

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: 29-AUG-2021 TIME: 0300 HOURS

2. OPERATOR: Shell Offshore Inc.

REPRESENTATIVE:

TELEPHONE:

CONTRACTOR: NOBLE DRILLING CORPORATION

REPRESENTATIVE:

TELEPHONE:

- STRUCTURAL DAMAGE
- CRANE
- OTHER LIFTING
- DAMAGED/DISABLED SAFETY SYS.
- INCIDENT >\$25K Damage due to Hurricane Ida.
- H2S/15MIN./20PPM
- REQUIRED MUSTER
- SHUTDOWN FROM GAS RELEASE
- OTHER Lost Object(s)

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

8. OPERATION:

4. LEASE: G05868

AREA: MC LATITUDE:

BLOCK: 809 LONGITUDE:

- PRODUCTION
- DRILLING
- WORKOVER
- COMPLETION
- HELICOPTER
- MOTOR VESSEL
- PIPELINE SEGMENT NO.
- OTHER Suspended Ops - Hurricane Ida

5. PLATFORM:

RIG NAME: NOBLE GLOBETROTTER II

6. ACTIVITY:

- EXPLORATION (POE)
- DEVELOPMENT/PRODUCTION (DOCD/POD)

9. CAUSE:

7. TYPE:

INJURIES:

- HISTORIC INJURY
- REQUIRED EVACUATION
- LTA (1-3 days)
- LTA (>3 days) 1
- RW/JT (1-3 days)
- RW/JT (>3 days)
- FATALITY
- Other Injury

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

- POLLUTION
- FIRE
- EXPLOSION

- LWC
- HISTORIC BLOWOUT
 - UNDERGROUND
 - SURFACE
 - DEVERTER
 - SURFACE EQUIPMENT FAILURE OR PROCEDURES

- 10. WATER DEPTH: 3630 FT.
- 11. DISTANCE FROM SHORE: 81 MI.
- 12. WIND DIRECTION:
SPEED: M.P.H.
- 13. CURRENT DIRECTION:
SPEED: M.P.H.
- 14. SEA STATE: FT.
- 15. PICTURES TAKEN:
- 16. STATEMENT TAKEN:

COLLISION HISTORIC >\$25K <=\$25K

INCIDENT SUMMARY

The Noble Globetrotter II Drillship was conducting Temporary Abandonment (TA) operations in Mississippi Canyon (MC) Block 809. The Drill crew unlatched the Lower Marine Riser Package (LMRP) from the Blowout Preventer (BOP) connected to the P012 well and tried to "drift and pull riser to evade" Hurricane Ida. The Drillship, with 115 Personnel onboard (POB), was unsuccessful in their evacuation attempt and sustained over 100 mph Hurricane force winds and high/rough seas for several hours. The incident resulted in a Pollution event, Loss Time Injury, vessel damage, equipment damage, and loss of 11 marine riser joints and LMRP.

OPERATOR'S INITIAL "STATUS" REPORT TO BSEE

On Sunday August 29, 2021, a Shell Offshore Inc. (Shell) representative on-board the Drillship sent an email to the BSEE New Orleans District after hours engineer reporting "what we currently know" about current conditions;

1. 3 injuries requiring First Aid treatment
2. Well was TA'd as verbally approved and LMRP was unlatched and suspended below the rotary - the Rig lost electrical communication with the LMRP ~03:00 am.
3. There is marine debris but no inventory available as the conditions remain too high to assess.

On Monday August 30, 2021, members of the BSEE Lafayette District Well Operations Section called the same Shell Representative for a status update. The following summarizes what was reported:

1. The well is currently secured with an RTTS packer set and tested. The Sub-Sea Blow Out Preventer (SSBOP) was left on the well the Blind Sheer Rams (BSRs) closed and locked.
2. Riser was displaced on 8-27-21 at 0630
3. LMRP was unlatched and the NGT II made it to safe zone and began to pull riser. Problems encountered while removing riser bolts.
4. Pulling riser until 8-28-21, decision made to stop pulling riser and hang off 12 riser joints and the LMRP.
5. Trying to evade Hurricane Ida 0.5 knots, increased speed to 3.0 knots and the NGT II was losing ground against the winds/waves.
6. On 8-29-21 at 0130 NGT II was being pulled back towards Hurricane Ida and thought they may have lost the LMRP and riser at that time.
7. Currently cofferdam around moon pool has water and will be checked for damage.
8. Rig is located in a safe area, MC 422 and remain here to access all damage.

BSEE INVESTIGATION

The BSEE Investigation consisted of reviewing electronic and written material, including but not limited to bridging documents, International Association of Drilling Contractor (IADC) reports, Operator daily activity reports, operator and contractor policies and procedures, and other records related to management systems. The BSEE Investigator visited the Drillship while docked in Pascagoula Mississippi and conducted multiple interviews with offshore and office personnel associated with the MC 809 and Drillship operations. The following is a report of the investigation findings:

WELL OPERATIONS & WEATHER REPORTS

On August 6, 2021, the Drillship started a well Completion in a water depth of 3630 feet. The drill crews were working 24 hours and encountered setbacks throughout the operation requiring Shell to submit several requests to modify the original permit and procedures.

On August 20, 2021, Shell Regulatory submitted a 4th Revised Permit to Modify (RPM) due to being unable to pump out of the frac sleeve during a Frac-n-pack operation. The RPM included steps for the recovery of the lower completion assembly and installation of a new lower completion assembly to allow for a frac-n-pack across the targeted E4 sand. The procedure also reflected a subsea tree installation instead of a dry hole tree because of a continuous loop current affecting the operation.

On August 22, 2021, the 18 3/4" BOP was latched to the Tubing Head Spool (THS) on the P012 wellhead. Pressure tests were completed, and all BOP functions were made from the driller's panel. The Drill crew Rigged down (RD) riser running equipment and Rigged up (RU) drill pipe (DP) handling equipment. They then ran in hole (RIH) with a packer retrieval tool on 5 7/8 DP.

On August 23, 2021 the Drillship continued with well operations. Shell and Noble Corporation (Noble) leadership, both on the Drillship and onshore, were monitoring tropical wave weather advisories by multiple weather service providers. One weather advisory showed a system very favorable for tropical development but "Model guidance is wanting to place it mostly in the Bay of Campeche, but confidence remains low on this system as there is not a yet trackable feature." An afternoon advisory showed "Long term, there remains at least a low chance for potential development of this system in the Bay of Campeche or western Gulf of Mexico early next week." with 7-day development potential 30% for both Tropical Depression/Tropical Storm.

Noble also started their T-Time & Evacuation Reports.

- According to Noble's Extreme Weather Plan, T-time is the time, in hours, for the rig to safely secure the well and evacuate/evade. The activation point depends on the rig-specific timelines to accomplish certain operational goals for securing the rig and well, relative to the forecasted arrival of an extreme weather event at a rig's location (sustained tropical-storm-force-winds = 34 knots).
- According to Shell's Gulf of Mexico Hurricane Plan, T-time is the amount of time that the asset (Platform, rig etc.) requires to suspend work, secure equipment & stabilize the asset, in order to finalize the evacuation of personnel before loss of favorable flight conditions. T-Time 0 = Shut in & personnel off the asset (or completed sail away such that they are currently at safe distance from hazardous Weather).

Noble's T-Time & Evacuation Report for August 23rd showed 75 hours to safely secure the well and 12 hours to evacuate/evade. Noble added a 20% contingency showing 90 hours to safely secure the well and 14.4 hours to evacuate/evade. Total 104.4 hours

On August 24, 2021, the Drill crew RIH with wash-over Bottom Hole Assembly (BHA) to Measured Depth (MD) and tagged the top of the shear joint. The Drill crew then started rotating while washing through a centralizer joint to tag the sump packer.

The morning and evening weather reports listed the disturbance "has the greatest potential to impact the land, with western Gulf of Mexico being the target as it tracks through the Caribbean over the next few days." The 7-day Development Potential showed 50% chance of Tropical Storm or Tropical Depression and 20% chance of Category

1 & 2 Hurricane.

The afternoon weather reports listed the 7-day Development Potential showed 60% chance of Tropical Storm or Tropical Depression and 10% chance of Category 1 Hurricane.

Noble's T-Time & Evacuation Report for August 24th showed 87 hours to safely secure the well and 12 hours to evacuate/evade. Noble added a 20% contingency showing 104.4 hours to safely secure the well and 14.4 hours to evacuate/evade. Total 118.8 hours

On August 25, 2021, the Drillship crew continued with well operations tripping in cased hole with wash-over assembly and pumped a HEC (hydroxyethyl cellulose) pill to minimize losses and then tripped out of hole.

According to Shell Representatives, the Gulf of Mexico (GOM) Hurricane Team was activated along with their GOM Tropical Weather/Hurricane Plan Phase II (Alert).

Noble's T-Time & Evacuation Report for August 25th showed 94 hours to safely secure the well and 12 hours to evacuate/evade. Noble added a 20% contingency showing 112.8 hours to safely secure the well and 14.4 hours to evacuate/evade. Total 127.2 hours

One afternoon weather advisory noted the now Tropical Disturbance "has potential to bring significant impacts to the Gulf of Mexico this weekend." The advisory listed "Due to the lack of a low-level circulation center, the track and intensity forecast remains at a below average confidence. Once formation occurs, potentially on Friday, confidence is expected to increase. Despite the lower confidence, significant impacts to the GoM appear likely." The 7-day Development Potential showed 80% chance of Tropical Storm or Tropical Depression and 60% chance of Category 1 Hurricane with 30% Category 2 Hurricane.

An afternoon communication to Noble personnel showed Noble leadership had a low confidence in the forecast. However, the forecast copied into this same email noted "There remains the potential for further adjustments to the forecast track at this time. However, the intensity forecast has increased in confidence with a favorable environment likely leading to a hurricane impacting the Gulf of Mexico between 95W and 90W on Sunday and Monday." The Noble Globetrotter II Drillship status was listed as "Currently on the edge of the gale forces - Plan to stay if track holds"

The Noble Globetrotter II continued well work throughout the night even though the T-time calculations put them within the potential cone of an extreme weather event and the weather event continued to worsen.

TEMPORARY ABANDONEMENT

During interviews, Shell personnel said that every well operation has a TA permit available when the operation starts and the request is ready to use, as needed. However, with T-time reports calculations already in the negative. Shell and Noble said the "joint decision" to TA the well was made the morning of August 26th. Shell Representatives also said their GOM Hurricane Team moved to Phase III (Response) on August 26th and started a "reduction of non-Essential personnel" per the GOM Hurricane Response Plan.

On August 26, 2021, one of the morning weather advisories listed the tracked storm "becoming a hurricane around Sunday evening or early Monday morning before making landfall as a possible hurricane by late Monday into early Tuesday."

The 06:30 am T-Time & Evacuation Reports for August 26th showed 100 hours to safely secure the well and 12 hours to evacuate/evade. Noble added a 20% contingency showing 120 hours to safely secure the well and 14.4 hours to evacuate/evade. Total 134.4

hours

A 9:52 am communication sent out by Noble Leadership, informed personnel Alert level 1 criterion had been met and the vessels (Globetrotter II included) were beginning steps to prepare for TA and storm evasion. This notification showed a separate T-time for the Drillship T-time 103.2 hr. (with 14hr Evac)

According to Noble's Extreme Weather Plan, Alert Level 1 was a "Monitor and Preparation" phase with an "Activation Point" Decision Time (F) = 96 hours. Note: Decision Time (F): The amount of time before T-time is reached using forecasted model guidance.

At approximately 11:34 am, a Shell Regulatory representative sent the BSEE New Orleans District an email request to TA the well. The plan proposed by Shell showed:

- RIH and set RTTS packer and storm valve with tail pipe.
- Positive test RTTS packer for 15 mins. Release setting tool from RTTS packer.
- Perform a negative test equivalent to 200 psi below seawater gradient at the mudline. POOH.
- Close upper and blind shear rams
- Displace marine riser, choke, kill, and boost line to seawater.
- Unlatch LMRP and pull BOP riser to surface
- Depart location and evade storm as necessary

A BSEE New Orleans District Engineer approved the request at approximately 1:00 pm

One of Noble's afternoon weather reports showed a now Tropical Depression with potential to bring "significant impacts to the Gulf of Mexico" and "there is good confidence in Tropical Depression Nine developing into a hurricane as it enters the central Gulf of Mexico with the latest forecasts peaking as a Category 2 hurricane. The 7- day Development Potential showed 100% chance of Tropical Storm or Tropical Depression and 90% chance of Category 1 Hurricane, 80% Category 2 Hurricane, 60% Category 3 Hurricane, 20% chance of Category 4 Hurricane, and 5% Category 5 Hurricane.

The 06:00 pm T-Time & Evacuation Report showed 65 hours to safely secure the well and 12 hours to evacuate/evade. Noble added a 20% contingency showing 78 hours to safely secure the well and 14.4 hours to evacuate/evade. Total 97.2 hours (Note: Noble sent out two T-time calculations for August 26th).

An 8:02 pm Noble communication informed personnel Alert level 2 criterion had been met. The status for the Noble Globetrotter II was listed as T-time 103 hrs. (with 14 Evac (12hr + 20%))

Noble's Extreme Weather Plan Alert Level 2 Procedure also requires evacuation of Non-essential personnel from the Noble Globetrotter II. However, Shell and Noble representatives said the intent of the Noble Globetrotter II is not to evacuate non-essential personnel, but rather for the Drillship to evade/evacuate the Extreme Weather Event.

The Drill crew continued TA operations throughout the night.

On August 27th 2021 at approximately 05:00 am, Noble T-Time & Evacuation Report showed 52 hours to safely secure the well and 12 hours to evacuate/evade. Noble added a 20% contingency showing 62.4 hours to safely secure the well and 14.4 hours to evacuate/evade. Total 76.8 hours -49 hours Decision Time. This meant the operation was hours behind in the attempt to successfully evacuate/evade. Note: Noble's definition of Decision Time (D)= The Amount of Time Before T-Time is Reached in a Direct Path

Scenario.

A 5:00 am Bulletin from the National Weather Service (NWS) showed a Hurricane watch was in effect from Cameron, Louisiana to the Mississippi/Alabama border.

At approximately 06:34 am, the Drill crew unlatched the LMRP from the P012 well and drifted to the "Safe Zone". This "Safe Zone" was pre-selected as part of the drilling operation and not updated based on current weather reports and potential extreme weather conditions.

Despite current conditions and T-Time & Evacuation Reports showing potentially not enough time to secure and evacuate/evade, Shell and Noble supervisors made a decision to conduct a crew change with the first of 4 helicopters arriving at approximately 07:52 am. The last crew change helicopter departed around 3:00 pm and flew from the Globetrotter II to the Olympus TLP to evacuate personnel as part of a "reduction of Non-Essential personnel". Note: The nearby Ursa TLP (MC 809) with 113 Personnel on Board (POB) and Olympus TLP (MC 807) with 130 POB fully evacuated by August 27th.

During interviews, Noble employees mentioned the crew change delayed the TA operation for several hours. The drill crew on tour was allegedly working shorthanded with only one crane operator assigned to two cranes. The crane operator was also part of the helicopter landing crew and had to leave the drill floor to work crew change arrivals and departures. The delay, coupled with an already depleted drill crew on tour, was not noted in the IADC or Shell's Morning Reports. The IADC report also listed personnel assigned working on tour, but the crew change flight logs identified the same personnel as arriving on the Shell-contracted helicopters. Per these same reports, the drill crew continued throughout the evening with preparations to pull the riser and LMRP.

On August 28th at approximately 01:00 am, the Drill crew started pulling riser. The IADC reports show the "rig was underway at 03:00 for tropical storm Ida avoidance" with the Drill crew continuing to pull riser.

Noble's T-Time & Evacuation Report for August 28th showed 25 hours to safely secure the well and 12 hours to evacuate/evade. Noble added a 20% contingency showing 30 hours to safely secure the well and 14.4 hours to evacuate/evade. Total 44.4 hours -29 Hours Decision Time.

During interviews, a Noble employee relayed over-torqued bolts connecting marine riser joints and hydraulic torque wrench breakdowns further delayed the riser pull operation. The Drill crew had to find parts for hydraulic torque wrenches and ended up bringing hydraulic wrenches from the aft drilling setback area and installing them on the main drill floor.

Noble's IADC report and Shell's Morning Reports show the riser pull operation stopped at 7:15 pm and the rig was again underway to avoid Hurricane Ida. Shell's report on Monday August 30th (Post incident) showed "a decision was made, at approximately 7:00 pm to stop pulling riser and hang off 12 riser joints and the LMRP."

However, interviews revealed that at approximately 7:00 p.m., the Drillship Captain, in his duty as Ultimate Work Authority (UWA), initiated Stop Work during the riser pull operation with 12 riser joints and LMRP still under the rotary. The Drillship then increased speed in an attempt to avoid Hurricane Ida's path while the crane crew installed riser bay hatches and the Drill crew secured the rig floor. The Drillship was maneuvering at speeds between 1-3.5 knots but was unsuccessful in evading Category 2+ Hurricane force winds and sea. Note: According to Noble's Stop Work Requirements, Ultimate Work Authority (UWA): The Ultimate Work Authority (UWA) is the person in charge of the vessel/facility and is responsible for ensuring work stoppages occur in

an orderly and safe manner. This authority should only be utilized if a job is stopped due to imminent risk or danger. The UWA has the ability to decide work can resume once an imminent risk no longer poses a threat to any persons or the environment. A rig move notification was submitted in the BSEE eWell reporting system, but neither the operator nor contractor notified the BSEE New Orleans District or Hurricane COOP Team that the Drillship, which included 115 personnel onboard, would be unsuccessful in evacuating from severe Hurricane conditions.

It is not documented on any Noble IADC or Shell Morning Reports, but it is estimated the 11 joints and LMRP broke away from the Drillship and fell to the sea floor the morning of August 29th. Shell also estimated over 1 million dollars in damage to the Noble Globetrotter. The Drillship docked at a Shipyard in Pascagoula Mississippi to assess damages and start repairs.

POLLUTION EVENT

The Noble Globetrotter II spilled approximately 3700 gallons of misc. oil into the Gulf of Mexico during this event. Shell reported 15 tote tanks on deck overturned and released misc oils. Noble reported the release to the National Response Center (NRC) as a "discharge of unknown amounts of lube oil and hydraulic oil."

LOSS TIME INJURY

Shell reported one Loss Time Injury that occurred while the drillship was trying to evade Hurricane Ida.

NATIONAL WEATHER SERVICE LINKS FOR TRACKING IDA INFORMATION

Tropical Weather - <https://www.weather.gov/lch/2021Ida>

Hurricane IDA Advisory Archive - <https://www.nhc.noaa.gov/archive/2021/IDA.shtml>

NWS LIX - Hurricane Ida Event page - <https://www.weather.gov/lix/hurricaneida2021>

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

- Maneuvering through Category 2+ Hurricane winds and high seas with 12 joints of marine riser and LMRP hanging from the Drillship eventually broke the riser just below the rotary sending approximately 11 riser joints and LMRP to the sea floor.

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

- The Operator and Contractor monitored storm forecasts waiting on notification of a direct path rather than following operational T-times already calculated relative to current well operations and potential Extreme Weather Event.
- Inadequate Planning prevented the drill crew from pulling marine riser and LMRP in time for the Drillship to evade/evacuate Hurricane Ida.
- The decision to crew change during the TA operation with weather approaching delayed an operation already hours behind schedule and resulted in a failed evacuation/evade attempt.
- Hydraulic Torque Wrench breakdowns and stuck riser bolts delayed pulling riser and LMRP.

20. LIST THE ADDITIONAL INFORMATION:

21. PROPERTY DAMAGED:

NATURE OF DAMAGE:

Marine Riser, LMRP, several pieces of equipment, tote tanks etc.

The vessel also had structural damage.

ESTIMATED AMOUNT (TOTAL): \$1,000,000

22. RECOMMENDATIONS TO PREVENT RECURRENCE NARRATIVE:

The BSEE Office of Incident Investigations work with the United State Coast Guard District 8 Officer in Charge of Marine Inspection (OCMI) to draft a Safety Alert.

23. POSSIBLE OCS VIOLATIONS RELATED TO ACCIDENT: YES

24. SPECIFY VIOLATIONS DIRECTLY OR INDIRECTLY CONTRIBUTING. NARRATIVE:

G-110 DOES THE LESSEE PERFORM ALL OPERATIONS IN A SAFE AND WORKMANLIKE MANNER AND PROVIDE FOR THE PRESERVATION AND CONSERVATION OF PROPERTY AND THE ENVIRONMENT?

E-100 IS THE OPERATOR PREVENTING UNATHORIZED DISCHARGE OF POLLUTANTS INTO OFFSHORE WATERS?

25. DATE OF ONSITE INVESTIGATION:

28. ACCIDENT CLASSIFICATION:

06-SEP-2021

26. INVESTIGATION TEAM MEMBERS:

29. ACCIDENT INVESTIGATION

PANEL FORMED: NO

Charles Arnold / Jason Schollian / Michael J. Sonnier /

OCS REPORT:

27. OPERATOR REPORT ON FILE:

30. DISTRICT SUPERVISOR:

David Trocquet

APPROVED

DATE: 08-DEC-2021