

DOT U.S. 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** 2/11/2016  
**Subject** Failure Investigation Report—Buckeye Linden Station, Internal Corrosion Leak, 8-inch Relief Line

### **Operator, Location, & Consequences**

**Date of Failure** 8/20/2014  
**Commodity Released** #2 Diesel Fuel  
**City, County, & State** Linden, Union County, New Jersey  
**OpID & Operator Name** 1845 Buckeye Partners, LP  
**Unit # & Unit Name** 3191 Linden Area, NJ  
**SMART Activity #** 147585  
**Milepost/Location** Latitude: 40.535833, Longitude: -74.256944  
**Type of Failure** Leak due to internal corrosion on dead leg station piping segment  
**Fatalities** 0  
**Injuries** 0  
**Description of area impacted** Buckeye Property  
**Total Costs** \$976,244

# Failure Investigation Report—Buckeye Linden Station Internal Corrosion Leak, 8-inch Relief Line

[Failure Date 8/20/2014]

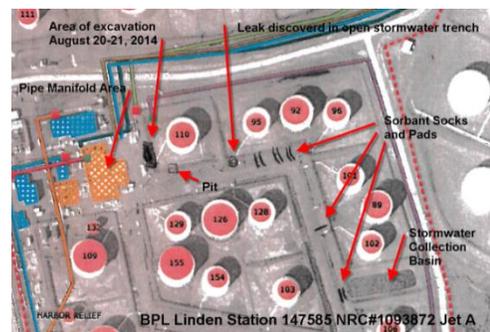
## Executive Summary

On August 20, 2014, at 8:30 a.m., Buckeye Partners, LP, reported a release of product at their Linden Station located in Linden, New Jersey. The product, Jet A Fuel, was discovered in the facilities storm water retention system by station operations personnel. Notification was made to the National Response Center by Buckeye Partners, LP, at 12:02 p.m. on August 20, 2014. An inspector from the Eastern Region of the Pipeline and Hazardous Materials Safety Administration (PHMSA) arrived on site on August 21, 2014, to begin an investigation into the cause of the release. The leak occurred on an 8-inch diameter nominal pipe size (NPS) dead leg segment of pressure relief piping connected to the 12-inch NPS Bayway Line Shipper manifold, and was caused by internal corrosion of the pipe. The presence of bacteria, discovered by the metallurgical analysis, indicates that the corrosion was likely due to microbial-induced corrosion (MIC) in the dead leg segment of piping. Approximately 143 barrels of Jet A Fuel were released, with a total of 130 barrels reported recovered. All released product was contained within the Linden facility, and there were no injuries, fatalities, or evacuations resulting from this release.



## System Details

Buckeye's Linden Station consists of 49 breakout tanks, with 1 breakout tank located at Newark Airport (Appendix A). The 8-inch NPS relief line at Linden station provides overpressure protection for the facility, and is connected to the 12-inch NPS Bayway Line Shipper Manifold. The 8-inch NPS relief line consists of 0.322-inch wall thickness API 5L seamless pipe that was installed in 1952. The line operates between 40 and 50 pounds per square inch gauge (psig), with a maximum operating pressure (MOP) of 60 psig.



The Linden Area NJ Unit (#3191) also includes:

1. 20-inch NPS & 16-inch NPS pipelines that stretch from Linden, NJ, to the Pennsylvania border (49.1 miles);
2. 12-inch NPS pipeline that stretches from Sewaren, NJ, to Linden Station (5.2 miles);
3. 6-inch NPS pipeline that stretches for 1 mile from Linden, NJ, then increases to an 8-inch NPS pipeline that runs 6.1 miles to Newark Airport, as well as two 12-inch NPS pipelines that run 2.8 miles from Linden, NJ, to Long Island, NY.

## Events Leading up to the Failure

On the morning of August 20, 2014, prior to the discovery of the release, the 8-inch NPS relief line was operating under normal conditions. Station operations personnel were performing routine inspections of the facility when they discovered jet fuel in the facility storm water collection system.

## Emergency Response

Upon discovery of the release, Buckeye personnel activated their Emergency Response and Oil Pollution Act plan at the Linden facility. The local fire department responded to the release, with crews isolating

## **Failure Investigation Report—Buckeye Linden Station Internal Corrosion Leak, 8-inch Relief Line**

[Failure Date 8/20/2014]

and excavating lines near the discovery point and deploying absorbent pads and booms to keep the product from migrating throughout the storm water system. All free product was recovered from the facility, and the contaminated soil removed. No product reached or breached the retention area of the Linden Terminal.

### **Summary of Return-to-Service**

The Linden Station was shut down to isolate a dead leg on a section of the 12-inch NPS Bayway Line Shipper Manifold. A pressure test performed on the dead leg segment of pipe confirmed that section was the source of the leak. The 8-inch NPS dead leg was permanently removed from the system and sent for metallurgical analysis. The station and relief line were returned to normal operations on August 27, 2014.

### **Investigation Details**

On August 20, 2014, station personnel conducting a routine inspection discovered product (Jet A Fuel) in the storm drains at Linden Station.

The Linden Station facility is located within a High Consequence Area (HCA). The release was contained within the storm water system on station property and no impacts to the HCA were noted.

Pressure/Supervisory Control and Data Acquisition (SCADA) records showed the MOP of the piping was not exceeded prior to the discovery of the release.

A sample of the released product was tested and identified as Jet A Fuel.

The section of leaking pipe was an 8-inch NPS, 0.322-inch nominal wall thickness, API 5L steel pipe installed in 1952.

The leak was located on a dead leg section of piping within the station. This section of pipe experienced stagnant flow conditions that created a corrosive environment by allowing sludge and debris to accumulate in the piping.

Normal operating pressure of the line is between 40 and 50 psig, with a MOP of 60 psig.

Two locations within a 6-foot section of piping were found to be leaking at the 6 o'clock orientation of the pipe. This section of the pipe—approximately 6 feet in total—was removed and shipped to Det Norske Veritas Germanischer Lloyd (DNV-GL) for analysis.

The pipe was cathodically protected with an impressed current system and externally coated with coal tar. Cathodic protection records reviewed during the course of the investigation showed acceptable levels of protection on the piping in the area of the leak.

Metallurgical analysis of the leaking pipe section identified two leak locations with internal corrosion pits at the 6 o'clock position on the pipe. The largest leak location (Leak #1) was approximately 0.59 inches longitudinally and 0.51 inches circumferentially. Five additional pits (that did not penetrate the pipe wall) were also identified in the 6 o'clock position, with the largest pit measuring 0.71 inches longitudinally, 0.47 inches circumferentially, and 0.30 inches deep.

Buckeye conducted a review of maps and diagrams of the station piping to determine if any additional dead leg segments existed elsewhere. None were identified.



**Failure Investigation Report—Buckeye Linden Station  
Internal Corrosion Leak, 8-inch Relief Line**

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**Findings and Contributing Factors**

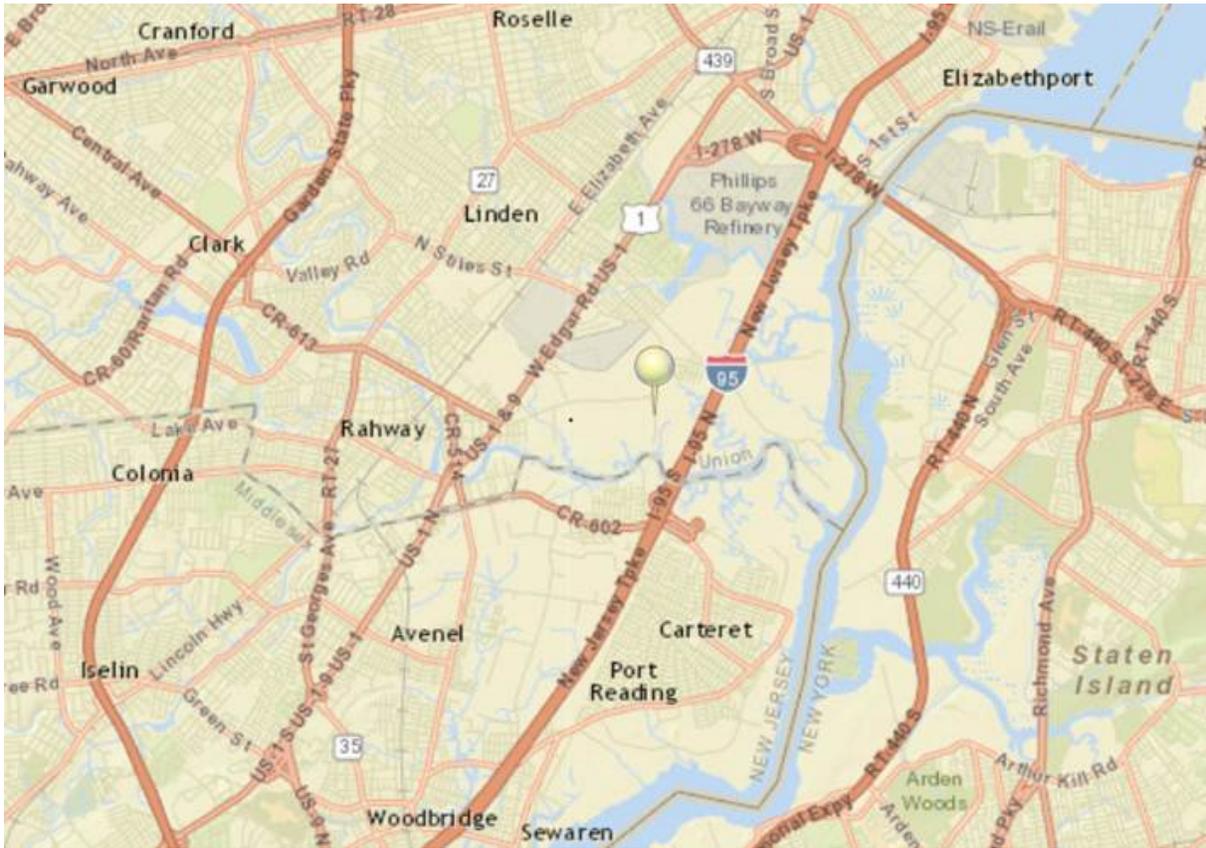
Based on the metallurgical analysis performed by DNV-GL, the apparent cause of the leak was corrosion due to microbial action on the internal surface of the pipe at the 6 o'clock position (Appendix D). There was no evidence of significant external corrosion on the pipe section.

The DNV-GL analysis also states that stagnant or non-flowing conditions, such as those found in dead leg segments, are known to cause internal corrosion threats due to the accumulation of water, deposits, or sediment. These conditions increase the risk for localized corrosion and are conducive to MIC.

**Appendices**

- A 147585—Map and Photographs
- B 147585—NRC Report 1092873
- C 147585—Incident Report Form 7000.1
- D 147585—Metallurgical Analysis Report

147585 Appendix A\_Maps and Photographs

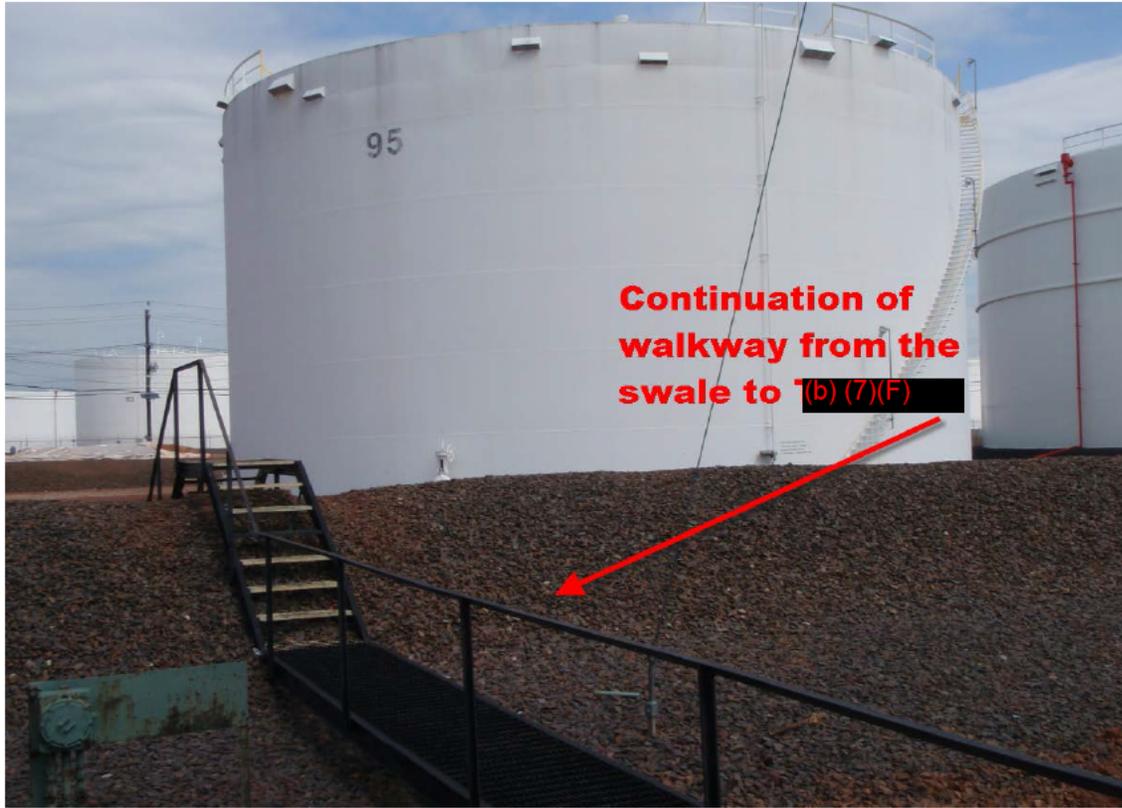




(b) (7)(F)









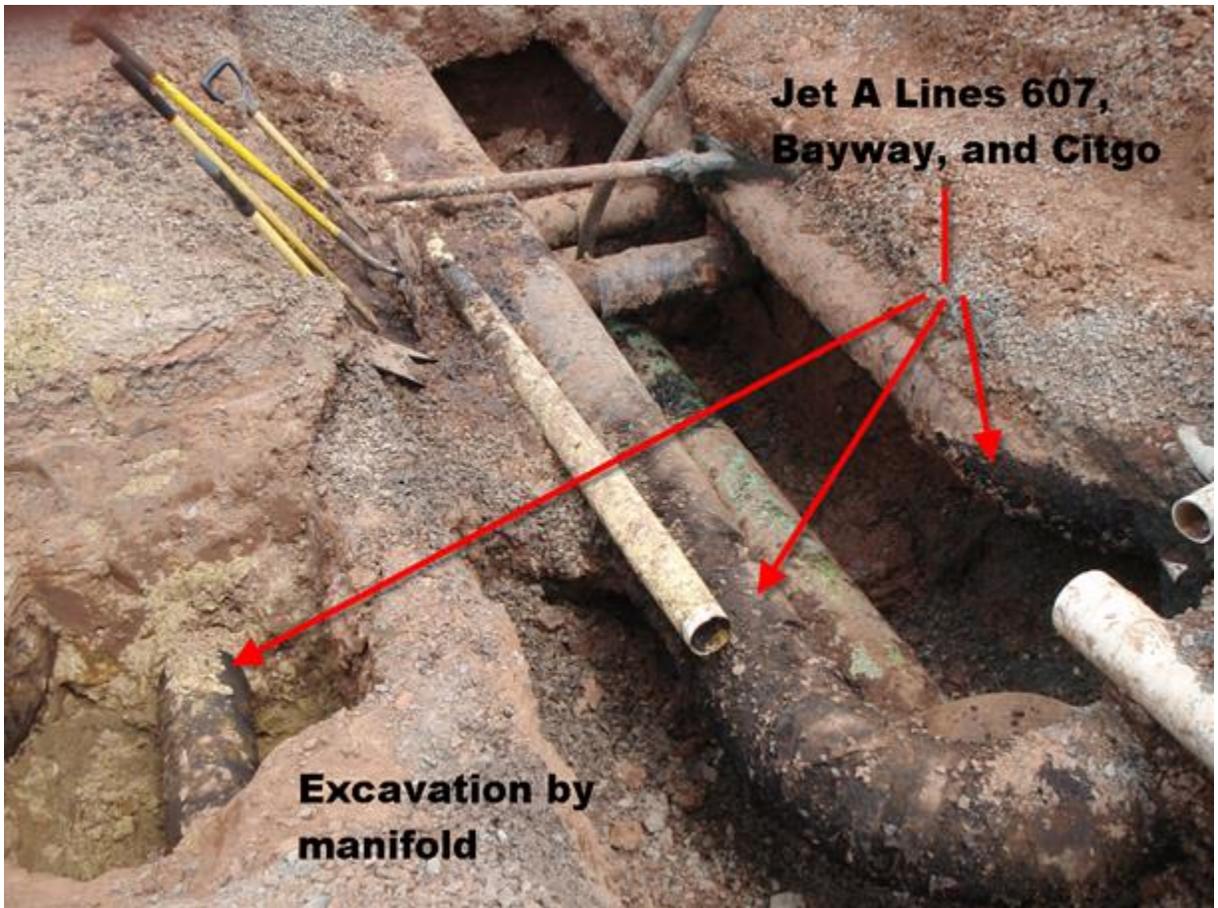
**Location of product/water first observed in open stormwater swale south of Tank 95**



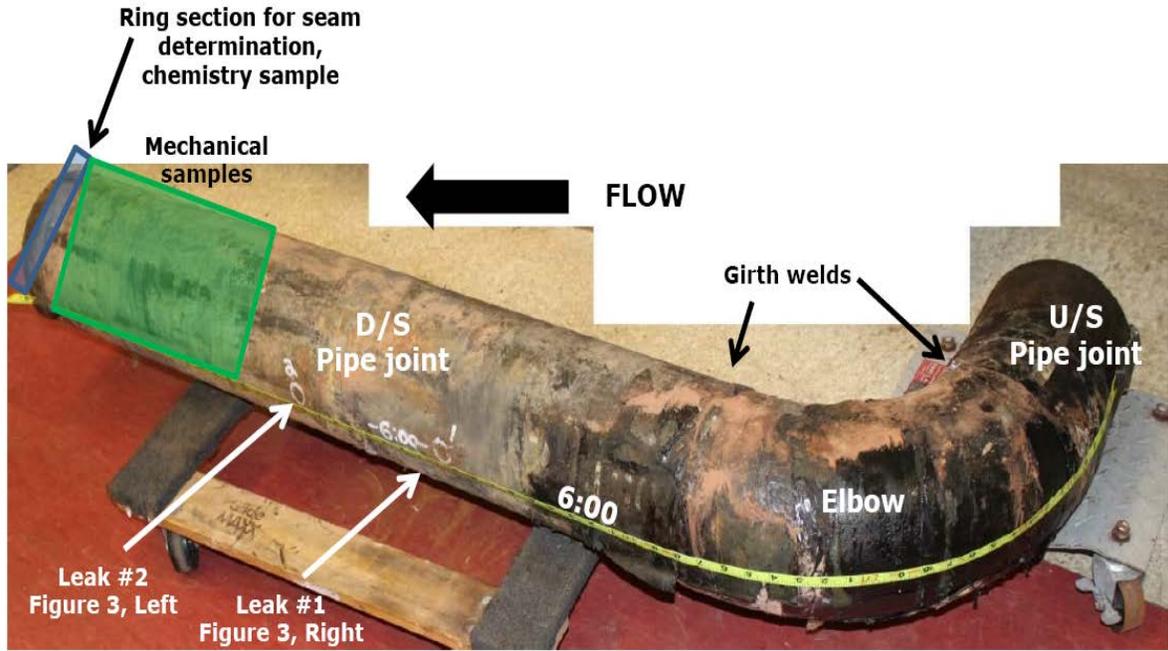


(b) (7)(F)











[Return to Search]

NRC Number: 1092873  
 Call Date: 08/20/2014 Call Time: 12:02:00

**Caller Information**

First Name: KEVIN Last Name: MCMAHON  
 Company Name: BUCKEYE PIPELINE  
 Address: 2650 MARSHES DOCK RD.  
 City: LINDEN State: NJ  
 Country: USA Zip: 07036  
 Phone 1: 9083745346 Phone 2: 7325588503  
 Organization Type: PRIVATE ENTERPRISE Is caller the spiller? (X)Yes ( )No ( )No Response  
 Confidential: ( )Yes (X)No ( )No Response

**Discharger Information**

First Name: KEVIN Last Name: MCMAHON  
 Company Name: BUCKEYE PIPELINE  
 Address: 2650 MARSHES DOCK RD.  
 City: LINDEN State: NJ  
 Country: USA Zip: 07036  
 Phone 1: 9083745346 Phone 2: 7325588503  
 Organization Type: PRIVATE ENTERPRISE

**Spill Information**

State: NJ County: UNION  
 Nearest City: LINDEN Zip Code: 07036  
 Location  
 2650 MARSHES DOCK RD.  
 Spill Date: 08/20/2014 (mm/dd/yyyy) Spill Time: 09:30:00 (24h:mm:ss)  
 DTG Type: [< V]  
 Incident Type: [Fixed Facility V] Reported Incident Type: FIXED FACILITY

Description  
 HEATING OIL DISCHARGED FROM AN UNKNOWN SOURCE THAT GOT INTO THEIR STORM SYSTEM DUE TO AN UNKNOWN CAUSE AT THIS TIME.

Materials Involved

Material / Chris Name	Chris Code	Total Qty.	Water Qty.
OIL, FUEL: NO. 2	OTW	0 UNKNOWN AMOUNT	0 UNKNOWN AMOUNT

Medium Type: [< V]  
 Additional Medium Information:  
 ONSITE STORM WATER SEWER SYSTEM

Injuries: [ ] Fatalities: [ ]  
 Evacuations: ( )Yes(X)No( )Unknown No. of Evacuations: [ ]  
 Damages: ( )Yes(X)No( )Unknown Damage Amount: [ ]  
 Federal Agency Notified: ( )Yes( )No(X)Unknown State Agency Notified: ( )Yes( )No(X)Unknown  
 Other Agency Notified: ( )Yes( )No(X)Unknown

Remedial Actions

A VAC TRUCK IS ONSITE AND A RESPONSE CONTRACTOR IS EN ROUTE.

Additional Info

CALLER STATES THEY HAVE SO FAR RECOVERED 6,000 GALLONS OF AN OIL WATER MIXTURE.

Latitude

Degrees: [ ] Minutes: [ ] Seconds: [ ] Quadrant: [ ]

Longitude

Degrees: [ ] Minutes: [ ] Seconds: [ ] Quadrant: [ ]

Distance from City: [ ] [ ] Direction: [ ]

Section: [ ] Township: [ ]

Range: [ ] Milepost: [ ]

[ ]Rescinded Comments (max 250 characters)

[<< Previous]

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[<< Save >>]

**147585 Appendix C Incident Report Form F7000.1**

NOTICE: This report is required by 49 CFR Part 195. Failure to report can result in a civil penalty not to exceed \$100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed \$1,000,000 as provided in 49 USC 60122.		OMB NO: 2137-0047 EXPIRATION DATE: 07/31/2015
 U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	<b>Original Report Date:</b>	09/19/2014
	<b>No.</b>	20140333 - 20382 ----- (DOT Use Only)

**ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS**

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0047. All responses to the collection of information are mandatory. Send comments regarding this burden 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:
		<b>Yes</b>	<b>Yes</b>
Last Revision Date:	04/24/2015		
1. Operator's OPS-issued Operator Identification Number (OPID):	1845		
2. Name of Operator	BUCKEYE PARTNERS, LP		
3. Address of Operator:			
3a. Street Address	FIVE TEK PARK 9999 HAMILTON BOULEVARD		
3b. City	BREINIGSVILLE		
3c. State	Pennsylvania		
3d. Zip Code	18031		
4. Local time (24-hr clock) and date of the Accident:	08/20/2014 08:30		
5. Location of Accident:			
Latitude:	40.609186		
Longitude:	-74.239401		
6. National Response Center Report Number (if applicable):	1092873		
7. Local time (24-hr clock) and date of initial telephonic report to the National Response Center (if applicable):	08/20/2014 12:14		
8. Commodity released: (select only one, based on predominant volume released)	Refined and/or Petroleum Product (non-HVL) which is a Liquid at Ambient Conditions		
- Specify Commodity Subtype:	Diesel, Fuel Oil, Kerosene, Jet Fuel		
- If "Other" Subtype, Descr be:			
- If Biofuel/Alternative Fuel and Commodity Subtype is Ethanol Blend, then % Ethanol Blend:			
- If Biofuel/Alternative Fuel and Commodity Subtype is Biodiesel, then Biodiesel Blend e.g. B2, B20, B100			
9. Estimated volume of commodity released unintentionally (Barrels):	143.00		
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):			
11. Estimated volume of commodity recovered (Barrels):	130.00		
12. Were there fatalities?	No		
- If Yes, specify the number in each category:			
12a. Operator employees			
12b. Contractor employees working for the Operator			
12c. Non-Operator emergency responders			
12d. Workers working on the right-of-way, but NOT associated with this Operator			
12e. General public			
12f. Total fatalities (sum of above)			
13. Were there injuries requiring inpatient hospitalization?	No		
- If Yes, specify the number in each category:			
13a. Operator employees			
13b. Contractor employees working for the Operator			
13c. Non-Operator emergency responders			
13d. Workers working on the right-of-way, but NOT associated with this Operator			
13e. General public			

**147585 Appendix C Incident Report Form F7000.1**

13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	No
- If No, Explain:	The suspected location was a dead leg
- If Yes, complete Questions 14a and 14b: (use local time, 24-hr clock)	
14a. Local time and date of shutdown:	
14b. Local time pipeline/facility restarted:	
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	No
16. Did the commodity explode?	No
17. Number of general public evacuated:	0
18. Time sequence (use local time, 24-hour clock):	
18a. Local time Operator identified Accident - effective 7- 2014 changed to "Local time Operator identified failure":	08/20/2014 08:30
18b. Local time Operator resources arrived on site:	08/20/2014 08:30

**PART B - ADDITIONAL LOCATION INFORMATION**

1. Was the origin of the Accident onshore?	Yes
	<i>If Yes, Complete Questions (2-12)</i>
	<i>If No, Complete Questions (13-15)</i>
<b>- If Onshore:</b>	
2. State:	New Jersey
3. Zip Code:	07036
4. City	Linden
5. County or Parish	Union
6. Operator-designated location:	Milepost/Valve Station
	Specify: LN
7. Pipeline/Facility name:	Linden Station
8. Segment name/ID:	LN
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Totally contained on Operator-controlled property
11. Area of Accident (as found):	Underground
	Specify: Under soil
	- If Other, Descr be:
	Depth-of-Cover (in): 60
12. Did Accident 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 Accident:	
- Select:	
<b>- If Offshore:</b>	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- On the Outer Continental Shelf (OCS) - Specify:	
- Area:	
- Block #:	
15. Area of Accident:	

**PART C - ADDITIONAL FACILITY INFORMATION**

1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Terminal/Tank Farm Equipment and Piping
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	
3. Item involved in Accident:	Pipe
- If Pipe, specify:	Pipe Body
3a. Nominal diameter of pipe (in):	8

**147585 Appendix C Incident Report Form F7000.1**

3b. Wall thickness (in):	.322
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	Unknown
3d. Pipe specification:	APL 5L line pipe steel
3e. Pipe Seam , specify:	Seamless
- If Other, Descr be:	
3f. Pipe manufacturer:	Unknown
3g. Year of manufacture:	Unknown
3h. Pipeline coating type at point of Accident, specify:	Coal Tar
- If Other, Descr be:	
- If Weld, including heat-affected zone, specify. If Pipe Girth Weld, 3a through 3h above are required:	
- If Other, Descr be:	
- If Valve, specify:	
- If Mainline, specify:	
- If Other, Descr be:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	
- If Other - Descr be:	
- If Other, descr be:	
4. Year item involved in Accident was installed:	1952
5. Material involved in Accident:	Carbon Steel
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Leak
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	Other
- If Other, Descr be:	internal corrosion
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	
<b>PART D - ADDITIONAL CONSEQUENCE INFORMATION</b>	
1. Wildlife impact:	No
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	Yes
3. Long term impact assessment performed or planned:	No
4. Anticipated remediation:	No
4a. If Yes, specify all that apply:	
- Surface water	
- Groundwater	
- Soil	
- Vegetation	
- Wildlife	
5. Water contamination:	No
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	
- Groundwater	
- Drinking water: (Select one or both)	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	
5c. Name of body of water, if commonly known:	
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	Yes
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	Yes
7a. If Yes, specify HCA type(s): (Select all that apply)	
- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's	

**147585 Appendix C Incident Report Form F7000.1**

Integrity Management Program?	
- High Population Area:	Yes
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	Yes
- Other Populated Area	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Drinking Water	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Ecological	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
8. Estimated cost to Operator – effective 12-2012, changed to "Estimated Property Damage":	
8a. Estimated cost of public and non-Operator private property damage paid/reimbursed by the Operator – effective 12-2012, "paid/reimbursed by the Operator" removed	\$ 0
8b. Estimated cost of commodity lost	\$ 0
8c. Estimated cost of Operator's property damage & repairs	\$ 155,059
8d. Estimated cost of Operator's emergency response	\$ 818,521
8e. Estimated cost of Operator's environmental remediation	\$ 475
8f. Estimated other costs	\$ 2,189
Descr be:	Estimated commodity lost calculation will be determined at a later date
8g. Estimated total costs (sum of above) – effective 12-2012, changed to "Total estimated property damage (sum of above)"	\$ 976,244
<b>PART E - ADDITIONAL OPERATING INFORMATION</b>	
1. Estimated pressure at the point and time of the Accident (psig):	.00
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	.00
3. Describe the pressure on the system or facility relating to the Accident (psig):	Pressure did not exceed MOP
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	No
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	No
- If Yes - (Complete 5a. – 5f below) effective 12-2012, changed to "(Complete 5.a – 5.e below)"	
5a. Type of upstream valve used to initially isolate release source:	
5b. Type of downstream valve used to initially isolate release source:	
5c. Length of segment isolated between valves (ft):	
5d. Is the pipeline configured to accommodate internal inspection tools?	
- If No, Which physical features limit tool accommodation? (select all that apply)	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Descr be:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	

**147585 Appendix C Incident Report Form F7000.1**

- If Yes, Which operational factors complicate execution? (select all that apply)	
- Excessive debris or scale, wax, or other wall buildup	
- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Descr be:	
5f. Function of pipeline system:	> 20% SMYS Regulated Trunkline/Transmission
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	No
If Yes -	
6a. Was it operating at the time of the Accident?	
6b. Was it fully functional at the time of the Accident?	
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	No
- If Yes:	
7a. Was it operating at the time of the Accident?	
7b. Was it fully functional at the time of the Accident?	
7c. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	
7d. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	
8. How was the Accident initially identified for the Operator?	Local Operating Personnel, including contractors
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Ground Patrol by Operator or its contractor" is selected in Question 8, specify:	Operator employee
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: (provide an explanation for why the Operator did not investigate)
- If No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: (provide an explanation for why the operator did not investigate)	This section of the station is not monitored by SCADA
- If Yes, specify investigation result(s): (select all that apply)	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
Provide an explanation for why not:	
- Investigation identified no control room issues	
- Investigation identified no controller issues	
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above:	
Descr be:	
<b>PART F - DRUG &amp; ALCOHOL TESTING INFORMATION</b>	

**147585 Appendix C Incident Report Form F7000.1**

1. As a result of this Accident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations? - If Yes:	No
1a. Specify how many were tested:	
1b. Specify how many failed:	
2. As a result of this Accident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations? - If Yes:	No
2a. Specify how many were tested:	
2b. Specify how many failed:	
<b>PART G – APPARENT CAUSE</b>	
<i>Select only one box from PART G in shaded column on left representing the APPARENT Cause of the Accident, and answer the questions on the right. Describe secondary, contributing or root causes of the Accident in the narrative (PART H).</i>	
<b>Apparent Cause:</b>	G1 - Corrosion Failure
<b>G1 - Corrosion Failure</b> - only one sub-cause can be picked from shaded left-hand column	
<b>Corrosion Failure – Sub-Cause:</b>	Internal Corrosion
<b>- If External Corrosion:</b>	
1. Results of visual examination: - If Other, Descr be:	
2. Type of corrosion: <i>(select all that apply)</i>	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Descr be:	
3. The type(s) of corrosion selected in Question 2 is based on the following: <i>(select all that apply)</i>	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Descr be:	
4. Was the failed item buried under the ground? - If Yes :	
<input type="checkbox"/> 4a. Was failed item considered to be under cathodic protection at the time of the Accident? If Yes - Year protection started:	
4b. Was shielding, tenting, or disbonding of coating evident at the point of the Accident?	
4c. Has one or more Cathodic Protection Survey been conducted at the point of the Accident? If "Yes, CP Annual Survey" – Most recent year conducted:	
If "Yes, Close Interval Survey" – Most recent year conducted:	
If "Yes, Other CP Survey" – Most recent year conducted:	
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	
<b>- If Internal Corrosion:</b>	
6. Results of visual examination: - Other:	Localized Pitting
7. Type of corrosion <i>(select all that apply):</i> -	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	Yes
- Erosion	
- Other:	
- If Other, Descr be:	
8. The cause(s) of corrosion selected in Question 7 is based on the following <i>(select all that apply):</i> -	
- Field examination	
- Determined by metallurgical analysis	Yes
- Other:	

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- If Other, Descr be:	
9. Location of corrosion (select all that apply): -	
- Low point in pipe	Yes
- Elbow	
- Other:	
- If Other, Descr be:	
10. Was the commodity treated with corrosion inhibitors or biocides?	Yes
11. Was the interior coated or lined with protective coating?	No
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	Not applicable - Not mainline pipe
13. Were corrosion coupons routinely utilized?	Not applicable - Not mainline pipe
<b>Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Tank/Vessel.</b>	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
<b>Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.</b>	
15. Has one or more internal inspection tool collected data at the point of the Accident?	No
15a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage Tool	Most recent year:
- Ultrasonic	Most recent year:
- Geometry	Most recent year:
- Caliper	Most recent year:
- Crack	Most recent year:
- Hard Spot	Most recent year:
- Combination Tool	Most recent year:
- Transverse Field/Triaxial	Most recent year:
- Other	Most recent year:
Descr be:	
16. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	No
If Yes -	
Most recent year tested:	
Test pressure:	
17. Has one or more Direct Assessment been conducted on this segment?	No
- If Yes, and an investigative dig was conducted at the point of the Accident::	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	No
18a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	Most recent year conducted:
- Guided Wave Ultrasonic	Most recent year conducted:
- Handheld Ultrasonic Tool	Most recent year conducted:
- Wet Magnetic Particle Test	Most recent year conducted:
- Dry Magnetic Particle Test	Most recent year conducted:
- Other	Most recent year conducted:
Descr be:	

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<b>G2 - Natural Force Damage</b> - only one <b>sub-cause</b> can be picked from shaded left-handed column	
<b>Natural Force Damage – Sub-Cause:</b>	
<b>- If Earth Movement, NOT due to Heavy Rains/Floods:</b>	
1. Specify:	
- If Other, Descr be:	
<b>- If Heavy Rains/Floods:</b>	
2. Specify:	
- If Other, Descr be:	
<b>- If Lightning:</b>	
3. Specify:	
<b>- If Temperature:</b>	
4. Specify:	
- If Other, Descr be:	
<b>- If Other Natural Force Damage:</b>	
5. Describe:	
<b>Complete the following if any Natural Force Damage sub-cause is selected.</b>	
6. Were the natural forces causing the Accident generated in conjunction with an extreme weather event?	
6a. If Yes, specify: <i>(select all that apply)</i>	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Descr be:	
<b>G3 - Excavation Damage</b> - only one <b>sub-cause</b> can be picked from shaded left-hand column	
<b>Excavation Damage – Sub-Cause:</b>	
<b>- If Previous Damage due to Excavation Activity: Complete Questions 1-5 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.</b>	
1. Has one or more internal inspection tool collected data at the point of the Accident?	
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage	Most recent year conducted:
- Ultrasonic	Most recent year conducted:
- Geometry	Most recent year conducted:
- Caliper	Most recent year conducted:
- Crack	Most recent year conducted:
- Hard Spot	Most recent year conducted:
- Combination Tool	Most recent year conducted:
- Transverse Field/Triaxial	Most recent year conducted:
- Other	Most recent year conducted:
Descr be:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	Most recent year tested:
	Test pressure (psig):
4. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	Most recent year conducted:
- If Yes, but the point of the Accident was not identified as a dig site:	Most recent year conducted:
5. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	

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5a. If Yes, for each examination, conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	Most recent year conducted:
- Guided Wave Ultrasonic	Most recent year conducted:
- Handheld Ultrasonic Tool	Most recent year conducted:
- Wet Magnetic Particle Test	Most recent year conducted:
- Dry Magnetic Particle Test	Most recent year conducted:
- Other	Most recent year conducted:
Descr be:	
<b>Complete the following if Excavation Damage by Third Party is selected as the sub-cause.</b>	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from: <i>(select all that apply)</i> -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
<b>Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.</b>	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: <i>(select all that apply)</i> -	
- Public	- If "Public", Specify:
- Private	- If "Private", Specify:
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks visible in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption (hours)	
17. Description of the CGA-DIRT Root Cause <i>(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):</i>	
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:	
<b>G4 - Other Outside Force Damage - only one sub-cause can be selected from the shaded left-hand column</b>	
<b>Other Outside Force Damage – Sub-Cause:</b>	
<b>- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:</b>	
1. Vehicle/Equipment operated by:	
<b>- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring:</b>	
2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	

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- Heavy Rains/Flood	
- Other	
- If Other, Descr be:	
<b>- If Previous Mechanical Damage NOT Related to Excavation: Complete Questions 3-7 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.</b>	
3. Has one or more internal inspection tool collected data at the point of the Accident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	Most recent year conducted:
- Ultrasonic	Most recent year conducted:
- Geometry	Most recent year conducted:
- Caliper	Most recent year conducted:
- Crack	Most recent year conducted:
- Hard Spot	Most recent year conducted:
- Combination Tool	Most recent year conducted:
- Transverse Field/Triaxial	Most recent year conducted:
- Other	Most recent year conducted:
	Descr be:
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
	Most recent year tested:
	Test pressure (psig):
6. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	Most recent year conducted:
- If Yes, but the point of the Accident was not identified as a dig site:	Most recent year conducted:
7. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	Most recent year conducted:
- Guided Wave Ultrasonic	Most recent year conducted:
- Handheld Ultrasonic Tool	Most recent year conducted:
- Wet Magnetic Particle Test	Most recent year conducted:
- Dry Magnetic Particle Test	Most recent year conducted:
- Other	Most recent year conducted:
	Descr be:
<b>- If Intentional Damage:</b>	
8. Specify:	
	- If Other, Descr be:
<b>- If Other Outside Force Damage:</b>	
9. Describe:	
<b>G5 - Material Failure of Pipe or Weld</b> - only one sub-cause can be selected from the shaded left-hand column	
<b>Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."</b>	
<b>Material Failure of Pipe or Weld – Sub-Cause:</b>	
1. The sub-cause shown above is based on the following: <i>(select all that apply)</i>	

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- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Descr be:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
<b>- If Construction, Installation, or Fabrication-related:</b>	
2. List contributing factors: <i>(select all that apply)</i>	
- Fatigue or Vibration-related	
Specify:	
- If Other, Descr be:	
- Mechanical Stress:	
- Other	
- If Other, Descr be:	
<b>- If Environmental Cracking-related:</b>	
3. Specify:	
- If Other - Describe:	
<b>Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.</b>	
4. Additional factors: <i>(select all that apply)</i> :	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Descr be:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	
Descr be:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
7. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident -	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site -	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	

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- 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:	
	Descr be:	

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

**Equipment Failure – Sub-Cause:**

**- If Malfunction of Control/Relief Equipment:**

1. Specify: *(select all that apply)* -

- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	
- Relief Valve	
- Power Failure	
- Stopple/Control Fitting	
- ESD System Failure	
- Other	
	- If Other – Descr be:

**- If Pump or Pump-related Equipment:**

2. Specify:

	- If Other – Descr be:
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**- If Threaded Connection/Coupling Failure:**

3. Specify:

	- If Other – Descr be:
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**- If Non-threaded Connection Failure:**

4. Specify:

	- If Other – Descr be:
--	------------------------

**- If Other Equipment Failure:**

5. Describe:

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**Complete the following if any Equipment Failure sub-cause is selected.**

6. Additional factors that contributed to the equipment failure: *(select all that apply)*

- Excessive vibration	
- Overpressurization	
- No support or loss of support	
- Manufacturing defect	
- Loss of electricity	
- Improper installation	
- Mismatched items (different manufacturer for tubing and tubing fittings)	
- Dissimilar metals	
- Breakdown of soft goods due to compatibility issues with transported commodity	
- Valve vault or valve can contributed to the release	
- Alarm/status failure	
- Misalignment	
- Thermal stress	
- Other	
	- If Other, Descr be:

**G7 - Incorrect Operation** - only one **sub-cause** can be selected from the shaded left-hand column

**Incorrect Operation – Sub-Cause:**

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<b>- If Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow</b>	
1. Specify:	
- If Other, Describe:	
<b>- If Other Incorrect Operation</b>	
2. Describe:	
<b>Complete the following if any Incorrect Operation sub-cause is selected.</b>	
3. Was this Accident related to (select all that apply): -	
- Inadequate procedure	
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	
<b>G8 - Other Accident Cause</b> - only one <b>sub-cause</b> can be selected from the shaded left-hand column	
<b>Other Accident Cause – Sub-Cause:</b>	
<b>- If Miscellaneous:</b>	
1. Describe:	
<b>- If Unknown:</b>	
2. Specify:	
<b>PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT</b>	
<p>On 8/20/2014 at 08:30, Linden Station Operations Personnel discovered jet fuel in the facility storm water system. Emergency response procedures were implemented and required notifications were made. Local Operations Personnel secured all potentially affected lines and deployed absorbent pads. All product released was contained on Linden Station property. By 09:00, vacuum trucks arrived on site and started recovering product. Over the next six days, a systematic approach to analyze station diagrams, and track all products through the station, led to the excavation, isolation and pressure testing of various sections of the 12 inch Bayway line Shipper manifold area of the station. On 8/26/2014, Linden Station was shutdown, to isolate a dead leg on a section of the station pressure relief system attached to the 12 inch Bayway line Shipper manifold. After unsatisfactory pressure test results, the dead leg was removed, a blind flange installed, and the section of removed pipe was sent for metallurgical analysis. All free product was recovered, and contaminated soil removed. No further remediation is necessary.</p> <p>Metallurgical analysis performed by a third party laboratory determined that the release occurred as a result of internal corrosion. The presence of bacteria, discovered by the analysis, indicates that the corrosion was likely due to microbiologically influenced corrosion.</p>	
<b>PART I - PREPARER AND AUTHORIZED SIGNATURE</b>	
Preparer's Name	Christopher A Strickler
Preparer's Title	Sr Compliance Specialist
Preparer's Telephone Number	610-904-4410
Preparer's E-mail Address	cstrickler@buckeye.com
Preparer's Facsimile Number	
Authorized Signer Name	Claudia Pankowski
Authorized Signer Title	Director Regulatory Compliance
Authorized Signer Telephone Number	610-904-4113
Authorized Signer Email	cpankowski@buckeye.com
Date	04/24/2015

**Appendix D**  
**Metallurgical Analysis Report**

This document is on file at PHMSA