2002?	No
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	

G6 - Equipment Failure - only one **sub-cause** can be selected from the shaded left-hand column

Equipment Failure – Sub-Cause:	
- If Malfunction of Control/Relief Equipment:	
1. Specify:	
- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	
- Relief Valve	

- Power Failure	
- Stopple/Control Fitting	
- Pressure Regulator	
- ESD System Failure	
- Other	
- If Other, Describe:	
- If Compressor or Compressor-related Equipment:	
2. Specify:	
- If Other, Describe:	
- If Threaded Connection/Coupling Failure:	
3. Specify:	
- If Other, Describe:	
- If Non-threaded Connection Failure:	
4. Specify:	
- If Other, Describe:	
- If Other Equipment Failure:	
5. Describe:	
Complete the following if any Equipment Failure sub-cause is selected.	
6. Additional factors that contributed to the equipment failure *(select all that apply)*	
- Excessive vibration	
- Overpressurization	
- No support or loss of support	
- Manufacturing defect	
- Loss of electricity	
- Improper installation	
- Mismatched items (different manufacturer for tubing and tubing fittings)	
- Dissimilar metals	
- Breakdown of soft goods due to compatibility issues with transported gas/fluid	
- Valve vault or valve can contributed to the release	
- Alarm/status failure	
- Misalignment	
- Thermal stress	
- Other	
- If Other, Describe:	
G7 – Incorrect Operation - only one **sub-cause** can be selected from the shaded left-hand column	
Incorrect Operation – Sub-Cause:	
- If Underground Gas Storage, Pressure Vessel, or Cavern Allowed or Caused to Overpressure:	
1. Specify:	
- If Other, Describe:	
- If Other Incorrect Operation:	
2. Describe:	
Complete the following if any Incorrect Operation sub-cause is selected.	
3. Was this Incident related to: *(select all that apply)*	
- Inadequate procedure	
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Incident:	
5. Was the task(s) that led to the Incident identified as a covered task in your Operator Qualification Program?	
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	
G8 - Other Incident Cause - only one **sub-cause** can be selected from the shaded left-hand column	
Other Incident Cause – Sub-Cause:	
- If Miscellaneous:	
1. Describe:	

- If Unknown:	
2. Specify:	

PART - H NARRATIVE DESCRIPTION OF THE INCIDENT

On June 9,2015 Leidy B Line ruptured between MLV517LB0 and MLV517LB10. At approximately 9:30 gas control recieved a low low pressure alarm and notified local personnel. The mainline block valves were closed to isolate the segment. Emergency responders and Williams personnell isolated the incident site and notified the NRC.

PART I - PREPARER AND AUTHORIZED SIGNATURE

Preparer's Name	Troy Stahle
Preparer's Title	Pipeline Safety Engineer
Preparer's Telephone Number	9183446359
Preparer's E-mail Address	troy.stahle@williams.com
Preparer's Facsimile Number	
Authorized Signature Title	Manager Pipeline Safety
Authorized Signature Telephone Number	17132152111
Authorized Signature Email	No Email Address
Date	07/09/2015

Appendix D

Stress Engineering Services Inc.

Metallurgical Analysis Report

This document is on file at PHMSA

Appendix E

Williams Root Cause Analysis

This document is on file at PHMSA