

UNITED STATES DEPARTMENT OF THE INTERIOR  
MINERALS MANAGEMENT SERVICE  
GULF OF MEXICO REGION  
**ACCIDENT INVESTIGATION REPORT**

1. OCCURRED

DATE: **03-APR-2005** TIME: **2130** HOURS

2. OPERATOR: **ARENA ENERGY, LLC**

REPRESENTATIVE: **Kalil Ackal**

TELEPHONE: **(281) 210-3113**

3. LEASE: **00796**

AREA: **EI** LATITUDE:

BLOCK: **100** LONGITUDE:

4. PLATFORM:

RIG NAME **THE 250**

5. ACTIVITY:  EXPLORATION(POE)

DEVELOPMENT/PRODUCTION  
(DOCD/POD)

6. TYPE:  FIRE

EXPLOSION

BLOWOUT

COLLISION

INJURY NO. \_\_\_\_\_

FATALITY NO. \_\_\_\_\_

POLLUTION

OTHER **Top Drive Quill Shaft Failure**

7. OPERATION:  PRODUCTION

DRILLING

WORKOVER

COMPLETION

MOTOR VESSEL

PIPELINE SEGMENT NO. \_\_\_\_\_

OTHER \_\_\_\_\_

8. CAUSE:  EQUIPMENT FAILURE

HUMAN ERROR

EXTERNAL DAMAGE

SLIP/TRIP/FALL

WEATHER RELATED

LEAK

UPSET H2O TREATING

OVERBOARD DRILLING FLUID

OTHER \_\_\_\_\_

9. WATER DEPTH: **24** FT.

10. DISTANCE FROM SHORE: **19** MI.

11. WIND DIRECTION: **NE**

SPEED: **10** M.P.H.

12. CURRENT DIRECTION:

SPEED: M.P.H.

13. SEA STATE: **3** FT.

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

**Doyle Williams**

CITY:

STATE:

TELEPHONE:

CONTRACTOR: **TODCO**

CONTRACTOR REPRESENTATIVE/  
SUPERVISOR ON SITE AT TIME OF INCIDENT:

**Ricky Lee**

CITY:

STATE:

TELEPHONE:

17. DESCRIBE IN SEQUENCE HOW ACCIDENT HAPPENED:

Below is a summary of the near-miss incident that occurred on the TODCO 250 rig on April 3, 2005 while drilling Well #42 in Eugene Island Block 100 for Arena Energy:

While reaming to bottom after a bit trip, mud was observed leaking from above the TESCO top drive in the vicinity of the power swivel. The OIM confirmed that the leak was occurring from the quill shaft connection that mates the TESCO top drive to the power swivel. The OIM instructed all floor personnel to clear themselves from the rotary table area. As the driller began picking up to a height where the slips could be set to break out a joint of drill pipe and inspect the leak area, the quill shaft connection parted. This failure resulted in dropping the TESCO top drive to the rotary, approximately 30 feet, where the elevators prevented the drill pipe from falling into the hole. The sudden impact from the fall resulted in jumping the drill line from the sheaves at the crown in addition to bending the bails. No personnel were hurt during this incident due to the OIM's immediate response.

Other significant findings:

Since this particular incident has occurred, TESCO has removed all 650 ton quill shafts that were manufactured at the same foundry which manufactured the failed quill shaft.

TESCO currently inspects their top drive system on a 60-day interval.

The current design between the power swivel and the TESCO top drive does not allow for safety bails or any other safety mechanism to be installed.

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

A preliminary report, of the upper 6-5/8 inch regular pin connection failure on the 650 ton top drive quill shaft has resulted in the following additional findings:

- (a) The toughness of the quill material in the region where the upper pin connection failed was observed to be 12.7 ft-lbs average at a test temperature of (-) 4 degrees F as compared to the required material toughness of 31 ft-lbs minimum at (-) 4 degrees F. This toughness is less than half of the minimum required material toughness.
- (b) The metal in the quill shaft had a less than optimal microstructure.
- (c) The combination of an irregular (flat) thread root form and sharp cornered, groove like features would be expected to act as stress risers, resulting in a crack initiation site which was followed by complete failure of the quill shaft.

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

A chemical analysis completed on the quill shaft material was reflective of commercial 4330 Modified alloys used for the manufacturing of drilling tools.

At the time of the preliminary report, TESCO had not provided the chemical requirements for the quill material. Once the chemical requirements have been provided by TESCO, they can be compared to the chemical analysis provided in the attached report. Depending on the results, the chemical composition of the quill shaft could be identified as a possible contributing

cause.

21. PROPERTY DAMAGED:

Following the incident, the rig removed and replaced all traveling equipment in the derrick (block, swivel and top drive). The rotary table was replaced after inspection of the skid beams that support the table were proven to be in satisfactory condition.

NATURE OF DAMAGE:

Once the Quill Shaft parted, the TESCO top drive dropped to the rig floor damaging the rotary table. As a result of the TESCO top drive falling, the drill line jumped the sheaves at the crown and damaged the traveling equipment.

ESTIMATED AMOUNT (TOTAL): \$125,000

22. RECOMMENDATIONS TO PREVENT RECURRENCE NARRATIVE:

The Lafayette district has no recommendations to make to the Regional office.

(a) MMS recommends that TESCO re-evaluate their quality control program concerning the manufacturing of quill shafts.

(b) MMS recommends that TESCO examine the possibilities of installing safety bails or any other safety mechanism to prevent the top drive from falling to the rig floor with a failure in the quill shaft.

(c) MMS recommends that TESCO re-examine the quality and frequency of their inspections.

23. POSSIBLE OCS VIOLATIONS RELATED TO ACCIDENT: NO

24. SPECIFY VIOLATIONS DIRECTLY OR INDIRECTLY CONTRIBUTING. NARRATIVE:

25. DATE OF ONSITE INVESTIGATION:

08-APR-2005

26. ONSITE TEAM MEMBERS:

Marty Rinaudo / Kevin Langlinais / Johnny Serrette /

29. ACCIDENT INVESTIGATION

PANEL FORMED: NO

OCS REPORT:

30. DISTRICT SUPERVISOR:

Elliott S. Smith

APPROVED

DATE: 16-JUN-2005