

Pipeline Failure Investigation Report

Pipeline System: 22-inch Maumee Pipeline **Operator:** Mid-Valley Pipeline Company
Location: Cygnnet, Ohio **Date of Occurrence:** 2-18-2009
Medium Released: Crude Oil **Quantity:** 1250 bbls

PHMSA Arrival Time & Date: 2-19-2009; 10:00 a.m. **Total Damages \$** 4,614,052

Investigation Responsibility: State PHMSA NTSB Other _____

Company Reported Apparent Cause:

<input type="checkbox"/> Corrosion	<input type="checkbox"/> Excavation
<input type="checkbox"/> Natural Forces	<input type="checkbox"/> Incorrect Operation
<input type="checkbox"/> Other Outside Force Damage	
<input checked="" type="checkbox"/> Material and/or Welds	<input type="checkbox"/> Equipment and Operations
<input type="checkbox"/> Other _____	

Rupture Yes No
Leak Yes No
Fire Yes No
Explosion Yes No
Evacuation Yes No

Number of Persons 1 Area n/a

Narrative Summary

Short summary of the Incident/Accident which will give interested person's sufficient information to make them aware of the basic scenario and facts.

On February 18, 2009, Mid Valley Pipeline's 22" Maumee Pipeline (Lima to Cygnnet) experienced a leak at a 12" diameter branch connection. The damaged pipeline, which was operating at the time, released 1250 barrels of crude oil into a farm field. Eventually, 782 of the 1250 barrels released were recovered. Some of the crude oil, approximately 200 barrels, did contaminate a local creek. There were no fatalities, or injuries. One person was evacuated for several hours. The release did occur in a high consequence area (drinking water).

A PHMSA engineer conducted an on-site investigation of the failure. The investigative summary is as follows:

The failure occurred at approximately 3:00 p.m. EST on February 18, 2009. The failure is located near milepost marker 46, in a rural area of Wood County, south of Cygnnet, OH. The failure was detected at 4:55 p.m. the same day when a Mid Valley Pipeline (MVP) employee driving near the Cygnnet pump station discovered a pool of crude oil on the ground surface. The employee notified the MVP control center, which immediately shut down the Maumee Pipeline. MVP blocked in the line segment at 5:00 p.m. by remotely isolating the upstream (Lima) and downstream (Cygnnet) pump stations. The pipeline was repaired and placed back in service on February 18, 2009.

In July 2003, MVP de-commissioned the 12" branch line. At the time of failure, the branch connection contained the attachment weld, approximately 50-inches of 12" diameter pipe, a 12" diameter valve (flanged) and a blind flange. Beyond the blind flange, the 12" branch connection piping was removed. The pipeline experienced a crack in the 12" branch connection attachment weld. The crack developed at the top (12 O'clock) position of the attachment weld, oriented circumferentially with the branch connection and longitudinally with the Maumee Pipeline. The crack measured 11" long and 0.125" at the maximum width. The driving stress for the crack was produced by the combined loading of the 22" x 12" diameter branch connection, the valve, flanging and somastic "mass" on the attachment weld.

The portion of the pipeline containing the failure is comprised of 22" diameter by 0.344" wall thickness API 5L - Grade B, seamless pipe, installed in 1949. The 12" diameter nominal branch line was attached at the 9 O'clock position to the mainline with a self reinforcing weld-on outlet fitting. The reported maximum operating pressure (MOP) is 788 psig. The operating pressure at the time and location of the failure was 470 psig. The MOP was established in accordance with 195.303, Risk Based Alternative to Pressure Testing. The pipeline external corrosion protection system consists of a Somastic coating and distributed galvanic anodes.

Pipeline Failure Investigation Report

MVP identified two additional de-commissioned branch connections in the Maumee Pipeline System as a result of this failure. These branch connections were cut out and removed from the Maumee Pipeline System.

The Maumee Pipeline System is a 994 mile long crude oil pipeline running from Longview, TX to Samaria, Michigan.

Operator ID: 12470

Unit ID: 3733

SMART Activity ID: 124413

Region/State: Central Region

Principal Investigator: Gery Bauman

Date: November 5, 2010

Reviewed by: _____

Title: Regional Director

Date: _____

Pipeline Failure Investigation Report

Failure Location & Response			
Location (City, Township, Range, County/Parish): Cygnnet, Ohio			(Acquire Map)
Address or M.P. on Pipeline: MP 46	(1)	Type of Area (Rural, City): Rural. Near Mid Valley Pipeline Cygnnet Pump Station	(1)
Date: 2-18-2009	Time of Failure: Approximately 3:00 p.m.		
Time Detected: 4:55 p.m.	Time Located: 4:55 p.m.		
How Located: Mid Valley Pipeline employee driving home from work.			
NRC Report #: 897885	(Attach Report)	Time Reported to NRC: 5:24 p.m..	Reported by: Chester Wilson
Type of Pipeline:			
Gas Distribution	Gas Transmission	Hazardous Liquid	LNG
<input type="checkbox"/> LP	<input type="checkbox"/> Interstate Gas	<input checked="" type="checkbox"/> Interstate Liquid	<input type="checkbox"/> LNG Facility
<input type="checkbox"/> Municipal	<input type="checkbox"/> Intrastate Gas	<input type="checkbox"/> Intrastate Liquid	
<input type="checkbox"/> Public Utility	<input type="checkbox"/> Jurisdictional Gas Gathering	<input type="checkbox"/> Offshore Liquid	
<input type="checkbox"/> Master Meter	<input type="checkbox"/> Offshore Gas	<input type="checkbox"/> Jurisdictional Liquid Gathering	
	<input type="checkbox"/> Offshore Gas - High H ₂ S	<input type="checkbox"/> CO ₂	
Pipeline Configuration (Regulator Station, Pump Station, Pipeline, etc.): The leak originated from a crack, located in a fillet weld, between the 22" diameter main line and a 12" diameter branch connection.			

Operator/Owner Information	
Owner: Mid Valley Pipeline Company	Operator: Mid Valley Pipeline Company
Address: 1874 Horseshoe Pike Honey Brook Chester, PA 19344-8500	Address: 1874 Horseshoe Pike Honey Brook Chester, PA 19344-8500
Company Official: David Justin	Company Official: David Justin
Phone No.: 610-670-3264 Fax No.: 610-670-3488	Phone No. 610-670-3264 Fax No. 610-670-3488
<u>Drug and Alcohol Testing Program Contacts</u> <input checked="" type="checkbox"/> N/A	
Drug Program Contact & Phone:	
Alcohol Program Contact & Phone:	

Damages			
Product/Gas Loss or Spill ⁽²⁾	1250 bbls	Estimated Property Damage \$	0
Amount Recovered	782 bbls	Associated Damages ⁽³⁾ \$	4,598,052
Estimated Amount \$	16,380		

- 1 Photo documentation
- 2 Initial volume lost or spilled
- 3 Including cleanup cost

Pipeline Failure Investigation Report

<i>Damages</i>			
Description of Property Damage: Emergency response and environmental cleanup. Approximately 10,000 cubic yards of soil was contaminated. Also approximately 200 barrels of crude oil impacted a local creek.			
Customers out of Service:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Number: _____
Suppliers out of Service:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Number: _____

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

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

Pipeline Failure Investigation Report

<i>System Description</i>
Describe the Operator's System: Mid-Valley Pipeline operates the Maumee Pipeline that transports crude oil from Lima, Ohio to refineries in Toledo, Ohio and an interconnect with a Marathon Pipeline at Samaria, Michigan.

<i>Pipe Failure Description</i>	<input type="checkbox"/> N/A
Length of Failure (inches, feet, miles): 12" (1)	
Position (Top, Bottom, include position on pipe, 6 O'clock): ⁽¹⁾ 12:00 O'clock position relative to the 12" diameter branch connection.	Description of Failure (Corrosion Gouge, Seam Split): ⁽¹⁾ Crack in fillet weld.
Laboratory Analysis: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Performed by: Kiefner and Associates	
Preservation of Failed Section or Component: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
If Yes - Method: Plastic wrap / tape and palletized for shipment.	
In Custody of: Kiefner and Associates	
Develop a sketch of the area including distances from roads, houses, stress inducing factors, pipe configurations, etc. Bar Hole Test Survey Plot should be outlined with concentrations at test points. Direction of Flow.	

<i>Component Failure Description</i>	<input checked="" type="checkbox"/> N/A
Component Failed:	(1)
Manufacturer:	Model:
Pressure Rating:	Size:
Other (Breakout Tank, Underground Storage):	

<i>Pipe Data</i>	<input type="checkbox"/> N/A
Material: Grade B	Wall Thickness/SDR: 0.344"
Diameter (O.D.): 22"	Installation Date: 1949
SMYS: 35,000	Manufacturer: Unknown
Longitudinal Seam: Seamless	Type of Coating: Somastic
Pipe Specifications (API 5L, ASTM A53, etc.): API 5L	

<i>Joining</i>	<input type="checkbox"/> N/A
Type: Fillet Weld	Procedure: Pre-code construction 1949
NDT Method: Unknown	Inspected: <input type="checkbox"/> Yes <input type="checkbox"/> No

<i>Pressure @ Time of Failure @ Failure Site</i>	<input type="checkbox"/> N/A

Pipeline Failure Investigation Report

<i>Pressure @ Time of Failure @ Failure Site</i>				
Pressure @ Failure Site: 470 psig			Elevation @ Failure Site: 215 feet	
Pressure Readings @ Various Locations:			Direction from Failure Site	
Location/M.P./Station #	Pressure (psig)	Elevation (ft msl)	Upstream	Downstream
Lima discharge	760	265	46.5 miles	
Cygnet suction	457	215		0.5 mile

<i>Upstream Pump Station Data</i>	
Type of Product: Crude Oil	API Gravity: 37 API
Specific Gravity: 0.84	Flow Rate:
Pressure @ Time of Failure ⁽⁴⁾ 760	Distance to Failure Site: 46.5 miles
High Pressure Set Point: 788	Low Pressure Set Point:

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

<i>Operating Pressure</i>	
Max. Allowable Operating Pressure: 788	Determination of MAOP: 195.303 (Risk Based Alternative To Pressure Testing)
Actual Operating Pressure: 470	
Method of Over Pressure Protection: Pump station overpressure switch	
Relief Valve Set Point:	Capacity Adequate? <input type="checkbox"/> Yes <input type="checkbox"/> No

<i>Integrity Test After Failure</i>	
Pressure Test Conducted in place? (Conducted on Failed Components or Associated Piping):	<input type="checkbox"/> Yes <input type="checkbox"/> No
If NO, Tested after removal?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Method:	
Describe any failures during the test.	

<i>Soil/water Conditions @ Failure Site</i>	
Condition of and Type of Soil around Failure Site (Color, Wet, Dry, Frost Depth): Loam with field tile.	
Type of Backfill (Size and Description): Loam backfill	

4 Obtain event logs and pressure recording charts

Pipeline Failure Investigation Report

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

<i>Outside Force Damage</i>		<input checked="" type="checkbox"/> N/A
Responsible Party:	Telephone No.:	
Address:		
Work Being Performed:		
Equipment Involved: ⁽¹⁾	Called One Call System? <input type="checkbox"/> Yes <input type="checkbox"/> No	
One Call Name:	One Call Report # ⁽⁸⁾	
Notice Date:	Time:	
Response Date:	Time:	
Details of Response:		
Was Location Marked According to Procedures? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Pipeline Marking Type: ⁽¹⁾	Location: ⁽¹⁾	
State Law Damage Prevention Program Followed? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No State Law		
Notice Required: <input type="checkbox"/> Yes <input type="checkbox"/> No	Response Required: <input type="checkbox"/> Yes <input type="checkbox"/> No	
Was Operator Member of State One Call? <input type="checkbox"/> Yes <input type="checkbox"/> No	Was Operator on Site? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Did a deficiency in the Public Awareness Program contribute to the accident? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Is OSHA Notification Required? <input type="checkbox"/> Yes <input type="checkbox"/> No		

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

Pipeline Failure Investigation Report

<i>Natural Forces</i> <input checked="" type="checkbox"/> N/A
Description (Earthquake, Tornado, Flooding, Erosion):

<i>Failure Isolation</i> <input type="checkbox"/> N/A ⁽¹⁾	
Squeeze Off/Stopple Location and Method: Pipeline shut down.	
Valve Closed - Upstream: Lima Station Time: 5:00 p.m.	I.D.: M.P.: 0
Valve Closed - Downstream: Cygnet Station Time: 5:00 p.m.	I.D.: M.P.: 46.1
Pipeline Shutdown Method: <input type="checkbox"/> Manual <input type="checkbox"/> Automatic <input checked="" type="checkbox"/> SCADA <input type="checkbox"/> Controller <input type="checkbox"/> ESD	
Failed Section Bypassed or Isolated: The cracked section of pipe was cut out.	
Performed By:	Valve Spacing:

<i>Odorization</i> <input checked="" type="checkbox"/> N/A	
Gas Odorized: <input type="checkbox"/> Yes <input type="checkbox"/> No	Concentration of Odorant (Post Incident at Failure Site):
Method of Determination: <input type="checkbox"/> Yes <input type="checkbox"/> No	% LEL: <input type="checkbox"/> Yes <input type="checkbox"/> No % Gas In Air: <input type="checkbox"/> Yes <input type="checkbox"/> No
Was Odorizer Working Prior to the Incident? <input type="checkbox"/> Yes <input type="checkbox"/> No	Time Taken: <input type="checkbox"/> Yes <input type="checkbox"/> No
Odorant Manufacturer: Model:	Type of Odorizer (Wick, By-Pass):
Amount Injected:	Type of Odorant:
Odorization History (Leaks Complaints, Low Odorant Levels, Monitoring Locations, Distances from Failure Site):	Monitoring Interval (Weekly):

Pipeline Failure Investigation Report

<i>Odorization</i>		<input checked="" type="checkbox"/> N/A

<i>Weather Conditions</i>		<input checked="" type="checkbox"/> N/A
Temperature:	Wind (Direction & Speed):	
Climate (Snow, Rain):	Humidity:	
Was Incident preceded by a rapid weather change? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Weather Conditions Prior to Incident (Cloud Cover, Ceiling Heights, Snow, Rain, Fog):		

<i>Gas Migration Survey</i>		<input checked="" type="checkbox"/> N/A
Bar Hole Test of Area: <input type="checkbox"/> Yes <input type="checkbox"/> No	Equipment Used:	
Method of Survey (Foundations, Curbs, Manholes, Driveways, Mains, Services) ⁽⁹⁾ (1)		

<i>Environment Sensitivity Impact</i>		<input checked="" type="checkbox"/> N/A
Location (Nearest Rivers, Body of Water, Marshlands, Wildlife Refuge, City Water Supplies that could be or were affected ⁽¹⁾ by the medium loss):		
The Rocky Ford Creek was impacted by the Mid Valley spill. The creek is approximately 500' west of the leak site and crude oil reached the creek through a farm tile. The US EPA was responsible for oversight of the creek cleanup.		
OPA Contingency Plan Available? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Followed? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

<i>Class Location/High Consequence Area</i>		<input type="checkbox"/> N/A
Class Location: 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/>	HCA Area? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Determination: _____	Determination: <u>Could affect drinking water</u>	
Odorization Required? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		

9 Plot on site description page

Pipeline Failure Investigation Report

Pressure Test History <input checked="" type="checkbox"/> N/A						
<i>(Expand List as Necessary)</i>						
	Req'd ⁽¹⁰⁾ Assessment Deadline Date	Test Date	Test Medium	Pressure (psig)	Duration (hrs)	% SMYS
Installation						
Next						
Next						
Most Recent						
Describe any problems experienced during the pressure tests.						

Internal Line Inspection/Other Assessment History <input type="checkbox"/> N/A					
<i>(Expand List as Necessary)</i>					
	Req'd ⁽¹⁰⁾ Assessment Deadline Date	Assessment Date	Type of ILI Tool ⁽¹¹⁾	Other Assessment Method ⁽¹²⁾	Indicated Anomaly If yes, describe below
Initial		2006	MFL/Caliper		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Next					<input type="checkbox"/> Yes <input type="checkbox"/> No
Next					<input type="checkbox"/> Yes <input type="checkbox"/> No
Most Recent					<input type="checkbox"/> Yes <input type="checkbox"/> No
Describe any previously indicated anomalies at the failed pipe, and any subsequent pipe inspections (anomaly digs) and remedial actions. None					

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

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

11 MFL, geometry, crack, etc.

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

Pipeline Failure Investigation Report

<i>Maps & Records</i>	<input checked="" type="checkbox"/> N/A
Are Maps and Records Current? ⁽¹³⁾ <input type="checkbox"/> Yes <input type="checkbox"/> No Comments:	

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

<i>Pipeline Operation History</i>	<input checked="" type="checkbox"/> N/A
Description (Repair or Leak Reports, Exposed Pipe Reports):	
Did a Safety Related Condition Exist Prior to Failure? <input type="checkbox"/> Yes <input type="checkbox"/> No Reported? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Unaccounted For Gas:	
Over & Short/Line Balance (24 hr., Weekly, Monthly/Trend):	

<i>Operator/Contractor Error</i>		<input checked="" type="checkbox"/> N/A
Name:	Job Function:	
Title:	Years of Experience:	
Training (Type of Training, Background):		
Was the person "Operator Qualified" as applicable to a precursor abnormal operating condition? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Was qualified individual suspended from performing covered task <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Type of Error (Inadvertent Operation of a Valve):		
Procedures that are required:		
Actions that were taken:		
Pre-Job Meeting (Construction, Maintenance, Blow Down, Purging, Isolation):		
Prevention of Accidental Ignition (Tag & Lock Out, Hot Weld Permit):		
Procedures conducted for Accidental Ignition:		
Was a Company Inspector on the Job? <input type="checkbox"/> Yes <input type="checkbox"/> No		

13 Obtain copies of maps and records

Pipeline Failure Investigation Report

<i>Operator/Contractor Error</i>				
Was an Inspection conducted on this portion of the job? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A				
Additional Actions (Contributing factors may include number of hours at work prior to failure or time of day work being conducted):				
Training Procedures:				
Operation Procedures:				
Controller Activities:				
Name	Title	Years Experience	Hours on Duty Prior to Failure	Shift
Alarm Parameters:				
High/Low Pressure Shutdown:				
Flow Rate:				
Procedures for Clearing Alarms:				
Type of Alarm:				
Company Response Procedures for Abnormal Operations:				
Over/Short Line Balance Procedures:				
Frequency of Over/Short Line Balance:				
Additional Actions:				

Pipeline Failure Investigation Report

Additional Actions Taken by the Operator

N/A

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

The failed branch connection along with approximately 80" length of mainline pipe containing it was cut out. The branch connection was transported to Kiefner and Associates for failure analysis (Appendix 5). The 80" long section of pipe was replaced with pretested pipe and the tie-in girth welds were radiographed. Mid Valley Pipeline initiated a cleanup of the crude oil near the branch connection. Unfortunately, crude oil found its way into the Rocky Ford Creek and Mid Valley Pipeline launched an extensive stream cleanup program under the direction of Ohio EPA and US EPA Region 5.

Pipeline Failure Investigation Report

<i>Photo Documentation</i> ⁽¹⁾					
Overall Area from best possible view. Pictures from the four points of the compass. Failed Component, Operator Action, Damages in Area, Address Markings, etc.					
Photo No.	Description	Roll No.	Photo No.	Description	Roll No.
1	Leak site looking north		1		
2	Leak site looking south		2		
3	Leak site looking south		3		
4	Valve and branch connection		4		
5	Valve and blind flange		5		
6	Location of crack		6		
7	Cracked weld		7		
8	Closeup of cracked weld		8		
9	Cleanup efforts on Rocky Ford Creek		9		
10	Crude oil contamination on creek bank		10		
11			11		
12			12		
13			13		
14			14		
15			15		
16			16		
17			17		
18			18		
19			19		
20			20		
21			21		
22			22		
23			23		
24			24		
25			25		
26			26		
27			27		
28			28		
29			29		
30			30		
Type of Camera:					
Film ASA:					
Video Counter Log (Attach Copy):					

Pipeline Failure Investigation Report

<i>Additional Information Sources</i>			
Agency	Name	Title	Phone Number
Police:			
Fire Dept.:			
State Fire Marshall:			
State Agency:	Dave Schilt	Ohio EPA	419-373-3041
NTSB:			
EPA:	Tricia Edwards	EPA Region 5	734-692-7687
FBI:			
ATF:			
OSHA:			
Insurance Co.:			
FRA:			
MMS:			
Television:			
Newspaper:			
Other:			

Pipeline Failure Investigation Report

Site Description

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

Refer to Appendix 2.

APPENDIX 1
PHOTO DOCUMENTATION



Photo 1 – View looking north from leak site. Tanks visible in the photo are no longer in service. The arrow points to Tank Farm Road.

Date Taken: 2-19-2009
Taken By: Gery Bauman



Photo 2 – View from leak site looking south. Visible is the branch connection and 12" valve.

Date Taken: 2-19-2009
Taken By: Gery Bauman



Photo 3 - The photo shows the view south of the branch connection. The tree line indicates Rocky Ford Creek. Field tile drain to the south into the Rocky Ford Creek and crude oil did reach the creek through the tile.

Date Taken: 2-19-2009
Taken By: Gery Bauman



Photo 4 - The photo shows the valve actuator at the branch connection.

Date Taken: 2-19-2009
Taken By: Gery Bauman



Photo 5 - The photo shows the valve and blinded flange.

Date Taken: 2-19-2009
Taken By: Gery Bauman



Photo 6 - The photo shows origin of the leak. The arrow points to the crack.

Date Taken: 2-19-2009
Taken By: Gery Bauman



Photo 7 - The photo shows the weld between the mainline pipe and the branch connection.

Date Taken: 2-19-2009
Taken By: Gery Bauman



Photo 8 - The photo shows the crack. Note the crack does contain some dirt as the result of the excavation.

Date Taken: 2-19-2009
Taken By: Gery Bauman



Photo 9 - The photo show booms in the Rocky Ford Creek just downstream of the Tank Farm Road.

Date Taken: 2-19-2009
Taken By: Gery Bauman



Photo 10 - The photo shows the crude oil contamination along the banks of the Rocky Ford Creek.

Date Taken: 2-19-2009
Taken By: Gery Bauman

APPENDIX 2
MAP AND SATELLITE PHOTO OF LEAK AREA

Mid Valley Pipeline Company – System Map

Mid Valley Pipeline Company is represented by **red** crude oil pipeline **line**. Sunoco Logistics is the owner of Mid Valley Pipeline

The screenshot displays the Sunoco Logistics website's 'Asset Map' page. At the top, the Sunoco Logistics logo is on the left, and the NYSE SXL stock price (64.805, -2.525) is on the right. A navigation menu includes links for Investors, Customers, Public Awareness, Environment and Safety, About Us, Careers, and Contact Us. Below the menu is a banner image of industrial facilities. The main content area features the 'Asset Map' title and a map of the Mid Valley Pipeline system. The map shows a red line for the crude oil pipeline and a blue line for the refined product pipeline, with various terminals marked by cylinder icons. A legend on the right explains the symbols and provides navigation tips. A note at the bottom states that the locations are approximate and advises calling before digging.

Sunoco Logistics
NYSE SXL 64.805 (-2.525) [as of 05/05/2010 11:38 ET]

Investors | **Customers** | Public Awareness | Environment and Safety | About Us | Careers | Contact Us

Home » Customers » Business Lines » Asset Map

Asset Map

This interactive map will allow you to view our pipeline and terminal system, as well as view asset descriptions and contact information.

Key:

- = Terminal
- = Refined Product Pipeline
- = Crude Oil Pipeline

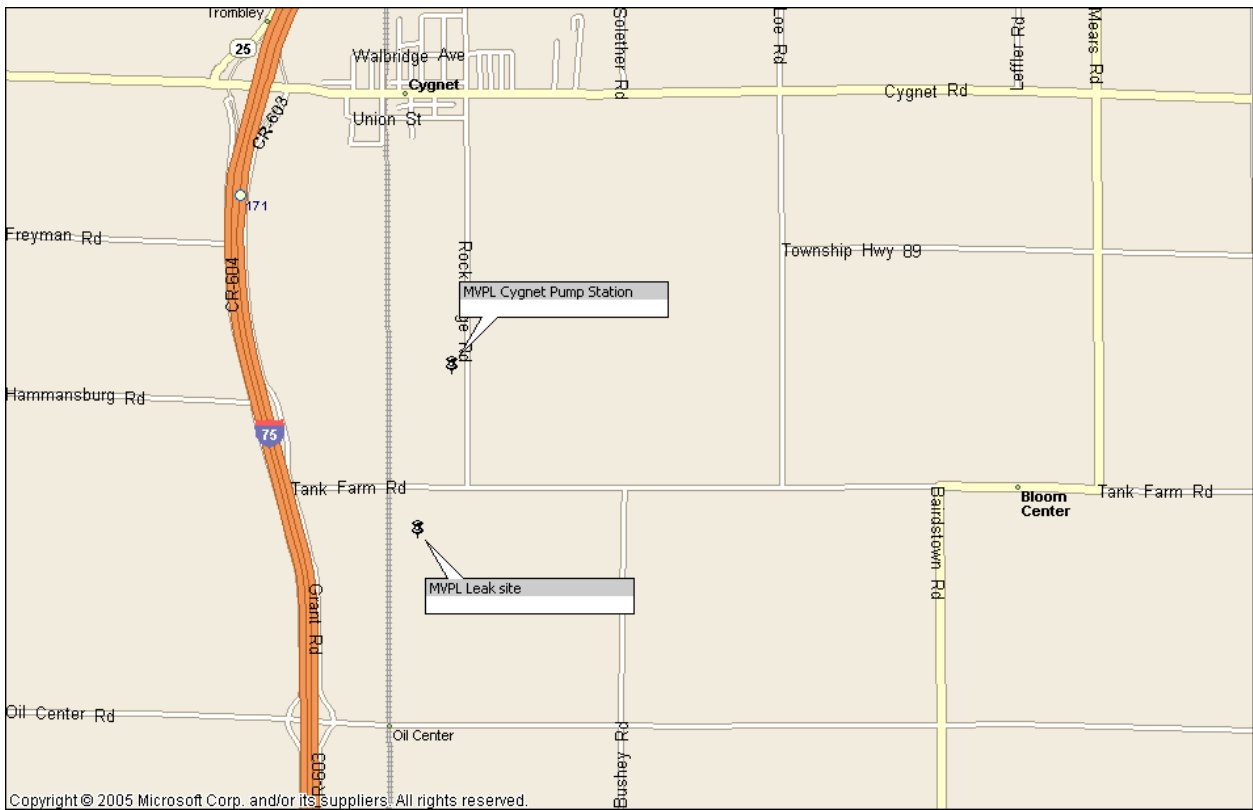
Navigation Tips

- To zoom in, click on the map or use the zoom features on the navigation panel below the map.
- Click on a terminal name or a pipeline segment to view asset information.
- To move on the map, click and drag or use the navigation box in the top left corner of the map.
- Click to refresh the map

Note - the location of the pipeline facilities shown are approximate only. For an exact location, please [Call Before You Dig](#).

[Navigation Tips](#)







Horizontal arrow points to the Mid-Valley Pipeline Cygnet Pump Station; Vertical arrow points to the leak site.

**APPENDIX 3
NRC REPORT**

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 # 897885

INCIDENT DESCRIPTION

*Report taken at 17:24 on 18-FEB-09
 Incident Type: PIPELINE
 Incident Cause: UNKNOWN
 Affected Area: ROCKY FORGE RIVER
 The incident was discovered on 18-FEB-09 at 17:00 local time.
 Affected Medium: WATER

SUSPECTED RESPONSIBLE PARTY

Organization: MID VALLEY PIPELINE
 CYGNAT, OH 43413

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

5152 ROCK RIDGE ROAD County: WOOD
 City: CYGNAT State: OH Zip: 43413

SOUTH OF ADDRESS BUT THE INCIDENT IS STILL ON THEIR PROPERTY.

RELEASED MATERIAL(S)

CHRIS Code: OIL Official Material Name: OIL: CRUDE
 Also Known As:
 Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

CALLER IS REPORTING A RELEASE OF CRUDE OIL FROM PIPELINE DUE TO UNKNOWN CAUSES. THE RELEASE WENT ONTO THE GROUND AND INTO THE ROCKY FORGE RIVER. THE AMOUNT SPILLED IS UNKNOWN BUT IT IS ESTIMATED TO BE AROUND 50 BARRELS.

INCIDENT DETAILS

Pipeline Type: TRANSMISSION
 DOT Regulated: YES
 Pipeline Above/Below Ground: BELOW
 Exposed or Under Water: NO
 Pipeline Covered: UNKNOWN

---WATER INFORMATION---

Body of Water: ROCKY FORGE RIVER
 Tributary of: PORTIS RIVER
 Nearest River Mile Marker:
 Water Supply Contaminated: UNKNOWN

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
 INJURIES: NO Hospitalized: Empl/Crew: Passenger:
 FATALITIES: NO Empl/Crew: Passenger: Occupant:
 EVACUATIONS: NO Who Evacuated: Radius/Area:
 Damages: NO

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

Track: N

Passengers Transferred: NO

Environmental Impact: NO

Media Interest: NONE Community Impact due to Material:

REMEDIAL ACTIONS

STOPPED THE SOURCE. BOOMS PLACED IN THE RIVER.

Release Secured: YES

Release Rate:

Estimated Release Duration:

WEATHER

Weather: RAINY, 40°F Wind speed: 10 MPH Wind direction: SSE

ADDITIONAL AGENCIES NOTIFIED

Federal: EPA

State/Local: NONE

State/Local On Scene: NONE

State Agency Number: NONE

NOTIFICATIONS BY NRC

ATLANTIC STRIKE TEAM (MAIN OFFICE)

18-FEB-09 17:33

USCG HSOC AT DHS (USCG HSOC DESK)

18-FEB-09 17:33

USCG ICC (ICC ONI)

18-FEB-09 17:33

INFO FOR CRITICAL MFG SECTOR (MAIN OFFICE)

18-FEB-09 17:33

DOT CRISIS MANAGEMENT CENTER (MAIN OFFICE)

18-FEB-09 17:33

U.S. EPA V (MAIN OFFICE)

18-FEB-09 17:34

FLD INTEL SUPPORT TEAM DETROIT (COMMAND CENTER)

18-FEB-09 17:33

NATIONAL INFRASTRUCTURE COORD CTR (MAIN OFFICE)

18-FEB-09 17:33

NOAA RPTS FOR OH (MAIN OFFICE)

18-FEB-09 17:33

OHIO DEPARTMENT OF HEALTH (OHDOH)

18-FEB-09 17:33

PIPELINE & HAZMAT SAFETY ADMIN (OFFICE OF PIPELINE SAFETY (AUTO))

18-FEB-09 17:33

OH EPA ATTN: DUTY OFFICER (MAIN OFFICE)

18-FEB-09 17:33

USCG DISTRICT 9 (COMMAND CENTER)

18-FEB-09 17:33

ADDITIONAL INFORMATION

CALLER HAS NO ADDITIONAL INFORMATION.

*** END INCIDENT REPORT # 897885 ***

**APPENDIX 4
ACCIDENT REPORT 20090076**



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

ACCIDENT REPORT – HAZARDOUS LIQUID PIPELINE SYSTEMS

Report Date _____

No. _____
(DOT Use Only)

INSTRUCTIONS

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

PART A – GENERAL REPORT INFORMATION

Check one or more boxes as appropriate:

Original Report Supplemental Report Final Report

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

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

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

3. Location of accident
(If offshore, do not complete a through d. See Part C.1)
 - a. Latitude: _____ Longitude: _____
(if not available, see instructions for how to provide specific location)
 - b. _____
City, and County or Parish
 - c. _____
State and Zip Code
 - d. Mile post/valve station or survey station no.
(whichever gives more accurate location)

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

5. Losses (Estimated)

Public/Community Losses reimbursed by operator:

Public/private property damage \$ _____
 Cost of emergency response phase \$ _____
 Cost of environmental remediation \$ _____
 Other Costs \$ _____
 (describe) _____

Operator Losses:

Value of product lost \$ _____
 Value of operator property damage \$ _____
 Other Costs \$ _____
 (describe) _____

Total Costs \$ _____

6. Commodity Spilled Yes No
(If Yes, complete Parts a through c where applicable)
 - a. Name of commodity spilled _____
 - b. Classification of commodity spilled:
 HVLs /other flammable or toxic fluid which is a gas at ambient conditions
 CO₂ or other non-flammable, non-toxic fluid which is a gas at ambient conditions
 Gasoline, diesel, fuel oil or other petroleum product which is a liquid at ambient conditions
 Crude oil

c. Estimated amount of commodity involved :

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

Amounts:

Spilled : _____

Recovered: _____

CAUSES FOR SMALL SPILLS ONLY (5 gallons to under 5 barrels) :

(For large spills [5 barrels or greater] see Part H)

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

PART B – PREPARER AND AUTHORIZED SIGNATURE

(type or print) Preparer's Name and Title

Area Code and Telephone Number

Preparer's E-mail Address

Area Code and Facsimile Number

Authorized Signature

(type or print) Name and Title

Date

Area Code and Telephone Number

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

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

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

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

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

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

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

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

Year the component that failed was installed: /_____/

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

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

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

c. Length of segment isolated _____ ft
 d. Distance between valves _____ ft
 e. Is segment configured for internal inspection tools? Yes No
 f. Had there been an in-line inspection device run at the point of failure? Yes No Don't Know
 Not Possible due to physical constraints in the system
 g. If Yes, type of device run (check all that apply)
 High Resolution Magnetic Flux tool Year run: _____
 Low Resolution Magnetic Flux tool Year run: _____
 UT tool Year run: _____
 Geometry tool Year run: _____
 Caliper tool Year run: _____
 Crack tool Year run: _____
 Hard Spot tool Year run: _____
 Other tool Year run: _____

PART D – MATERIAL SPECIFICATION

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

PART E – ENVIRONMENT

1. Area of accident In open ditch
 Under pavement Above ground
 Underground Under water
 Inside/under building Other _____

2. Depth of cover: _____ inches

PART F – CONSEQUENCES

1. Consequences (check and complete all that apply)
 a. Fatalities Injuries
 Number of operator employees: _____
 Contractor employees working for operator: _____
 General public: _____
 Totals: _____

b. Was pipeline/segment shutdown due to leak? Yes No
 If Yes, how long? _____ days _____ hours _____ minutes

c. Product ignited Yes No d. Explosion Yes No
 e. Evacuation (general public only) _____ / people
 Reason for Evacuation:
 Precautionary by company
 Evacuation required or initiated by public official

f. Elapsed time until area was made safe:
 _____ / hr. _____ / min.

2. Environmental Impact
 a. Wildlife Impact: Fish/aquatic Yes No
 Birds Yes No
 Terrestrial Yes No
 b. Soil Contamination Yes No
 If Yes, estimated number of cubic yards: _____
 c. Long term impact assessment performed: Yes No
 d. Anticipated remediation Yes No
 If Yes, check all that apply: Surface water Groundwater Soil Vegetation Wildlife

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

PART G – LEAK DETECTION INFORMATION

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

PART H – APPARENT CAUSE

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

H1 – CORROSION

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

H2 – NATURAL FORCES

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

H3 – EXCAVATION DAMAGE

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

H4 – OTHER OUTSIDE FORCE DAMAGE

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

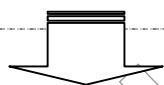
H5 – MATERIAL AND/OR WELD FAILURES

Material

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

Weld

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



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

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

H6 – EQUIPMENT

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

H7 – INCORRECT OPERATION

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

H8 – OTHER

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

PART I – NARRATIVE DESCRIPTION OF FACTORS CONTRIBUTING TO THE EVENT

(Attach additional sheets as necessary)

Large empty box for narrative description of factors contributing to the event.

APPENDIX 5
KIEFNER AND ASSOCIATES


Report for the sole use and benefit of client

Final Report

Failure Analysis of Branch Tee on the 22-Inch Maumee Pipeline from Lima to Cygnet

Donovan Richie and M.J. Rosenfeld, P.E.
April 15, 2009



 **Kiefner & Associates, Inc.**
585 Scherers Court
Worthington, Ohio 43085

(614) 888-8220
www.kiefner.com