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

Principal Investigator	Peter J. Katchmar/John Haddow
Regional Accident Coordinator	Peter J. Katchmar
Region Director	Chris Hoidal
Date of Report	4/13/2012
Subject	Failure Investigation Report – Suncor Energy (USA) Pipeline Company (Suncor) Tank # 1168 Overfill

Operator, Location, & Consequences

Date of Failure	6/14/2010
Commodity Released	Crude Oil
City/County & State	Cheyenne/Laramie, WY
OpID & Operator Name	31822 - Suncor Energy (USA) Pipeline Company
Unit # & Unit Name	3945 – Rocky Mountain Crude System
SMART Activity #	130287
Milepost / Location	MP-78 - Cheyenne Pump Station
Type of Failure	Break Out Tank Overflow
Fatalities	0
Injuries	0
Description of area impacted	Inside operator controlled pump station and tank farm
Property Damage	$45,375

Executive Summary

On the afternoon of June 14, 2010, a Suncor controller received a high-high level mechanical alarm but did not shut down the pipeline because the radar gauge showed an abundance of working capacity in the tank. The controller knew there were people at the Cheyenne pump station. Instead of following Suncor's written procedures and shutting down product to the tank, he called the pump station and asked one of the workers to check the level in the tank. Before the employee went to the tank, another employee at the pump station noticed the tank overflowing.

Tank #1168 is a cone roof 40,000 BBL tank with an internal floating roof and was hydrotested with approximately 38,232 BBLs of water. It has an inverted cone floor so the center of the tank is higher in elevation than the edge. A very viscous fluid (thought to be drag reducing agent (DRA)) filled the outer area of the tank, filled the sump and a slug got into the gauge tube. This column of DRA in the gauge tube was more viscous than normally transported crude oil and moved slower than the actual fluid in the tank. The radar gauge followed the DRA fluid level in the gauge tube giving the controller bad information on the crude oil volume in the tank. The gauge tube is used by Supervisory Control and Data Acquisition (SCADA) controllers in Canada to understand the tank level at any given time.

Another operator owned this asset in 2002. Records show that they performed an API 653 inspection on this tank in late 2001/early 2002 after replacing the Internal Floating Roof (IFR). For some unknown reason, they strapped the tank, and then added vents ~30 inches lower than the original vents. The design of the sump and gauge pole in this tank is such that one can bypass the datum at the bottom of the gauge pole which is 6 inches above the actual tank bottom level and actually gauge from the bottom of the sump, an additional 24 inches below the tank bottom. This would add 30 inches to the gauge. It is deduced that in 2002, this is why the engineers did not notice that the actual working level of the tank had been reduced by 30 inches from the newly installed vents.

System Details

Suncor Energy's Rocky Mountain Crude Oil Transmission Pipeline System begins at Guernsey Station and ends at the Suncor refinery in Commerce City, CO. The Rocky Mountain Crude System unit consists of 2 parallel, 54-mile 8" pipelines from Guernsey station to Horse Creek and one 10-inch 118 mile pipeline that begins at Horse Creek station and ends at Suncor's refinery in Commerce City, CO. There are 10 breakout tanks at Guernsey, one at Fort Lupton, one at Commerce City, and three breakout tanks at the Cheyenne Pump Station. There are three pump stations: Cheyenne, Ault, and Fort Lupton. The pipeline crosses the Big Thompson, Cache la Poudre, and South Platte rivers and passes through populated areas in Cheyenne, Greeley, Fort Lupton, Brighton, and Commerce City.

Events Leading up to the Failure

Suncor purchased this pipeline system from another operator on August 1, 2003. Suncor has been utilizing this tank as well as all others in the system with no faults for the past seven years. It appears while the controllers know how to operate the crude oil pipeline system, they were not aware of the way each specific tank alarm worked. On tank #1168, the gauge tube was fitted with an electronic radar level gauge and the tank was fitted with a high-high mechanical alarm. This is critical because, had the controller known that the high-high level alarm was a physical – mechanical alarm, he reported that he would have performed differently. As it was, he thought each alarm was the same and the radar gauge showed there was sufficient capacity left in the tank and the mechanical alarm showed the tank was critically full. The controller normally receives 3 other alarms before the Hi-HI alarm and since none of them came in, his first response was to have the tank looked at to see if the Hi-Hi alarm was wrong.

The controller reported that the batch of oil being pumped was almost complete and with a few hundred barrels left to pump and seeing the radar gauge showing there was sufficient capacity to complete the batch into the tank, the controller decided not to adhere to the company's written procedures and immediately shut down product into the tank. Instead, the controller called the personnel he knew were at the Cheyenne Pump Station and requested that one check the tank level. The personnel who were at the Cheyenne Pump Station happened to be in a safety meeting at the time the controller called. Instead of immediately going to the tank to check the level, they finished their safety meeting. This took approximately 15 minutes and by the time the meeting was over and the worker started toward the tank; another employee who was driving into the pump station, saw oil coming out of the overflow vents on Tank #1168. He immediately called the control center in Canada and reported to the controller to stop the receipt into the tank because the tank was overflowing.

History of Tank #1168

Another operator owned this asset in 2002. Records show that they performed modifications on this tank in late 2001/early 2002 after replacing the Internal Floating Roof (IFR). For some unknown reason, they strapped the tank at the beginning of the project, and then added vents ~30 inches lower than the original vents.

The design of the sump and gauge pole in this tank is such that one can bypass the datum at the bottom of the gauge pole which is 6 inches above the actual tank bottom level and actually gauge from the bottom of the sump, an additional 24 inches below the bottom of the tank floor. This would add 30 inches to the gauge. It is deduced that in 2002, this is why the engineers did not notice that the actual working level of the tank had been reduced by 30 inches.

Suncor reported that they have had some problems with the equipment on their pipeline system becoming clogged with a sludge that they think is an excess amount of DRA mixed with basic sediment and water (BS & W). Over the years, Suncor thinks that this sludge dropped out of the crude while in tank 1168 and accumulated to the point of filling the sump and the outer rim of the tank. Once this sludge accumulated to the point of the level of the bottom of the gauge tube, a slug of the sludge entered the gauge tube.

The gauge tube is fitted with a radar gauge which works on the principal of a reflective signal. The tank level (distance from the radar) is derived from the time delay of the reflected signal. Conjecture is that the column of sludge moved up and down the 8 inch gauge tube slower than the tank actually filled and drained. The gauge tube is an older design and was not slotted.

The design of the inside of the tank also contributed to the overfilling of the tank. The gauge tube was placed directly over the two foot deep sump area in the bottom of the tank floor. There is a datum plate that extends four inches across the eight inch gauge tube and is located 6 inches above the tank bottom. This datum is where a gauge line is supposed to land when a person is manually gauging this tank. Back in 2002, there is a record of the hydrotest of this tank after modifications were made. The tank was overfilled at that time too. The engineer manually gauged the tank in an attempt to understand why the tank was overfilling. He reported that the gauge level at 37' 11" which could only be accurate if the gauge was at the bottom of the sump.

Emergency Response

This was a small crude oil release and as it was non-flammable, the operator did not call 911. They did contact the Wyoming Department of Environmental Quality (WY-DEQ) to report the spill. The operator

immediately contracted with local contractors to wash down the tank and remove affected soil. All released crude remained within the diked area.

Summary of Return-to-Service

Suncor called the National Response Center to report the release. They also called the Western Region PHMSA office. The Western Region dispatched an inspector to the site to obtain preliminary information. PHMSA's Western Region Accident Coordinator, who is stationed in Cheyenne, Wyoming had left town for an inspection and so was not available to respond to the release. When the Accident Coordinator returned to town, he visited Suncor's offices for a meeting to discuss what occurred and what Suncor had done and planned to do to ensure the events leading to the tank overfill could not be repeated. Suncor reviewed their procedures, tank records, performed a physical review of each tank as well as inspected the mechanical settings on the over flow protection for each breakout tank in their pipeline system.

Suncor lowered the working tank capacity of the tank that overfilled and moved up the API 653 out-of-service tank inspection that was already scheduled for 2012. The tank was checked and deemed suitable for continued service. Plans were developed to change the service of the tank to not receive crude oil from the Butte Pipeline system as this was thought to be where the viscous fluid came from.

Suncor reviewed the event with all controllers in their operational control center (OCC) in Canada and explained how the alarms work and why it is extremely important to follow the procedures as written.

Findings & Contributing Factors

The Suncor Controller did not follow Suncor's written procedures to immediately divert flow from tank #1168 when he received a Hi-Hi Alarm.

Contributing Factors:

1. The previous operator modified the tank design and did not lower the working capacity of the tank or the Hi-Hi-Alarm level on the tank.
2. A slug of viscous fluid entered the gauge tube. The slug travelled slower than the fluid in the tank. The radar gauge followed the viscous fluid level in the gauge tube.
3. The controller did not understand the data source for different types of tank level alarms.

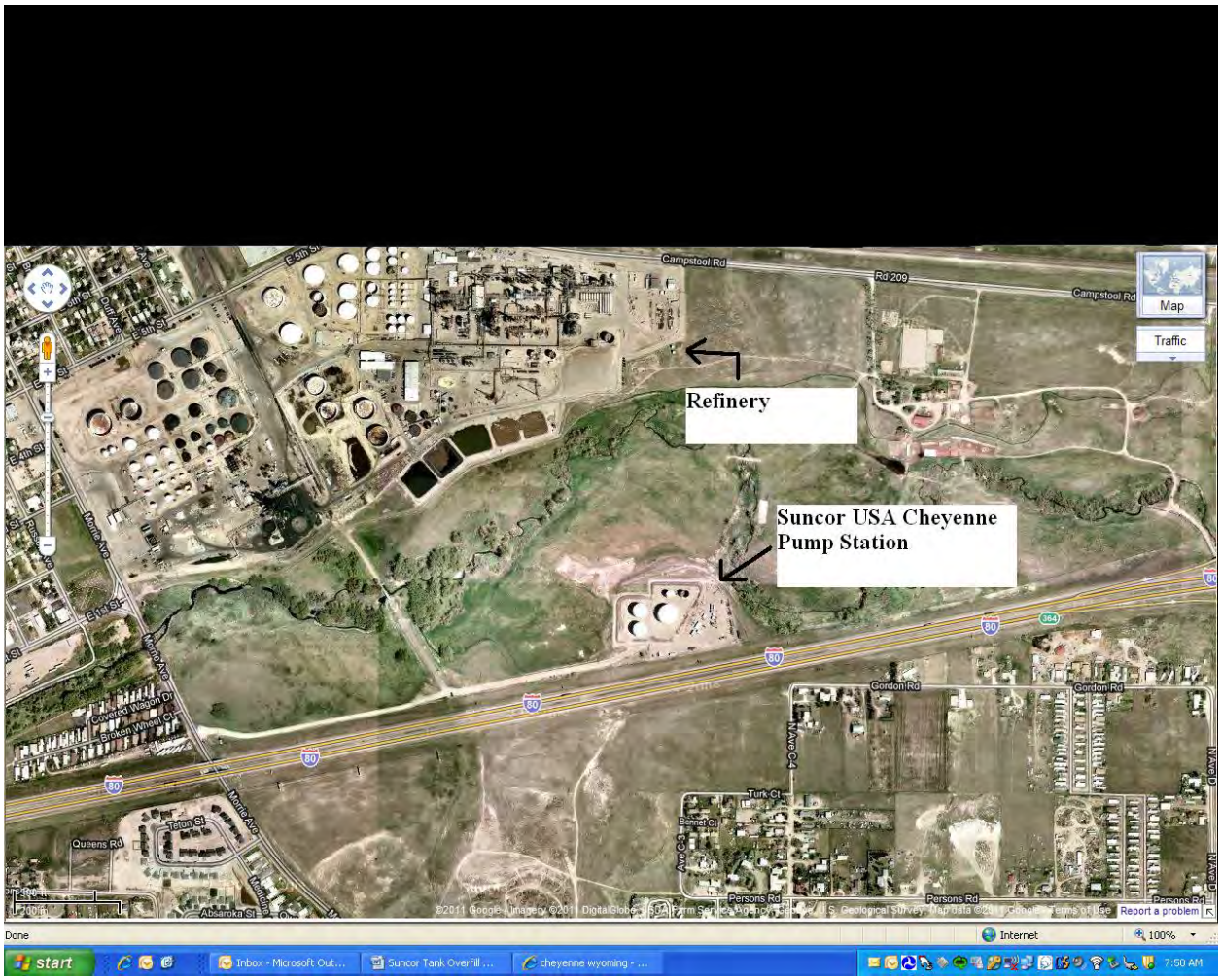
Appendices:

Maps and Photographs

NRC Report

Suncor Accident Report to PHMSA

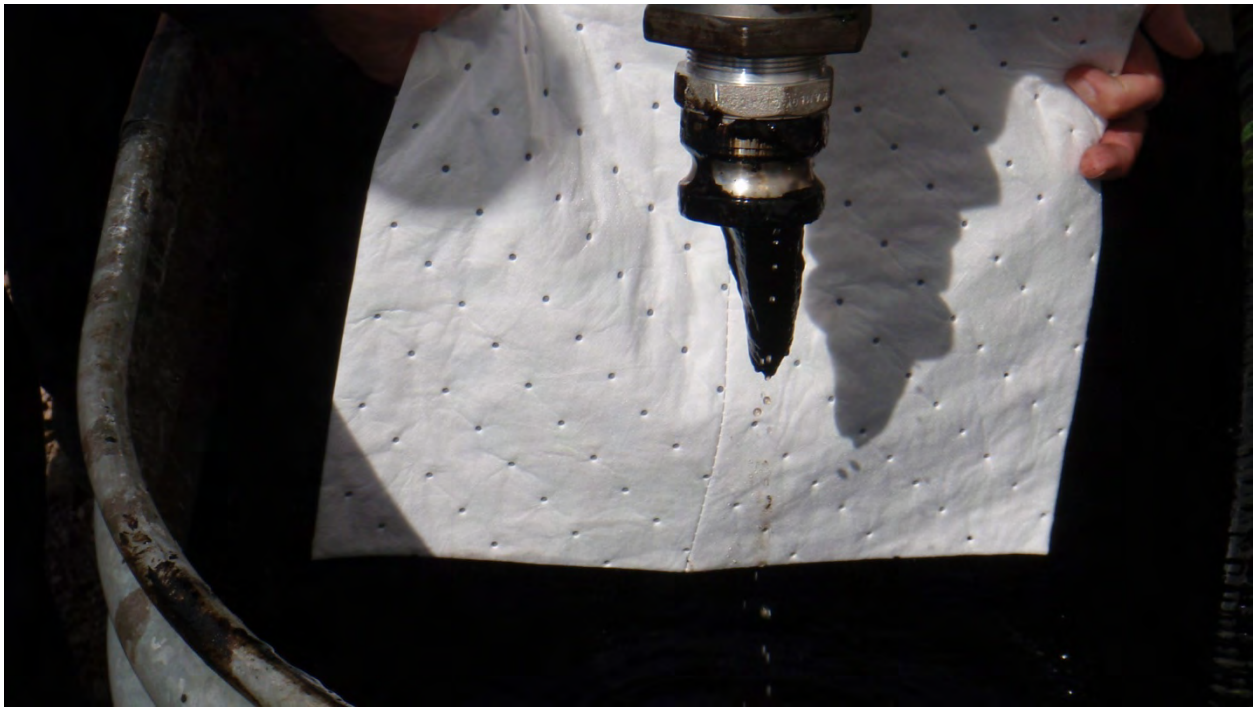
Suncor Investigation Report



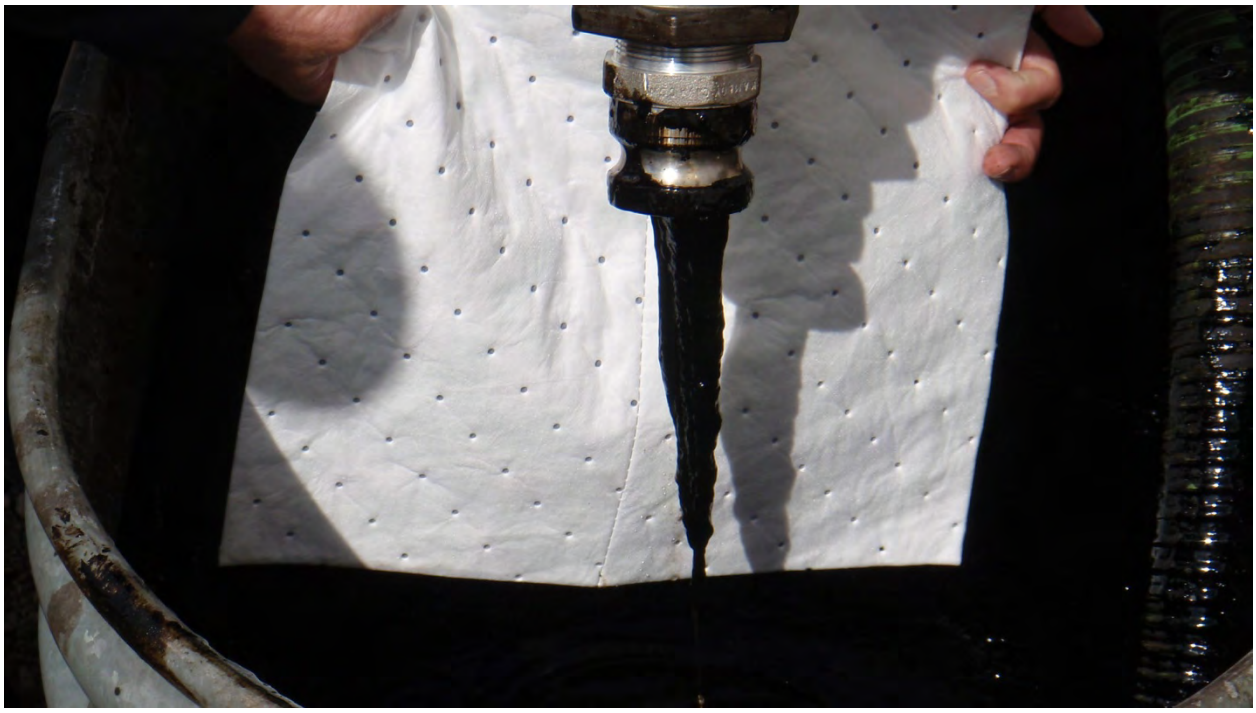
Overview of Suncor's Cheyenne Pump Station and Breakout Tank Farm.

Suncor Tank 1168 Overfill.

Suncor Tank 1168 Overfill.



Sludge being drained from the water draw sump. Water can be seen dropping out of the sludge.



Sludge being drained from the water draw sump.

Sludge being drained from the water draw sump. Water can be seen dropping out of the sludge.

Inside floor of tank 1168. The gray is an internal liner.

Water draw sump inside the tank. Gauge tube can be seen.

Water draw sump inside the tank. Gauge tube can be seen.

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 # 944028

INCIDENT DESCRIPTION

*Report taken at 16:42 on 14-JUN-10
Incident Type: STORAGE TANK
Incident Cause: OPERATOR ERROR
Affected Area:
The incident occurred on 14-JUN-10 at 13:43 local time.
Affected Medium: LAND

SUSPECTED RESPONSIBLE PARTY

Organization: SUNCOR PIPELINE COMPANY
CHEYENNE, WY 82001

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

199 SOUTH MORRIE AVE. County: LARAMIE
City: CHEYENNE State: WY

RELEASED MATERIAL(S)

CHRIS Code: OIL Official Material Name: OIL: CRUDE
Also Known As:
Qty Released: 50 BARREL(S)

DESCRIPTION OF INCIDENT

CALLER IS REPORTING A DISCHARGE OF 25 - 50 BARRELS OF CRUDE OIL FROM A STORAGE TANK WHEN THE TANK WAS OVERFILLED.

INCIDENT DETAILS

Description of Tank: CRUDE OIL TANK
Tank Above/Below Ground: ABOVE
Transportable Container: NO
Tank Regulated: YES
Tank Regulated By: DOT
Tank ID: 1168
Capacity of Tank: 80000 BARREL(S)
Actual Amount:

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			

Closure Type		Description of Closure	Length of Closure	Direction of Closure	
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

CLEAN UP IS UNDERWAY
Release Secured: YES
Release Rate:
Estimated Release Duration:

WEATHER

Weather: PARTLY CLOUDY, ºF

ADDITIONAL AGENCIES NOTIFIED

Federal: NONE
State/Local: NONE
State/Local On Scene: NONE
State Agency Number: NONE

NOTIFICATIONS BY NRC

USCG ICC (ICC ONI)
14-JUN-10 16:47
CO DEPT OF HEALTH AND ENVIRONMENT (MAIN OFFICE)
14-JUN-10 16:47
COLORADO INFO ANALYSIS CENTER (FUSION CENTER)
14-JUN-10 16:47
DHS PROTECTIVE SECURITY ADVISOR (PSA DESK)
14-JUN-10 16:47
DOT CRISIS MANAGEMENT CENTER (MAIN OFFICE)
14-JUN-10 16:47
U.S. EPA VIII (MAIN OFFICE)
14-JUN-10 16:54
NEBRASKA DEPT OF ENV QUALITY (MAIN OFFICE)
14-JUN-10 16:47
NATIONAL INFRASTRUCTURE COORD CTR (MAIN OFFICE)
14-JUN-10 16:47
NOAA RPTS FOR WY (MAIN OFFICE)
14-JUN-10 16:47
NTSB PIPELINE (MAIN OFFICE)
14-JUN-10 16:47
PIPELINE & HAZMAT SAFETY ADMIN (OFFICE OF PIPELINE SAFETY (AUTO))
14-JUN-10 16:47
PIPELINE & HAZMAT SAFETY ADMIN (OFFICE OF PIPELINE SAFETY WEEKDAYS (VERBAL))
14-JUN-10 16:50
PACIFIC STRIKE TEAM (MAIN OFFICE)
14-JUN-10 16:51
CO OIL & GAS CONSERVATION COMM (MAIN OFFICE)
14-JUN-10 16:47
DOI/OEPC DENVER (MAIN OFFICE)
14-JUN-10 16:47
WY DEPARTMENT OF ENVIRON QUALITY (MAIN OFFICE)
14-JUN-10 16:47
WYOMING CRIMINAL INTEL CENTER (SR INTELLIGENCE OFFICER)
14-JUN-10 16:47
WYOMING OFFICE OF HOMELAND SECURITY (OPERATIONS DIVISION)
14-JUN-10 16:47

ADDITIONAL INFORMATION

CALLER WILL NOTIFY WY DEQ AND PHMSA WESTERN OFFICE.

*** END INCIDENT REPORT # 944028 ***

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:** 07/12/2010 **No.** 20100147 - 15220 ---------- (DOT Use Only)

ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0047. Public reporting for this collection of information is estimated to be approximately 10 hours per response (5 hours for a small release), including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.

INSTRUCTIONS

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

PART A - KEY REPORT INFORMATION

Report Type: *(select all that apply)*	**Original:**	**Supplemental:**	**Final:**
		Yes	**Yes**
Report Status:	Submitted		
Create Date:	07/30/2010		
1. Operator's OPS-issued Operator Identification Number (OPID):	31822		
2. Name of Operator	SUNCOR ENERGY (USA) PIPELINE CO.		
3. Address of Operator:			
3a. Street Address	1715 FLEISCHLI PARKWAY		
3b. City	CHEYENNE		
3c. State	Wyoming		
3d. Zip Code	82001		
4. Local time *(24-hr clock)* and date of the Accident:	06/14/2010 13:34		
5. Location of Accident:			
Latitude:	41.123379		
Longitude:	-104.783855		
6. National Response Center Report Number (if applicable):	944028		
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	06/14/2010 14:42		
8. Commodity released: *(select only one, based on predominant volume released)*	Crude Oil		
- Specify Commodity Subtype:			
- 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):	30.00		
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):			
11. Estimated volume of commodity recovered (Barrels):	25.00		
12. Were there fatalities?	No		
- If Yes, specify the number in each category:			
12a. Operator employees			
12b. Contractor employees working for the Operator			
12c. Non-Operator emergency responders			
12d. Workers working on the right-of-way, but NOT associated with this Operator			
12e. General public			
12f. Total fatalities (sum of above)			
13. Were there injuries requiring inpatient hospitalization?	No		
- If Yes, specify the number in each category:			
13a. Operator employees			
13b. Contractor employees working for the Operator			
13c. Non-Operator emergency responders			

13d. Workers working on the right-of-way, but NOT associated with this Operator	
13e. General public	
13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	No
- If No, Explain:	Switched out of tank that was overfilling and pulled out of tank
- If Yes, complete Questions 14a and 14b: *(use local time, 24-hr clock)*	
14a. Local time and date of shutdown:	
14b. Local time pipeline/facility restarted:	
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	No
16. Did the commodity explode?	No
17. Number of general public evacuated:	0
18. Time sequence *(use local time, 24-hour clock)*:	
18a. Local time Operator identified Accident:	06/14/2010 13:34
18b. Local time Operator resources arrived on site:	06/14/2010 13:34
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:	Wyoming
3. Zip Code:	82001
4. City	Cheyenne
5. County or Parish	Laramie
6. Operator-designated location:	Milepost/Valve Station
Specify:	78.17
7. Pipeline/Facility name:	Cheyenne Crude Station
8. Segment name/ID:	10" Horse Creek to Denver
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Totally contained on Operator-controlled property
11. Area of Accident (as found):	Tank, including attached appurtenances
Specify:	
- If Other, Describe:	
Depth-of-Cover (in):	
12. Did Accident occur in a crossing?	No
- If Yes, specify below:	
- If Bridge crossing –	
Cased/ Uncased:	
- If Railroad crossing –	
Cased/ Uncased/ Bored/drilled	
- If Road crossing –	
Cased/ Uncased/ Bored/drilled	
- If Water crossing –	
Cased/ Uncased	
- Name of body of water, if commonly known:	
- Approx. water depth (ft) at the point of the Accident:	
- Select:	
- If Offshore:	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- On the Outer Continental Shelf (OCS) - Specify:	
- Area:	
- Block #:	
15. Area of Accident:	
PART C - ADDITIONAL FACILITY INFORMATION	
1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Breakout Tank or Storage Vessel, including Attached Appurtenances
- If Onshore Breakout Tank or Storage Vessel, Including Attached	Atmospheric or Low Pressure

Appurtenances, specify:	
3. Item involved in Accident:	Tank/Vessel
- 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:	
- If Other, Describe:	
- If Valve, specify:	
- If Mainline, specify:	
- If Other, Describe:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	Other
- If Other - Describe:	Tank Overfill
- If Other, describe:	
4. Year item involved in Accident was installed:	1984
5. Material involved in Accident:	Carbon Steel
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Overfill or Overflow
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	
- 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:	Yes
3. Long term impact assessment performed or planned:	No
4. Anticipated remediation:	No
4a. If Yes, specify all that apply:	
- Surface water	
- Groundwater	
- Soil	
- Vegetation	
- Wildlife	
5. Water contamination:	No
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	
- Groundwater	
- Drinking water: *(Select one or both)*	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	
5c. Name of body of water, if commonly known:	
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	Yes
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	Yes
7a. If Yes, specify HCA type(s): *(Select all that apply)*	

- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- High Population Area:	Yes
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	Yes
- Other Populated Area	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Drinking Water	Yes
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	Yes
- Unusually Sensitive Area (USA) - Ecological	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
8. Estimated cost to Operator :	
8a. Estimated cost of public and non-Operator private property damage paid/reimbursed by the Operator	$ 0
8b. Estimated cost of commodity lost	$ 375
8c. Estimated cost of Operator's property damage & repairs	$ 10,000
8d. Estimated cost of Operator's emergency response	$ 5,000
8e. Estimated cost of Operator's environmental remediation	$ 30,000
8f. Estimated other costs	$
Describe:	
8g. Estimated total costs (sum of above)	$ 45,375

PART E - ADDITIONAL OPERATING INFORMATION

1. Estimated pressure at the point and time of the Accident (psig):	.00
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	.00
3. Describe the pressure on the system or facility relating to the Accident (psig):	Pressure did not exceed MOP
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	No
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	No
- If Yes - (*Complete 5a. – 5f. below)*	
5a. Type of upstream valve used to initially isolate release source:	
5b. Type of downstream valve used to initially isolate release source:	
5c. Length of segment isolated between valves (ft):	
5d. Is the pipeline configured to accommodate internal inspection tools?	
- If No, Which physical features limit tool accommodation? (*select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	

- If Yes, Which operational factors complicate execution? (*select all that apply*)	
- Excessive debris or scale, wax, or other wall buildup	
- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	Yes
If Yes -	
6a. Was it operating at the time of the Accident?	Yes
6b. Was it fully functional at the time of the Accident?	Yes
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	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?	Yes
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	No
- If Yes:	
7a. Was it operating at the time of the Accident?	
7b. Was it fully functional at the time of the Accident?	
7c. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	
7d. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	
8. How was the Accident initially identified for the Operator?	Controller
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Guard Patrol by Operator or its contractor" is selected in Question 8, specify the following:	Operator employee
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	Yes, specify investigation result(s): (select all that apply)
- 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)*	
- 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	Yes
- 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:	Yes
Describe:	See Powerpoint slide

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:	G7 - Incorrect Operation

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

Corrosion Failure – Sub Cause:	
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground?	
- If Yes :	
4a. Was failed item considered to be under cathodic protection at the time of the 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:	
1. The sub-cause selected below is based on the following: *(select all that apply)*	
- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Original Manufacturing-related (NOT girth weld or other welds formed in the field):	
2. List contributing factors: *(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	
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Describe:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	

Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
7. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident -	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site -	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G6 – **Equipment Failure** - only one **sub-cause** can be selected from the shaded left-hand column	
Equipment Failure – **Sub-Cause:**	
- If Malfunction of Control/Relief Equipment:	
1. Specify: *(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:	Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow
- If Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage:	
- If Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow:	
1. Specify:	
- If Other, Describe:	
- If Valve Left or Placed in Wrong Position, but NOT Resulting in a Tank, Vessel, or Sump/Separator Overflow or Facility Overpressure:	
- If Pipeline or Equipment Overpressured:	
- If Equipment Not Installed Properly:	
- If Wrong Equipment Specified or Installed:	
- If Other Incorrect Operation:	
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	Yes
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	Normal operating conditions
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	Yes
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	Yes, they were 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

Time line for June 14, 2010 Tank 1168 over fill

At the time of the incident Suncor Pipeline Control Center was filling tank 1168, nothing coming out of the tank. Operations were normal.

At 13:34 on June 14, 2010 operator received a call from the Control Center in Sherwood Park, Alberta to inform him they had received a High Alarm on tank 1168. (this was the first and only alarm they received) the operator was preparing to investigate.

Data at the Control Center showed 1200 bbls working room. Level was ~32 feet (32,200 bbls) and the tank trend showed normal.

At 13:37, operator was turning onto the access road to Cheyenne Crude Station and saw the tank over flowing. He immediately called the Control Center to inform them to stop flow into tank 1168 and swing into tank 928.

At 13:39 the valve to tank 1168 was closed.

At 13:30 the Suncor leak trailer was activated and contractors working at the crude station were evacuated. Barricades were established and absorbent boom was deployed. Overflow was contained in the tank dike and no oil left Suncor¿s property.

Cleanup began immediately.

Phone notifications:

14:30 NCR (944028)
14:40 PHMSA
14:45 WY-DEQ (100614-1400)

File Full Name

PART I - PREPARER AND AUTHORIZED SIGNATURE

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Date	07/30/2010

Appendix D Suncor Investigation Report

This document is on file at PHMSA