



Investigation of Loss of Well Control  
Eugene Island Block 277  
OCS-G 10744 Well A-2  
Off the Louisiana Coast  
July 6, 2001



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

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Gulf of Mexico  
Off the Louisiana Coast

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New Orleans  
July 2002

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## Investigation and Report

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**Authority** Uncontrolled flow from Well A-2 occurred aboard the platform rig *Nabors P904* during workover operations on Tri-Union Development Corporation Lease OCS-G 10744 Platform A, Eugene Island Block 277, in the Gulf of Mexico, offshore the State of Louisiana, on July 6, 2001, at approximately 1500 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 July 6, 2001, the following MMS personnel were named to the investigation panel:

|                |                                 |
|----------------|---------------------------------|
| Cliff Delouche | Lafayette, Louisiana (Chairman) |
| Tom Basey      | Lafayette, Louisiana            |
| Marty Rinaudo  | Lafayette, Louisiana            |

**Procedures** On July 7, 2001, personnel (one engineer and one inspector) from the MMS Lafayette District conducted an aerial reconnaissance of Eugene Island 277 A platform and the workover rig. The MMS and the U.S. Coast Guard (U.S.C.G) boarded Eugene Island Block 277 Platform A, where Tri-Union and contract personnel had begun cleanup operations. The MMS personnel were able to conduct onsite interviews and obtained information concerning the incident.

On July 9, 2001, an MMS engineer and inspector returned to the incident location for an update on the surveillance and cleanup efforts. The MMS personnel confirmed that the well was secured by the closure of the bottom 2-7/8 inch pipe rams, annular, and TIW valve.

On July 16, 2001, an MMS engineer and inspector-supervisor returned to the incident location for an update on the response effort.

On August 21, 2001, the Panel Members met at the MMS District Office in Lafayette, Louisiana, and the following individual was interviewed:

Jeff Janik                      Tri-Union Development Corporation

On August 28, 2001, the Panel Members met at the MMS District office in Lafayette, Louisiana, and the following individuals were interviewed:

Johnny Picard                  Quality Tubular Service

Charles Tyler                  Nabors Offshore

Aubrey Tyler                   Nabors Offshore

On October 3, 2001, the Panel Members met at the MMS District office in Lafayette, Louisiana, and the following individual was interviewed:

Bruce Falcon                   Sierra Engineering

The panel members met at various times throughout the investigative effort and, after having considered all of the information, produced this report.

## **Introduction**

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### **Background**

Lease OCS-G 10744 covers approximately 5,000 acres and is located in Eugene Island Block 277, Gulf of Mexico, off the Louisiana coast. (For lease location, see Attachment 1.) The lease was issued effective July 1, 1989, and Tri-Union Development Corporation became the designated operator of the lease on January 6, 1998. Platform A was installed in January 1990.

### **Brief Description of pack assembly using a Accident**

On July 6, 2001, while washing over a gravel 2-7/8 inch workstring, the rig crew experienced a kick. Observed pressures were 1,100 psig on the casing and 1,800 psig on the workstring. Well control operations were initiated by bull-heading into the well.

Pressure rose to 4,200 psig. The pressure safety valve (PSV) located on the mud pump relieved, allowing a mixture of formation sand, gas, and completion fluid to escape. The area around the rig equipment and drill floor became inundated with a hazardous accumulation of gas and formation sand, thus forcing all personnel to evacuate to a standby boat. Once the platform was safe for boarding, personnel secured the well by closing the TIW valve and the blowout preventer (BOP) pipe rams.

## Findings

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### Activities Prior to Loss of Well Control

#### *Planning*

**June 10, 2001** – The MMS Lafayette District approved Tri-Union Development Corporation’s request to plug back and recomple Well A-2, Eugene Island Block 277, Lease OCS-G-10744. In the Sundry Notice, Tri-Union Development Corporation proposed recompleting Well A-2 by using *Nabors P-904* rig. The well is located in 165 feet of water. Tri-Union Development Corporation anticipated removing the current gravel pack and proposed to perforate in the upper portion of the sand and re-gravel pack.

#### *Summary of Workover Operations*

**June 15, 2001** – *Nabors P-904* rig arrived on location and began offloading operations. Tri-Union Development Corporation plans were to conduct simultaneous operations after installation of the rig was completed. During workover operation one dual completed well and one single completed well would remain on line. Total production would be 75 barrels of oil and 180 MCF daily.

**June 18, 2001** – Offloading operations of rig and associated equipment were completed.

**June 19, 2001** – Using chocks and lines, the well was killed by displacing 10.0 ppg brine with 450 barrels of 8.6 ppg seawater into the tubing and casing. The BOP stack and equipment were offloaded and secured on the platform.



**June 20, 2001** – A back-pressure valve was installed in the tree and the tree was removed.

The rig crew began nipping up the BOP stack and connecting the necessary control lines to the accumulator and remote station. A function test of the surface stack and associated equipment was performed to ensure proper function and operation. Rig personnel removed the back-pressure valve and installed a two-way check valve.

**June 21, 2001** – Rig personnel tested the BOP's and surface equipment to 250 psig low and 5,000 psig high per MMS regulations. It was stated during the interview process that the mud pump PSV was exposed to a pressure of 5,000 psig. They then removed the two-way check valve from the tubing hanger and began pulling 2-7/8 production tubing. The tubing was offloaded onto the M/V *Madeline B.*

**June 22, 2001** – The 2-7/8 inch tubing pulling operation was completed.

**June 23-28, 2001** – The 2-7/8 workstring, equipped with a 5-3/4 overshot, was tripped into the hole. The fish was tagged and latched, but was unable to be jarred loose. The tubing was pulled out of the packer using 80,000 lbs. of pull weight. A circulating head was installed and 75 barrels of 8.6 ppg seawater was reversed circulated, resulting in 15 barrels of mud in the returns. The workstring was then pulled out of hole to change the bottomhole assembly and to pick up the packer retrieving tools. The bottomhole assembly and workstring were tripped into the hole. The packer was tagged, latched, and pulled free. Sixty-five barrels

of seawater was reverse circulated up the tubing. The tubing and packer assembly were tripped out of hole.

**June 29, 2001** - A BOP test (250 psig low and 5,000 psig high) was performed, and again the mud pump PSV was exposed to a pressure of 5,000 psig. The bottomhole assembly with overshot was tripped into the hole.

**June 30 – July 4, 2001** - The wellbore was cleaned down to gravel pack screen.

**July 5, 2001** - 8.6 ppg seawater was reverse circulated, the top of the fish was milled, and the well began to flow.

#### **Loss of Well Control**

**July 6, 2001** - Rig personnel experienced pit volume gains at approximately 0130 hours. The well was shut in with 1,700 psig on the tubing and 1,100 psig on the casing. The rig took on 8.6 ppg seawater and began reverse circulating the well for 2.5 hours. The well was monitored for pressure buildup for 1.5 hours. Eighteen hundred psig on the tubing and 1,100 psig on the casing were observed. Reverse-circulating began with the presence of gas, oil, and sand in the returns. The pump was shut down for 2 hours. A 15-barrel LC pill was mixed and reverse-circulated with 1,000 psig on the casing while holding 1,200 psig on the tubing. Operations were shut down to clean the platform and mud tanks. Five barrels of a 10-bbl LC pill was bullheaded with the casing being shut in at a rate of 0.5 barrel per minute at a pressure of 2,500 psig. During the bullheading process, the Nabors driller and the Tri-Union representative were located at the mud tanks, the Nabors tool

pusher was located on the koomey unit, while the Nabors derrickman was operating the mud pump (see Attachment 3). Pump pressure rose to 4,200 psig and the mud pump PSV prematurely relieved below its set pressure of 5,000 psig, thereby releasing large volumes of gas, oil and sand in the area. Attempts were made to shut the valves at the manifold, but were unsuccessful because of the close proximity of the release of well fluids around the valve manifold.

**Attempts to Stop  
Well Flow**

**July 6, 2001** - The onsite Tri-Union representative was at the mud tanks well flow when he witnessed sand, completion fluid, and gas escaping from the pressure relief valve on the discharge piping of the mud pump. The Tri-Union representative immediately instructed the crew to evacuate the platform. Once the platform was safe for boarding, personnel secured the well by closing the TIW valve and the BOP pipe rams. The Tri-Union representative, assisted by two employees of Nabors Offshore, boarded the platform, where they made their way to the rig floor. The driller positioned himself in the derrick, where he had access to close the TIW Valve. After the TIW Valve was closed, the flow from the well was stopped, and the well was secured by closing both pipe rams.

**Evacuation  
and Rescue**

**July 6, 2001** - Personnel abandonment of the Eugene Island 277 Platform A was accomplished in a safe and orderly fashion. The platform abandonment alarm was activated while personnel were exiting the top production deck, at approximately 1500 hours. Personnel exited

the platform using the northeast stairway, which led to the eastside boat landing, to board the M/V *Russell Charmine*. All but one person were accounted for prior to departing the platform. Personnel then boarded the platform to search for a galleyhand, who was found in the shower of the living quarters. All personnel were then accounted for on the M/V *Russell Charmine*.

**Subsequent  
Activities**

On July 7, 2001, the Tri-Union Spill Management Team was mobilized to respond to the incident. Representatives from Boots and Coots well control were called in for expert support. The platform and workboat M/V *Russell Chermaine* were encircled by containment booms. The M/V *AMPOL Response* was on location and equipped with a fast response unit. As reported to the National Response Center, Tri-Union estimated the spill to be approximately one barrel. After analysis of the slick size, using USCG calculations, the spill amount was determined to be 1.56 gallons. All attempts to recover any amount of oil were unsuccessful because of the small amount and area of coverage. A team of ten *AMPOL* oil spill responders was dispatched to the location to begin cleanup operations. All personnel were housed onboard the M/V *Russell Chermaine* during cleanup operations. Cleanup operations were conducted on the platform only during daylight hours. The *Nabors P-904* was removed from the platform on August 7, 2001. On August 28, 2001, the jack-up rig *ENSCO 60* was moved on location to complete the kill operations. The well was killed on September 2, 2001, and successfully recompleted on September 26, 2001.

**PSV Shear Pin Integrity**

On June 21 and 29 and possibility during other tests, the PSV shear pin was exposed to the maximum allowable working pressure of 5,000 psig. The manufacture representative's recommendation stated that repeated testing under these conditions could reduce the pin's maximum allowable working pressure through deformation of the shear pin. The PSV shear pin was not recovered and therefore not available for metallurgical testing for the purpose of determining the shear pin's integrity. The investigation revealed no evidence that the PSV shear pin had been visually inspected after being subjected to the previously mentioned test pressures.

**Damages**

The platform and rig sustained minimal damage as a result of the incident. There was no damage to the other wellheads on the platform. The main production and top deck of the platform were partially covered with sand, mud, and oil. An area of decking beneath the downward outlet piping of the PSV was cut by the sand and water that were released. Platform drains became plugged because of the volume of sand, mud, and oil that entered the drain system.

**Management**

Tri-Union Management stated that they monitored on a daily basis the daily drilling reports for correctness and talked to engineers/consultants about routine operations being conducted.

## **Conclusion**

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**The Accident**            The No. 2 mud pump PSV prematurely relieved at 4,200 psig, caused by a reduction in the maximum design working pressure of the PSV shear pin. This resulted in the release of sand, gas, and completion fluid onto the platform and into the Gulf.

**Possible Contributing Cause**            Given the unavailability of the pin for metallurgical testing, no definite conclusions can be drawn with respect to the reasons for the pin's premature failure. However, the shear pin could have prematurely sheared below the designed working pressure because of the possible deformity of the shear pin as a result of repeated pressure testing. Since a visual inspection of the PSV shear pin after the PSV's exposure to the BOP test pressure would have revealed the aforementioned deformity, an apparent failure to have done so represents a possible contributing cause of the accident.

## **Recommendations**

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### **Safety Alert**

The Gulf of Mexico OCS Region should issue a Safety Alert that contains a brief description of the accident and recommends the following:

1. PSV shear pins should be visually inspected for integrity after having been exposed to pressures at or near their relief pressures.
2. PSV's should be maintained in accordance with manufacturer's recommendations.
3. PSV's discharge should be piped to a safe location so as to minimize interference with operations.