

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

Principal Investigator Alex Dankanich
Senior Accident Investigator Mike Yazemboski
Region Director Byron Coy
Date of Report 7/17/2013
Subject Failure Investigation Report – Buckeye Macungie Tank 230 bottom weld failure

Operator, Location, & Consequences

Date of Failure 07/13/2012
Commodity Released Hazardous Liquid (Gasoline)
City/County & State Emmaus, Lehigh County, PA
OpID & Operator Name 1845 - Buckeye Partners, LP
Unit # & Unit Name 321 - Macungie - PA
SMART Activity # 140298
Milepost / Location Macungie Station, 5131 Buckeye Road, Emmaus, PA 18049
Latitude 40.513554, Longitude -75.53238
Type of Failure Leak from crack in weld between tank bottom and wall
Fatalities No
Injuries No
Description of area impacted Leak was contained to the tank dike area. Facility is located a High Consequence Area (HCA).
Total Costs \$380,538

Failure Investigation Report – Buckeye Tank 230 Leak

[Failure Date 7/13/2012]

Executive Summary

At 11:30 am on July 13, 2012, gasoline was discovered in the dike area of Tank 230 in the Buckeye Macungie Station located in Emmaus, Lehigh County, Pennsylvania. Tank 230 is designated as a break-out tank and is thus regulated under 49 CFR, Part 195. The leak was caused by a low cycle fatigue weld failure due to the filling and draining of the tank. Corrosion contributed to the weld failure.

Approximately 9 barrels of gasoline leaked into tank dike area. The gasoline was totally contained on Operator-controlled property. Tank 230 is located in a designated high consequence area (HCA). There were no injuries or fatalities, evacuations, or supply disruptions as a result of the incident.

An inspector from PHMSA Eastern Region was dispatched to the location on August 16, 2012 to conduct an investigation into the cause of the release.

System Details

Buckeye Partners, LP owns and operates a break out tank farm in Macungie, PA (Appendix A). Refined products are regularly delivered to the tank farm, temporarily stored, and shipped out by pipeline and by truck to fill requests for product. A Buckeye owned system of pipelines enters and exits the tank farm.

Tank 230 is an atmospheric storage tank that was built in 1974. It is 110 foot diameter by 48 feet high and has an internal floating roof and a steel cone roof. It was last internally inspected on 4/2/1997 by DJA Inspection Services, Inc (Appendix B / Appendix C). At that time it had a magnetic flux leakage scan over 100% of the floor, and ultrasonic thickness readings taken on the bottom. Repairs were made on all pits as needed to achieve a calculated floor life of about 24 years. A 2008 external inspection (Appendix D) included ultrasonic thickness readings of the shell, nozzles and roof.

Events Leading up to the Failure

Prior to the leak that was discovered on July 13, 2012, Tank 230 was in normal service (Appendix E). There were no leaks or operational issues reported since the tank bottom was repaired following the 1997 out-of-service inspection.

Emergency Response

At 11:30 am on July 13, 2012, while performing a monthly tank inspection on Tank 230 at Buckeye's Macungie Station (Appendix F), a Buckeye operations employee noticed stained soil next to the tank. Emergency response procedures were initiated and all appropriate notifications were made. The tank was isolated and emptied. Three monitoring wells were excavated in the area of the stained soil. Gasoline odor was detected in the well closest to the tank, but no free product was observed. The monitoring wells were checked during the tank emptying process and no additional product was discovered. The tank was emptied and cleaned.

Summary of Return-to-Service

The tank bottom was inspected and repaired. Below is a list of the repairs completed. The tank was hydrostatically tested and returned to service in January of 2013.

1. New 30 inch wide annular ring installed
 - a. Vacuum box tested lap weld to existing tank bottom
 - b. Vacuum box and mag particle tested annular ring butt welds
 - c. Oil penetrant tested shell/annular ring corner weld
 - d. Helium tested entire tank bottom

Failure Investigation Report – Buckeye Tank 230 Leak

[Failure Date 7/13/2012]

2. Repaired 4 soildside pits
3. Installed new epoxy floor coating
4. Removed leak detection tubes
5. Installed new man-way and door sheet
6. Painted tank exterior shell course 1 (up to first horizontal weld – 8')

Investigation Details

PHMSA Eastern Region received an NRC report 1017664 on 7-14-2012 regarding a possible tank leak after a routine plant patrol found gasoline at the chime area of Tank 230 at the Buckeye Macungie PA tank farm. The gasoline appeared to be coming from under the tank bottom. The gasoline was transferred to another tank, and the tank was cleaned and taken out of service for inspection. An internal inspection and investigation revealed a crack in the fillet weld at the base of the tank wall and bottom plate.

A metallurgical analysis (Appendix G) was performed on the failed weld. A summary of the metallurgical analysis is below. Tank 230 was repaired and returned to service.

A soil boring investigation was conducted and soil samples were sent for laboratory analysis. Soil results indicated that concentrations of target constituents of concern are below PADEP approved risk-based site specific standards for the Macungie Station; therefore, no additional environmental investigation or remediation was conducted.

Metallurgical Analysis Summary:

The analysis states: “We believe the crack that ultimately formed the leak had initiated and propagated under cyclic fatigue loading. Specifically, the failure mechanism was low-cycle fatigue (LCF). LCF occurs under high-amplitude low-frequency loading. In this instance cyclic loading was a function of the applied pressure variations directly related to changing gasoline levels in the tank. While LCF can also be associated with thermal stress, this is not likely in this instance as such thermal stress changes are a function of temperature change. Since the tank only saw ambient temperatures, changes in thermal stresses would have been negligible. This initiated the crack from the inside of the tank that propagated through-wall, causing the leak. As previously noted, we were unable to identify features associated with fatigue from fracture surface evaluation. However, the presence of multiple cracks adjacent to the leak was an indicator of LCF. Multiple parallel cracks are common under LCF as the high strain amplitude can initiate several cracks. Only one preferential crack will continue to propagate while the others stop. The presence of these multiple transgranular cracks is a good indicator of an LCF mechanism. We are of the opinion that the root cause of cracking really resulted directly from the loss of wall associated with external pitting corrosion. The degree of external pitting observed would have increased the stress from applied service loads, in some cases more than doubling local stress. We believe the increase in stress caused by wall loss was sufficient to initiate and propagate an LCF crack adjacent to the weld toe in the floor plate”.

Findings and Contributing Factors

The source of the release was determined to be a small crack in the floor plate near the tank shell. Laboratory analysis revealed that corrosion contributed to the weld failure. Weld failure was due to Low Cycle Fatigue from the filling and draining of the tank.

There were leak detection tubes near the failure location which had been placed there after the tank was built. The tubes were no longer being used, however, Buckeye believes that the placement of these

Failure Investigation Report – Buckeye Tank 230 Leak

[Failure Date 7/13/2012]

tubes displaced the firm soil foundation in the area where the leak occurred. This may have contributed to the cycling effect of the floor plate during filling and draining of the tank.

Appendices

Appendix	Description
A	140298 Appendix A Maps
B	140298 Appendix B Bottom Inspection Report - 1997
C	140298 Appendix C Tank 230_mrt_calc 1997
D	140298 Appendix D API-653 In-Service Inspection - 2008
E	140298 Appendix E NRC Report 1017664
F	140298 Appendix F Buckeye O&M Inspection procedures
G	140298 Appendix G Metallurgical Test Report
H	140298 Appendix H Accident Report 20120232 - 17205

Appendices A-D

Removed

Files available at PHMSA

140298 Appendix E NRC Report 1017664

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

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

Incident Report # 1017664

INCIDENT DESCRIPTION

*Report taken at 14:41 on 13-JUL-12

Incident Type: STORAGE TANK

Incident Cause: EQUIPMENT FAILURE

Affected Area:

The incident was discovered on 13-JUL-12 at 13:00 local time.

Affected Medium: OTHER DIKED AREA

SUSPECTED RESPONSIBLE PARTYOrganization: BUCKEYE PARTNERS
EMMAUS, PA 18049

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION5131 BUCKEYE RD County: LEHIGH
City: EMMAUS State: PA Zip: 18049RELEASED MATERIAL(S)

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

Also Known As:

Qty Released: 25 BARREL(S)

DESCRIPTION OF INCIDENT

THE CALLER REPORTED THAT WHILE DOING A TANK INSPECTION, PRODUCT STAINING WAS DISCOVERED ON THE DIKE FLOOR. THERE WAS A DEVIATION IN THE PRODUCT LEVELS LAST NIGHT WHICH WOULD INDICATE 25 BBLs OF GASOLINE HAD DISCHARGED.

INCIDENT DETAILS

Description of Tank: GASOLINE

Tank Above/Below Ground: ABOVE

Transportable Container: NO

Tank Regulated: YES

Tank Regulated By: PHMSA

Tank ID: 23

Capacity of Tank: 73600 BARREL(S)

Actual Amount: 60074 BARREL(S)

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: NO Hospitalized: Empl/Crew: Passenger:

FATALITIES: NO Empl/Crew: Passenger: Occupant:

EVACUATIONS: NO Who Evacuated: Radius/Area:

Damages: NO

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

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Passengers Transferred: NO
Environmental Impact: UNKNOWN
Media Interest: NONE Community Impact due to Material:

REMEDIAL ACTIONS

TANK WILL BE EMPTIED/ INVESTIGATION UNDERWAY
Release Secured: YES
Release Rate:
Estimated Release Duration:

WEATHER

Weather: CLEAR, °F

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local: DEP/ FD
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATLANTIC STRIKE TEAM (MAIN OFFICE)
13-JUL-12 14:49
DHS PROTECTIVE SECURITY ADVISOR (PSA DESK)
13-JUL-12 14:49
DOT CRISIS MANAGEMENT CENTER (MAIN OFFICE)
13-JUL-12 14:49
U.S. EPA III (MAIN OFFICE)
13-JUL-12 14:50
FLD INTEL SUPPORT TEAM PHILADELPHIA (MAIN OFFICE)
13-JUL-12 14:49
NATIONAL INFRASTRUCTURE COORD CTR (MAIN OFFICE)
13-JUL-12 14:49
NJ STATE POLICE (MARINE SERVICES BUREAU)
13-JUL-12 14:49
NOAA RPTS FOR PA (MAIN OFFICE)
13-JUL-12 14:49
PA STATE POLICE (BUREAU OF CRIMINAL INVESTIGATION)
13-JUL-12 14:49
PA EMERG MGMT AGCY (MAIN OFFICE)
13-JUL-12 14:49

ADDITIONAL INFORMATION

*** END INCIDENT REPORT # 1017664 ***

Appendix F
O&M Inspection Procedures
Removed
Files available at PHMSA

Appendix G

Metallurgical Test Report

Removed

Files available at PHMSA

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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: 01/31/2014	
 U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	Original Report Date:	08/10/2012	
	No.	20120232 - 17205 ----- (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. Public reporting for this collection of information is estimated to be approximately 10 hours per response (5 hours for a small release), including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this 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 .			
PART A - KEY REPORT INFORMATION			
Report Type: (select all that apply)	Original:	Supplemental:	Final:
		Yes	Yes
Last Revision Date:	02/04/2013		
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		
3b. City	BREINIGSVILLE		
3c. State	Pennsylvania		
3d. Zip Code	18031		
4. Local time (24-hr clock) and date of the Accident:	07/13/2012 11:30		
5. Location of Accident:			
Latitude:	40.513554		
Longitude:	-75.53238		
6. National Response Center Report Number (if applicable):	1017664		
7. Local time (24-hr clock) and date of initial telephonic report to the National Response Center (if applicable):	07/13/2012 14:40		
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:	Gasoline (non-Ethanol)		
- If "Other" Subtype, Describe:			
- 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):	B		
9. Estimated volume of commodity released unintentionally (Barrels):	8.70		
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):			
11. Estimated volume of commodity recovered (Barrels):	.02		
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			

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13d. Workers working on the right-of-way, but NOT associated with this Operator	
13e. General public	
13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	No
- If No, Explain:	THE TANK WAS ISOLATED AND EMPTIED
- 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:	07/13/2012 11:30
18b. Local time Operator resources arrived on site:	07/13/2012 11:30

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the origin of Accident onshore?	Yes
<i>If Yes, Complete Questions (2-12)</i>	
<i>If No, Complete Questions (13-15)</i>	
- If Onshore:	
2. State:	Pennsylvania
3. Zip Code:	18049
4. City:	EMMAUS
5. County or Parish:	LEHIGH
6. Operator-designated location:	
Specify:	
7. Pipeline/Facility name:	MACUNGIE STATION
8. Segment name/ID:	ZG
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):	Tank, including attached appurtenances
Specify:	
- If Other, Describe:	
Depth-of-Cover (in):	
12. Did Accident occur in a crossing?	No
- If Yes, specify 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:	
- If Offshore:	
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 Breakout Tank or Storage Vessel, including Attached Appurtenances
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	Atmospheric or Low Pressure

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Was this HCA identified in the "could affect" determination for this Accident site in the Operator's 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	Yes
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	Yes
- 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 Property Damage:	
8a. Estimated cost of public and non-Operator private property damage	\$ 0
8b. Estimated cost of commodity lost	\$ 0
8c. Estimated cost of Operator's property damage & repairs	\$ 370,115
8d. Estimated cost of Operator's emergency response	\$ 10,423
8e. Estimated cost of Operator's environmental remediation	\$ 0
8f. Estimated other costs	\$ 0
Describe:	
8g. Total estimated property damage (sum of above)	\$ 380,538
PART E - ADDITIONAL OPERATING INFORMATION	
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. – 5e. 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, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	
- If Yes, Which operational factors complicate execution? (select all that apply)	

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- Excessive debris or scale, wax, or other wall buildup	
- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	Yes
If Yes -	
6a. Was it operating at the time of the Accident?	Yes
6b. Was it fully functional at the time of the Accident?	Yes
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	No
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	No
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	Yes
- If Yes:	
7a. Was it operating at the time of the Accident?	Yes
7b. Was it fully functional at the time of the Accident?	Yes
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?	No
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?	No
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 "Guard Patrol by Operator or its contractor" is selected in Question 8, specify the following:	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)	THE RELEASE VOLUME WAS TOO SMALL TO BE DETECTED BY THE CONTROLLER
- 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:	
Describe:	
PART F - DRUG & ALCOHOL TESTING INFORMATION	
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?	No
- If Yes:	
1a. Specify how many were tested:	

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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:	
PART G – APPARENT CAUSE	
<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>	
Apparent Cause:	G1 - Corrosion Failure
G1 - Corrosion Failure - only one sub-cause can be picked from shaded left-hand column	
External Corrosion:	Yes
Internal Corrosion:	
- If External Corrosion:	
1. Results of visual examination: - If Other, Describe:	Localized Pitting
2. Type of corrosion: <i>(select all that apply)</i>	
- Galvanic	Yes
- 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: <i>(select all that apply)</i>	
- Field examination	
- Determined by metallurgical analysis	Yes
- Other: - If Other, Describe:	
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?	No
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	No
- If Internal Corrosion:	
6. Results of visual examination: - Other:	
7. Type of corrosion <i>(select all that apply)</i> : -	
- 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 <i>(select all that apply)</i> : -	
- Field examination	
- Determined by metallurgical analysis	
- Other: - If Other, Describe:	
9. Location of corrosion <i>(select all that apply)</i> : -	
- Low point in pipe	
- Elbow	

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- Other:	
- If Other, Describe:	
10. Was the commodity treated with corrosion inhibitors 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 Accident" (from PART C, Question 3) is Tank/Vessel.	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	Yes
- No Out-of-Service Inspection completed	1997
14b. API Std 653 In-Service Inspection	Yes
- No In-Service Inspection completed	2008
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.	
15. Has one or more internal inspection tool collected data at the point of the Accident?	
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:
Describe:	
16. 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:
17. Has one or more Direct Assessment been conducted on this 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:
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
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:
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:	

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1. Specify:	- If Other, Describe:
- If Heavy Rains/Floods:	
2. Specify:	- If Other, Describe:
- If Lightning:	
3. Specify:	
- If Temperature:	
4. Specify:	- If Other, Describe:
- If High Winds:	
- 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 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, Describe:
G3 - Excavation Damage - only one sub-cause can be picked from shaded left-hand column	
Excavation Damage – Sub-Cause:	
- If Excavation Damage by Operator (First Party):	
- If Excavation Damage by Operator's Contractor (Second Party):	
- If Excavation Damage by Third Party:	
- 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.	
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:
	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 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:	

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Most recent year conducted:	
5. Has one or more non-destructive examination been conducted at the point of the Accident 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	
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:	
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: <i>(select all that apply)</i> -	
- 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: <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:	
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 Nearby Industrial, Man-made, or Other Fire/Explosion as Primary Cause of Incident:	
- 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	

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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, Describe:	
- If Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation:	
- If Electrical Arcing from Other Equipment or Facility:	
- 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.	
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:	
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 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:	
Describe:	
- If Intentional Damage:	
8. Specify:	
- If Other, Describe:	
- If Other Outside Force Damage:	

9. Describe:	
G5 - Material Failure of Pipe or Weld - only one sub-cause can be selected from the shaded left-hand column	
Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."	
Material Failure of Pipe or Weld – Sub-Cause:	
1. The sub-cause selected below is based on the following: <i>(select all that apply)</i>	
- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
	- If "Other Analysis", Describe:
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: <i>(select all that apply)</i>	
- Fatigue or Vibration-related	
	Specify:
	- If Other, Describe:
- Mechanical Stress:	
- Other	
	- If Other, Describe:
- If Original Manufacturing-related (NOT girth weld or other welds formed in the field):	
2. List contributing factors: <i>(select all that apply)</i>	
- Fatigue or Vibration-related:	
	Specify:
	- If Other, Describe:
- Mechanical Stress:	
- Other	
	- If Other, Describe:
- If Environmental Cracking-related:	
3. Specify:	
- Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
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, Describe:
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:

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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 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: -	
- 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: <i>(select all that apply)</i> -	
- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	
- Relief Valve	
- Power Failure	
- Stopple/Control Fitting	
- ESD System Failure	
- Other	
- If Other – Describe:	
- If Pump or Pump-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 Defective or Loose Tubing or Fitting:	
- If Failure of Equipment Body (except Pump), Tank Plate, or other Material:	
- 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: <i>(select all that apply)</i>	
- Excessive vibration	
- Overpressurization	
- No support or loss of support	

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- 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, Describe:	

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

Incorrect Operation – Sub-Cause:	
Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage	No
Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow	No
1. Specify:	
- If Other, Describe:	
Valve Left or Placed in Wrong Position, but NOT Resulting in a Tank, Vessel, or Sump/Separator Overflow or Facility Overpressure	No
Pipeline or Equipment Overpressured	No
Equipment Not Installed Properly	No
Wrong Equipment Specified or Installed	No
Other Incorrect Operation	No
2. Describe:	

Complete the following if any Incorrect Operation sub-cause is selected.

3. Was this Accident related to (<i>select all that apply</i>): -	
- 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)?	

G8 - Other Accident Cause - only one **sub-cause** can be selected from the shaded left-hand column

Other Accident Cause – Sub-Cause:	
- If Miscellaneous:	
1. Describe:	
- If Unknown:	
2. Specify:	

PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT

AT 11:30 AM ON JULY 13, 2012, WHILE PERFORMING A MONTHLY TANK INSPECTION ON TANK 230 AT BUCKEYE'S MACUNGIE STATION, A LOCAL OPERATIONS EMPLOYEE NOTICED STAINED SOIL NEXT TO THE TANK. EMERGENCY RESPONSE PROCEDURES WERE INITIATED AND ALL APPROPRIATE NOTIFICATIONS WERE MADE. THE TANK WAS ISOLATED AND EMPTIED. THREE MONITORING WELLS WERE EXCAVATED

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IN THE AREA OF THE STAINED SOIL. GASOLINE ODOR WAS DETECTED IN THE WELL CLOSEST TO THE TANK, BUT NO FREE PRODUCT WAS OBSERVED. THE MONITORING WELLS WERE MONITORED DURING THE TANK EMPTYING PROCESS AND NO ADDITIONAL PRODUCT WAS DISCOVERED.

THE TANK HAS BEEN EMPTIED AND CLEANED. AN INDEPENDENT INSPECTION COMPANY IS PERFORMING A SCAN OF THE TANK BOTTOM TO LOCATE THE SOURCE OF THE RELEASE. THE SOURCE HAS NOT BEEN IDENTIFIED AT THE TIME OF THE SUBMISSION OF THIS REPORT AND THE INVESTIGATION IS ONGOING.

UPDATE: THE SOURCE OF THE RELEASE HAS BEEN DETERMINED TO BE A SMALL CRACK IN THE FLOOR PLATE NEAR THE TANK SHELL. THE DAMAGED FLOOR PLATE SECTION AND PART OF THE SHELL WAS REMOVED AND SENT TO AN INDEPENDENT LABORATORY FOR METALLURGICAL ANALYSIS. THE METALLURGICAL ANALYSIS CONFIRMED THAT THE WALL LOSS FROM CORROSION ON THE EXTERIOR SECTION SURFACE OF THE FLOOR PLATE (BOTTOMSIDE) HAD THE EFFECT OF INCREASED STRESS ON THE REMAINING STEEL FROM NORMAL SERVICE LOADS WHICH IN TURN ALLOWED LOW CYCLE FATIGUE CRACKING TO OCCUR. THE TANK REPAIR PROCESS IS UNDERWAY.

UPDATE: THE TANK REPAIR PROCESS HAS BEEN COMPLETED AND COSTS FINALIZED. THE TOTAL VOLUME RELEASED HAS BEEN RECALCULATED AT 8.7 BARRELS. SOIL BORING INVESTIGATION WAS CONDUCTED AND SOIL SAMPLES WERE SENT FOR LABORATORY ANALYSIS. ANALYTICAL SOIL RESULTS INDICATED THAT CONCENTRATIONS OF TARGET CONSTITUENTS OF CONCERN ARE BELOW PADEP APPROVED RISK-BASED SITE SPECIFIC STANDARDS FOR MACUNGIE STATION; THEREFORE, NO ADDITIONAL ENVIRONMENTAL INVESTIGATION OR REMEDIATION WILL BE CONDUCTED. BUCKEYE WILL NOT BE MAKING ANY MORE UPDATES TO THIS RELEASE REPORT.

File Full Name

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