

**Investigation of Riser Disconnect and Blowout
Mississippi Canyon Block 538
OCS-G 16614 Well #2
February 28, 2000**

**Gulf of Mexico
Off the Louisiana Coast**



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David Dykes
David Trocquet
Randall Josey

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Investigation and Report

Authority

The accidental riser disconnect and subsequent uncontrolled flow during drilling operations occurred on Murphy Exploration and Production Company's (Murphy) Mississippi Canyon Block 538, Lease OCS-G-16614, Well #2 in the Gulf of Mexico, offshore the State of Louisiana, on February 28, 2000, at approximately 1445 hours. Pursuant to Section 208, Subsection 22 (d), (e), and (f), of the Outer Continental Shelf (OCS) Lands Act, as amended in 1978, and the Department of the Interior Regulations 30 CFR 250, the Minerals Management Service (MMS) is required to investigate and prepare a public report of this accident. By memorandum dated April 13, 2000, the following personnel were named to the investigative panel:

David Dykes	New Orleans, Louisiana (Chairman)
David Trocquet	New Orleans, Louisiana
Randall Josey	New Orleans, Louisiana

Procedures

On February 29, 2000, personnel from the MMS New Orleans District Office and Region office visited the Diamond Offshore Drilling Incorporated (Diamond) semi-submersible mobile offshore drilling unit *Ocean Concord* to assess the situation and began gathering information, thereby initiating MMS's investigation of the incident. The MMS personnel issued Incidences of Noncompliance (INC) E-100 and G-110.

On March 8, 2000, personnel from the MMS New Orleans District Office visited the *Ocean Concord* to see the BOP stack and LMRP connector.

The panel received various documents from Diamond and Murphy during the course of the investigation.

On August 1, 2000, Diamond submitted their final report of the accidental riser disconnect to the investigative panel.

On September 20, 2000, Murphy submitted their final report of the accidental riser disconnect to the investigative panel.

Introduction

Background

Lease OCS-G 16614 covers approximately 5,000 acres and is located in Mississippi Canyon Block 538, Gulf of Mexico, off the Louisiana coast. *For lease location, see Attachment 1.* The lease was issued effective June 01, 1996, to Murphy Exploration and Production Company (Murphy) and Callon Petroleum Operating Company. Murphy became the designated operator of the lease on May 22, 1996.

Brief Description of Accident

The *Ocean Concord* was in the process of running a liner on drill pipe when the lower marine riser package (LMRP) was inadvertently disconnected from the blowout preventer (BOP) stack. The disconnect resulted in the discharge to the sea of approximately 806 barrels of synthetic mud from the riser and 150 barrels of synthetic mud and 150-200 barrels of crude oil from the wellbore.

Findings

Response to NTL 2000-G07

- On February 22, 2000, NTL 2000-G07, Accidental Disconnect of Marine Drilling Risers, was e-mailed to Murphy representatives at Murphy's New Orleans office and was then faxed to the Murphy representative on the *Ocean Concord* on or about February 23, 2000. This NTL outlined measures to prevent the accidental disconnect of marine drilling risers. *For details of the NTL, see Attachment 2.*
- The proposed NTL modifications were discussed at the maintenance meeting held on February 28, 2000, at 6 a.m. Those present included the offshore installation manager (OIM), the subsea engineer (SSE), and the Murphy company representative. It was determined that modifications were required on all LMRP disconnect buttons.
- The BOP panels at the drill floor and the subsea accumulator panels were sequenced panels with "push and hold to activate" buttons. To disconnect the LMRP, one would have to push and hold one button while pushing the LMRP disconnect button.
- The remote BOP panel in the OIM's office is an older "Koomey" panel with a one-button release function. To disconnect the LMRP, one would only have to push the disconnect button.
- On February 28, 2000, at 9 a.m., the OIM received a call from Diamond's Houston office instructing him to get the modifications

made to the panels right away. The OIM then instructed the SSE to start installing the panel guard plates.

- The OIM did not conduct a risk assessment of the panel guards installations. He stated during Diamond's Serious Incident Review (SIR) that he had confidence in his people to do the job correctly and was more concerned by the mandate from Diamond's office to get the modifications done. Furthermore, the OIM did not complete a Permit-to-Work (PTW) for installing the panel guards.
- The Murphy company representative was unaware of the telephone conversation between the OIM and Diamond's Houston office and the directive to install the panel guards.
- The SSE had installed panel guards on the panels at the drill floor and at the subsea accumulator without encountering any problems.

The Accident

- The rig was in the process of running 1350 feet of 9 7/8 inch liner as planned in Murphy's application to drill.
- The liner was being run on 5 inch drill pipe and was approximately 1000 feet off the borehole bottom when the Riser Connector Unlatch button was inadvertently activated and the LMRP disconnected from the BOP stack.
- At the time of the disconnect, the 5 inch drill pipe was located across the BOP stack.
- The applied tension in the riser tensioning system lifted the LMRP

off the BOP stack, resulting in the discharge of 806 barrels of Novaplus synthetic mud to the seafloor.

- The decrease in the hydrostatic pressure caused by the loss of the riser mud column resulted in a pressure underbalance in the open-hole section of the well and the subsequent discharge of mud and wellbore fluids to the sea.
- The SSE was installing the panel guards on the Riser Connector function button on the remote panel at 1410 hours on February 28, 2000.
- The remote panel cover was open and the face of the panel was pulled out at the time of the incident.
- The SSE inadvertently contacted the LMRP disconnect button while he was drilling mounting holes in the BOP panel.
- The SSE was unaware of the LMRP disconnection until he heard the alarms sounding, indicating low accumulator pressure.
- The SSE stated during the Diamond SIR meeting that he did not follow any lockout/tagout procedures to de-energize the BOP control panel prior to working on the panel.
- The light bulbs for the LMRP latch/unlatch functions were burned out at the time of the panel modifications.

**Concurrent
Activity in the
OIM's Office**

The Subsea Engineer

The following information was provided to the panel by Diamond from their post-accident SIR meeting:

- The SSE stated that he did not realize it was possible to lock out the remote panel until after the incident.
- The SSE had never been to well-control training. He had worked for another contractor as a roughneck and had recently trained with both subsea engineers on the *Concord*. The SSE stated that additional training may have helped him prevent this incident. The OIM stated that this was the SSE's second hitch on his own on the *Concord*.
- The SSE stated that he knew that if the riser unlatched that there would be a loss of mud from the riser, but he did not know that the well would flow. The SSE also stated that he did not consider "any such risk prior to the job" of installing the panel guards.

Emergency Response to the LMRP Disconnect

- At 1430 hours (approximately 20 minutes after the disconnect), rig personnel attempted to lower the LMRP to re-establish connection on the BOP stack but were unable to build system pressure to latch the connector. The bottom of the 9 7/8 inch liner was pulled back into the 11 3/4 inch liner at this time. The U.S. Coast Guard was contacted and the request to use dispersant was made. Two fast-response skimming units (FRU) were mobilized to location.
- At 1530 hours, full oil flow was observed (via subsea camera) at the LMRP connection. Rig personnel energized the top packer on the

9 7/8 inch liner to isolate the liner from any flow. The oil flow slowed to a trickle and stopped. Non-essential personnel were evacuated at this time.

- From 1550 to 1750 hours, the LMRP was lowered over the BOP and several attempts were made to stab over the BOP stack with no success. Finally the problem was found to be the blind/shear ram function – not allowing system pressure to build.
- The rig was not equipped with a secondary system capable of securing the well in the absence of the primary BOP controls.
- At 1815 hours, the rig personnel attempted to latch the LMRP but they could not verify the connector latch because of poor visibility.
- At 1850 hours, the rig personnel closed the #3 Variable Bore Rams (VBR) on the BOP stack and received good indication of this function. The wedgelocks on the rams were then activated.
- Flow ceased from around the riser connector and the well was secured.

Damages

- Approximately 150-200 barrels of crude oil were released to the sea. Approximately 40 barrels of highly emulsified crude were recovered with the FRU's.
- Damaged was incurred to the BOP/LMRP connector. The LMRP connector collet showed signs of washing.

Conclusions

Causes

- The failure of the SSE to properly lockout/tagout the remote BOP control panel in the OIM's office.
- The failure of Diamond to properly train the SSE in lockout/tagout procedures and in Diamond's Permit-To-Work system.
- The failure of the OIM to conduct a job hazards analysis of the panel guard installation.
- The OIM should not have allowed any BOP control system modifications while well formations were exposed.
- The lack of a secondary system capable of securing the well in the absence of the primary BOP control. The BOP stack was not equipped with remote operated vehicle (ROV) hot-stab capability on the rams.
- The lack of communication among all responsible parties regarding the critical nature of the operations being performed at the time.

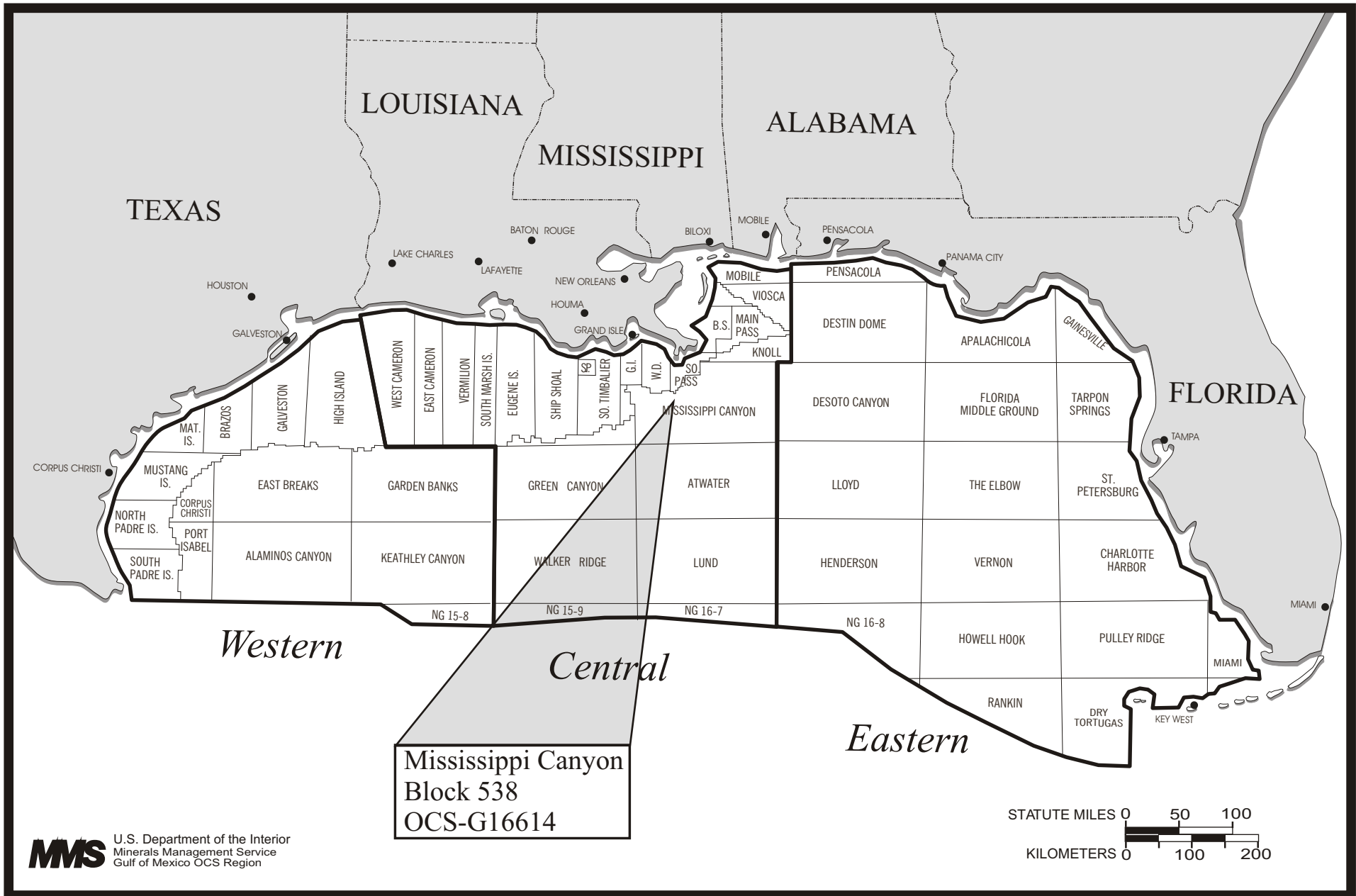
Recommendations

Safety Alert

The MMS issued a Safety Alert (No. 186 – Accidental Disconnect of Marine Drilling Risers) on March 3, 2000, regarding the subject accident. A Safety Alert was issued prior to the completion of this report because of the routine nature of the activity and the potential for similar incidents with catastrophic consequences. The panel has determined that the measures outlined in the Safety Alert are still appropriate to this incident. *For details of the Safety Alert, see Attachment 3.*

Secondary Well Security Capability

As a Condition of Approval, MMS is requiring secondary well security capability for all well operations utilizing subsea BOP stacks. This became effective October 24, 2000.



Location of Lease OCS-G 16614, Mississippi Canyon Block 538

UNITED STATES DEPARTMENT OF THE INTERIOR
MINERALS MANAGEMENT SERVICE
GULF OF MEXICO OCS REGION

NTL No. 2000-G07

Effective Date: February 22, 2000

NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL AND GAS LEASES
IN THE OUTER CONTINENTAL SHELF, GULF OF MEXICO OCS REGION

Accidental Disconnect of Marine Drilling Risers

Recently, an incident occurred on a drillship that had the potential for causing a serious well control event. An employee was attempting to conduct a function test of the blind-shear rams. However, he inadvertently pushed the lower marine riser package (LMRP) button instead of the blind-shear ram button on the control panel. Since the LMRP button was not part of the primary or emergency disconnect sequence, the pod stabs did not retract and the blind-shear rams did not close. The disconnect allowed the release of drilling mud from the riser. Fortunately, the wellbore was cased, and a well control event caused by a loss of riser hydrostatics did not occur.

Regulation 30 CFR 250.107(a) requires you to protect health, safety, property, and the environment by performing all operations in a safe and workmanlike manner. Regulation 30 CFR 250.400 requires you to take all necessary precautions to keep your wells under control at all times. Panels and processes that control important systems that are not designed to reduce the possibility of human error do not comply with these requirements.

Accordingly, to ensure that such an event does not occur while you conduct operations from floating drilling rigs, accomplish all of the following by March 17, 2000:

1. Implement measures to lock out any LMRP disconnect (hydraulic or electro-hydraulic) that is not part of a sequential disconnect process (i.e., a process that ensures that a well is secured by blind or blind-shear rams before the riser disconnects) before the BOP/LMRP enters the water. These measures can include the use of electronic exclusion switches and bolted covers. A cover that is easily removed or lifted to gain access to the LMRP release control function is not sufficient. Any computer-based LMRP disconnect function should also be equipped with an effective lock-out. The locking out of a nonsequential disconnect should not affect your ability to conduct a successful primary or emergency disconnect of the riser.
2. Ensure that your sequential LMRP disconnect process (including isolating the wellbore) is designed so that the LMRP can be disconnected only as the result of a deliberate act.
3. Implement human engineering measures such as labeling the LMRP panel button to clearly distinguish it from other functions and using warning labels.
4. Ensure that all of your floating drilling rig contractors, including those with stacked rigs and drilling rigs that are moving into the Gulf of Mexico, are aware of these safety requirements.

Paperwork Reduction Act of 1995 Statement

This NTL does not refer to or impose any information collection subject to the Paperwork Reduction Act of 1995.

Contacts

Please address any questions you may have on the content of this NTL to the appropriate MMS Gulf of Mexico District Drilling Engineer as follows:

New Orleans District, David Trocquet at (504) 736-2506
Houma District, John McCarroll at (504) 853-5892
Lafayette District, Buddy Stewart at (337) 289-5108
Lake Charles District, Larry Williamson at (337) 480-4606
Lake Jackson District, Lee Fowler at (979) 266-1004

Chris Oynes
Regional Director

Safety Alert

MMS

U.S. Department of the Interior
Minerals Management Service
Gulf of Mexico OCS Region

Safety Alert No. 186
March 3, 2000

Contact: Joe Gordon
504-736-2923

Accidental Disconnect of Marine Drilling Risers

Recently, an incident occurred on a drillship that had the potential for causing a serious well-control event. An employee was attempting to conduct a function test of the blind-shear rams. However, he inadvertently pushed the lower marine riser package (LMRP) button instead of the blind-shear ram button on the control panel. Since the LMRP button was not part of the primary or emergency disconnect sequence, the pod stabs did not retract and the blind-shear rams did not close. The disconnect allowed the release of drilling mud from the riser. Fortunately, the wellbore was cased, and a well-control event caused by a loss of riser hydrostatics did not occur.

As a result of the aforementioned incident, Notice to Lessees and Operators (NTL) No. 2000-G07 was issued regarding the accidental disconnecting of marine drilling risers. The NTL clarifies 30 CFR 250.107 (a) and 250.400 by prescribing the necessary measures to be taken to prevent the accidental disconnect of the lower marine drilling risers while conducting operations from floating drilling rigs.

Since the issuance of the NTL, a second incident occurred in which the LMRP was accidentally disconnected during an attempted implementation of the measures prescribed in the NTL. The accident occurred when an employee was attempting to install the lock-out device on the LMRP disconnect switch (button) while the rig was running a liner to set across an open hydrocarbon-bearing zone. Riser hydrostatic pressure was lost when mud escaped from the bottom of the riser. Surface control of the BOP stack was lost. Additionally, there was no remotely operated vehicle (ROV) or other intervention capability to close, at a minimum, the blind shear rams on the BOP stack.

Measures listed in the NTL or other actions that could impair the integrity of the marine riser or BOP system should not be taken when the well is vulnerable to flow. Therefore, a risk and consequence analysis should be performed prior to making the change. Further, when instituting these necessary changes, communication of current activities is critical in performing this operation safely. Time extensions for the implementation of the measures prescribed in the NTL may be granted on a case-by-case basis by the appropriate District Supervisor to allow for the safe implementation of the lock-out measures.

The MMS considers a backup BOP actuation system to be an essential component of a deepwater drilling system and, therefore, expects OCS operators to have reliable back-up systems for actuating the BOP in the event that the marine riser is damaged or accidentally disconnected. District Supervisors will be assessing current and future operations for back-up BOP actuation capabilities.