



**Investigation of Pollution Incident
Area 6B, Block 5165, Platform A
Lease OCS-P 0241
7 December 2008**

**Pacific OCS Region
Off the California Coast**



**U.S. Department of the Interior
Minerals Management Service
Pacific OCS Regional Office**

**Camarillo
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David Dykes – Chairman
Jason Mathews
Glenn Shackell
Ralph Vasquez

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Glossary of Acronyms

APCD – Air Pollution Control District

API – American Petroleum Institute

ASME – American Society of Mechanical Engineers

DCOR – Dos Cuadras Offshore Resources, LLC

INC – Incident of Noncompliance

LLLP- Limited Liability Limited Partnership

MMS – Minerals Management Service

OCS – Outer Continental Shelf

OGOR – Oil and Gas Operation Report

PXP – Plains Exploration and Production Company

USCG – United States Coast Guard

UT – Ultrasonic Test

Executive Summary

Between the hours of 0400 and 0700 hours on the morning of December 7, 2008, a pollution incident occurred on Platform A, Lease OCS-P 0241, Area 6B, Block 5165. A hole, approximately ½ inch in diameter, developed on the #4 shipping pump can, at a height of 10-12 feet above the water line. It is estimated that between 20 - 30 barrels were released to the Pacific Ocean in the Santa Barbara Channel. Eleven vessels responded to the spill, and an estimated 20 barrels of crude oil/emulsion were recovered.

This investigative panel has concluded that the hole was caused by accelerated corrosion of the pump can in the area of the location of the stability clamp. This corrosion resulted from the exposure to the elements near the water line, the age of the pump can, and the lack of an effective preventive inspection and maintenance program.

The panel recommends that the MMS develop immediate and long-term plans to address the utilization of pump cans, verify the status of existing pump cans, investigate the possible requirement of containment and protection systems (riser guards), and consider the decommissioning of remaining systems. The panel recommends that MMS consider working with API to issue guidance on pump can (or similar systems) installation, operation, inspection, and maintenance. The panel also recommends that MMS issue a Safety Alert that briefly describes the incident; informs industry of the findings of the investigation; and identifies possible corrective actions.

Introduction

Authority

An incident that resulted in a pollution event occurred on Dos Cuadras Offshore Resources LLC (DCOR) Platform A on Lease OCS-P 0241, Area 6B, Block 5165, in the Santa Barbara Channel, offshore the State of California, on December 7, 2008, between the hours of 0400 and 0700. Pursuant to Section 208, Subsection 22(d), (e), and (f), of the Outer Continental Shelf (OCS) Lands Act, as amended, and Department of the Interior regulations at 30 CFR 250, Minerals Management Service (MMS) is required to investigate and prepare a public report of this accident. By memorandum dated January 27, 2009, the following personnel were named to the investigative panel:

J. David Dykes, Chair – Office of Safety Management, Field Operations, Gulf of Mexico OCS Region

Jason Mathews – Accident Investigation Board, MMS Headquarters Herndon

Ralph Vasquez – California District, Pacific OCS Region

Glenn Shackell – Office of Facilities, Safety, & Enforcement, Pacific OCS Region

Background

Lease OCS-P 0241 covers approximately 5400 acres and is located in Area 6B, Block 5165, Santa Barbara Channel, off the California coast. (*For lease location, see Attachment 1.*) The lease was originally issued to Union Oil of California (UNOCAL) effective February 1, 1968. Through numerous transfers, DCOR and Venoco Incorporated (Venoco) became lease owners effective March 17, 2005. DCOR became the designated operator effective March 17, 2005. Effective August 11, 2005, Santa Barbara Acquisitions LLLP became an additional lease owner along with DCOR and Venoco.

Findings

Brief Description of Spill

Between the hours of 0400 and 0700, on December 7, 2008, a pollution incident occurred at Platform A. DCOR performed equipment operations safety inspections at 2400 hours on December 6, 2008. The last pollution control inspection prior to the incident was performed at 2000 hours on December 6. According to platform personnel, a surveillance round was made at 0400 hours on December 7, and no indication of pollution was observed.

Pollution was discovered at 0701 by a field vessel, and the platform was subsequently shut-in at 0705 hours. MMS was notified at 0710 and arrived on the platform at 0730. The pollution incident was related to a 3/8" – 3/4" hole on the #4 pump can. (*For post-mortem photograph of hole, see Attachment 2.*) From 0800 to 0830, DCOR was working on plugging the hole. By 0830, DCOR had successfully plugged the hole and covered the area with Splash-zone (protective coating).

Conditions during this incident:

- Seas were calm with winds from the west at 3 MPH.
- Sea current was approximately 1-2 knots to the southeast.
- Sheen was 1.25 miles long and ½ mile wide and located southeast of Platform A.

Eleven vessels responded to the spill. Two vessels had boom capability. First vessel had boom deployed by 1015 hours. The second vessel had its boom deployed by 1200 hours. Spill response vessels remained on location conducting skimming operations through December 9, 2008. DCOR reported that 19.16 barrels were recovered during the skimming operations. (*For photograph of vessel response, see Attachment 3.*)

Five birds were impacted and three died from contamination with the crude oil. Two were cleaned and then released.

On December 17, 2008, MMS issued two Incidents of Noncompliance and requested a plan of action to prevent reoccurrence. DCOR was instructed to submit this plan within 14 days from the date of issuance of the following Incidents of Noncompliance (INC):

- G111 - INC was issued from not maintaining the #4 shipping pump can, which led to corrosion and a hole that allowed oil to leak into the Pacific Ocean.
- E100 - INC was issued due to the spill from the #4 shipping pump can on Platform A that introduced oil into the Pacific on December 7, 2008.

Spill Volume Determination Estimate

During the investigation, the panel reviewed multiple spill volume determination techniques to establish an estimated volume released into the Pacific Ocean. Along with the information submitted by DCOR to the panel in regards to actual volumes recovered, the following methodologies were taken into consideration by the panel in establishing an estimated spill volume:

Adios Spill Scenario (ADIOS 2.0 Spill Model)

DCOR simulated a similar oil spill incident with trajectory analysis and physical observations (wind speed/direction, current speed/direction, API gravity, etc.). As a result of this simulation, DCOR projected a volume of 28.7 barrels of oil spilled.

United States Coast Guard Spill Guide Estimation Table

Using the Coast Guard spill estimator (MSEXcel spreadsheet), the panel evaluated numerous pictures and reports, and estimated that the volume spilled was approximately 20 barrels. This volume is based on size of spill (length/width), percent of coverage, and appearance of coverage.

United States Coast Guard Effectiveness Figure

The Coast Guard estimated the spill volume to be 100 barrels based on the efficiency of the mechanical skimming equipment. Given the volume of 19.16 barrels recovered with an efficiency factor of 20%, the estimated spill volume from the Coast Guard is approximately 100 barrels.

Hourly Production Rate for Platform A

In accordance with Oil & Gas Operations Report (OGOR) production for Platform A for the months of October and November 2008, the panel calculated a hourly production rate of 50.75 barrels per hour. If the spill had lasted approximately 3 hours (0400 to 0700 hours), the estimated volume spilled could have been 152.25 barrels, if flowing directly from the process stream directly into the Pacific Ocean.

Worst Case Discharge

The panel calculated a possible worst case discharge of 432.25 barrels. This was determined by calculating the volumes of the oil surge vessel (MDJ 131) and the #4 pump can, (PAX 141B) along with the associated piping. This includes the hourly production rate for Platform A from 0400 to 0700 hours.

United States Coast Guard Estimate

The USCG will be using the estimated max potential discharge number of 150 barrels for the Platform A incident. This number was determined using the flow rate and max time (12hrs) of discharge from the shipping can. This number was approved by the Sector Commander and published in their reports.

Pump can, Description

The pump can is a large, 20-inch diameter pipe sealed at bottom and top and suspended from the production deck. The pump can is 60 feet in length and extends from an elevation of +47 feet to -13 feet below the water line. The three pump cans are located on the outboard side of the platform which prevents easy access for inspection. This location also exposes the can to the likelihood of significant external corrosion. Further, the pump cans are not protected against allision by external guards nor do they have containment protection in the event of integrity failure. Additionally, the pump cans do not appear to have any external protective coatings other than paint. *(For photograph of pump cans in relationship to the platform, see Attachment 4.)*

The pump can capacity is approximately 13 barrels. The pump can receives crude oil from the shipping tank (MBJ 131) situated on the platform. A multi-stage centrifugal pump and submersible electric motor is suspended in the can and pumps the oil from hydrostatic pressures of approximately 30 psi into the pipeline that transports the oil to shore. This pump and motor were out of service at the time of the incident and are only used as a backup to other oil transportation equipment on the platform. (*For simplified drawing of pump can, See Attachment 6.*)

Pump can History

Platform A was originally designed and installed in September 1968 without pump cans. In December 1969, a 900 barrel leak occurred in the riser of the 8-inch oil pipeline near the bottom of Platform A. It was determined at this time that one of the likely causes of this failure was vibrations associated with the then existing oil pump. Three pump cans (#3, #4, and #5) were installed on Platform A in 1971 as a solution to the vibration problem.

In January 2002, a corrosion-related leak occurred on pump can #5 on Platform A at the stability bracing clamp at the +14 deck. (*For photograph of corrosion on pump can #5, see Attachment 2.*) The #5 can was placed out of service at this time. The operator at this time (Nuevo Energy) did not implement any preventive measures to ensure integrity of the remaining two pump cans. In November 2004, Plains Exploration and Production Company (PXP) became lease owner/operator of Platform A. The panel is unaware of any precautionary measures that PXP may have had in place during their five-month tenure on the facility.

Erosion/Corrosion Inspections

Following the transfer of the platform to DCOR, no additional measures were taken at Platform A by DCOR to avert a similar incident (as in 2002) from occurring. All inspections performed on the pump cans were “visual” and did not fully incorporate a 360-degree view. No sufficient logs on the “visual” inspections were obtained by the

panel team. No ultrasonic test (UT) inspections for wall thickness had been performed on the pump cans.

DCOR performed Equipment Operations Safety Inspections twice daily, comprised of visual check/pipeline leak. They also performed Air Pollution Control District (APCD) Rule 331 inspections three times a day.

DCOR had an internal corrosion coupon monitoring program in place at the time of the incident. This program monitored the corrosion activity internal to the pipeline system. Only one coupon existed in the oil pipeline system at Platform A, and it was located at a point downstream of the oil shipping pumps on the departing oil pipeline.

The pump cans were not captured within pipeline corrosion inspections, the Level I structural surveys, or the Level II structural surveys.

MMS Requirements for Vessel Inspections

API 510

The MMS regulations at 30 CFR 250.803(b)(1) require that pressure and fired vessels have maintenance inspection, rating, repair, and alteration performed in accordance with the applicable provisions of API 510, Pressure Vessel Inspection Code: In-Service Inspection, Rating, Repair, and Alteration, Downstream Segment, Ninth Edition, June 2006.

The pump cans are identified on the flow schematics and SAFE Charts as PAX which indicates a pipeline pump. Upon further review, the panel has determined that the pump cans should be considered as pressurized vessels operating in the range of 30 pounds per square inch gauge pressure. According to DCOR personnel and verified through visual observation by the panel, the pump cans do not have any indication that they are ASME coded vessels.

API 570

The MMS regulations do not incorporate standards for design and/or inspection of process piping. In general, industry uses ASME B31.3 to design process piping and API Standard 570 (Inspection, Repair, Alteration, and Rerating of In-Service Piping Systems) to inspect in-service process piping.

Post Incident Corrective Actions

DCOR implemented the following corrective actions:

- Take #4 pump can out of service on Platform A.
- Test and evaluate all existing pump cans still in service in the Pacific OCS Region (pressure test and UT as needed).
- Develop a team to phase out all pump cans and replace with deck pumps in the Pacific OCS Region.
- Assess and evaluate all existing process components below the production deck.

Pacific Region Pump can, Inventory

As of March 2009, the following table captures all existing pump cans and their status:

Platform Name	Number of Pump cans	In-Service Pump cans
Platform A	3	1
Platform B	3	2
Platform C	3	2
Gilda	3	3
Irene	3	3
Hidalgo	3	2
Hermosa	3	2
TOTAL	21	15

(For photograph of pump cans at Platform B and C, see Attachment 6.)

Conclusions

The Incident

It is concluded by the panel that on December 7, 2008, between the hours of 0400 and 0700, a pollution incident occurred as result of a ½” diameter hole in the #4 production shipping pump can, on Platform A. This hole was located approximately 10-12 feet above the water line and allowed for the release of 20-30 barrels to the Pacific Ocean.

The discharge volume derived by the panel reflects an estimate, and the panel reviewed all pertinent data (USCG Spill Guide Estimation Table, simulation analysis on incident specific variables, and pictures taken of the sheen by MMS inspectors the morning of the incident) available to allow for the accuracy of this estimate. Even though DCOR reportedly recovered 19.16 barrels following the incident, it is unknown if some of recovered oil was from natural seeps. The panel was not able to obtain certain variables to determine an exact amount of oil spilled into the Pacific. This data included the duration of the spill, amount of hydrocarbons within the out-of-service pump can, and the precise orifice size. Without this data, assumptions were needed, and this would introduce many errors into the calculation of a volume displaced.

Cause

The hole developed as a result of the failure of the integrity of the pump can. This failure was due to external corrosion in the area of the location of the stability clamp at the +14 level. This corrosion is evident to the water line; however, it appears to be accelerated near the location of the stability clamp. Pictures taken post incident verify this condition. Given this evidence, the failure of the integrity is directly caused by the extreme amount of corrosion on the pump can.

Contributing Cause(s)

Preventive Maintenance and Inspection

It is concluded from this investigation that the lack of a preventive maintenance and inspection program that included external inspection of the production pump cans is a

contributing cause of this incident. Further, following the incident that occurred in 2002, the operator at the time failed to implement any preventive corrective actions. Following the transfer of ownership, DCOR failed to develop or implement an inspection program that included x-ray or ultrasonic testing (UT) of the wall thickness of the pump cans. Although not required, DCOR did not include pump can inspections in their pipeline corrosion inspections, the Level I structural surveys, or the Level II structural surveys. Given the age of the facility and pump cans, inspection and maintenance to ensure integrity are crucial to conducting an environmentally safe operation.

Containment

It is concluded from this investigation that the location of the pump can precluded the installation of containment barriers to prevent the release of hydrocarbons to the Pacific. Therefore, the lack of containment is considered to be a contributing cause to this incident. However, having proper containment in place would not have prevented the leak, but it would have possibly prevented oil from entering the Pacific Ocean.

Location of the Pump cans

Due to the location and proximity of the pump cans to the water line, the probability of corrosion is greatly increased. Further, the physical location of the pump can on the outboard side of the platform prevents a 360 degree visual inspection. Therefore, locating these pump cans on the outboard side of the platform, near the water line or in the water, is considered a contributing cause of the incident.

Recommendations

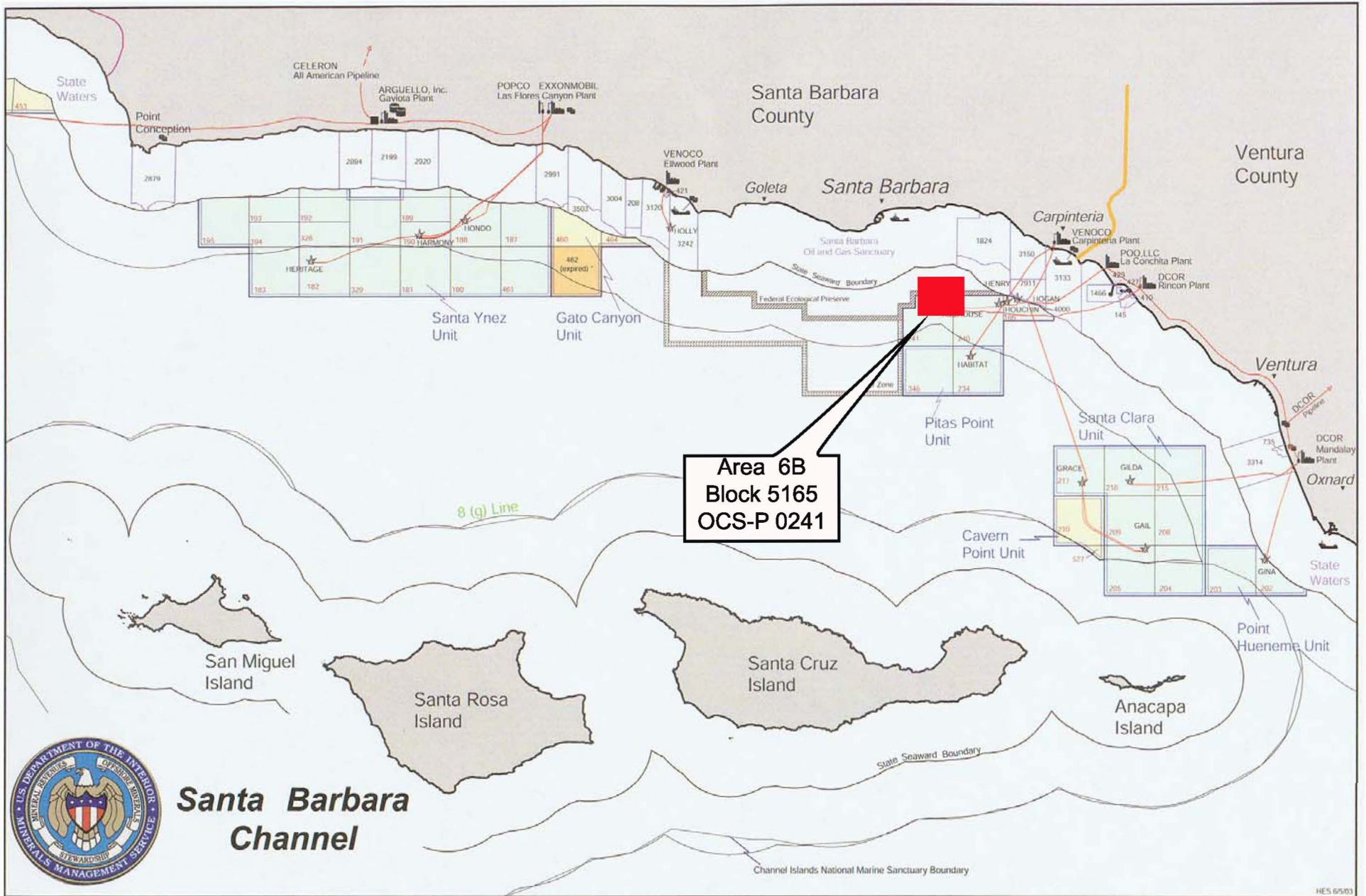
The panel recommends that MMS should issue a Safety Alert to all lessees and operators containing the following:

- Brief description of the pollution incident;
- Summary of the causes;
- The following recommendations:
 - Lessees and operators should review or develop preventive maintenance and inspection procedures for pump cans (or similar equipment) in their inventory to ensure that the procedures include a full visual inspection as well as thresholds for initiating corrective actions or further inspection.
 - Lessees and operators should perform risk assessments on pump can (or similar equipment) utilization without containment systems.
 - Lessees and operators should include in the assessment the consideration of installing riser guards or similar protective measures on pump cans that are located on the outboard side of the platform jacket at the water line, to protect against physical damage that could result from contact with floating vessels.

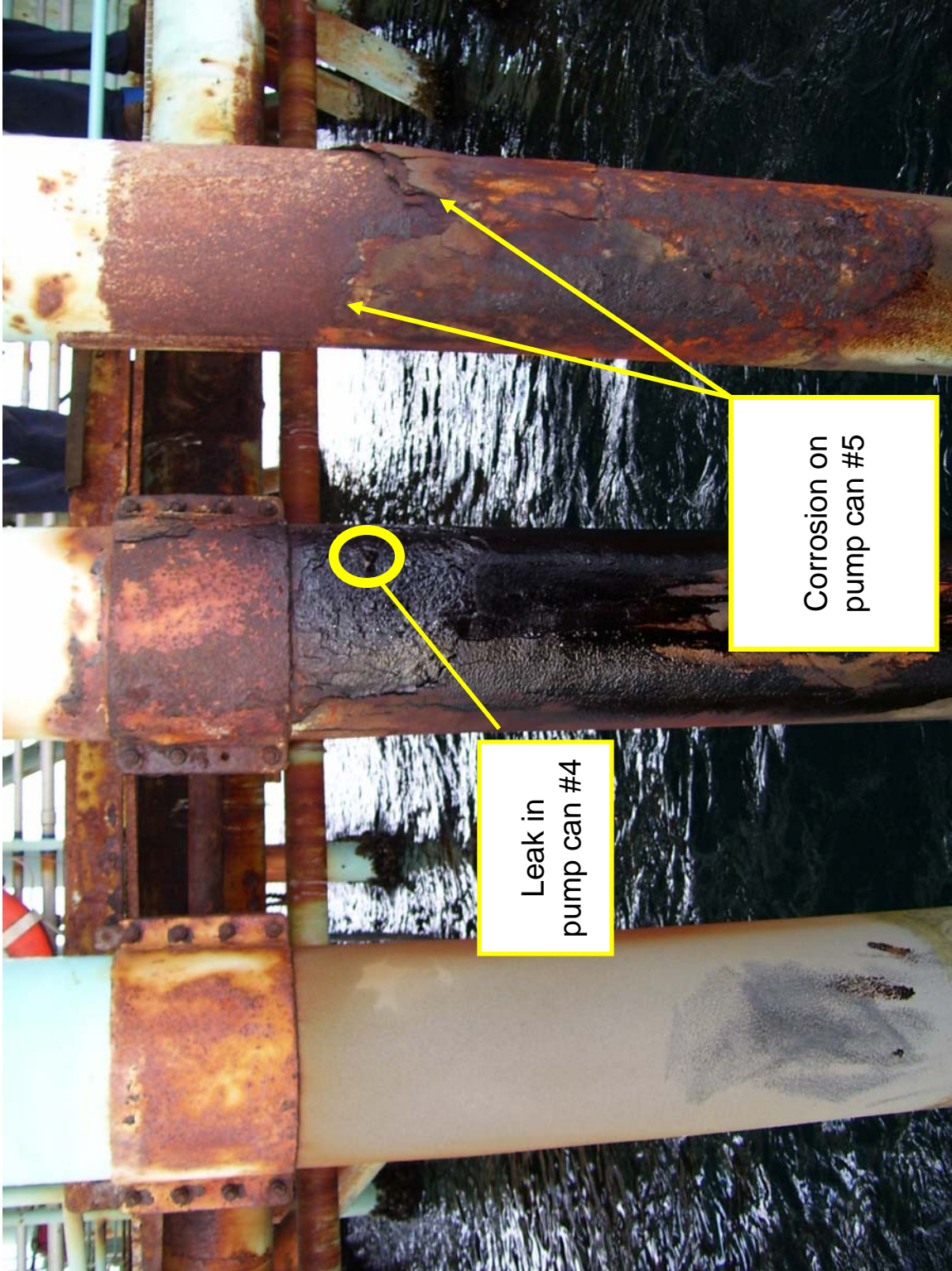
MMS should verify the existence, status, and location of all existing pump cans (or similar devices) on the OCS (Pacific and Gulf of Mexico Region). In accomplishing this, MMS should consider identifying these systems as pressurized vessels which fall under 30 CFR 250, Subpart H compliance.

MMS should consider meeting with all impacted operators and discuss immediate and long-term initiatives on decommissioning these systems.

MMS should consider working with API to develop best practices for the installation, operation, inspection, and maintenance of pump cans and/or similar systems.

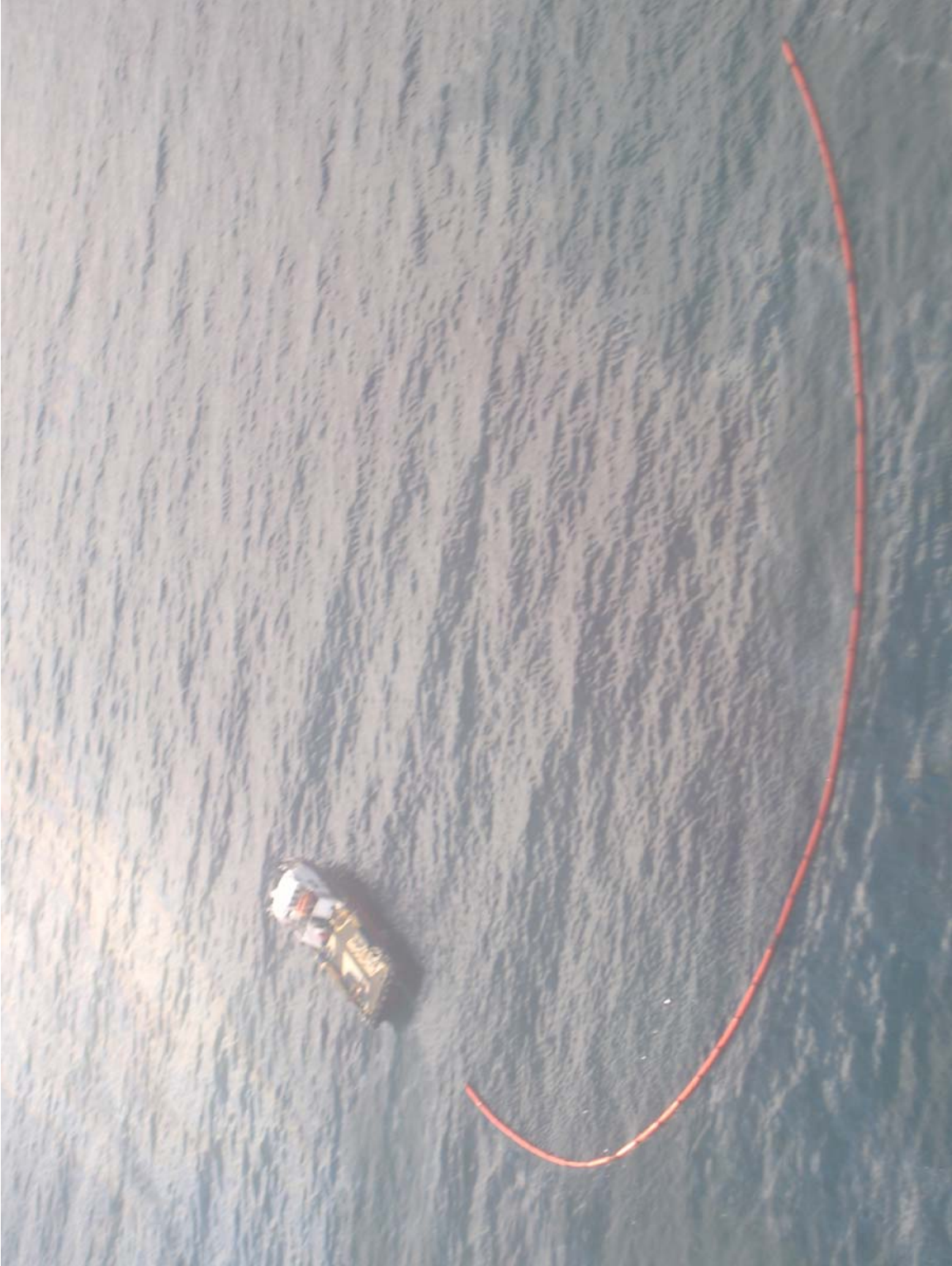


Location of Lease OCS-P 0241, Area 6B, Block 5165



Location of leak in pump can #4 and corrosion on pump-can #5

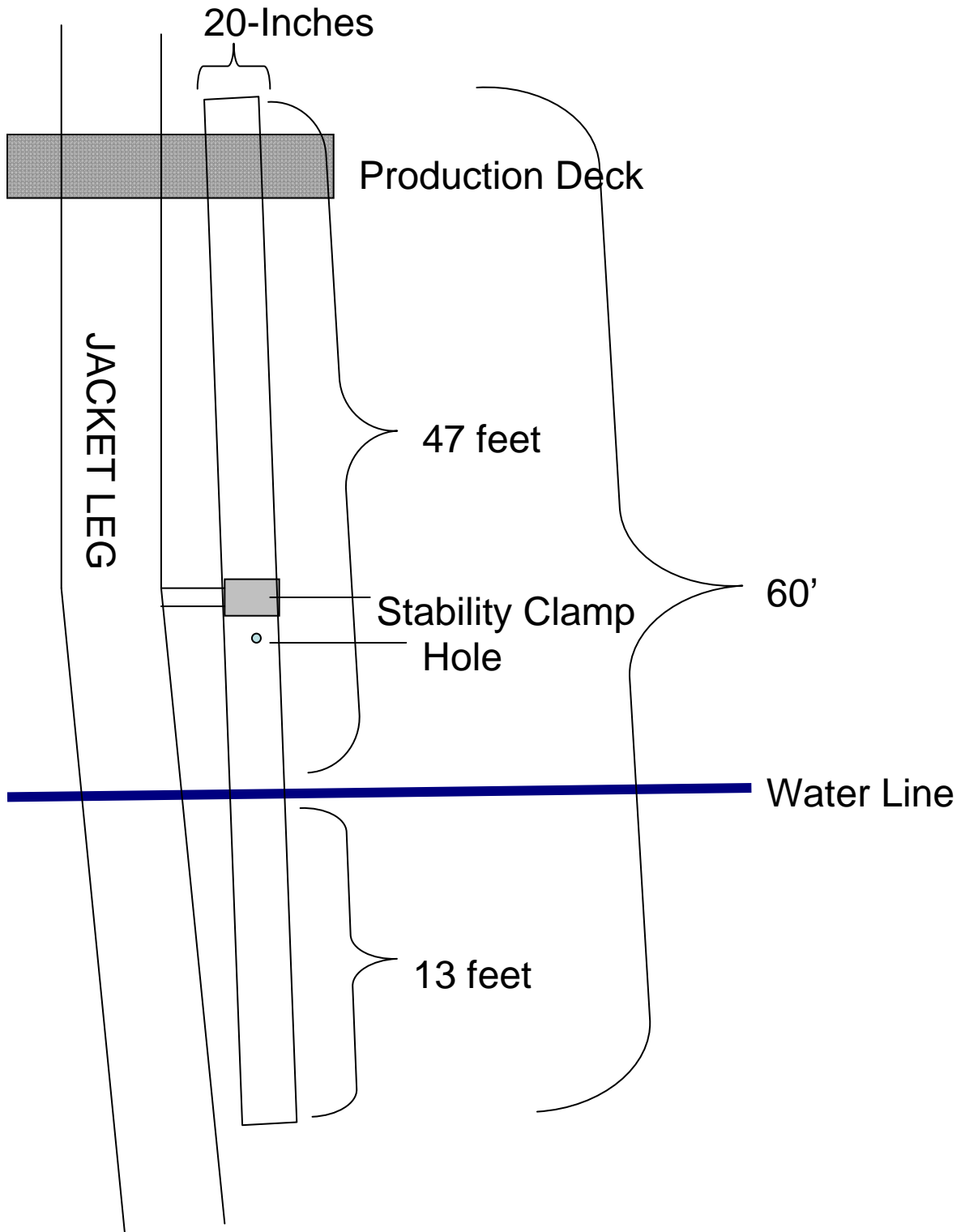
Attachment 3



Vessel response to 12/7/2008 pollution incident



Location of pump cans in relation to the platform



Pump Can Simplified Drawing



Pump Cans on Platform B and Platform C