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: **15-OCT-2019** TIME: **0755** HOURS
2. OPERATOR: **Talos Petroleum LLC**
   REPRESENTATIVE:
   TELEPHONE:
   CONTRACTOR:
   REPRESENTATIVE:
   TELEPHONE:

- [ ] STRUCTURAL DAMAGE
- [X] CRANE
- [ ] OTHER LIFTING
- [ ] DAMAGED/DISABLED SAFETY SYS.
- [X] INCIDENT >$25K **Damaged Crane Boom**
- [ ] H2S/15MIN./20PPM
- [ ] REQUIRED MUSTER
- [ ] SHUTDOWN FROM GAS RELEASE
- [ ] OTHER

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

4. LEASE: **G01665**
   AREA: **MP** LATITUDE: **29.23983794**
   BLOCK: **288** LONGITUDE: **-88.40948497**

5. PLATFORM: **A**
   RIG NAME:

6. ACTIVITY:
   - [ ] EXPLORATION(POE)
   - [X] DEVELOPMENT/PRODUCTION (DOCD/POD)

7. TYPE:
   INJURIES:
   - [ ] HISTORIC INJURY

	OPERATOR	CONTRACTOR
[ ] REQUIRED EVACUATION		
[ ] LTA (1-3 days)		
[ ] LTA (>3 days)		
[ ] RW/JT (1-3 days)		
[ ] RW/JT (>3 days)		
[ ] FATALITY		
[ ] Other Injury		

   - [ ] POLLUTION
   - [ ] FIRE
   - [ ] EXPLOSION

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

   COLLISION [ ] HISTORIC [ ] >$25K [ ] <=$25K

8. OPERATION:
   - [X] PRODUCTION
   - [ ] DRILLING
   - [ ] WORKOVER
   - [ ] COMPLETION
   - [ ] HELICOPTER
   - [ ] MOTOR VESSEL
   - [ ] PIPELINE SEGMENT NO.
   - [ ] OTHER

9. CAUSE:
   - [X] EQUIPMENT FAILURE
   - [X] HUMAN ERROR
   - [ ] EXTERNAL DAMAGE
   - [ ] SLIP/TRIP/FALL
   - [ ] WEATHER RELATED
   - [ ] LEAK
   - [ ] UPSET H2O TREATING
   - [ ] OVERBOARD DRILLING FLUID
   - [ ] OTHER _____

10. WATER DEPTH: **393** FT.
11. DISTANCE FROM SHORE: **35** 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:

On 15 October 2019, at 0755 hours, a crane incident occurred during unscheduled maintenance at Talos Petroleum LLC's Main Pass (MP) 288 A (OCS-G 01665) platform. The crane boom dropped from a 45 degree angle onto the existing boom rest, severely damaging the outermost 20-foot long boom mid-section on the crane. The weight of the boom caused a lateral deviation of 18 inches in the top of the existing boom rest. No injuries, damage to process equipment, or to the platform structure were reported for this incident.

SEQUENCE OF EVENTS:

On 13 October 2019, the crane maintenance contractor was called to investigate a noise associated with the boom winch. The crane was previously placed out of service (OOS) by the person in charge (PIC).

On 14 October 2019, two Seatrax crane mechanics arrived late in the evening to investigate the crane boom hoist. The crane mechanics conducted a risk assessment of the crane and discussed different options to lower the boom down safely onto the boom rest for repairs. The mechanics took the hoist apart and noticed the planetary gears were heavily damaged. The damage restricted the boom in place at a 45 degree angle. The mechanics suspected the damage was caused by a shock load of the crane. The mechanics contacted the Seatrax Account Manager to inform him of the damaged boom hoist. The mechanics ordered parts with the account manager to repair the damaged boom hoist. The mechanics continued to dismantle the hoist and discovered more damage to the planetary gears. The damaged planetary gears prevented the hoist from working properly and the boom could not be laid down onto the boom rest.

Once parts arrived, the Seatrax Account Manager and mechanics discussed how to continue. The Seatrax Account Manager directed the mechanics to lower the boom hoist by using the hydraulic motor. The Seatrax Account Manager and mechanics went over the procedures to change out the planetary hoist gears. Both parties agreed to clean the debris and replace the planetary hoist gears before hydraulically lowering the boom.

On the morning of 15 October 2019, the Lead Mechanic suggested to the Mechanic Helper that they should use the emergency load lowering method. This method would save time and the Lead Mechanic felt it would be safer than repairing the hoist with the boom suspended. The crane was structurally safe at the time due to the engaged brake band. The mechanics decided among themselves to start the emergency load lowering procedure.

The mechanics conducted a Job Safety Analysis (JSA) for the sequence of basic job steps. The JSA was written for lowering the boom and removing the boom winch drum and shaft. The mechanics removed the threaded cap on top of the brake actuator. Then a 1/4" all thread bolt was utilized in the brake actuator to lower the boom by turning it clockwise and counter-clockwise to stop it. The Lead Mechanic controlled the hoist drum to the lower the boom. The Mechanic Helper was on the side in order to see the boom being lowered. As the Lead Mechanic started turning the bolt clockwise to lower it, the actuator tension gradually released until the drum began to turn in a downward rotation. The drum rotated down and the speed increased from the weight of the boom. The Lead Mechanic backed off the bolt to allow the brake to stop the rotation of the drum. They continued with the process until, suddenly, the drum came to a stop. The Mechanic Helper told the Lead Mechanic the drum was moving slower than before. Both mechanics suspected trash may be hung up in the gears preventing it from moving. The mechanics continued to lower the boom. When the boom angle reached approximately 10 degrees, the boom brake failed, and control was lost. The Lead Mechanic quickly tried to stop the boom from falling by turning the bolt counterclockwise. The boom was descending too fast for the mechanic to keep up. Consequently, the boom dropped at a rate of speed great enough to bend the boom over the boom rest.

The mechanics suspected a hydraulic failure that caused the boom to fall 30 feet onto the boom rest. The impact caused a severe bend to the boom at the saddle point. The crane boom was properly secured and the area around the crane was barricaded.

The Seatrax Account Manager received a phone call informing him that the mechanics had made an attempt to lower the boom using the emergency load lowering procedure. Per the Seatrax Account Manager, there was no conversation, or approval given to use the emergency load lowering procedure. The mechanics took it upon themselves to use the emergency load lowering procedure to save time. Seatrax and Talos management would only approve of this method in an emergency situation.

Talos' field incident investigation team was immediately formed, and personnel were diverted to MP 288 A to begin an investigation. The team arrived onsite to document the damages to the crane boom and ensure there was no structural damage to the facility. Due to the existing damage on the boom, the team determined that the entire boom assembly was to be replaced in the field. The team developed a plan to remove and replace the crane boom section. Talos submitted a plan to BSEE New Orleans District office to review the existing boom removal and replacement procedure. Talos hired a specialized Motor Vessel (M/V) equipped with a crane to remove the crane boom.

The crew replaced the crane boom without incident or injuries. The Seatrax mechanics performed an annual inspection, tested the hoists and brakes and performed a 100% pull test on the repaired crane per the requirements of American Petroleum Institute Recommended Practice 2C (API RP 2C). The crane was placed back into full service upon completion of the post test inspection. The damaged boom was loaded onto the M/V to bring to the Seatrax yard located in Belle Chase, Louisiana.

BSEE INVESTIGATION:

On 17 October 2019, a team consisting of one Bureau of Safety and Environmental Enforcement (BSEE) New Orleans District (NOD) Accident Investigator and one BSEE Regional Office of Incident Investigations (OII) Engineer conducted a follow-up investigation. The BSEE team interviewed multiple personnel, took photographs, and collected documents. The team also conducted a hazard assessment inspection of the area surrounding the crane. The BSEE investigation team noticed the area was unsafe, due to the crane boom position over process equipment. At the time of the onsite investigation, Talos Petroleum did not supply engineering documents to determine the stability of the crane boom cradled over the boom rest. The team noted the platform crane was a SeaKing Model 1400 equipped with a 100' long boom. The crane boom was positioned in the crane boom rest and was badly bent in the vertical direction. This bend was found outboard of the boom rest, 64' from the heel pin tie-in location.

While inspecting the crane boom hoist, investigators noticed the boom brake had a blue 1/4" threaded bolt still in the brake actuator. After reviewing the Seatrax emergency load lowering procedure, BSEE determined that the brake release tool required a fixed head nut, adjustment nut and flat washer. However, the tool that was used was not fixed to the bolt. Therefore, it is possible when the boom lowered, the nut was turning and not the bolt itself. This bolt is commonly used as a fastener on process vessels and pipe flanges.

The post inspection of the brake actuator revealed that a failure of the spiral lock ring occurred while the emergency load lowering procedure was being performed. The spiral lock ring was likely damaged but still holding when the emergency brake load lowering procedure began. As the hoist began to turn and lower the boom, the spiral lock ring failed. At this point, the mechanical brake had no load holding capability to stop the boom from falling.

BSEE investigators questioned the mechanics about the reasoning for using the

emergency load lowering procedure. The mechanics explained they presumed a sense of urgency to return the crane to service. However, the Talos PIC stated there was no rush to get the crane back into service.

Furthermore, the Talos and Seatrax's JSAs for the crane work performed on 15 October 2019 did not mention utilizing the emergency load lowering procedure, and the procedure was not approved by Seatrax or Talos. According to the Seatrax Account Manager, the emergency load lowering procedure should not have been performed because it was not an emergency. The original plan was to reassemble the hoist using new parts and lower the boom in a normal manner using the hydraulic motor. However, the Seatrax employees deviated from the work scope and did not communicate this to their supervisor. They proceeded to lower the boom using the emergency load lowering procedure before repairing the hoist. API RP 2C section 13.8 "Personnel Emergency Load Lowering" illustrates when to utilize the procedure.

The Talos and Seatrax team explained that the SeaKing crane uses two separate braking methods. A counterbalance valve restricts fluid flow from the hydraulic cylinder to promote controlled lowering. However, the failed gearbox rendered the counterbalance valve inoperable. Another method used is the brake band, which acts directly on the drum to hold the load indefinitely. The brake band had the ability to withhold the load of the boom. Seatrax stated that the mechanics could have made the repairs needed to the boom hoist without the need to use the emergency load lowering procedure.

Seatrax determined the thrust bearing was the initial failure point. Debris from the failed thrust bearing traveled into the gears causing damage to the planetary gear teeth. The debris jammed between the planetary gear and ring gear created enough force in the ring gear to crack the planetary gear.

Conclusion:

BSEE concluded the investigation with findings of multiple failures. First, wear and tear caused the initial failure of the gear box assembly. Next, failures of management of change, communication, and documentation allowed the emergency load lowering procedure to take place. Then, a bolt normally used for process pipe flanges was used in place of the proper brake release tool. Lastly, mechanical failure of a spiral lock ring prevented the brake band from working.

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

1. Communication- Inadequate communication between operator and contractor personnel: The Seatrax employees deviated from the work scope and did not communicate this to their supervisor.
2. Management Systems- Inadequate documentation or availability of hazard analyses, job procedures, emergency procedures: The JSA was to be for lowering the boom and removing the boom winch and shaft. There was no mention in the JSA about utilizing the emergency load lowering procedure and the procedure was not approved by Seatrax or Talos.

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

1. Equipment Failure - Wear and tear: Wear tear caused a failure of a thrust bearing which made the crane inoperable. Wear and tear may have also caused the failure of the spiral lock ring on the brake assembly.
2. Human Performance Error- Not following proper procedures: According to the Seatrax Account Manager, the emergency load lowering procedure should not have been performed, because it was not an emergency.
3. Human Performance Error- Rushing to get job completed: The Mechanics presumed it

was a sense of urgency to return the crane to service. After a discussion with Talos PIC onboard, it was said it was not a rush to get the crane back into service.

20. LIST THE ADDITIONAL INFORMATION:

21. PROPERTY DAMAGED:

Crane boom

NATURE OF DAMAGE:

Boom Brake Failure

ESTIMATED AMOUNT (TOTAL): **$569,000**

22. RECOMMENDATIONS TO PREVENT RECURRANCE NARRATIVE:

New Orleans District does not have any recommendation to BSEE to prevent recurrence.

23. POSSIBLE OCS VIOLATIONS RELATED TO ACCIDENT: **YES**

24. SPECIFY VIOLATIONS DIRECTLY OR INDIRECTLY CONTRIBUTING. NARRATIVE:

G-110 During the BSEE investigation into the incident that occurred on October 15, 2019. Talos failed to follow procedures, deviating from the planned scope of work resulting in significant damage to the crane boom.

25. DATE OF ONSITE INVESTIGATION:

17-OCT-2019

26. INVESTIGATION TEAM MEMBERS:

Pierre Lanoix, AI Specialist / Quoc "Rodney" Dang /

27. OPERATOR REPORT ON FILE:

28. ACCIDENT CLASSIFICATION:

29. ACCIDENT INVESTIGATION PANEL FORMED: **NO**

OCS REPORT:

30. DISTRICT SUPERVISOR:

David Trocquet

APPROVED DATE: **02-APR-2020**