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

Investigators	Richard Lopez and Joseph Elmer
Region Director	R. M. Seeley
Date of Report	April 19, 2012
Subject	Failure Investigation Report – Chevron Coahoma LPG Loop

Operator, Location, & Consequences

Date of Failure	09/08/2011
Commodity Released	Liquefied Petroleum Gas (LPG)
City/County & State	Mitchell County, Texas
OpID & Operator Name	2731, Chevron Pipe Line Company
Unit # & Unit Name	36804, West Texas LPG System #3
SMART Activity #	135846
Milepost / Location	MP 148.8, remote area
Type of Failure	Crack near weld
Fatalities	0
Injuries	0
Description of area impacted	Rural – open range
Property Damage	$1,501,020

Executive Summary

At approximately 07:50 a.m. on September 8, 2011, a failure occurred on the Chevron Pipe Line Company's (CPL) 10-inch Coahoma LPG Loop pipeline, which resulted in the release of approximately 13,241 barrels of LPG. The failure occurred approximately 40 feet west of CPL's MP 148.8, 2.7 miles south of Interstate 10 (Exit 200) in Mitchell County, Texas. The area where the leak occurred is remote, isolated ranch land, not an HCA, and there are no known unusually sensitive environmental areas in the vicinity. The incident was reported to the National Response Center as NRC Report # 988809.

The product released from the pipeline vaporized, ignited and caused a brush fire. The probable ignition source for the fire was the start up of a production pump. There were no injuries or fatalities.

The failure occurred near the fillet weld of a reinforcing sleeve. The damaged segment was transported to Stress Engineering Services (SES) in Houston, TX for analysis. The probable cause of the failure was determined to be a crack in the 10-inch diameter pipe located at the upstream fillet weld of the external sleeve. The crack was the result of a combination of bending loads and excessive hardness in the heat affected zone (HAZ) of the weld. Chevron submitted an initial and final report to PHMSA.

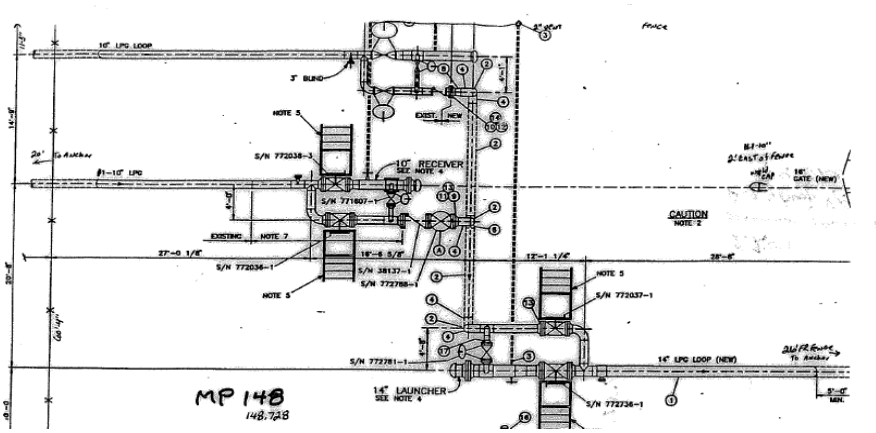
System Details

The CPL West Texas LPG pipeline originates at natural gas processing facilities in western Texas and New Mexico and ends at product storage facilities at Mt. Belvieu, TX and is approximately 2750 miles long. The route is shown in a map provided by Chevron (Appendix A).

Pipe Specifications

The segment of pipeline where the failure occurred was the 10-inch (nominal diameter) Loop line. This segment was fabricated using 0.219-inch wall thickness, Grade X-52, electric fusion welded line pipe manufactured by US Steel and was constructed in 1967. Chevron reports that no known prior accidents exist on this section. The pipeline is cathodically protected by an impressed current system. Chevron further reports that an ILI was performed in 2007 and adequate cathodic protection has been maintained.

The maximum operating pressure (MOP) of the segment of pipe where the failure occurred is 1042 psig. The MOP was established in 1967 by an eight-hour hydrostatic test. Actual operating pressure of the pipeline segment at time of failure was 600 psig.



Sketch 1 – Pig Trap upstream of failure site (flow is from left to right)

The leak site is approx. 17.2 miles east CPL's Coahoma pump station (Howard Co. TX.) and approx. 40-feet west of the MP 148.8 pig trap (Mitchell Co. TX). The area where the leak occurred is remote, isolated ranch land. The terrain is generally flat with arid soil conditions typical of the West Texas region.

Photo 1 – Facing upstream on line that failed

Events Leading up to the Failure

CPL's Houston Control Center, while investigating a potential leak due to system imbalance, had shut down the two 10-inch sections of the LPG System for a stand up test at MP 158 & MP 139. One of the 10-inch lines was blocked in at 06:47 a.m. and the other at 06:58 a.m.

Shortly after the shut down the control center received a phone call at 07:52 a.m. reporting a vapor cloud in the vicinity of the Chevron pipelines. The control center then received another phone call a few minutes later reporting that the vapor cloud had ignited. Chevron personnel and local Volunteer Fire Department personnel arrived at the scene and began spraying water around the perimeter to extinguish any grass fires.

Photo 2 – Pig trap area facing upstream

The photo is an upstream view of the two 10-inch pipelines within the trap area. The line on the right hand side is the 10-inch Loop line – the line that failed. The line in the middle was not affected. The line on the left is the 14-inch line that continues to Mt. Belvieu. Fire during the accident engulfed both 10-inch pipelines in the trap area. Product from the failure site that is still burning can be seen in the background. Temporary flares can also be seen in the background.

Emergency Response

CPL's Houston Control Center (investigating a potential leak, due to system imbalance) had shut down the two 10-inch sections of the LPG System for a stand up test at MP 158 and MP 139. The two 10-inch lines were blocked in at 06:47 and 06:58 a. m. respectively.

The failure occurred near the fillet weld of a reinforcing sleeve. The product released from the pipeline, vaporized, ignited and caused a brush fire. The fire continued to burn from the pipeline for several days after the failure likely because the 'ice ball' was slow to dissolve and kept supplying LPG vapors entrained in the ice ball.

The probable ignition source for the fire was the start up of a production pump. There were no injuries or fatalities.

Summary of Return-to-Service

Both of the aboveground segments of the 10-inch pipelines and their respective main line valves located at the MP 148 valve site were engulfed in the fire. The aboveground pipe was tested for integrity by Chevron material specialists. They conducted both the Brinnell and Rockwell hardness tests and concluded that both lines were safe to operate.

Photo 3 – Chevron specialists performing integrity tests

The valves on the inside 10-inch line (Line 2) in the scraper trap were evaluated by Chevron personnel after purging the LPG from the line. The valves internals on the line were then removed and replaced by a contractor. With the valves rebuilt, Line No. 2 was returned to service. No upstream service disruptions to Gas Processing Plants were caused by this accident.

The failed piece was cut and shipped to a metallurgical lab in Houston for detailed failure analysis. The valves on Line No. 1 were also inspected and repairs were not required.

During the course of the investigation, PHMSA inspectors reviewed the Return to Service plans prepared by Chevron. No concerns were identified.

A close interval cathodic protection survey was performed during the investigation. Levels of protection met the protection criteria.

Investigation Details

At approximately 09:39 a.m. (EST) on September 8, 2011, CPL reported to the National Response Center a failure on their West Texas LPG pipeline (Appendix B). The leak site is approximately 17.2 miles east CPL's Coahoma pump station (Howard Co. TX.) and approximately 40-feet west of the MP 148.8 pig trap (Mitchell Co. TX). The area where the leak occurred is remote, isolated ranch land. The terrain is generally flat with arid soil conditions typical of the West Texas region. Chevron submitted an initial report to PHMSA as required by §195.54 Accident reports (Appendix C).

PHMSA's Southwest Region received the incident notification and dispatched investigators to the site the following day. The investigators arrived on site on September 9th.

The maximum operating pressure (MOP) of the segment of the pipeline where the failure occurred is 1042 psig. The MOP was established in 1967 by an eight-hour hydrostatic test. Actual operating pressure of the pipeline segment at time of failure was 600 psig. The incident occurred below the specified MOP. The pipeline was last inline inspected (ILI) in 2007. There were no actionable anomalies identified in the area of the failure by the ILI.

Chevron prepared a Work Plan to ensure a safe environment for investigating personnel entering the failure site. The Work Plan was reviewed by all involved entities. PHMSA Investigators were able to enter the area of the failure on September 9th but because the release product was still burning Chevron was unable to excavate to enable examination the failed segment of the pipeline. The released product continued to burn for several days likely because the melting of the ice ball kept feeding flammable vapors that ignited.

Photos 4 and 5 – Showing the failure and the location of the failure

Metallurgical Analysis

The pipeline segments involved in the incident were shipped to SES in Houston, TX for metallurgical analysis. SES's analysis (Appendix D) identifies that:

1. The failure occurred near the fillet weld of sleeve on an anchor near a pig trap.
2. The controller's actions were appropriate and the incident location was isolated promptly.

Photo 6 – Segment removed for metallurgical testing

Findings & Contributing Factors

Subsequent initial visual inspection of the failed section of pipeline showed the failure likely initiated at an anchor on the 10-inch Loop line. It is not known when or why the anchor was installed. The failure appeared to have occurred near the fillet weld where a reinforcing sleeve had been welded to the pipeline at an anchor.

The damaged segment was transported to Stress Engineering Services (SES) in Houston, TX for analysis. The probable cause of the failure was determined to be a crack in the 10-inch diameter pipe located at the upstream fillet weld of the external sleeve. The crack was the result of a combination of bending loads and excessive hardness in the heat affected zone (HAZ) of the weld.

Appendices

A Map of CPL's West Texas LPG system

B Telephonic Notice Report – NRC #988809

C Chevron Accident Report to PHMSA 20110380-16525

D Metallurgical Evaluation Report

Appendix A **Map of CPL's West Texas LPG system**

This document is on file at PHMSA

Appendix B Telephonic Notice Report – NRC #988809

Lewis, Cynthia (PHMSA)

From: HQS-PF-fldr-NRC@uscg.mil
Sent: Thursday, September 08, 2011 8:46 AM
To: PHP Accident/Incident Cadre <PHMSA>; CMC-01 (OST)
Subject: NRC#988809

NATIONAL RESPONSE CENTER 1-800-424-8802
GOVERNMENT USE ONLYGOVERNMENT USE ONLY***
Information released to a third party shall comply with any
applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 988809

INCIDENT DESCRIPTION

*Report taken by: MST1 JERRY HARDY at 09:39 on 08-SEP-11
Incident Type: PIPELINE
Incident Cause: UNKNOWN
Affected Area:
Incident was discovered on 08-SEP-11 at 07:50 local incident time.
Affected Medium: AIR ATMOSPHERE

REPORTING PARTY
Name: JOSEPH WHITE
Organization: CHEVRON PIPELINE CO.
Address: 4800 FOURNACE PL
BELLAIRE, TX 77401

PRIMARY Phone: (281)6301927
Type of Organization: PRIVATE ENTERPRISE

SUSPECTED RESPONSIBLE PARTY
Name: JOSEPH WHITE
Organization: CHEVRON PIPELINE CO.
Address: 4800 FOURNACE PL
BELLAIRE, TX 77401
PRIMARY Phone: (281)6301927

INCIDENT LOCATION
County: HOWARD
City: COAHOMA State: TX
Latitude: 32° 15' 04" N
Longitude: 101° 18' 21" W
4 MILE SOUTH OF NEAREST TOWN

RELEASED MATERIAL(S)
CHRIS Code: LPG Official Material Name: LIQUEFIED PETROLEUM GAS
Also Known As:
Qty Released: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

CALLER REPORTED THAT A THIRD PARTY DISCOVERED A VAPOR CLOUD WHICH THEN IGNITE FROM AN UNKNOWN SOURCE.

SENSITIVE INFORMATION

INCIDENT DETAILS

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

IMPACT

Fire Involved: YES Fire Extinguished: NO

INJURIES: NO Hospitalized: Empl/Crew: Passenger:
FATALITIES: NO Empl/Crew: Passenger: Occupant:
EVACUATIONS:NO Who Evacuated: Radius/Area:

Damages: NO

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major Artery:N
Waterway:	N		
Track:			

Environmental Impact: UNKNOWN
Media Interest: NONE Community Impact due to Material:

REMEDIAL ACTIONS

LINE BLOCKED IN, AREA SECURED.
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

Weather: CLEAR, 68ºF Wind speed: 7 MPH Wind direction: NNE

ADDITIONAL AGENCIES NOTIFIED

Federal: NONE

State/Local: TEXAS RAILROAD COMMISION
State/Local On Scene: NONE
State Agency Number: 20112678

NOTIFICATIONS BY NRC

CALCASIEU PARISH SHERIFF'S DEPT (CRIMINAL INTELLIGENCE UNIT)
08-SEP-11 09:45 (337)4913778
USCG ICC (ICC ONI)
08-SEP-11 09:45 (301)6693363
DHS TEXAS FUSION CENTER (INTELLIGENCE OFFICERS)
08-SEP-11 09:45 (202)3068204
DOT CRISIS MANAGEMENT CENTER (MAIN OFFICE)
08-SEP-11 09:45 (202)3661863
U.S. EPA VI (MAIN OFFICE)
(866)3727745
USCG NATIONAL COMMAND CENTER (MAIN OFFICE)
(202)3722100
JFO-LA (COMMAND CENTER)
08-SEP-11 09:45 (225)3366513
NATIONAL INFRASTRUCTURE COORD CTR (MAIN OFFICE)
08-SEP-11 09:45 (202)2829201
NOAA RPTS FOR TX (MAIN OFFICE)
08-SEP-11 09:45 (206)5264911
NATIONAL RESPONSE CENTER HQ (MAIN OFFICE)
(202)2671136
PIPELINE & HAZMAT SAFETY ADMIN (OFFICE OF PIPELINE SAFETY (AUTO))
08-SEP-11 09:45 (202)3660568
TCEQ (MAIN OFFICE)
08-SEP-11 09:45 (512)2392507
TEXAS STATE OPERATIONS CENTER (COMMAND CENTER)
08-SEP-11 09:45 (512)4242208

ADDITIONAL INFORMATION

CALLER HAD NO ADDITIONAL INFORMATION.

*** END INCIDENT REPORT #988809 ***
Report any problems by calling 1-800-424-8802
PLEASE VISIT OUR WEB SITE AT http://www.nrc.uscg.mil

Appendix C Chevron Accident Report to PHMSA – 20110380

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: 01/31/2013

U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	**Report Date:**	10/08/2011
	No.	20110380 - 16525 --- (DOT Use Only)

ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS

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:	03/27/2012
1. Operator's OPS-issued Operator Identification Number (OPID):	2731
2. Name of Operator	CHEVRON PIPE LINE CO
3. Address of Operator:	
3a. Street Address	4800 FOURNACE PLACE, Rm C382A
3b. City	BELLAIRE
3c. State	Texas
3d. Zip Code	774012324
4. Local time *(24-hr clock)* and date of the Accident:	09/08/2011 07:50
5. Location of Accident:	
Latitude:	32.251168
Longitude:	-101.305851
6. National Response Center Report Number (if applicable):	988809
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	09/08/2011 08:36
8. Commodity released: *(select only one, based on predominant volume released)*	HVL or Other Flammable or Toxic Fluid which is a Gas at Ambient Conditions
- Specify Commodity Subtype:	LPG (Liquefied Petroleum Gas) / NGL (Natural Gas Liquid)
- 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):	13,241.00
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):	
11. Estimated volume of commodity recovered (Barrels):	
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	
13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	
- If No, Explain:	
- 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?	Yes
16. Did the commodity explode?	Yes
17. Number of general public evacuated:	0
18. Time sequence *(use local time, 24-hour clock)*:	
18a. Local time Operator identified Accident:	09/08/2011 07:52
18b. Local time Operator resources arrived on site:	09/08/2011 08:20

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the origin of Accident onshore?	Yes
If Yes, Complete Questions (2-12)	
If No, Complete Questions (13-15)	
- If Onshore:	
2. State:	Texas
3. Zip Code:	79565
4. City	Latan
5. County or Parish	Mitchell
6. Operator-designated location:	Milepost/Valve Station
Specify:	148.7
7. Pipeline/Facility name:	West Texas LPG
8. Segment name/ID:	10" Coahoma LPG Loop
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Pipeline Right-of-way
11. Area of Accident (as found):	Underground
Specify:	Under soil
- If Other, Describe:	
Depth-of-Cover (in):	39
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 Pipeline, Including Valve Sites
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	
3. Item involved in Accident:	Weld, including heat-affected zone

- If Pipe, specify:	
3a. Nominal diameter of pipe (in):	
3b. Wall thickness (in):	
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	
3d. Pipe specification:	
3e. Pipe Seam , specify:	
- If Other, Describe:	
3f. Pipe manufacturer:	
3g. Year of manufacture:	
3h. Pipeline coating type at point of Accident, specify:	
- If Other, Describe:	
- If Weld, including heat-affected zone, specify:	Fillet Weld
- If Other, Describe:	
- If Valve, specify:	
- If Mainline, specify:	
- If Other, Describe:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	
- If Other - Describe:	
- If Other, describe:	
4. Year item involved in Accident was installed:	1967
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:	Crack
- If Other, Describe:	
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	

PART D - ADDITIONAL CONSEQUENCE INFORMATION

1. Wildlife impact:	No
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	No
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?	No
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	No
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 Integrity Management Program?	
- High Population Area:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- 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 Property Damage:	
8a. Estimated cost of public and non-Operator private property damage	$ 0
8b. Estimated cost of commodity lost	$ 1,001,020
8c. Estimated cost of Operator's property damage & repairs	$ 400,000
8d. Estimated cost of Operator's emergency response	$ 100,000
8e. Estimated cost of Operator's environmental remediation	$ 0
8f. Estimated other costs	$ 0
Describe:	
8g. Total estimated property damage (sum of above)	$ 1,501,020

PART E - ADDITIONAL OPERATING INFORMATION

1. Estimated pressure at the point and time of the Accident (psig):	600.00
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	1,040.00
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?	Yes
- If Yes - (*Complete 5a. – 5f. below)*	
5a. Type of upstream valve used to initially isolate release source:	Manual
5b. Type of downstream valve used to initially isolate release source:	Manual
5c. Length of segment isolated between valves (ft):	100,320
5d. Is the pipeline configured to accommodate internal inspection tools?	Yes
- If No, Which physical features limit tool accommodation? (*select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	No
- If Yes, Which operational factors complicate execution? (*select all that apply*)	
- Excessive debris or scale, wax, or other wall buildup	

- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
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?	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?	Yes
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?	Yes
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?	CPM leak detection system or SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations)
- 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:	
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)*	Control center personnel had detected the system imbalance, ordered the system blocked in & initated field investigation in the area of the imbalance, prior to receiving the phone call confirming the location of the leak.
- 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:	
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?	No
- If Yes:	
2a. Specify how many were tested:	
2b. Specify how many failed:	

PART G – APPARENT CAUSE

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).

Apparent Cause:	G5 - Material Failure of Pipe or Weld
G1 - Corrosion Failure - only one **sub-cause** can be picked from shaded left-hand column	
External Corrosion:	
Internal Corrosion:	
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground?	
- If Yes :	
4a. Was failed item considered to be under cathodic protection at the time of the 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?	
- If Internal Corrosion:	
6. Results of visual examination:	
- Other:	
7. Type of corrosion *(select all that apply)*: -	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	
- Erosion	
- Other:	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following *(select all that apply)*: -	
- Field examination	

- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
9. Location of corrosion *(select all that apply)*: -	
- Low point in pipe	
- Elbow	
- 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	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
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:	
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: *(select all that apply)*	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Describe:	
G3 - Excavation Damage - only one **sub-cause** can be picked from shaded left-hand column	
Excavation Damage – Sub-Cause:	
- If 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:	
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: *(select all that apply)* -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: *(select all that apply)* -	
- Public	
- If "Public", Specify:	
- Private	
- If "Private", Specify:	
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
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 *(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):*	
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 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:	Construction-, Installation-, or Fabrication-related
1. The sub-cause selected below is based on the following: *(select all that apply)*	
- Field Examination	Yes
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	Yes
- Other	
- If Other, Describe:	
- If Original Manufacturing-related (NOT girth weld or other welds formed in the field):	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related:	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Environmental Cracking-related:	
3. Specify:	
- Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional factors: (*select all that apply*):	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	Yes
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Describe:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	Yes
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	Yes
Most recent year run:	2007
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	

- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	
Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	Yes
- If Yes:	
Most recent year tested:	1967
Test pressure (psig):	1,300.00
7. Has one or more Direct Assessment been conducted on the pipeline segment?	No
- If Yes, and an investigative dig was conducted at the point of the 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?	No
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G6 – Equipment Failure - only one **sub-cause** can be selected from the shaded left-hand column	
Equipment Failure – Sub-Cause:	
- If Malfunction of Control/Relief Equipment:	
1. Specify: *(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 – 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: *(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, 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 *(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)?	

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

CPL¿s Houston Control Center (investigating a potential leak, due to system imbalace) had shut down the two 10¿ sections of the LPG System for a stand up test (blocked @MP 158 & MP 139). One of the 10¿ lines was blocked in @ 06:47 & the other @ 06:58.
The control center received a phone call @ 07:52 reporting a vapor cloud in the vacinity of our pipelines. The control center then received another phone call a few minutes later reporting that the vapor cloud had ignited. Chevron personnel & local VFD¿s arrived & began spraying water around the perimeter to extinguish any grass fires.

Both 10¿ lines have been excavated & examined for heat damage. All block valves at the MP 148.8 swab trap area were dismantled & inspected for any heat related damage and all seals replaced on 9-11-11. The pipe near the leak site was examined by metallurgists and determined to be undamaged on 9/11/11. The damaged pipe was replaced with new tested pipe and the 10¿ Loop Line was put back in service on 9/15/11.
SEE ATTACHED LAB ANALYSIS_CONCLUSIONS

File Full Name
20120327230001_Lab Analysis_Conclusions.pdf

PART I - PREPARER AND AUTHORIZED SIGNATURE

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INTRODUCTION

A section of 10-inch diameter pipe from the Coahoma LPG Pipeline in West Texas was received from Chevron Pipe Line Company. The pipe sample contained an external sleeve, which was cracked at the upstream pipe-to-sleeve weld. The pipe was been bolted to a concrete anchor block with a clamp that extended across the external sleeve. The cylindrical sleeve was attached to the outside of the pipe with fillet welds on the upstream and downstream ends of the sleeve. The upstream fillet weld between the pipe and sleeve exhibited a visible crack at the pipe-side weld toe that extended approximately one third of the circumference across the top of the pipe. The received section of pipe consisted of three short pup pieces connected by two butt welds: a short pup containing the cracked fillet weld with the sleeve, clamp and anchor; and two short pup pieces, one upstream and one downstream of cracked pipe segment. The pipe, which has been in liquid petroleum gas service, was reportedly installed in 1967 and was manufactured from API 5L, Grade X52. Stress Engineering Services, Inc. was asked by to perform a metallurgical analysis on the cracked pipe-to-sleeve weld to determine the cause of the crack.

CONCLUSIONS

- The crack in the 10-inch diameter pipe occurred at the upstream fillet weld of the external sleeve was a result of a combination of bending loads and excessive hardness in the weld heat affected zone (HAZ):
    - The as-received pipe sample exhibited an upward bow with a measured deflection of approximately ½ inch over the ten foot span of the pipe sample;
    - The maximum deflection of the bow occurred adjacent to the crack at the upstream pipe-to-sleeve fillet weld.
    - The crack at the upstream pipe-to-sleeve fillet weld occurred on the top half of the pipe extending from approximately 9:00 across the top to 2:00 on the tensile side of the pipe bow;
    - The ID surface of the pipe was necked or reduced in thickness at the through-wall crack;

Appendix D Metallurgical Report

This document is on file at PHMSA