APPENDIX C: BARREL AVOIDANCE PLAN

Shell Exploration & Production

OLYMPUS Host – MARS "B" Development

MISSISSIPPI CANYON BLOCK 807

Waste Barrel Avoidance and Release Response in the Mississippi Canyon Area

Project	OLYMPUS Host – MARS "B" Development
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Revision History is shown on next page

REVISION HISTORY

Rev #	Date of Issue	Issue Description	Originator	Reviewer	Approver
2	10/20/10	Formalized existing document into Document Mgmt program	RB Kuehn	RB Kuehn	Nilesh Popat

Summary

Contents

Purpose

This document provides expectations and guidance for avoiding, and responding to a release of the contents of, a seafloor waste barrel. The procedures below describes Shell's expectations for routine barrel avoidance, data management, and response to inadvertent release of barrel contents.

Applicability

This document applies to all ROV, anchor and other operations which could cause a seafloor barrel rupture.

Changes to this procedure must be approved by BOEMRE.[1]

Revision History

Date	Person	Revision
12/16/08	RBKuehn	Incorporated comments from MMS[2] and issued as final.
8/16/10	RBKuehn	Incorporated comment from BOEMRE[3] to include New Orleans District manager in the notification of Step 2 of the section ***Barrel Impact Reporting.*** Also revised all relevant references to MMS as BOEMRE
10/20/10	RBKuehn	➢ In Background, added in summary of suspected materials disposed at the site, based on research of the site in public records. ➢ In section on Equipment Decontamination- **Decon Procedure:** o clarified what types of detergents are preferred/allowed, using the NPDES Vessel General Permit as a guide. o Expanded on appropriate PPE and other personnel precautions o Noted a need for secondary containment as appropriate Significant changes to the text are shown in yellow shade. ➢ Added page numbers and cleaned up format. ➢ Issued as REV 2

Background

Various projects will be carried out in an area of the Mississippi Canyon known to contain barrels of chemical waste.

[1] Per MMS approval of West Boreas Supplemental Exploration Plan, MS 5231 December 16, 2008 Control No. S-07273, Lease(s) OCS-G07957, Block 762, Mississippi Canyon Area OCS-G07962, Block 806, Mississippi Canyon Area

[2] Per MMS approval of West Boreas Supplemental Exploration Plan, MS 5231 December 16, 2008 Control No. S-07273, Lease(s) OCS-G07957, Block 762, Mississippi Canyon Area OCS-G07962, Block 806, Mississippi Canyon Area

[3] Per BOEM approval of the Supplement to the Conceptual DWOP for Mars B project, 8/12/10, MS 5220

- The barrels were discharged in this area in the 1970's under government approved permits.

- The content, and its toxicity, of each individual barrel is not known. However, there are records of a wide range of industrial waste materials that were disposed in the barrels including chlorinated hydrocarbons and liquid metal salts. Below is a summary of the barrel contents based on available records.

    1. Metallic sodium and calcium; calcium oxide, sodium oxide, and inert salts.[4]

    2. 80-90% dichlorobutene, 20% organic high-boilers, and 1% quaternary ammonium salts. "Other wastes produced from the manufacture of fungicides and herbicides".[5]

- Within the area there are/could be many hundreds of waste barrels. Many of the barrels may have released their contents over time. However, an unknown number of barrels still look intact, and they may or may not still contain their original content. Also, as some of the barrels contained metal based solid waste, some of the barrels that no longer look intact may still contain some waste.

- Extensive sonar surveys of the area exist and are available for planning purposes.

Potential Hazards

Although there are no records of any issues regarding the barrels during the many years of Oil and Gas operations in the Mississippi Canyon area, the following potential hazards exist:

- Personnel exposure or equipment damage due to adherence of waste chemicals to recovered subsea equipment
- Equipment damage from sodium exposure to water (very vigorous reaction).

Normal Operations

For normal operations, all contractors and Shell employees must meet the following expectations:

1. Shell's over-arching policy is to avoid barrel contact.

2. Press releases making any reference to the chemical waste or barrels, or any incidents involving any chemical waste or barrels, will require the express written permission from

[4] EPA Permit Application No. 730D009E from Ethyl Corp, March 1, 1977, Public Notice April 20, 1977,
[5] Chapter 5 "Ocean Discharge" in the book Assessing Potential Ocean Pollutants, A Report of the Study Panel on Assessing Potential Ocean Pollutants. National Academy of Sciences, Washington DC, 438 pp. This document details DuPont's application to dispose of the following at the ocean disposal site

Shell.

3. All recorded video material is confidential and the property of Shell (standard contract provision).

   If during normal ROV operations there is a discovery of any potential archaeological resource (i.e., cannot be definitively identified as waste barrel/barrel remnant, modern debris, or refuse), any seafloor-disturbing activities in its proximity, must be stopped, the discovery must be reported to Dr. Chris Horrell at 504-736-2796, and further instructions must be obtained before proceeding.

4. Equipment Placement/Stand-off Distance
   - 4.1. A safe stand-off distance from the waste barrels is considered 10m (33ft). Care must be taken that flexible components (e.g. ROV tether, anchor lines, seismic cables) are controlled as well (e.g. don't drag through a barrel field).
   - 4.2. If a seafloor action will generate cuttings or debris, increase the stand-off distance as needed to avoid debris contact with nearby barrels.
   - 4.3. Do not investigate any barrels or remainders of barrels. Remain the minimum stand-off of 10m (33ft) at all times.
   - 4.4. Survey the anchor/pile/export locations with an ROV to ensure barrel avoidance.
   - 4.5. Record the (approximate) location of any chemical waste barrel seen, if feasible, without getting closer than the 10m (33ft) stand-off distance.

5. Contact the Shell EP Company Environmental Duty Phone for any questions or concerns. 1-504-390-1330

6. Decontamination of Equipment: In the event of contact with a barrel contents decontaminate equipment per **Decontamination of Equipment** below.

7. Make reports of barrel contact/rupture per **Barrel Release Reporting** below.

Decontamination of Equipment

1. General

In the unlikely case that contact is suspected or has been made with any wastes from a barrel, appropriate action needs to be taken to guarantee the topside safety of personnel handling the equipment (e.g. ROV, anchor lines, etc).

It is left solely to the judgment of the Person-in-Charge of the equipment/vessel to determine if it is necessary to abandon all or part of the equipment on the sea floor.

2. Decon Procedure

Based on various factors[6], Shell recommends the following:

2.1. Use the ocean to "wash" the equipment (e.g. fly an ROV for at least an hour at depth high enough above sea floor to prevent umbilical dragging or other disturbance of the sea floor). For other equipment, provide any movement through the water column that's possible, again avoiding seafloor dragging.

2.2. Retrieve the equipment to the surface, but do not bring onboard if feasible.

2.3. Hose the equipment off before retrieving onto the vessel. Use as high a water flow as is available/safe. **CAUTION**- detergent/soap may be used BUT in as low a quantity as practicable to minimize foam. Only non-toxic and phosphate free cleaners and detergents may be used. Furthermore, cleaners and detergents should not be caustic or only minimally caustic and should be biodegradable[7].

2.4. Avoid physical contact with the equipment, and keep the equipment off the vessel at this point..

2.5. Dunk the equipment back in the sea and "wash" the equipment for approximately 15 minutes.

2.6. Retrieve the equipment to the surface. Before recovering, visually inspect the equipment, umbilical, cable surfaces with binoculars for signs of corrosion, discoloration, air reaction such as fuming/smoking, or any other signs of chemical contact. Rewash and dunk the equipment as needed.

2.7. Retrieve the equipment onto the back deck. Monitor the equipment and surrounding storage area for indications of chemical contamination (corrosion, discoloration, air reaction such as fuming/smoking, etc). Establish secondary containment as necessary to collect any potentially contaminated drips.

2.8. Only essential personnel should be allowed near the equipment, once retrieved on the back deck.

2.9. While performing cleaning operations on the equipment, involving contact with potentially contaminated surfaces, personal protective equipment must be worn including, but not limited to: safety eye goggles, safety clothing such as coverall and

[6] Shell assumes, for purposes of this decontamination guidance, that:
- The most toxic material identified in the disposal area's permits and other available documents is involved . However Shell cannot guarantee there are not other toxic materials present than those identified in the permits and other documents.
- It is assumed that the materials do not chemically interact with the materials of the ROV, its tools and equipment.

[7] The NPDES General Permit for Discharges Incidental to the Normal Operation of a Vessel provides insight into managing any washing. Also, EPA provides the following definitions:
"Non-toxic" soaps, cleaners, and detergents means these materials which do not exhibit potentially harmful characteristics as defined by the Consumer Product Safety Commission regulations found at 16 CFR Chapter II, Subchapter C, Part 1500.
"Phosphate Free" soaps, cleaners, and detergents means these materials which contain, by weight, 0.5% or less of phosphates or derivatives of phosphates.

aprons, Nitrile type chemical resistant industrial-safety gloves, and PVC boots.

2.10. Wash hands thoroughly and take a shower after performing cleaning operations on the equipment.

2.11. Avoid drinking liquids or eating food in the work area.

2.12. If contamination is still suspected, consult with the Shell representatives/management for further actions including additional washing, abandonment on the seafloor, segregated storage on the boat, wrapping the equipment partially or fully in plastic sheeting, etc.

2.13. Document all actions and results in a log.

Barrel Impact Reporting

1. Initial reporting:

1.1. Equipment operator is to inform the Shell onsite representative and the Shell operations supervisor on duty.

1.2. The Shell onsite representative or the Shell operations supervisor will call the SEPCO Environmental Duty Engineer at 1-504-390-1330. As a back-up, call 337-281-0783 (Rob Kuehn).

- The call should be made at the earliest convenience.
- Be prepared to report the lat/long of the ruptured barrel (not the surface location) and water depth.

2. The SEPCO Environmental Duty Engineer will call

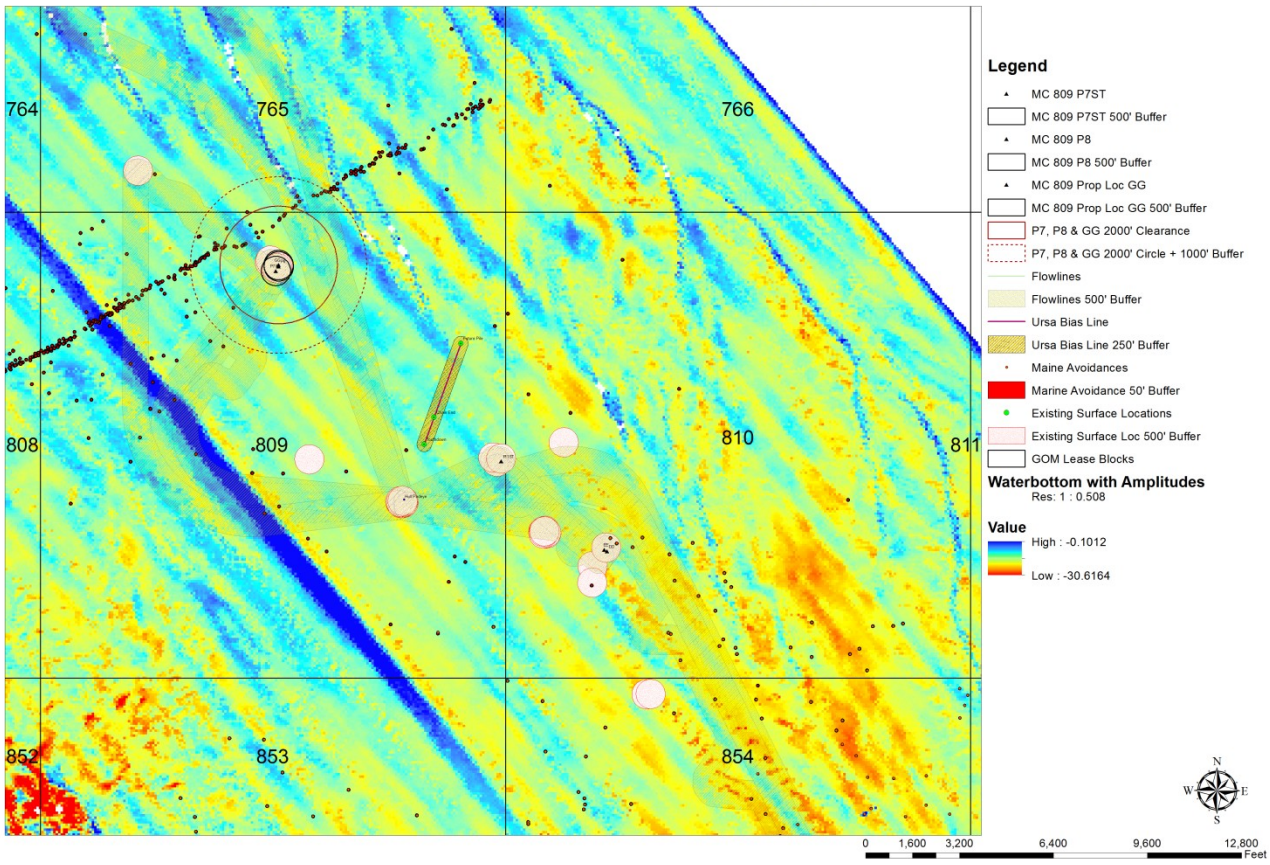
- the regulatory Affairs Duty Phone 504-782-7823,
- Mr. Broussard of the BOEMRE (504-736-3245) and
- BOEMRE New Orleans District Manager

to report the event. The call should include the lat/long and any circumstances of note.

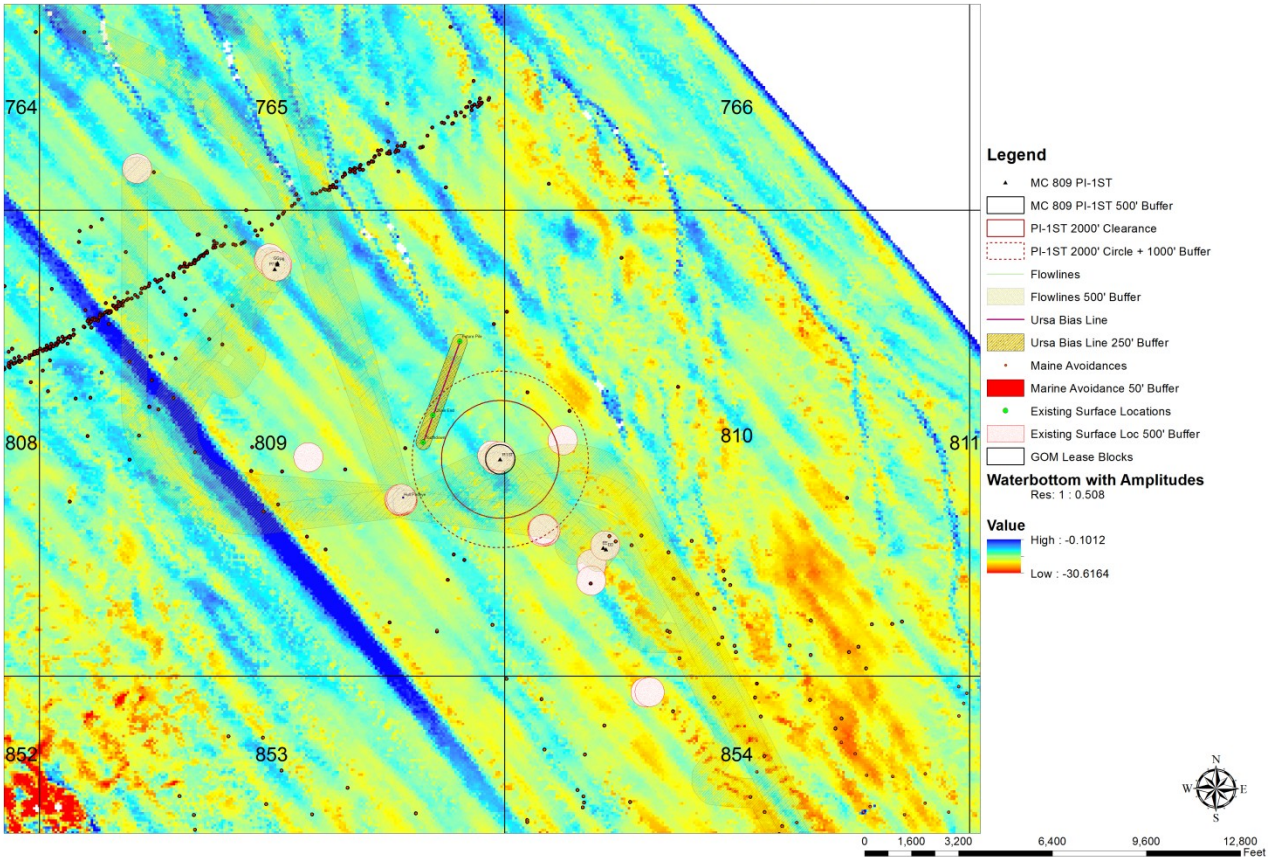
3. Follow-up Reporting
The SEPCO Environmental Duty Engineer or Rob Kuehn follows up with an email to Mr. Broussard of BOEMRE.

The BOEMRE have requested submission of a copy of whatever relevant video is available for the event period. *No dedicated* video survey is required for a barrel rupture (i.e. just be prepared to submit whatever video was obtained as normal part of the activities). BOEM has agreed we can submit any video after the project is completed.

Mississippi Canyon 809, Locations P7ST, P8 and Prop Loc GG
2000' Wellsite Clearance (and 1000' Buffer)



Mississippi Canyon 809, Location PI-1ST
2000' Wellsite Clearance (and 1000' Buffer)



Mississippi Canyon 810, Proposed Locations DD and EE
2000' Wellsite Clearance (and 1000' Buffer)