

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCEMENT
GULF OF MEXICO REGION

ACCIDENT INVESTIGATION REPORT

For Public Release

1. OCCURRED

DATE: 19-MAY-2016 TIME: 2030 HOURS

2. OPERATOR: Chevron U.S.A. Inc.
REPRESENTATIVE:
TELEPHONE:
CONTRACTOR: TRANSOCEAN OIL INC.
REPRESENTATIVE:
TELEPHONE:

- STRUCTURAL DAMAGE
- CRANE
- OTHER LIFTING DEVICE
- DAMAGED/DISABLED SAFETY SYS.
- INCIDENT >\$25K \$243,000
- H2S/15MIN./20PPM
- REQUIRED MUSTER
- SHUTDOWN FROM GAS RELEASE
- OTHER

3. OPERATOR/CONTRACTOR REPRESENTATIVE/SUPERVISOR
ON SITE AT TIME OF INCIDENT:

6. OPERATION:

4. LEASE: G20082
AREA: GC LATITUDE:
BLOCK: 640 LONGITUDE:

- PRODUCTION
- DRILLING
- WORKOVER
- COMPLETION
- HELICOPTER
- MOTOR VESSEL
- PIPELINE SEGMENT NO.
- OTHER

5. PLATFORM:
RIG NAME: T.O. DEEPWATER ASGARD

6. ACTIVITY: EXPLORATION(POE)
 DEVELOPMENT/PRODUCTION
(DOCD/POD)

8. CAUSE:

7. TYPE:
 HISTORIC INJURY
 REQUIRED EVACUATION 1
 LTA (1-3 days)
 LTA (>3 days)
 RW/JT (1-3 days)
 RW/JT (>3 days) 1
 Other Injury

- EQUIPMENT FAILURE
- HUMAN ERROR
- EXTERNAL DAMAGE
- SLIP/TRIP/FALL
- WEATHER RELATED
- LEAK
- UPSET H2O TREATING
- OVERBOARD DRILLING FLUID
- OTHER _____

- FATALITY
- POLLUTION
- FIRE
- EXPLOSION

9. WATER DEPTH: 4240 FT.

LWC HISTORIC BLOWOUT
 UNDERGROUND
 SURFACE
 DEVERTER
 SURFACE EQUIPMENT FAILURE OR PROCEDURES

10. DISTANCE FROM SHORE: 112 MI.

11. WIND DIRECTION:
SPEED: M.P.H.

12. CURRENT DIRECTION:
SPEED: M.P.H.

COLLISION HISTORIC >\$25K <=\$25K 13. SEA STATE: FT.

On May 19, 2016 a Transocean Electrician received electrical burns to his right hand and forearm while performing maintenance on the drawworks motors. The incident occurred aboard the Transocean Deepwater Asgard which was working for Chevron USA Inc.

The Injured Person (IP) was preparing to conduct a megger test at the time of the incident as part of the rig's yearly preventive maintenance program (PM). The megger test is a method of testing the integrity of electrical wires and components by applying voltage to the desired components and measuring it's resistance to flow. This test will detect if there is any leakage of electricity that otherwise may go undetected by other test methods. With the megger test, it is possible to detect deteriorated wires, bad motors, generators, transformers, etc... prior to components actually failing.

On the day of the incident, rig management met and agreed the PM for the megger test on the drawworks motors would be conducted that evening once the well was in a safe state. During this meeting, procedures Rig Recommended Practice (RRP) DGD-543 and Written Work Assessment (WRA) DGD-1121 were approved to be used in order to complete the PM, and a Level 2 Energy Isolation (lock-out/tag-out) was going to be required. However, following the meeting the Electrical/Electronic (E/E) Supervisors agreed that the approved RRP and WRA were inadequate and needed to be revised. They knew that the Original Equipment Manufacture's procedure (OEM) had been used successfully for similar tasks and the OEM's procedure was less intrusive, so they decided to instruct the crew to use the OEM's procedure, Siemens Blue Drive 908.4401.09.1A.

On the evening of the incident, the E/E Supervisors instructed the IP and Chief Electrician to perform the PM that evening and also to follow the OEM Siemens Blue Drive procedure instead of the approved RRP and WRA. They were also instructed to update the rig's RRP and WRA after they completed the PM, based off of the OEM's procedure. Neither had ever completed this task before, but the IP had performed similar isolations in this electrical panel.

Around 1900 hours the IP completed the "Energy Isolation Certificate" and the "Try to Operate" paperwork and posted it on the Bridge. Around 2045 hours the IP and Chief Electrician reported to the Mud Module Electrical Room to begin the PM. They discussed the Siemens Blue Drive Procedure and agreed to work in adjoining cabinets and megger two inverters at the same time, with the IP calling out the procedure for both to follow.

They proceeded to switch the breakers from automatic to manual mode to prevent anyone from accidentally operating the breakers while they were working in the cabinet. At this point, they believed the breaker to be open (which would de-energize the cabinet). However, in order to actually open the breaker in manual mode a special tool is required to be inserted into the breaker and turned until the breaker is open. The Siemens Blue procedure did not mention the need for this tool to be used in order to open the breaker (nor did the RRP and WRA). The IP then viewed the Human Machine Interface (HMI) for the panel and observed no voltage present. He interpreted this to mean that the system was de-energized and they proceeded with the procedure. This observation would prove to be a misinterpretation of the system. The HMI was reading zero voltage because the drawworks were sitting idle. Had the drawworks been moving, voltage would have been observed. They considered using a multimeter to test the voltage across the busses, but their meter was only good for up to 1000 volts, and the voltage of the busses was known to fluctuate above 1000 volts. Other equipment to check for voltage above 1000 volts was available but they did not take the time to acquire the equipment. At this point a padlock should have been applied to the breaker in accordance with the Level 2 isolation requirements and the Siemens

Blue Drive Procedure, but the IP and Chief Electrician decided not to apply a lock. Had they attempted to apply the lock, they would have known the breaker was still closed (energizing the cabinet) because the lock can only be applied when the breaker is in the open position. Furthermore, only the Offshore Installation Manager (OIM) can give permission to deviate from isolation requirements, and he was not aware of their decision to not follow Level 2 Isolation requirements.

The Siemens Blue Drive Procedure called for a jumper wire from the positive to negative DC bus bar. When the IP made this connection, the jumper short circuited the 1000 volt DC bus which resulted in an arc flash that burned the IP's hand and forearm. The moment the bus arced out, the lighting on the rig turned off and immediately back on. The on tour E/E Supervisor went to the bridge to investigate the lighting flicker and learned that the breakers the IP and Chief Electrician should have opened to conduct their PM were still closed. Knowing they were working in the area, the E/E Supervisor traveled to the work area to check on the IP and Chief Electrician.

Upon arrival the E/E Supervisor asked if anyone was injured, to which both the IP and Chief Electrician both denied any injuries. They then began discussing the incident and assessing equipment damage. To discuss a plan forward they relocated to the Maintenance Office and during this discussion the E/E Supervisor noticed the IP appeared to be in pain. At this time the IP confessed that he was experiencing pain in his hand and forearm. The IP was taken to the Rig Hospital to initiate treatment and the OIM and Chevron Drill SIGHT Manager (DSM) were notified of the incident. At this time it was decided that the IP should be evacuated for further evaluation. The IP was treated for radiant heat burns and placed on restricted duty for one week.

Multiple decisions lead to this incident. The procedures that were initially agreed to be followed in order to complete the task were found to be inadequate by the E/E Supervisors, so they instructed the IP and Chief Electrician to use the OEM Siemens Blue procedure. The change in procedure was not adequately evaluated for hazards or thoroughness by the E/E Supervisors, the IP, or the Chief Electrician prior to starting the PM. The tool required to be used in order to open the breaker in manual mode was not mentioned in any of the procedures for meggering the drawworks. The IP and Chief Electrician had not completed this task previously, and no one was present at the worksite with sufficient experience to properly isolate the circuit. They decided not to follow the approved Level 2 isolation requirements which required a lock to be installed on an open breaker. Had this procedure been followed, it would have been discovered that the breaker was closed and the circuit was energized. The IP filed the "Energy Isolation Certificate" and "Try to Operate" an hour and a half prior to actually doing the work, which should not have been done until the breaker was isolated and verified to be isolated by testing the system during the task.

18. LIST THE PROBABLE CAUSE(S) OF ACCIDENT:

- Neither the IP nor the Chief Electrician had performed this job before, and they did not have supervision with them to instruct them how the task should be properly done.

- Inadequate work instructions and procedures.
- Failure to follow proper lock-out/tag-out procedures (Level 2 Isolation).

19. LIST THE CONTRIBUTING CAUSE(S) OF ACCIDENT:

- Failure to adequately evaluate the change in procedures for hazards and thoroughness.
- Failure to notify supervisors when changes in procedure were made.

20. LIST THE ADDITIONAL INFORMATION:

*There was another procedure available on the rig for isolating the drawworks at the time of the incident, RRP-DGD-422. This procedure was not known to anyone among the rig's crew at the time of incident, and this procedure was still inadequate in that it also did not specify the need for a special tool to open the breaker in manual mode.

21. PROPERTY DAMAGED:

Electrical Cabinet

NATURE OF DAMAGE:

electrical components shorted out and burned from arc flash

ESTIMATED AMOUNT (TOTAL): \$243,000

22. RECOMMENDATIONS TO PREVENT RECURRANCE NARRATIVE:

BSEE Houma District has no recommendations for the Office of Incident Investigations at this time.

23. POSSIBLE OCS VIOLATIONS RELATED TO ACCIDENT: YES

24. SPECIFY VIOLATIONS DIRECTLY OR INDIRECTLY CONTRIBUTING. NARRATIVE:

A G-110 INC was issued on July 7, 2016 as follows:

On May 19, 2016 a Transocean Electrician received electrical burns to his right hand and forearm while performing maintenance on the drawworks motors. The injuries were received while attempting to conduct a megger test of the drawworks motors. The following items were identified as root causes of the incident:
1) Neither the IP (injured person) nor the Chief Electrician had had performed this job before, and they did not have supervision with them to instruct them how the task should be done.

2) Inadequate work instructions and procedures.

3) Failure to follow proper lock-out/tag-out procedures (Level 2 procedures).

For Public Release

A letter of explanation must be submitted along with the signed INC within 14 days, detailing how this INC has been corrected and how future occurrence will be prevented.

25. DATE OF ONSITE INVESTIGATION:

24-MAY-2016

26. ONSITE TEAM MEMBERS:

**Paul Reeves / Clint Campo / Josh
Ladner /**

29. ACCIDENT INVESTIGATION

PANEL FORMED: **NO**

OCS REPORT:

30. DISTRICT SUPERVISOR:

Bryan Domangue

APPROVED

DATE: **17-AUG-2016**