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: **06-JUN-2022** TIME: **1030** HOURS

2. OPERATOR: **BP Exploration & Production Inc.**
   REPRESENTATIVE:
   TELEPHONE:
   CONTRACTOR:
   REPRESENTATIVE:
   TELEPHONE:

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

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

4. LEASE:
   AREA: **MC** LATITUDE: **28.19060986**
   BLOCK: **778** LONGITUDE: **-88.49558496**

5. PLATFORM: **A(Thunder Horse**
   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		

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

10. WATER DEPTH: **6200** FT.
11. DISTANCE FROM SHORE: **66** 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:

INCIDENT SUMMARY:

On 6 June 2022, at 1030 hours, a pollution incident occurred at Mississippi Canyon MC 778 A (Thunderhorse), Lease OCS-G 09868. A subsea leak was observed by a Remotely Operated Vehicle (ROV) during a subsea inspection of the Slot 47/MC822-13/TD004 well (Well TD004). The estimated volume of the hydrocarbon leak was 9 barrels. BP Exploration & Production Incorporated (BP) is the designated operator of the lease.

SEQUENCE OF EVENTS:

On 5 June 2022, at 1700 hours, an unplanned shut-in occurred due to a generator power failure. During the shutdown, an increase in hydraulic fluid consumption was observed. The increase in hydraulic consumption was believed to have been caused by an apparent failure of the Surface Control Subsurface Safety Valve (SCSSV) in Well TD004.

On 6 June 2022, at 0500 hours, BP personnel began troubleshooting the cause for the hydraulic consumption. Well TD004 was identified as the cause for the consumption and subsea leak. The well was shut in at 1000 hours with the SCSSV closing around 1030 hours.

On 7 June 2022, while BP was troubleshooting the B control side of the SCSSV, a dark discharge was noted coming from the Subsea Control Module (SCM) vent port.

On 13 June 2022, the Motor Vessel Holiday arrived back at Well TD004 to complete troubleshooting the control lines and SCSSV. The testing and troubleshooting confirmed the integrity of the A-side and SCSSV.

BSEE INVESTIGATION:

The Bureau of Safety and Environmental Enforcement (BSEE) New Orleans District (NOD) Accident Investigator (AI) received notification of the incident on 6 June 2022. The AI requested and received further documentation via the BSEE eWell Reporting System. The AI met with BP’s Regulatory Compliance Advisor and discussed the incident and received BP’s meeting minutes from initial BSEE meetings.

The BSEE investigation determined that there had been a platform power loss and fieldwide shutdown on 5 June 2022. The platform power loss occurred as a result of failed process run cards. BSEE determined that the loss of power event was not a reportable event because the emergency back-up power responded as designed and returned critical power to the platform within 45 seconds.

BSEE agrees with BP’s assessment that the most likely probable cause of the leak is due to a rod piston seal failure. It is suspected tha rod piston seals of the Surface Controlled Subsurface Safety Valve had failed, allowing oil and gas to enter the hydraulic lines and discharge through the hydraulic vent. BP’s subsea wells tying into the Thunderhorse platform have had a history of rod piston seal failures. One event occurred in 2021 causing a leak of over 50 barrels of hydrocarbons.

BSEE investigated BP’s subsea leak detection system to determine whether it was effective in identifying this leak. BP’s subsea leak detection system, known as Condition Rate of Change (C-ROC Algorithm), uses a conditional rate of change (an algorithmic sensor-based leak detection technique) which detects changes in pressure trends. BSEE confirmed that the system was active at the time of the leak but could not detect this relatively small discharge.

There are several NRC reports related to this event. On 6 June 2022, BP reported to the National Response Center (NRC# 1337946) the pollution incident that occurred on 5 June 2022 at 1700 hours. The caller reported a potential control valve failure inside of an offshore subsea well. Then, on 7 June 2022 at 0645 hours, the National Oceanic and Atmospheric Administration (NOAA) reported an image that described a sheen (NRC# 1338032) as follows: "POSSIBLE, UNCONFIRMED OIL WAS OBSERVED IN SATELLITE IMAGERY. THE ANOMALY APPEARED DARK AND STOOD OUT WELL AGAINST THE BACKGROUND, AND WAS LOCATED CLOSE TO TWO OIL FACILITIES. THE ANOMALY WAS 6.5 NM LONG AND UP TO 2.8 NM AT ITS WIDEST SECTION. THE WIND AT THE TIME WAS FROM S AT 8KT." Next, BP reported NRC# 1338045 on the same day (7 June 2022) at 1418 hours, "CALLER REPORTED AN UNKNOWN SHEEN FROM AN UNKNOWN SOURCE DURING A FLYOVER. THE SHEEN HAS MADE ITS WAY TO THEIR FACILITY." The sheen was 1.5 miles long by 300 yards wide. Finally, on 11 June 2022 at 1500 hrs (NRC# 1338496), BP observed (by the ROV) a crude oil release (through bubbles) coming out the subsea control module vent.

Conclusion:

BSEE concluded that when the leak occurred, BP operated within their leak detection and prevention polices. The probable cause of the leak is an equipment failure related to the rod piston seal on the SCSSV. BSEE will continue to perform a detailed investigation into rod piston seal failures with the intent of preventing further pollution.

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

- **Equipment Failure: Rod piston seal failure.**

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

20. LIST THE ADDITIONAL INFORMATION:

BSEE has scheduled a follow-up meeting with BP’s engineering and leadership to further investigate similarities in the several rod piston seal failures in the last 3 years.

21. PROPERTY DAMAGED: NATURE OF DAMAGE:

The Slot 47/MC822-3/TD004 Subsea well SCSSV piston rod seal.

ESTIMATED AMOUNT (TOTAL):

22. RECOMMENDATIONS TO PREVENT RECURRANCE NARRATIVE:

The NOD recommends that BSEE consider developing policy to address these potential SCSSV rod piston seal failures (to prevent reoccurrence).

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

24. SPECIFY VIOLATIONS DIRECTLY OR INDIRECTLY CONTRIBUTING. NARRATIVE:

E100 (C) - 30 CFR 250.107(a) - Operator failed to stop the unauthorized discharge of hydraulic fluid from the SCSSV of the Slot 47/MC822-3/TD004 Subsea well.

25. DATE OF ONSITE INVESTIGATION:

06-JUN-2022

26. Investigation Team Members/Panel Members:

Gerald Taylor /

27. OPERATOR REPORT ON FILE:

28. ACCIDENT CLASSIFICATION:

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

OCS REPORT:

30. DISTRICT SUPERVISOR:

David Trocquet

APPROVED DATE: **11-FEB-2023**