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Exhibit No. _____
Worldwide Court
Reporters, Inc.

Jim Cunningham
Egypt / Mediterranean Sea

**Loss of Well Control and
Emergency Response**

Event: August 20, 2004 at 21:30 hrs

**Mediterranean District
Eurafrican Unit**



Management Incident Review

- Summary of Incident
- Log of Events
- Supporting Factual Data
- Causation Analysis
- Remedial Actions and Accountability Issues

Incident Summary

- Jim Cunningham (JIC) was drilling the Sienna Up-1 exploration well off the coast of Egypt in the Mediterranean for Rashpetco (BG / EGAS JV w/ Petronas as partner in well).
- Water depth 330m. 13-3/8" set at 1305m. BOP's tested, diverter functioned and LOT on casing shoe performed to 12.5 ppg emw. Drilling 12-1/4" hole at 1494m at 20-25 m/hr ROP with 11.3 ppg water based mud at time of blowout.
- Influx occurred during a connection, but was not observed prior to gas bubble reaching surface. (Bottoms up time was +/- 34 minutes)
- Excessive return flowrates observed at the shakers and flow rising above rotary table. Driller stopped rotation & pumps and attempted to close diverter, but did not have time to close in at the stack before the blowout occurred.
- An uncontrolled blowout occurred with resulting fire.

Incident Summary (Continued)

- General alarm was sounded & personnel mustered.
- DP shear and LMRP disconnect functioned from remote OIM panel in preparation of a planned winch off of location. (5", 19.5 ppf, S-135 DP failed to shear due to tool joint position across shear rams. Subsequent LMRP disconnect released LMRP from stack, but DP kept LMRP aligned over stack. Planned winch off aborted after rig power was lost).
- All 106 personnel successfully evacuated within 2.5 hrs via crane to standby boat (with final 5 supervisors evacuating by lifeboat).
- Two injuries: 1 Schlumberger WL hand – minor burns to nose and ear (FAC). 1 Halliburton MWD hand – 3rd degree burns to hands (MTC).
- Environmental impact: Negligible
- Annulus apparently bridged off the flow of gas after +/- 3 hours.
- Gas leak began again via DP by the following morning. (DP leak began approximately 15' above the rig floor after the compensator bled off, causing the blocks and top drive to lower, creating a 90 degree bend in the DP. This gas leak increased as the DP crack washed out over subsequent days.)

Incident Summary (Continued)

- Wild Well Control (WWC) was mobilized by Rashpetco (RP). WWC mobilized equipment from US with the plan to cut & cap the 5" DP above rig floor, and bullhead to kill. Logistical problems delayed the arrival of all the required equipment until Sept. 6 (17 days after blowout).
- Closed VBR's via ROV intervention as insurance against possible additional flows up annulus on August 24.
- Significant formation sediment flow from well started Sept. 2 and increased through Sept. 7. Window of opportunity to cap and kill the well ended at this point (unsafe to continue well control operations on rig floor).
- Result of this delay and ultimate aborting of the cap & kill operations was additional damage to rig (water cannon damage from boats, water damage to electronic equipment, equipment damage due to significant sediment flow), delay of recovery operation due to time required to remove tons of sediment from rig, and necessity to leave JIC's stack on wellhead to control well.
- Sheared DP via ROV intervention (1500 psi operating pressure) on Sept. 9. (Tool joint apparently had dropped 1-2' below shear rams due to slack off of compensator the first night.)

Incident Summary (Continued)

- Winched rig off location on Sept. 9.
- Initiated cleaning of formation sediment, damage survey of rig and temporary establishment of key systems (electrical, air compressors, drawworks, riser tensioners, accommodation cleaning and services, etc.).
- POH w/sheared DP. Pulled riser and LMRP, pulled anchors, and initiated tow to Malta shipyard Oct. 2, 2004 @ 22:30.
- ROV reconnaissance after pipe shear shows minimal gas bubbling exiting from connector mandrel above shear rams.
- Preliminary damage survey indicates a probable 3 month repair period at a cost of \$10.8MM (including \$3.1MM operating costs). Total impact on P&L including \$7.5MM lost revenue = \$18.3MM.
- Impact on client (Rashpetco): Delay of exploration program. Spread costs during repair period.

Key Events Summary (Prior to Blowout)

- 19:50: Driller made connection at 1432m w/o problems. Riser boost pump turned off during connection. Shaker hand goes to floor for connection (replacing floorhand working on other job), leaving shakers unattended.
- 20:10: Driller noticed pit level change – called pump man (PM) who confirmed pit transfer was taking place (at mud engineer (ME) request). Night company man (NCM) discussed need to notify driller of transfers with PM.
- 21:00: Night TP (NTP) relieves driller on floor. Depth 1484m.
- 21:06: NTP is notified of another pit transfer.
- 21:07: NTP back-reams stand and makes connection @ 1491m. Riser boost pump left on during connection. Shaker hand goes to floor for connection, again leaving shakers unattended.
- 21:15: Pumps online again
- 21:20: MWD crew confirms good survey / NTP starts drilling at 1491m.
- 21:22: Driller returns to floor and NTP departs.
- 21:23: Driller observes 120 psi pressure drop & checks pump strokes.

Key Events Summary (Prior to Blowout)

- 21:25: Shaker hand observes excessive flow at shakers. Due to poor English skills, decides to run up stairs to rig floor to warn driller (tells driller – “problems at shakers”).
- 21:26: Driller asks AD to go check problem at shakers.
- 21:27: Mud logger calls driller to discuss pressure loss. Driller observes flow over rotary table.
- 21:28: Driller stops rotation, chains brake & stops pumps.
- 21:30: Driller functions diverter.
- 21:32: Driller opens BOP panel when explosion on floor occurs. Driller evacuates floor.

Key Events Summary (After Blowout)

- 21:32: OIM hears blowout from office. NTP is alerted of event by AD, runs to pipe deck where he observes entire rig floor engulfed in fire. NTP goes to remote BOP panel in OIM's office.
- 21:34: NTP closes shear rams (primary shear function) and observes gallon counter moving. Moments afterward SS Engineer functions secondary shear function.
- 21:37: OIM enters control room (emergency control center) & announces plan to winch off location. General alarm has sounded and mustering begins. Barge engineer (BE) and assistant BE start lining up winches.
- 21:39: OIM joins Senior TP (STP), NTP & Subsea Engineer (SSE) in OIM office, and instructs team to unlatch LMRP and winch off location.
- 21:40: OIM and team discuss possibility pipe may not have sheared (well still blowing), but OIM indicates he believes flow is residual gas in riser.
- 21:45: OIM orders LMRP disconnect. SSE functions primary & secondary unlatch of connector.
- 21:46: NTP goes to pipe deck to assist fire fighting via deck monitors.
- 21:54: Muster complete – all personnel accounted for.

Key Events Summary (After Blowout)

- 21:55: Power black out on rig. Rig goes on battery back up a short while and then emergency generator comes on line. 2nd “explosion” occurs on rig floor. (Power loss eliminated control of winches. Water supply on fire main lost soon afterward as loss of power to low pressure compressor causes pontoon skin valves to close shutting off SW). Work boat starts water cannons on rig floor area.
- 23:04: Start evacuation to workboat via crane (101 PAX off by 23:59)
- 24:00: Final 5 personnel launch lifeboat #1 (OIM / BE / Crane Op / Mech / asst BE).
- 00:30: All 106 POB aboard workboat.

Supporting Facts (Well Control Event)

- 1) Drilling program identifies 3 “medium risk hazards” in interval (gas fault, gas sand & bright seismic “pod”). Program risk assessment notes 3 zones create a risk of potential gas influx & consequence of well control problems (loss of section / loss of hole). Drilling program called for max pore pressure of 10.5 – 11.5 ppg through 12-1/4” interval.
- 2) RP Standing Instructions to Driller (SID) noted 3 hazard zones in interval.
- 3) RP reps on rig described Siena Up-1 well as “shake-down well” prior to drilling next HTHP well. Evidence of complacency on part of RP and TO personnel on rig (as indicated in items 4-7 below).
- 4) RP Day Company Man (DCM) repeatedly instructed that no pit transfers were to take place while drilling. However written RP Standing Instructions to Driller (SID) stated driller must be informed before transfers (indicating transfers were ok). NCM re-confirmed “no pit transfers” rule in meeting 2-1/2 hrs before event, although he was involved in several transfers just prior to the influx. (TO, NCM, mud engineer & mud loggers all were aware of transfers.)

Supporting Facts (Well Control Event)

- 5) Careful analysis of mudloggers PVT chart indicates +/- 10 bbl influx occurred during pit transfer & connection (21:06-21:20 hrs). Pit level change masked due to pit transfer and connection flow back. Flow was not observed on connection due to boost pump being left on.
- 6) Routine was to leave PVT audible alarm off, however warning light for high / low level alarm still in effect.
- 7) Procedures were not set up to effectively detect kicks. This might include restricted ROP through hazard intervals, periodic flow checks, flow checks on connections (or fingerprinting backflow if boost pump is left on), strict controls on pit transfers, tight coordination between all parties (RP / TO / mud loggers / mud engineer / pore pressure engineer), etc. This is responsibility of RP and TO.
- 8) Driller functioned diverter at first sign of well flow, but there is evidence that bag did not close and flowline/diverter line valves did not sequence. (Diverter checked at noon of same day.)

Supporting Facts (Emergency Response)

- 1) Engines shut down likely due to fire damage to emergency shut down circuit on rig floor. Effect of power loss was loss of anchor winch motors. Also lost power to low pressure compressors, which caused pontoon skin valves to fail-safe close, shutting down SW to fire main. Also, this eliminated air pressure to start crane for evacuation, and crews had to rig up jumper hose to air receiver to start crane. Note that emergency generator bus does not feed low-psi compressors.
- 2) Shear rams (SR's) closed on tool joint as driller did not have time to space out pipe before blowout. Note: Primary shear function applied 1500 psi manifold operating pressure to 2 chambers of the dual chamber high pressure shear ram. Soon afterward, the secondary shear function was initiated, which bypasses manifold regulator and applies stack accumulator pressure to both chambers (roughly 3000 psi). These high pressure SR's require only 1200-1500 psi to cut 5", 19.5#, S-135 DP.
- 3) Key personnel did not determine that SR's did not shear pipe and close in well. Continued well flow up riser mis-identified as residual gas in riser.

Supporting Facts (Emergency Response)

- 4) LMRP disconnected +/- 10 minutes after SR's functioned. Obviously control of BOP lost after disconnect.
- 5) Primary strategy was to shear pipe and winch off location.
- 6) OIM / TP's did not attempt to close other rams or annulars after functioning SR's.
- 7) Rig Emergency Response Manual is clear for blowouts: If pipe is sheared and flow is controlled there is no need to disconnect. If pipe shear is not successful, release drill string, disconnect LMRP and winch off.

Causation Analysis

- Well Control Event and Emergency Response were evaluated separately utilizing REASON.
 - Asbjorn Olsen, Rick Deighton & John Mills performed the incident investigation, and team worked with Bob Alexander to analyze causation factors via REASON.
 - Additional information was gathered through interviews with key supervisors present on the rig during the event

Simplified Causation Analysis (Loss of Well Control)

Causation Factors - Loss of Well Control:

- 1) JIC and Rashpetco team had a low perception of risk on this exploration well. Team did not heed warnings in drilling program and Rashpetco's Standard Instruction to Driller of possible zones of concern.
- 2) Team did not use disciplined, coordinated procedures to monitor for well influxes:
 - Riser boost pump not always shut off on connections.
 - No flow checks or "finger-printing" pit level trends on connections.
 - Written & verbal instructions from Rashpetco differed with respect to pit transfers during drilling & connections. However it is drillers ultimate responsibility to monitor the well (via flow checks & monitoring, coordination and control of pits, etc.).

The combination of the boost pump being left on during the connection, the lack of a proper flow check during the connection, and the pit transfer before and during the connection made it impossible to detect this influx.

Simplified Causation Analysis (Loss of Well Control)

- 3) Driller attempted to close diverter as opposed to annular per WC policies. (His reasoning was to protect roughneck. However, had the well been closed in at this point the flow would have been ultimately controlled and rig damage minimized.)

Contributing Factors:

- Experienced shaker hand helped on floor each connection, reducing our capability in identifying an influx.
- Shaker hand also had poor English skills which delayed his notification of driller of excessive flow at shakers.
- Mud logger used wrong bottoms up lag time (twice the actual 34 minutes), but our personnel did not cross check this. Effect was Rashpetco's pore pressure engineer was unable to identify increasing pore pressure as this made his analysis ineffective. (Note that this would have made well kill problematic had we used wrong bit to surface time in our calculations too).
- No preliminary kick sheet was maintained per policy. This would have allowed team to identify lag time error.

Simplified Causation Analysis (Loss of Well Control)

- Rigs flow show was not accurate due to excess cuttings in flowline (plan was to clean out flowline next casing point). Mud logger did not supply a flow show device.
- Audible PVT alarms were turned off, although alarm light was still operational. Had this been on it could have provided a few moments of warning to allow driller to shut in before the bubble reached surface.
- Risks were identified in the planning stage, however this was not properly highlighted to the crews to ensure mitigation measures were put in place.

Note: These mitigation steps may include controlled ROP, flow checks on drilling breaks, flow checks on each connection, control & coordination of fluid in pits, etc. Additionally, the problem of shallow gas in deep water wells needs to be highlighted, as the lag time from bit to mudline is short. (Bubble reached surface in 13 minutes after pumps were turned on after connection.)

Simplified Causation Analysis (Emergency Response)

- **Causation Factors - Emergency Response Problems:**
 - 1) Initial action by TP was to close Shear Ram (SR), which follows rig emergency response (E/R) plan for a blowout. Unknown to team, DP did not shear as SR closed on tooljoint.
 - 2) Team did not attempt to close other preventer as back-up. Had this been done, this would have shut in well, which would have negated need to disconnect and winch off, and ultimately saved rig from more severe damage.
 - 3) E/R manual states if SR's are successfully closed and the well is controlled, there is no need to disconnect & winch off. However, LMRP was disconnected 8-10 min after functioning SR's with plan to winch off location. SR's were considered effectively closed by OIM (continued blow from well viewed as residual gas venting from riser). This was an error as we lost control of BOP after disconnect. The preferred option would have been to attempt to close another preventer.

Simplified Causation Analysis (Emergency Response)

- 4) Emergency response command and control was weak.
 - Obviously high stress from catastrophic blowout and fire was a factor.
 - OIM had not attended MEM training.

Contributing Factors:

- Power was lost on the rig 25 minutes after the start of the blowout and fire. The result was the immediate loss of power to anchor winches. Power loss to low pressure compressor also allowed sea chest valve to failsafe close, ending SW feed to the fire pumps.
- With the loss of power to key systems, loss of control of the stack after LMRP disconnect, and continued well flow after the shear rams were functioned, there was no option but to evacuate.

Action Items (Well Control Event)

- **Immediate Actions:**
 - 1) Issue an alert:
 - Ensure rig management and drilling staff properly review all well programs to properly address known risks.
 - Remind OIM's, TP's & drillers of their fundamental responsibility to ensure procedures and systems are set up to monitor well stability at all times.
 - Highlight required drills and necessity to shut in well at first sign of problems.
 - Discuss required kick calculations that must be maintained (including bottoms up lag time, kick tolerances, etc.).

Action Items (Well Control Event)

- 2) Review well control training in light of this event.
 - Consider using this scenario in formal well control training, rigsite drills or as noted above, as a minimum, relay learnings in form of an alert. Ensure crews get guidance on initial choice of closing diverter, the decision to disconnect as opposed to attempting to close another preventer, etc.

Action Items

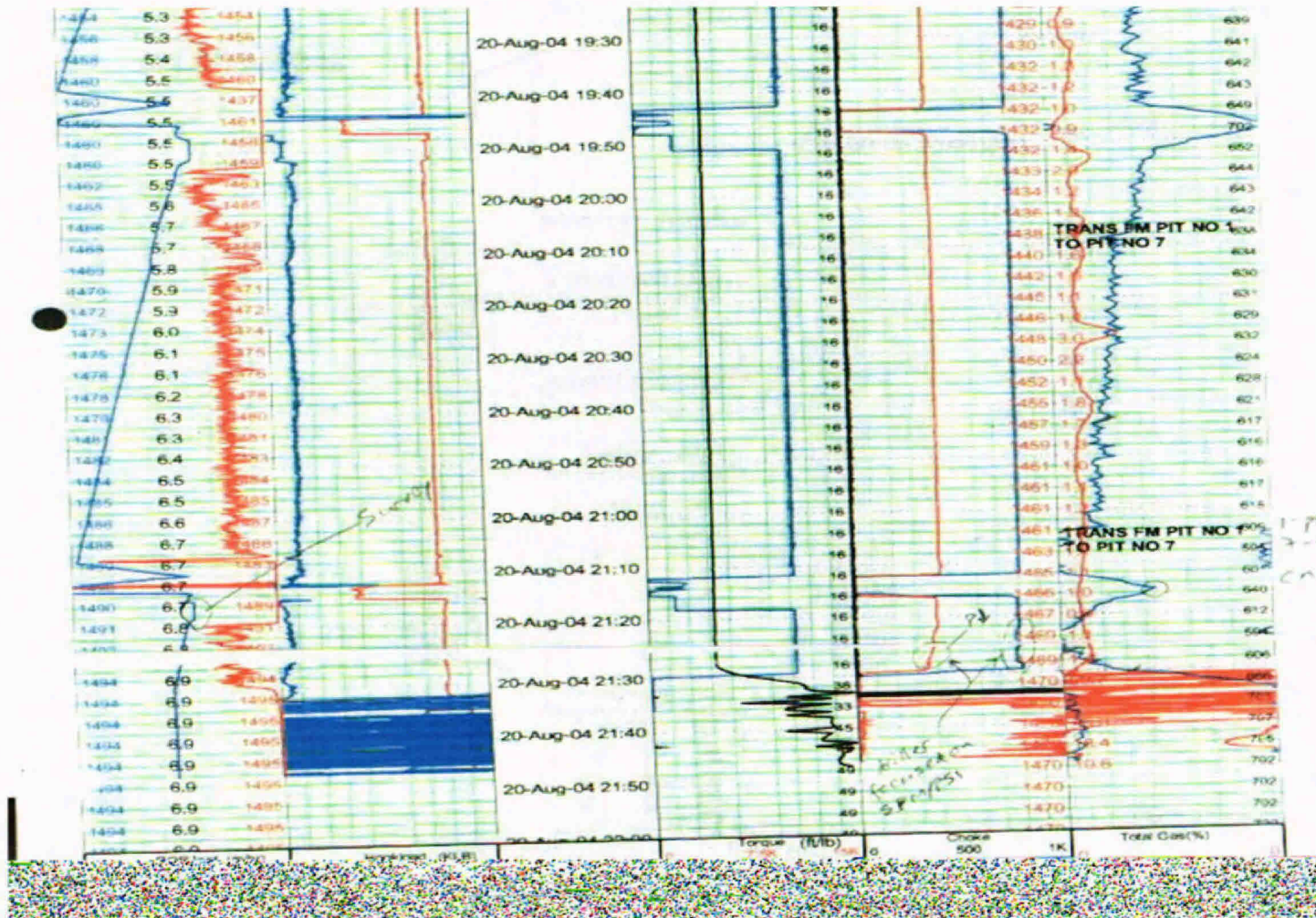
(Emergency Response)

- **Immediate Actions:**

- 1) Key personnel (OIM, barge captains, etc.) to successfully complete MEM training. This training not only confirms their ability to manage emergencies, but it teaches a systematic approach to handle these events. This includes setting up a proper Emergency Control Center, and procedures to effectively handle various emergencies. Drills will also be improved to train the supervisors and crews.
- 2) Review Emergency Response Plans for all rigs for this worst case blowout scenario to make sure they are viable. Initiate occasional drills to cover this potential event. (Consider possibility that shear rams may not cut pipe and review options like closing other preventers. Also, evaluate if 'pipe release' instruction is feasible in a blowout scenario.)
- 3) Confirm what critical equipment is lined up to run off the emergency generator bus for all rigs (like low pressure compressors, etc.) to ensure we have the capabilities required during a black out. (Check MAHRA for potential vulnerabilities in a black-out.)

Accountability Review

- Roles, actions and inactions of all key players have been reviewed.
- Accountability Decision Tree has been used.
- Accountability calls being finalized at this time.



BOP SCHEMATIC

