International Association of Oil & Gas Producers

...Safety Performance Indicators
High potential event reports by region

Report No. 2011sHPE, May 2012

High potential event reports by region

Africa

Onshore

Congo **Function: Production** **Category: Explosions or Burns** **Activity: Production Operations**

Narrative:

On 07/07, 6:30 am, oil overflow at the flare resulting in oil spill fire of about 600 m². Despite a very high potential and impressive burning flames (about 50 m high), no serious impact on human, environment and material was recorded. Production was stopped for 2 days.

Some immediate actions were taken which reduced the immediate consequences of the fire: closure of the manual valve on site which prevent from additional overflow, short delay for fire fighting team intervention, no activation of general mustering alarm. The muster point was located in a heat exposed area in that case.

What went wrong:

- *Slug catcher was not operational.*
- *Production was not stopped on time: deviation of level alarms which does not allow a clear control on capacities, all drums were filled with hydrocarbons due to intentional system inhibitions, production was a priority.*
- *Tiredness following complicated night shift operations.*
- *Integration of new installation (slug catcher and new production line) from other company was not commissioned.*
- *Inhibitions access on panel control was not protected by password.*

Corrective actions and recommendations:

- *Partner installation to be commissioned and HAZOP to be performed.*
- *Incorporate flare overflow fire in emergency scenarios taking into account the topography (extension of spill).*
- *Management of change, complete review of site configuration integrating each modification.*
- *Replace level alarm by specific level controllers adapted to new fluid composition.*
- *Safety shall remain a priority in any situation.*
- *Hand-over between night shift and day shift shall be performed under supervision of management supervisory level.*
- *Management responsibilities to be clearly defined between day and night shift, week-end and vacations.*
- *Advanced emergency situation training for all members of site management team.*

Causal Factors:

- *People (acts): Following Procedures: Violation intentional (by individual or group)*
- *People (acts): Use of Protective Methods: Failure to warn of hazard*
- *People (acts): Use of Protective Methods: Disabled or removed guards, warning systems or safety devices*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *People (acts): Inattention/Lack of Awareness: Fatigue*
- *Process (conditions): Protective Systems: Inadequate security provisions or systems*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate/defective tools/equipment/materials/products*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate communication*
- *Process (conditions): Organisational: Inadequate supervision*
- *Process (conditions): Organisational: Failure to report/learn from events*

Congo [Democratic Republic of the Congo (formerly Zaire)] **Function: Production** **Category: Other** **Activity:Transport - Air**

Narrative:

Crash during final approach of dedicated aircraft. Two of the of seven passengers onboard were seriously injured including one third party.

What went wrong:

- *Weather conditions not suitable for VFR (Visual Flight Rules) landing.*
- *Human Error: Pilot made wrong decision not to abort landing.*

Corrective actions and recommendations:

- *Conduct regular audits of local air services providers.*

Causal Factors:

- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *Process (conditions): Organisational: Failure to report/learn from events*

High potential events by region

Tunisia **Function: Exploration** **Category: Pressure Release** **Activity: Seismic/Survey Operations**

Narrative:

Piercing of condensate pipeline by bulldozer during seismic operations. During the construction of the ramp, the pipeline was punctured by a bulldozer, resulting in a significant release of pressurized condensate and consequential loss of production by the owners and operators of the pipeline.

What went wrong:

- *Insufficient risk assessment for used equipment, unclear pipe position, lack of supervision. Unclear presence of pipeline*
- *Accurate visual identifications missing*
- *Topographer not present, lack of survey by competent personnel (maps, metal detectors)*
- *Bulldozer used instead of Front End Loader*
- *Missing specific procedure for bulldozer*
- *Absence of competent supervision of ramp construction*
- *Nearing end of seismic contract for the company – possible time pressures*
- *Ramp construction considered 'routine'*
- *No PTW or risk assessment for use of bulldozer*
- *Management of change procedure not applied*
- *Lack of instructions on bulldozer ramp construction*
- *No visual pipeline markers available*
- *Poor document control system*

Corrective actions and recommendations:

- *Provide accurate and visible pipeline locations and instructions to operators*
- *Risk assessment for overall project to be carried out prior to start up and implemented in contract (prescriptive)*
- *Ensure full time supervision by both company and contractor on technical matters and HSSE*
- *Show visible leadership with higher frequency of MWAs (company and joint)*

Causal Factors:

- *People (acts): Following Procedures: Violation intentional (by individual or group)*
- *People (acts): Following Procedures: Violation unintentional (by individual or group)*
- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *People (acts): Use of Protective Methods: Inadequate use of safety systems*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *People (acts): Inattention/Lack of Awareness: Lack of attention/distracted by other concerns/stress*
- *People (acts): Inattention/Lack of Awareness: Fatigue*
- *Process (conditions): Protective Systems: Inadequate/defective guards or protective barriers*
- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate/defective tools/equipment/materials/products*
- *Process (conditions): Organisational: Inadequate training/competence*
- *Process (conditions): Organisational: Inadequate work standards/procedures*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate communication*
- *Process (conditions): Organisational: Inadequate supervision*
- *Process (conditions): Organisational: Poor leadership/organisational culture*

High potential events by region

Tunisia **Function: Production** **Category: Explosions or Burns** **Activity: Construction, Commissioning, Decommissioning**

Narrative:

During welding a fire took place on a platform resulting in an explosive zone. During welding operations of a supporting structure on PF3 near the Separator, a spark from welding ignited a fire at the welding site while unattended.

What went wrong:

- *Sparks from welding operations dropped on floor of worksite*
- *Use of non-certified plastic liner material*
- *Use of insufficiently fire proof coated wood for scaffolding*
- *Absence of required supervision (Watchman)*
- *Lack of awareness of contactor personnel*

Corrective actions and recommendations:

- *Reinforce existing HSSE procedures*
- *Check pre-qualifications of contractor personnel for offshore operations*

Causal Factors:

- *People (acts): Following Procedures: Violation unintentional (by individual or group)*
- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *People (acts): Use of Protective Methods: Failure to warn of hazard*
- *People (acts): Use of Protective Methods: Inadequate use of safety systems*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *People (acts): Inattention/Lack of Awareness: Lack of attention/distracted by other concerns/stress*
- *Process (conditions): Protective Systems: Inadequate/defective guards or protective barriers*
- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*
- *Process (conditions): Protective Systems: Inadequate security provisions or systems*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate/defective tools/equipment/materials/products*
- *Process (conditions): Work Place Hazards: Hazardous atmosphere (explosive/toxic/asphyxiant)*
- *Process (conditions): Organisational: Inadequate training/competence*
- *Process (conditions): Organisational: Inadequate work standards/procedures*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate supervision*
- *Process (conditions): Organisational: Poor leadership/organisational culture*

High potential events by region

Offshore

Angola **Function: Drilling** **Category: Other** **Activity: Drilling, Workover, Well Services**

Narrative:

At 10:45 am a complete power shutdown was initiated, following the activation of an ESD push button located at a lifeboat station. As a consequence the rig was left with no power generation, no Uninterrupted Power System (UPS) and then with no possibility to maintain and monitor her position above the well. The yellow alert was raised shortly followed by the red alert. The Emergency Disconnect Sequence (EDS) was therefore initiated by the Driller, shearing the completion string and disconnecting the Lower Marine Riser Package (LMRP). The drillship started drifting until it was maintained in position by 2 tugboats (about 2 NM away from well location). ERC (Emergency Response Centre) was locally activated. On the drillship, dynamic positioning functions were restored at 7 pm.

The ESD-0 was activated during a routine inspection of one of the lifeboat stations. It was wrongly interpreted as a reset switch for the remote controlled winch.

What went wrong:

- *The ESD-0 was activated during a routine inspection of one of the lifeboat stations. It was wrongly interpreted as a reset switch for the remote controlled winch.*
- *The cover box was incorrectly labelled, not identified as a major ESD location and poorly protected against accidental actuation.*
- *Lifeboat test planned during inappropriate period*
- *The crew was not prepared and trained for a manual start-up which is normally handled by the Power Management System.*

Corrective actions and recommendations:

- *Identify & label properly the ESD location or boxes. Secure the boxes as needed to prevent accidental activation.*
- *Organize regular training/practice of manual start-ups with the concerned crews to improve the efficiency of power recovery in an emergency.*

Causal Factors:

- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*

Angola **Function: Production** **Category: Explosions or Burns** **Activity: Maintenance, Inspection, Testing**

Narrative:

Chlorination unit explosion. On 13/03, the chlorination unit cell A was isolated from the process and electrically. On 14/03, the cell was opened to inspect the plates condition.

On 15/03, the electrical and process isolations were removed and the cell was refilled with water on manual mode (to the minimum liquid level of 48%) and then switched to automatic mode. Some minutes later, the cell exploded damaging the adjacent cell B.

What went wrong:

- *Lack of start-up procedure: opening the cell allowed to have air in the system, which allowed the explosion to occur. There was no procedure provided by the vendor to remove the air before strat-up.*
- *No respect of operating manual procedures: the system was flushed once every 2 days while the vendor manual requests once every day.*
- *It is assumed that the electrolyte plates were not covered with water that could most likely cause a spark that ignited the explosion.*
- *PSV failed to release the blast pressure.*

Corrective actions and recommendations:

- *Respect strictly the operating manual.*
- *Perform HAZOP to ensure that unit design and safety barriers are compliant with company rules.*
- *For start-up and shutdown of specific units ensure that vendors procedures are existing and apply them strictly.*

Causal Factors:

- *People (acts): Following Procedures: Violation unintentional (by individual or group)*
- *People (acts): Use of Protective Methods: Equipment or materials not secured*
- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate maintenance/inspection/testing*
- *Process (conditions): Organisational: Inadequate work standards/procedures*

High potential events by region

Democratic Republic of the Congo (formerly Zaire)
Function: Construction **Category:Falls from Height** **Activity: Construction, Commissioning, Decommissioning**

Narrative:

- *During extensive rope access activities, one absailer working on wellhead conductors (spider deck) fell into the sea. The affected party was recovered safely by work colleagues and sustained no resulting injuries or medical issues. There was no direct witness to the event.*
- *Missing Grating where individual fell to the sea.*
- *Individual was either not 'hooked on' – no rope evident or 'panic grabbed' the shunt (foreseeable misuse).*

What went wrong:

- *No Safe Operating Procedure for Rope Access, detailed task management handed off to service providers.*
- *Limited active monitoring at the worksite and equally limited corporate auditing of Rope Access activities.*
- *Rope access supervision was inadequate for complexity of activities (including at preparation/planning stages)*

Corrective actions and recommendations:

Each service provider shall be subject to audit prior to them resuming activities on assets and required to demonstrate compliance with International codes of practice e.g. confirmation that contractor management, organisation, experience and competence is adequate for the task and confirmation that the nominated supervisor(s) experience and competence is adequate for the task.

Causal Factors:

- *People (acts): Use of Protective Methods: Inadequate use of safety systems*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate supervision*

Ghana **Function: Drilling** **Category: Struck by** **Activity: Lifting, Crane, Rigging, Deck operations**

Narrative:

A 20 ounce (.6 kilogram) hammer was left on top of a joint of riser pipe after it was prepared for lifting. This created a potential "Dropped Object" event for personnel onboard the vessel and the drilling rig.

What went wrong:

The crane operator onboard the drilling rig saw the hammer when the joint was at pipe deck level. Personnel on pipe deck were warned and moved from area. Riser joint was placed on pipe deck without incident. Maximum potential drop distance was 55 feet (17 meters) to the boat and 20 feet to the pipe deck (7 meters).

Corrective actions and recommendations:

The STC and OIM were notified and a safety stand down was called by the barge engineer. The boat captain was informed of the incident by radio.

Causal Factors:

- *People (acts): Following Procedures: Violation unintentional (by individual or group)*
- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *People (acts): Use of Protective Methods: Equipment or materials not secured*
- *People (acts): Inattention/Lack of Awareness: Lack of attention/distracted by other concerns/stress*

High potential events by region

Ghana **Function: Drilling** **Category: Struck by** **Activity:Transport - Water, incl. Marine activity**

Narrative:

Tow bridle failed when anchor handling vessel could not maintain position to safely pass the tow bridle back to semi-submersible drilling rig. Significant shock load exerted on the tow bridle wire, causing it to fail, injuring worker when the line recoiled onto the deck of the vessel.

What went wrong:

This was the third attempt to release the tow bridle. No one made an attempt to stop the job.

Just prior to the tow wire parting, the crew was attempting to disconnect the connecting shackle. One man had removed the split pin and was hammering on the shackle nut to get it turning. The vessel tow wire needed to be dragged aft. The injured person and another man were attempting to get a chain and tugger wire connected to the tow wire.

Corrective actions and recommendations:

- *Vessel captain and crew did not recognize the potential risk and continued to try to release the tow bridle even though the vessel could not remain on station and would drift away from the rig with the current.*
- *May have been confusion as to assigned tasks or lack of preparation by the vessel deck crew. During one attempt, there was an approximate 11 minute window when the tow wire could have been released safely. Personnel on the boat did not seem ready.*
- *Operation was stopped. Rig medical personnel were sent to the boat. IP was assessed, spinal immobilized on spine board and transported to the rig for evacuation to shore.*
- *Revise rig JSA to state "if the workboat has problems due to seas or problems with his vessel, evaluate whether we need to exercise our Stop Work Authority and delay operations until a time when the job can be done safely".*

Causal Factors:

- *People (acts): Following Procedures: Improper position (in the line of fire)*
- *People (acts): Use of Tools, Equipment, Materials and Products: Servicing of energized equipment/inadequate energy isolation*
- *People (acts): Use of Protective Methods: Failure to warn of hazard*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *People (acts): Inattention/Lack of Awareness: Lack of attention/distracted by other concerns/stress*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Work Place Hazards: Storms or acts of nature*
- *Process (conditions): Organisational: Inadequate training/competence*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*

HIGH POTENTIAL EVENTS BY REGION

Asia/Australasia

Onshore

Australia **Function: Production** **Category: Pressure Release** **Activity: Maintenance, Inspection, Testing**

Narrative:

During a nitrogen pressure test a test hose failed as a result of over pressurisation.

What went wrong:

- *Company can remove a contributing factor from this problem by establishing a process of controlling goods inward (i.e. ISO Tank detour and delay to F02 work party).*
- *Company can remove a contributing factor from this problem by balancing work-rest schedules to allow optimal performance of Project Supervisors.*
- *Company can remove a systematic root cause from this problem by clearly defining and communicating Company management responsibility for contractor safety throughout the organisation.*
- *Contractor can remove a contributing factor from this problem by enforcing the requirement of a minimum of two competent personnel present at any pressure/leak testing work sites, as outlined in their Safe Work Standard.*
- *Company can remove a systemic root cause from this problem by establishing a Procedure requiring test packs for all pressure/leak testing.*
- *Contractor can remove a systemic root cause from this problem by changing the Procedure for multiple gauge monitoring.*
- *Contractor can remove a systemic root cause from this problem by establishing a standard requiring a suitable regulator.*
- *Contractor can remove a systemic root cause from this problem by establishing a Standard to provide approved test packs.*
- *Contractor can remove a systemic root cause from this problem by establishing a standard requiring PSVs independent of unit under test.*
- *Company can remove a systemic root cause from this problem by establishing a robust planning process to enforce adequate notification of work to the appropriate authorities. This ensures sufficient time for Engineering and Operations review prior to Permit Issue*

Corrective actions and recommendations:

- *Company to define contractor HSSE management accountabilities across company and clearly communicate responsibilities to stakeholders.*
- *Company to collaborate on the development of a Procedure detailing the minimum requirements for a test pack to be supplied to company project management prior to the commencement of any pressure or leak testing.*
- *To establish an effective work planning process to ensure all proposed work is subject to appropriate Engineering and Operations review prior to application for Work Permit/Work Authorisation.*
- *To review staffing, PTW Procedure, and training to ensure the requirement for Area Authorities, who are competent in the plant/facility, to review the content of permits is clearly understood.*
- *To review competence of existing Permit Authorities with detailed examination of their ability to carry out responsibilities as defined in Permit to Work Procedure.*
- *To establish a training and competence program for future Permit Authorities based on defined resp*

Causal Factors:

- *People (acts): Use of Protective Methods: Failure to warn of hazard*
- *Process (conditions): Protective Systems: Inadequate/defective guards or protective barriers*
- *Process (conditions): Organisational: Inadequate work standards/procedures*
- *Process (conditions): Organisational: Inadequate supervision*

High potential events by region

Australia **Function: Production** **Category: Explosions or Burns** **Activity: Production Operations**

Narrative:

Following a planned shutdown of the onshore gas plant, a gas release occurred during re-start activities on Train 5. The loss of containment resulted when flanges installed in the liquid outlet on a Column were subjected to excessive load during the cool down process. This loading occurred because thermal movement of the pipe allowed it to exceed the height of the support guides resulting in a single point of support adjacent to the flanges. This support created the excessive flange bending moment. The hydrocarbon release was classified as significant (RIDDOR Classification).

What went wrong:

The root causes from the major investigation include; engineering process did not adequately consider piping thermal bowing and piping quality control did not identify that piping stress calculations had not been completed for the design change relative to Train 4.

Corrective actions and recommendations:

- *Lessons learned have been shared with Design Development Project Teams for future project designs.*
- *Revise project procedures to ensure that design changes on critical piping are subjected to reassessment of the piping stress calculations.*
- *Develop an improved process for the cooldown of LNG trains to minimise the piping thermal gradient and thermal bowing during the cooldown.*

Causal Factors:

- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*

Pakistan **Function: Production** **Category: Pressure Release** **Activity: Production Operations**

Narrative:

Mild gas leakage was observed from lower side glass level gauge (GLG) of inlet filter coalescer V-590 by shift incharge and area operator during routine plant round. Upon leakage identification level-1 shutdown was activated at 1227 hrs to stop the leakage. All emergency response measures were taken by activating FAT and FFT. GLG was replaced with new one and plant was again brought into flow at 1528 hrs following cold start-up procedures and using the already developed plant start-up TRA.

What went wrong:

The sealing gasket of the glass level gauge could not withstand the operating pressure even it was well within the design range of LG and eventually led to material failure.

Corrective actions and recommendations:

Maintenance schedule shall be revised. There shall be annual inspection of LGs instead of bi-anual (2 years).

Causal Factors:

- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*

Pakistan **Function:Unspecified** **Category: Struck by** **Activity:Transport - Land**

Narrative:

A vehicle was hit at back by rear vehicles while going to drop female staff after office hours. There was no obvious injury to any passenger and the driver; however the passengers were taken to the Hospital for evaluation where one employee was admitted for suspicion of whip lash injury of the cervical spine while the rest of the passengers were relieved from the Hospital.

Corrective actions and recommendations:

- *Install In Vehicle Monitoring System IVMS)/Tracker*
- *Share findings and leanings*
- *Refresher training courses for the drivers*
- *Emergency Response Plan (ERP)*
- *Review of current pick & drop facility to staff*

<<No Causal Factors Allocated>>

High potential events by region

Thailand **Function: Drilling** **Category: Pressure Release** **Activity: Drilling, Workover, Well Services**

Narrative:

While drilling the 12 1/4" top hole section with flow riser (no BOP) at 220m, the drill started to bounce. Plans were checked for anti-collision and it was concluded there was still a 5m separation. Cautious drilling continued. Some 7 minutes later the well kicked. Mud flowed from the wellbore. Rig crews evacuated the rig floor. The kick lasted 3-5 minutes then stopped by itself. During attempts to pump mud into the well another small kick occurred. The well was eventually filled with mud again and no further flow occurred.

What went wrong:

The well being drilled collided with an adjacent well. Rig ESD was not hooked up at the time.

Corrective actions and recommendations:

Close attention must be paid to anti-collision procedures and practices. Pre-spud meeting must be held with all involved parties to ensure everyone has a clear understanding.

Causal Factors:

- *People (acts): Following Procedures: Violation intentional (by individual or group)*
- *People (acts): Use of Protective Methods: Inadequate use of safety systems*
- *People (acts): Inattention/Lack of Awareness: Lack of attention/distracted by other concerns/stress*
- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate supervision*

Offshore

Australia **Function: Construction** **Category: Struck by** **Activity: Lifting, Crane, Rigging, Deck operations**

Narrative:

Scaffold planking was being landed onto the Wellhead platform using the S3K port-side 40Te crane, when planking slid from the rigging before the load was landed. No personnel injuries resulted from this event. No damage to any asset.

What went wrong:

Scaffold planks were not in a lifting basket. There was no lifting plan. There was no Job Safety Analysis.

Corrective actions and recommendations:

Lift scaffold planks in a basket and ensure proper lashing inside. Conduct JSA and develop lifting plans.

Causal Factors:

- *People (acts): Following Procedures: Violation intentional (by individual or group)*
- *People (acts): Following Procedures: Improper lifting or loading*
- *People (acts): Use of Protective Methods: Inadequate use of safety systems*
- *Process (conditions): Organisational: Inadequate work standards/procedures*

Australia **Function: Construction** **Category: Pressure Release** **Activity:Diving, Subsea, ROV**

Narrative:

Toward the end of March 2011, preparations commenced for the replacement and installation of mooring chain on the Riser Turret Mooring (RTM). This work included cleaning marine growth from the RTM by contract divers using a HP water blasting gun. While conducting diving activities at 28m, specifically High Pressure (HP) water blasting for the removal of marine growth from the Riser Turret Mooring (RTM), the protection pipe and tube of the HP water blaster gun fell away. Water jet from the unprotected retro lance struck the diver's left forearm, causing a puncture wound.

The diver returned to the bell and subsequently dive chamber, and after initial examination and treatment, was decompressed to the surface for medivac. The IP has undergone several flushes of the wound, two skin graft operations, and has commenced intensive physiotherapy treatment.

What went wrong:

- *EQ2-1 Equipment/Parts Defective - Procurement The procurement process of the gun was not as robust as it could have been. The wrong nozzles were supplied with the gun and no manuals were provided.*
- *EQ2-2 Equipment/Parts Defective - Manufacturing The protection pipe retaining cap screws may have become loose due the vibrating and pulsing force of the gun operation, and on/off actions.*
- *HP4-2 Procedures - Wrong No guidance or warnings in diving procedures or guidelines noted the specific hazard of a short retro lance to the operator.*

Corrective actions and recommendations:

- *Positive learnings: Preparation and planning for Emergency Response by the contracting company, particularly in relation to diving activities were thorough and included additional assurance by the Project Team - this ensured that the response to the incident was robust.*
- *Contractor/sub-contractor procurement processes and associated QA/QC checking is identified by the dive contractor as an area for improvement*

Causal Factors:

- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate/defective tools/equipment/materials/products*
- *Process (conditions): Organisational: Inadequate work standards/procedures*

High potential events by region

Australia **Function: Construction** **Category: Pressure Release** **Activity: Construction, Commissioning, Decommissioning**

Narrative:

During the commissioning phase of a new FPSO a major hydrocarbon release (estimated at 28,000kg) occurred when the pressure vacuum (PV) breaker protecting the cargo tanks from over and under pressure released gas to the atmosphere at a pressure lower than the design intent. The hydrocarbon release was detected by the gas detection system and the appropriate actions were initiated, resulting in shutdown of the facility.

What went wrong:

The investigation determined that the root causes included; incorrect calculation signed off in design, consequence analysis not completed for P/V breaker release, P/V breakers not constructed as per design specification, small margins between maximum operating pressure and P/V breaker release and onshore commissioning that never tested the full functionality of the P/V breaker (re-sealing arrangement).

Corrective actions and recommendations:

- *PV breakers designed with an automatic re-sealing system should be reviewed and if necessary "computational fluid dynamics" to demonstrate their viability.*
- *Carry out consequence analysis of PV breaker release (dispersion, fire and explosion, asphyxiation) and ensure that the instrumented protective function is suitable for the hazard.*
- *Review design margins between maximum operating pressure, high pressure trip setting and PV breaker release.*
- *Commissioning and Operating procedures must ensure that the PV breaker is suitably commissioned, tested and operated as per design.*

Causal Factors:

- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*

China **Function: Production** **Category: Struck by** **Activity: Lifting, Crane, Rigging, Deck operations**

Narrative:

A crane was being used to lift a chemical tank from a ship to the platform. When the tank was lifted in the air the tightwire broke and the tank fell to the deck of the ship. It caused a shipman's leg to be broken.

What went wrong:

- *The crane's tightwire jumped out from the pulley block, and was cut by the pulley block.*
- *The shipman was standing around the area in which the tank fell.*

Corrective actions and recommendations:

- *Check crane pulley block weekly.*
- *Training for shipmen to move away when lifting tank from ship to platform.*

Causal Factors:

- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *People (acts): Use of Protective Methods: Failure to warn of hazard*
- *People (acts): Inattention/Lack of Awareness: Acts of violence*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate maintenance/inspection/testing*
- *Process (conditions): Organisational: Inadequate training/competence*

High potential events by region

Malaysia **Function: Construction** **Category: Struck by** **Activity:Transport - Land**

Narrative:

A total of 15 passengers and a driver were on their way back to Base Camp. The truck was ascending uphill (approx. 40 degree), when it suddenly stopped just before the top. The driver failed to control the brake which resulted in the vehicle skidding backwards very fast and hitting the slope.

Fourteen out of sixteen (14/16) were injured and were sent to Hospital.

What went wrong:

- *Improper maintenance on brake system*
- *Acceptance of repaired vehicle by incompetent personnel*
- *Driver not trained with 4WD and defensive driving training*
- *Inadequate Land Transportation Procedure focusing on guideline to address off road driving, steep slope, loading capacity and parking area for lorry bus*

Corrective actions and recommendations:

- *Vigorous review of, and adherence to, the procedures and guideline on land transport.*
- *Focus on vehicle and machinery management system in order to maintain integrity.*
- *Risk assessment shall thoroughly address the risk elements of the following:*
  - *Drop and pick-up point for passengers especially at hotspot areas*
  - *Off-road driving in extreme conditions*
- *Improvement on communication media within multiracial working environment.*
- *Passenger vehicle shall be equipped with good communication device*

Causal Factors:

- *People (acts): Following Procedures: Violation intentional (by individual or group)*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate/defective tools/equipment/materials/products*
- *Process (conditions): Work Place Hazards: Inadequate surfaces, floors, walkways or roads*
- *Process (conditions): Organisational: Inadequate training/competence*
- *Process (conditions): Organisational: Inadequate work standards/procedures*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*

New Zealand **Function: Exploration** **Category: Exposure Electrical** **Activity: Maintenance, Inspection, Testing**

Narrative:

Injured Person was assisting the HV Tech by conducting Point to Point testing. While conducting the testing, he sustained an electrical shock of approximately 220Volts.

What went wrong:

Improper decision making: the situation was wrongly judged and the wrong decision was made.

Corrective actions and recommendations:

- *Instigate procedure to have a second registered electrician to verify if no isolation is required (e.g. – second electrician to initial PTW application to verify no isolation is required in the "Isolation Cert Number' box.*
- *Revise all electrical JHA's which require the use of multi-meters to include the use of 'prove-test- proves'.*
- *Complete PTW refresher training for all personnel who completed the training over 2 years ago. Reinforce at safety meetings for the next 6 weeks that: - No-one may assist personnel working under a permit to work until they have been fully briefed, have read and understood the PTW and associated documentation and signed on to the JHA and the TBT.*
- *Reinforce to personnel and supervision that incident or accident scenes are to be quarantined immediately for evidence preservation purposes.*
- *If personnel are involved in an incident or accident they should make the worksite safe, report the incident to their supervisor and report to the Medic whether or not an injury has occurred.*
- *Medic to ensure that personnel compile a witness statement and keep the personnel involved in the incident/accident under observation.*
- *Commence a program to apply ID tags to all cables and cores. Follow-up and progress with the issue of the "As built' drawings for the FPSO.*

Causal Factors:

- *People (acts): Following Procedures: Violation unintentional (by individual or group)*
- *People (acts): Use of Tools, Equipment, Materials and Products: Servicing of energized equipment/inadequate energy isolation*
- *People (acts): Use of Protective Methods: Failure to warn of hazard*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *Process (conditions): Organisational: Inadequate training/competence*
- *Process (conditions): Organisational: Poor leadership/organisational culture*

High potential events by region

New Zealand **Function: Exploration** **Category: Struck by** **Activity: Lifting, Crane, Rigging, Deck operations**

Narrative:

During cargo offloading operations at the Well Head Platform (WHP), while securing a load to the hook on the WHP crane block, the block became caught under the frame of an adjacent load on the deck of the supply vessel. This caused the bottom of the block to swing out from the frame, coming into contact with the person attempting to attach the locking pin into the hook.

What went wrong:

The Swear crew knew the stinger was needed for the heavy lifts, and as it was simply sitting on the deck of the vessel, felt it was ok to attach it to the load and bring the crane main block down to attach the stinger to the main block hook.

Corrective actions and recommendations:

- *Do not lower the block to the vessel, utilize a stinger/pennant*
- *Manage certified lifting gear on the facility*
- *Transport lifting gear as cargo, not loose*
- *Do not underestimate the risk, especially when factors are outside of your control i.e. weather*
- *Ensure plans are in place for the work and any changes are properly assessed*

Causal Factors:

- *People (acts): Following Procedures: Improper lifting or loading*
- *People (acts): Use of Protective Methods: Disabled or removed guards, warning systems or safety devices*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *Process (conditions): Organisational: Inadequate training/competence*
- *Process (conditions): Organisational: Poor leadership/organisational culture*

New Zealand **Function: Exploration** **Category: Struck by** **Activity: Lifting, Crane, Rigging, Deck operations**

Narrative:

During a work-over operation, a lubricator was lifted from the pipe deck to the rig floor. The load was put down and the rear leg of the 2-leg attachment was removed in preparation to "stab on" in the vertical position.

The lubricator was then lifted beyond horizontal and the tool string rolled out of the lubricator and fell approximately 6 meters from the rig floor. The tool string landed on the pipe deck catwalk.

Due to the safe/correct positioning of the two dog men, they remained out of the trajectory of the falling tool string. Had the tool string hit a person in the torso, a fatality could have eventuated.

What went wrong:

- *Tool rolled out of Lubricator and fell 6 meters to pipe-deck catwalk.*
- *Lack of rigorous checks of hazard ID & JSAs for specialist contractors' work.*
- *Perceived need to keep job going quickly and avoid two lifts.*
- *Limited space and not able to confirm tool was "in catch" without another lift.*
- *No end cap available for in-situ sub in case tool not "in catch" (Safety backup)*

Corrective actions and recommendations:

Ensure all JSA's and rig up/down procedures are specifically tailored to the unusual companies WHP Work-Over Unit.

Causal Factors:

- *People (acts): Following Procedures: Improper lifting or loading*
- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *People (acts): Use of Protective Methods: Equipment or materials not secured*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *Process (conditions): Organisational: Inadequate work standards/procedures*
- *Process (conditions): Organisational: Poor leadership/organisational culture*

HIGH POTENTIAL EVENTS BY REGION

Europe

Onshore

Austria **Function:Unspecified** **Category:Falls from Height** **Activity:Unspecified - other**

Narrative:

During the safety instruction training for working on a device for rescuing from heights a near miss took place.

While simulating the rescuing of a person with the device in rescue mode, the instructor (simulating the person needing to be rescue and connected to the steel line of the safety device via harness etc.) asked them to be trained rescuer, who was operating the device, to let go of the handle of the device, with which the person on the line can be lifted or lowered.

According to the use of the device and the specification the load break should have worked immediately and stop any lowering of a person.

However, the load break failed and the handle started to rotate and the instructor on the line stopped on his feet. Due to his position in relation to the device (about 50 degree as simulation hanging in the safety harness) the instructor instinctively started to walk backwards to catch his balance. This attempt did not work as the instructor was hanging in the line which was tight but also giving a little bit of way, as the load in this position is not enough to activate the gravity break and the load break did not work.

At the end the instructor came to a stop on his bottom and due to breaking the stop with his hands nothing happened (also no hematoma).

The instructor was wearing a safety helmet, safety shoes, etc.

A nearby placed floor console was removed to give more space for the training area.

What went wrong:

A technical failure: Loosening of a screw thread, fixed by adhesion with special glue, in the load break. As a consequence the adjustment of the break device of the rescue lifting device shifted. Therefore, the needed axial pressure on the friction area of the break was not given.

Without opening the device it can be noticed, because the handle can be moved in both directions regardless if the device is in rescue- or working-mode.

Corrective actions and recommendations:

Immediate measures:

- *Determining the number of these devices present in the company in the same design*
- *Identify owners of these devices*
- *HSE Alert and banning of usage of this device until further notice by the HSE department*
- *Amassing all devices*
- *Inspection and all relevant devices (revision ahead of time - regular inspection/revision due 02-2012)*

Causal Factors:

- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate/defective tools/equipment/materials/products*

Hungary **Function: Production** **Category: Explosions or Burns** **Activity: Production Operations**

Narrative:

In the middle of the storage-yard in a safe area the separator No S-101, polluted with pirophoric materials was planned to clean. Opening the entering hole the separator was monitored for 1 day, then the other flanges were also taken off. As the downer level control flange was opened, the glowing material ignited the CH mix in the separator, and a fire ball was shot through the previously opened water discharge line. At that time the victim arrived to call the colleagues for lunch. He was hit by the fireball, and had serious burning injuries on his leg. His colleagues took him to the doctor, and the ambulance took him to the clinic.

What went wrong:

Cleaning of a piroforic tank was done without any safety information, proper risk assessment, trained staff.

Corrective actions and recommendations:

New procedure for handling piroforic equipment Reinforce PTW system

Causal Factors:

- *Process (conditions): Protective Systems: Inadequate/defective guards or protective barriers*
- *Process (conditions): Protective Systems: Inadequate security provisions or systems*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate maintenance/inspection/testing*
- *Process (conditions): Work Place Hazards: Hazardous atmosphere (explosive/toxic/asphyxiant)*
- *Process (conditions): Organisational: Inadequate training/competence*
- *Process (conditions): Organisational: Inadequate work standards/procedures*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate communication*
- *Process (conditions): Organisational: Inadequate supervision*

High potential events by region

Hungary **Function: Production** **Category: Explosions or Burns** **Activity: Production Operations**

Narrative:

There was a fire on compressor N-708. The discharge valve's cover bolts were broken, the valve cap, and the valve holding "bell" was shot to the foot-grid, the gas was flowing and ignited. The plant-fire brigade in cooperation with the govt fire-brigade started the cooling. The operators eliminated the critical sections. Additional problem occurred, when the CC2-MC2 units emergency shut down, as the gas could flow back from the flareline through a damaged valve. Decreasing the field production and started the CC2-MC2 units, the supply of the gas could be stopped, the fire was out and the unit could be cooled down. There was personal injury (post-event psychological shock).The plant-fire brigade in cooperation with the govt fire-brigade started the cooling. The operators eliminated the critical sections. There was a personal injury (post-event psychological shock and a bone in his ear was broken), 155 000 m^3 natural gas was burned (causing 300 tons of CO_2 emission).

What went wrong:

Cleaning of a piroforic tank was done without any safety information, proper risk assessment, trained staff.

Corrective actions and recommendations:

New procedure for handling piroforic equipment Reinforce PTW system

Causal Factors:

- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *Process (conditions): Protective Systems: Inadequate/defective guards or protective barriers*
- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate/defective tools/equipment/materials/products*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate maintenance/inspection/testing*
- *Process (conditions): Organisational: Inadequate communication*

Romania **Function: Unspecified** **Category: Struck by** **Activity:Transport - Land**

Narrative:

Early in the morning of August 27, 2011 a contracted bus, transporting company employees over night on a long route, crashed into an oncoming truck while overtaking a horse carriage on a blind bend.

The truck driver had managed to pull over and was stationary when the bus hit it head on, while the employees in the bus were sleeping.

During the event, 6 employees were injured one of which was a LWDC (broken nose). In addition, the second driver who was resting on the passenger seat also sustained injuries.

What went wrong:

- *Nine hours overnight journey*
- *Overtaking of horse carriage where forbidden (straight line)*
- *Not all of passengers had seatbelts fastened*

Corrective actions and recommendations:

- *Development of an awareness campaign to increase the use of safety seat-belts (includes movies, windows stickers, installation of wrecked car and dummies, dummies in buses in post-crash positions, posters etc.).*
- *Issue a motion to enforce employees' commitment on the wearing of safety seat-belt.*
- *Monitoring the use of seat-belts in all vehicles.*
- *Review of all bus trips in the company Journey Management compliance.*

Causal Factors:

- *People (acts): Use of Protective Methods: Personal Protective Equipment not used or used improperly*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *People (acts): Inattention/Lack of Awareness: Fatigue*
- *Process (conditions): Organisational: Inadequate training/competence*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*

High potential events by region

UK **Function:Unspecified** **Category: Pressure Release** **Activity: Construction, Commissioning, Decommissioning**

Narrative:

Two members of the site's demolition team accidently cut into a 20 inch pipe containing gas at 1.7 barg. The pipe was cut on the wrong side of the isolation, the workscope having been misunderstood by the contractor. A site procedure relating to marking of pipes had not been followed. An estimated 162 kg of gas was released to the atmosphere. The gas was not ignited and was dispersed in an open area. There was no injury to personnel. The affected plant was shut down and depressured. At the time of the incident the 2 members of the demolition work party were positioned approximately 1m from the locus of the cut in a cherry picker basket. The 12v electrical control panel for the cherry picker located in a panel at the rear of the basket was not EX certified and so represented a potential source of ignition.

What went wrong:

- *Ineffective communication of work scope - Workscope was communicated verbally during site visit, and misunderstood by the contractor. The company work pack defined the scope, but was not used by the contractor. The contractors work pack did not define the scope.*
- *Lack of marking on pipes - Pipework was labelled as redundant (historical). No physical marking on the pipework for this work contrary to the contractor's procedure. Live pipework at air gap not marked as required by current site decommissioning philosophy.*
- *Work control - The risk of cutting the pipe in the wrong position was not recognised in the work permit, but the control designed to prevent this was not sufficiently rigorous.*
- *Safety leadership - The site's earlier practice of marking or witnessing cuts ceased circa early 2009, despite this being called for in the method statement. The site auditing process had not identified this gap.*

Corrective actions and recommendations:

- *Ensure there is a rigorous process in place and followed for marking the location and witnessing any process pipework cuts.*
- *Ensure sufficient safeguards are in place to mitigate against the potential for human error or misunderstanding in communicating safety critical activities.*
- *Ensure auditing and monitoring processes are rigorous enough to identify degradation in adherence to procedures and processes.*

Causal Factors:

- *People (acts): Following Procedures: Violation unintentional (by individual or group)*
- *People (acts): Use of Tools, Equipment, Materials and Products: Servicing of energized equipment/inadequate energy isolation*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Organisational: Inadequate work standards/procedures*
- *Process (conditions): Organisational: Inadequate communication*

Offshore

Greenland **Function: Drilling** **Category: Struck by** **Activity: Lifting, Crane, Rigging, Deck operations**

Narrative:

A 1 ton sling parted under tension, whilst being used with a tugger to try and pull free a Kelly hose that had become caught in a joint of riser being lifted onto the rig floor. No injury to personnel.

As a result of the sling parting, the tugger hook and wire went to the crown and became trapped in the sheave. The slack tugger wire came down to the rig floor landing over the tugger controls. The tugger operator had moved to a point of safety upon hearing the sling break.

What went wrong:

- *Incorrect use of machinery/equipment*
- *Inadequate tools/equipment*

Corrective actions and recommendations:

- *Supervisors to ensure right tool for job is being used.*
- *Supervisors to show greater presence when operations like this are going on.*
- *Safety officer to show a greater presence during critical drill floor operations.*

Causal Factors:

- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate/defective tools/equipment/materials/products*

High potential events by region

Greenland **Function: Drilling** **Category:Water related, Drowning** **Activity:Transport - Water, incl. Marine activity**

Narrative:

During a drill the FRC crew failed to release the off-load hook. The FRC was waterborne without the off-load hook being released in advance and the painter line was also released before the off-load hook. Ships speed was at that moment close to 0 knots, therefore no serious consequence. Potential for a serious incident which could mean the FRC capsizing whilst the ship is underway.

What went wrong:

Incorrect procedures

Corrective actions and recommendations:

- *Safety briefing/toolbox talks required for all potential FRC operators*
- *Test on/off load device on all vessels*

Causal Factors:

- *Process (conditions): Organisational: Inadequate work standards/procedures*

Greenland **Function: Drilling** **Category: Struck by** **Activity: Drilling, Workover, Well Services**

Narrative:

Whilst conducting dual operations, pulling out of hole with 9 7/8" pilot BHA on the main (aft) well and preparing to run in hole with 36" BHA on 5 7/8" drill pipe on the aux (fwd) well, a stand of 5 7/8" drill pipe fell across the derrick from the aux well to the main well. The top of the dropped stand was found leaning against the main well dolly tracks, with the bottom end (pin) sitting not yet screwed (unsecured) in the box of the stand held in the slips.

What went wrong:

- *Human error*
- *Lack of manpower for dual operations*

Corrective actions and recommendations:

- *Importance of clear communications*
- *Upmanning*
- *To provide responsible person with tool to manage both human and technical resources - a transparency report for 'at a glance' review.*

Causal Factors:

- *Process (conditions): Organisational: Inadequate communication*
- *Process (conditions): Organisational: Inadequate supervision*

Greenland **Function: Drilling** **Category:Water related, Drowning** **Activity:Transport - Water, incl. Marine activity**

Narrative:

When transferring a person from vessel to vessel via the fast rescue craft, the person climbing the ladder on the ship's side lost his grip on his way up the ladder and fell into the water. No person injured and no damage to equipment.

What went wrong:

- *Procedures not followed correctly (principle vessel engaged in transfer never sought direct approval through required source; transfer undertaken in darkness; passenger had not received toolbox talk)*
- *Many procedural documents but lack of simple checklist.*
- *Peer pressure for transfer to take place at earliest opportunity.*

Corrective actions and recommendations:

- *Simplify documentation, e.g. checklist.*
- *Better roll out of procedures and more checks.*
- *All passengers to be fully briefed.*

Causal Factors:

- *People (acts): Following Procedures: Violation unintentional (by individual or group)*
- *Process (conditions): Organisational: Inadequate work standards/procedures*
- *Process (conditions): Organisational: Inadequate communication*

High potential events by region

Greenland **Function: Exploration** **Category: Water related, Drowning** **Activity:Transport - Water, incl. Marine activity**

Narrative:

During a routine crew change, a fast rescue craft (FRC) collided with a lead. As the pressure on the FRC increased, it was dragged under the lead resulting in the vessel starting to sink and throwing the passengers into the water. The coxswain was trapped temporarily but managed to free himself. Another FRC was close by and all 6 crew members were picked up safely. All personnel were wearing survival suits with built in buoyancy at the time of the incident.

What went wrong:

- *Failure to review technical adaptation requirements.*
- *Poor safety planning, awareness and knowledge transfer.*
- *Failure in Office QC of vessel JSA form.*
- *Use of equipment for which it was not properly designed (FRC in boat cradle that was too large).*

Corrective actions and recommendations:

- *Develop competence matrices for key roles; link to e-modules and record of completion.*
- *Quality Assurance process should be instituted for procedures changed locally. Consider instituting more frequent reviews of inherently higher risk activities and controls to prevent complacency.*
- *Adequate training and briefing of all crew prior to application of modified procedures and equipment changes for FC crew change.*
- *Evaluate best practice for QC of JSAs.*

Causal Factors:

- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/ materials/products*
- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*
- *Process (conditions): Organisational: Inadequate work standards/procedures*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate supervision*

Norway **Function: Drilling** **Category: Struck by** **Activity: Lifting, Crane, Rigging, Deck operations**

Narrative:

A scaffolding plank fell off of a crane boom on the pipedeck. The area was barriered off, but crane personnel were inside the area.

What went wrong:

- *The crane was not energy isolated before work on the crane boom took place.*
- *Lack of risk assessment during the project planning, both onshore and offshore. The project is a relatively big project compared with the maintenance that should be carried out in operation and the need for the crane is considerable.*
- *Only verbal routines and experience transfer regarding the execution of the job and how to deal with the situation was done.*
- *The crane operator did not inspect the painter's work site and did not personally ensure that it was safe to lift the boom out from the scaffolding, according to the agreement between painters and crane operators.*

Corrective actions and recommendations:

- *The crane must be energy isolated to avoid unintentional use when maintenance takes place.*
- *Removable scaffolding planks to be secured or removed when they are unattended.*

Causal Factors:

- *People (acts): Use of Protective Methods: Equipment or materials not secured*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Organisational: Inadequate work standards/procedures*

HIGH POTENTIAL EVENTS BY REGION

FSU

Onshore

Kazakhstan **Function: Drilling** **Category: Struck by** **Activity: Drilling, Workover, Well Services**

Narrative:

Incident occurred during POOH the drill pipes with the liner setting tool. The driller was pulling out 1 stand of DP from the hole and he over-pulled approximately 6-7 m of the 4th joint. This resulted in Top Drive hitting the mast top spreader beam.

The spreader beam of the mast was bent and damaged as well as the two front main beams.

What went wrong:

- *The crown/floor saver was in switched off position and crown-o-matic wasn't adjusted properly.*
- *Driller and Tool pusher did not hear the crown saver signal while they were pulling out 63 stand prior of hitting mast's spreader beams.*

Corrective actions and recommendations:

- *Contractor implement detailed operation procedure regarding slip and cut operation and the use of draw works safety devices (OPS-003-KAZ)*
- *Use of draw works safety devices shall be introduced into JSA's before starting tripping in/out of the hole and before slip and cut operation.*
- *Crown saver keys shall be kept in Rig Manager's office and only used with permit to work*

Causal Factors:

- *People (acts): Following Procedures: Improper lifting or loading*
- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *People (acts): Use of Protective Methods: Inadequate use of safety systems*
- *Process (conditions): Organisational: Inadequate supervision*
- *Process (conditions): Organisational: Poor leadership/organisational culture*

Russia **Function: Drilling** **Category: Struck by** **Activity: Lifting, Crane, Rigging, Deck operations**

Narrative:

A contractor crew was performing handling operations using a Ural 4320 truck-mounted crane at pad, when, at 11:30, the crane's front left outrigger collapsed as the load was being lowered to the rack. As a result, the crane tilted to the left with the extension boom running into the ground. No one was hurt.

What went wrong:

Immediate causes:

- *Improper placement of equipment:*
  - *The crane was sited on hydromounts on an unprepared pad without any provision for the difference in ground surface properties;*
- *Violation of lifting operations procedure*
- *Improper decision making or lack of judgment:*
  - *Crane Operator placed wooden and inventory pads under one of the outriggers on soft ground and considered the crane safely positioned on a stable surface and Handling Foreman decided that handling work could commence.*
- *Congestion or confined space:*

Corrective actions and recommendations:

- *Suspend all handling operations across Subsidiary sites and check operating personnel for permitting documents required to perform this type of operations.*
- *Hold a safety standdown to communicate the circumstances of this incident to all Subsidiary and contractor employees.*
- *Provide unscheduled briefing to crane operators and slingers in Golden Rules of Safe Operation, and in particular, task-based risk assessment.*
- *Prepare and carry out unscheduled operating procedures knowledge testing of crane operators and slingers engaged at Subsidiary's sites.*
- *Ensure that risk assessment is carried out before the start of handling operations, with mandatory fill-out of Risk Assessment Card and Work Safety Scorecard.*
- *Carry out an audit of materials storage areas across the group of fields for compliance with materials storage requirements and availability of space for manoeuvring lifting equipment.*
- *Check for the availability of a company order to put in place controls of pre-work risk assessment for handling operations with mandatory fill out of Lifting Equipment Operation Safety Scorecard.*

Causal Factors:

- *People (acts): Following Procedures: Improper lifting or loading*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *Process (conditions): Work Place Hazards: Congestion, clutter or restricted motion*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate supervision*

High potential events by region

Russia **Function: Drilling** **Category: Struck by** **Activity: Drilling, Workover, Well Services**

Narrative:

A contractor was running in tubing at well R-115 of the field when, at 14:10, the tubing collar parted and remained in the elevator. Broken tubing damaged the hoisting tackle of the APRS-50 WO rig. No one was hurt.

What went wrong:

Immediate causes:

- *Improper decision making or lack of judgment*
- *The situation was wrongly judged and the wrong decision was made.*
- *Operator could have used other drawworks braking tool (foot brake), but was overwhelmed and did not use it.*

Corrective actions and recommendations:

- *Provide an unscheduled briefing in tripping operations to all contractor WO crew members.*
- *Carry out unscheduled primary skill knowledge testing of Contractor hoist unit operators.*
- *WO contractors to carry out on-the-job training of hoisting unit operators for the type of unit, with relevant records made in certificates and submission of data to the Customer's units supervising WO contractors.*
- *Provide data on completed on-the-job training of WO contractors' hoisting unit operators.*
- *Ensure that ongoing control is in place of operators' certificates complying with the hoisting unit type.*
- *Develop an emergency response plan for WO contractors (in the event of equipment failure).*

Causal Factors:

- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*

Russia **Function: Drilling** **Category: Struck by** **Activity: Drilling, Workover, Well Services**

Narrative:

A contractor WO crew was performing work on well when, at 22:35, a drilling line (Ø25mm) broke as UPA-60 WO rig was running in tubing (Ø73mm), which fell to the rig floor from a height of 1 metre. Drilling line was last rewound on 25 Jan 2011. No one was hurt.

What went wrong:

- *Use of defective equipment, tools or materials:*
  - *Performance of tripping operations with defective crown block saver.*
- *Work, equipment operation or motion at improper speed:*
  - *If the lifting speed had been slower, the driller could have had time to stop the travelling block before it reached the crown.*
- *Violation of "Safety rules in oil and gas industry" (PB 08-624-03):*
  - *Preventive inspection of lifting equipment carried out by WO crew every shift was tokenistic. The same entry "Travelling block is in good repair" was made in the equipment inspection log.*
- *Defective safety, isolation or protective devices:*
  - *The driller failed to check the crown block saver before starting the tripping operation.*

Corrective actions and recommendations:

- *Carry out root cause analysis of TS drilling line breakage incidents in 2008-2011. Identify recurrent causes and develop a corrective action plan to prevent similar incidents. Submit data to the Upstream HSE Department.*
- *Ensure that daily control of hoisting tackle safety is in place by WO crew foremen and mechanics.*
- *Provide unscheduled hoisting tackle safety briefings to crews providing drilling, sidetracking, completion and WO services.*
- *Carry out an audit of hoisting tackle safety devices of all rigs.*

Causal Factors:

- *People (acts): Following Procedures: Improper lifting or loading*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate/defective tools/equipment/materials/products*
- *Process (conditions): Organisational: Inadequate communication*

Russia **Function: Drilling** **Category: Explosions or Burns** **Activity:Transport - Land**

Narrative:

At 17:40, a vehicle driven by a contractor driver was on an infield road on the way to the well, when a fire broke out in the engine compartment. A fire brigade arrived on the scene and put out the fire. The driver and passenger (supervisor) were not hurt. The vehicle was completely destroyed in the fire. The cause of the fire is being investigated. The vehicle was fitted with safety belts. There was no onboard monitoring system.

What went wrong:

Immediate causes:

- *Other violations in the use of protective methods: fuel line had no mechanical damage protection.*
- *Mechanical hazards: as the vehicle was sucked into the mud, the gasoline line was damaged and broken.*

Corrective actions and recommendations:

- *Provide an unscheduled road safety briefing to drivers of contractor organizations.*
- *Develop a methodology for checking the operability of vehicle fuel system during trips.*

Causal Factors:

- *Process (conditions): Protective Systems: Inadequate/defective guards or protective barriers*

High potential events by region

Russia **Function: Drilling** **Category: Struck by** **Activity: Drilling, Workover, Well Services**

Narrative:

A contractor crew was performing work on the well. At 14:16, after completing reaming at a depth of 3049 meters, the drilling line broke in the drawworks drum 3 meters from the rotary table during lifting to make a connection. The swivel fell to the rotary table. No one was hurt. There was no damage to equipment.

What went wrong:

Immediate causes:

- *Hidden defects:*
  - *Edges of some cables in the line's rupture point are tapered, which is characteristic of plastic deformation. Some cables broke in places of dents and battering.*
- *Other natural or production hazards:*
  - *Mechanical damage to the line from pinching during winding onto the drum reel*

Corrective actions and recommendations:

- *Ensure that day-to-day control is in place of hoisting tackle safe and proper operation.*
- *Provide training and knowledge testing in Technical Standard for Drilling Line Operation and Run Life to drilling foremen.*
- *Provide unscheduled safety briefing to crews providing drilling, sidetracking, completion and WO services in tackle system inspection and operation.*
- *Engage a commission to inspect tackle system of all rigs. Replace drilling lines if any violation is identified in drilling line operating procedure.*
- *Ensure that incoming control is in place in accordance with applicable drilling line incoming control regulations for compliance with properties specified in certificates. WO and drilling contractors*
- *Set up a work group to look into the process of drilling line loading and transportation from the factory and warehouses to identify and eliminate causes of mechanical damage and circulate findings to all drilling and WO companies.*
- *Engage an independent organization to carry out an expert review of the rig's derrick and drawworks equipment. Take the rig out of service until expert review findings are available.*

Causal Factors:

- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate/defective tools/equipment/materials/products*

Russia **Function: Drilling** **Category: Struck by** **Activity: Drilling, Workover, Well Services**

Narrative:

At 04:11 the Driller, after completing well killing, opened the BOP rams and stated packer pull-out, when a sudden weight surge to 75 tons occurred, resulting in the crippling of UPA-60 WO unit upper derrick section and its collapse to the derrick floor. No one was hurt. The well was not damaged.

What went wrong:

Immediate causes:

- *Improper use of equipment, tools and materials:*
  - *After well killing and before pull-out, preventer should be opened. BOP rams should be opened for packer pull-out.*
- *Work, equipment operation or motion at improper speed:*
  - *Driller violated the procedure (requirements for hanger release) and quickly released the hanger without taking notice of weight reading.*
- *Improper decision making or lack of judgment:*
  - *Driller closed BOP rams without putting up BOP Closed sign. He proceeded with hanger pull-out without checking the BOP.*
- *Inadequate equipment:*
  - *UPA-60 WO unit was not compliant with safety requirements because of defective load limiter of UPA-60A WO unit (para 4.5.3. of PB 08-624-03 - winch drive should have a hook load limiter).*

Corrective actions and recommendations:

- *Amend internal regulations by adding requirements for WO rig load limiters and including relevant changes in the Company Startup Commission Regulations. 25.10.11. WO Sector Team*
- *Submit completion reports for the above actions. 15.12.11. Leaders of TS WO units For Stream*
- *Request that WO contractors provide information of the availability of load and torque limiters in WO rigs (if torque limiters are specified by rig design).*
- *Provide a schedule for load limiter installation (retrofitting, repair) in WO rigs. WO contractors.*
- *Fit all contractors' WO rigs with load limiters.*
- *Based on information provided by WO contractors and action plan developed based on investigation findings, carry out target inspections of WO contractors for WO rig compliance with Upstream-defined requirements.*
- *Check the availability and provide crews with warning and information signs as needed.*
- *Send a request to the manufacturer that a methodology and frequency of load limiter testing be provided for UPA-60A rig. Make the materials received available to the supervision unit.*
- *Ensure that BOP Closed signs are securely attached.*
- *Provide an unscheduled briefing to WO crews.*

Causal Factors:

- *People (acts): Following Procedures: Work or motion at improper speed*
- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*

High potential events by region

Russia **Function: Drilling** **Category:Exposure Noise, Chemical, Biological, Vibration** **Activity: Construction, Commissioning, Decommissioning**

Narrative:

A contractor crew was dismantling an inactive pipeline, when, at 15:00, an excavator involved in earthwork damaged an active oil pipeline (commissioned in 1994) with its bucket. As a result of the incident, 0.25 tons of oil-water emulsion were spilt over an area of 0.33 ha.

What went wrong:

- *Violation of ground disturbance procedure:*
  - *performance of work without operation certificate and hazardous work permit.*
  - *performance of work using a mechanical digger in the buffer zone of active oil pipeline.*
  - *Absence of underground utility line diagram and clearance from the owners of the utilities.*
- *Improper decision making or lack of judgment*
  - *Digger driver did not know that the inactive pipeline to be dismantled intersected an active pipeline as there was no utilities diagram agreed with their owners.*
- *Improper decision making or lack of judgment:*
  - *Foreman made an error of judgment when he instructed the digger driver to start ground disturbance work thinking that the documentation for pipeline from well to ZU2 of field referred to the detected ZU9 – GS pipeline.*

Corrective actions and recommendations:

- *Carry out target audits of operations to dismantle inactive pipelines for compliance with:*
  - *procedure for interaction between the Customer's units and shops;*
  - *issuance of permitting documents for the performance of works (operation certificate issued to the contractor to perform work at the Customer's sites, work permit, availability of agreed utilities flow diagram, briefings, etc.)*
- *Review and update as needed instructions and regulations regarding dismantling of inactive pipelines to ensure that coordination of accountabilities of unit and shop leaders are in place.*
- *Apply penalties to the contractor in accordance with the contract.*
- *Take disciplinary action against persons responsible for the incident.*
- *Carry out cleanup work on the incident site.*

Causal Factors:

- *People (acts): Following Procedures: Violation unintentional (by individual or group)*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate communication*

High potential events by region

Russia **Function: Drilling** **Category: Struck by** **Activity: Drilling, Workover, Well Services**

Narrative:

A Contractor crew was performing preparatory work on the well. At 18:15, after loosening the dog nut, the crew started the BOP installation, with the hanger pulled out to a height of 1 metre, when a crippling of APRS-40 hoist unit lower derrick section occurred at the junction of two sections due to improper wedge locking, which resulted in the tear-out of tubing coupling in the ETA-60 and parting of tubing with cable and ESP. No one was hurt.

What went wrong:

Immediate causes:

- *Improper securing of equipment, tools or materials:*
  - *The incident was caused by improper wedge locking in the derrick upper section*
- *Improper decision making or lack of judgment:*
  - *As the upper derrick section was lowered on the lockings, the driller heard the sound signal but failed to visually check the lockings.*
- *Improperly prepared equipment:*
  - *The hoist unit was not properly prepared in accordance with operating instructions, and specifically, only two of the design-specified four wedge locks pulled out in the upper derrick section during rigging up.*
  - *The operator failed to lubricate the parts before rigging up (lubrication should be performed before each rigging)*
  - *The operator violated the rigging procedure: failed to check the upper section locks three times before setting. An entry regarding the integrity of pull-out locks was made in the shift equipment inspection log.*

Corrective actions and recommendations:

- *Provide unscheduled occupational safety briefing to crews in the safety of rigging operations.*
- *Suspend further preparatory work (dismantling of dog nut, installation of BOP, spider, etc.) using the hoist unit until startup certificate is issued.*
- *Revise the regular and extended maintenance schedules for hoist units and specify the list of required operations. Communicate the revised schedules to all responsible persons against signature.*
- *Ensure that all operations comply with the schedules for regular and extended maintenance of hoist units.*
- *Discuss with the hoist unit manufacturer the possibility of fitting visual control equipment to their derricks to monitor the coupling of the upper and lower sections of the derrick.*
- *Specify in the work permit for rigging operations the person responsible for derrick rigging, supervision of secure derrick upper section connection.*
- *Amend the hoist unit rigging instruction regarding the hoist unit startup to loosen the dog nut and install BOP prior to startup commission.*
- *Review the composition of commission to startup rigged up hoist unit due to the need for confirming hoist unit readiness for loosening the dog nut and installing BOP.*
- *Amend the Subsidiary regulatory documents in a timely manner to include safety requirements to ensure compliance with Corrective Action Plans developed based on the investigation findings from incidents occurred in Company Subsidiaries, and other government regulations.*

Causal Factors:

- *People (acts): Following Procedures: Improper lifting or loading*
- *People (acts): Use of Protective Methods: Equipment or materials not secured*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate maintenance/inspection/testing*

HIGH POTENTIAL EVENTS BY REGION

Middle East

Onshore

Iraq **Function: Exploration** **Category: Pressure Release** **Activity: Drilling, Workover, Well Services**

Narrative:

After finishing drilling a stand at 2354 Meters and reaming down the stand, the RCD (ROTATING CONTROL DEVICE) seal failed, causing an unexpected well pressure, H2S gas release to the atmosphere through the top of the BOP, Reaching almost the crown and placing H2S gas level up to 1.2 % in the atmosphere. Night Drilling Supervisor secured the well.

What went wrong:

RCD (ROTATING CONTROL DEVICE)) seal failed

Corrective actions and recommendations:

- *Check the certifications for each equipment prior the job and ensuring by visual inspection.*
- *Run only slick drill pipe through the RFD seals*
- *Wellhead pressure; In respect to confirm if the industry leader in UBD operations has reduced the dynamic WHP by 20%, and, determine the reason(s) for doing so, if relevant, adjust the WHP parameters accordingly.*
- *Improve the gas detection capability at the RFD seals*
- *Seal material checked for quality or degradation. This should ideally be carried out by an independent organization*
- *ensure that practice drills are as realistic as practicable and are carried out to the furthest practicable extent*

Causal Factors:

- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate/defective tools/equipment/materials/products*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate maintenance/inspection/testing*
- *Process (conditions): Organisational: Inadequate training/competence*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*

Kuwait **Function:Unspecified** **Category: Exposure Electrical** **Activity: Construction, Commissioning, Decommissioning**

Narrative:

Backfilling of excavated trench of a 12" gas pipeline with sand was in progress with the help of a Tipper Truck in the field. During this operation, the driver of the Tipper Truck took the vehicle in reverse direction close to the excavated site and unloaded the sand directly from the tipper truck to excavated trench. After this operation, the driver forgot to reset the tipper body to its original position and took forward the vehicle in the same condition. In the process he also ignored watching the 11 KV overhead electrical transmission lines which are just above the site. As a result, the front portion of the Tipper which was in elevated position hit with the electrical high voltage transmission line. Fortunately nothing happened. No Injuries. No damages.

What went wrong:

The worksite supervisor allowed the tipper truck at the hazardous place with out instruction and assessment of risk at the site. After unloading the sand, the driver did not wait for instruction from worksite supervisor for removal of truck from the site. The driver continued to move the truck with out lowering the tipper.

Corrective actions and recommendations:

Avoid accessing Sand Trucks or material handling equipment below or near to high voltage overhead cable and where critical facilities are very close. No part or portion of lifting material handling equipment shall be allowed or permitted within a distance of 15 metres from an energized overhead power lines as per HSE Management System Procedures of the company. Supervisor and driver must familiarize the area of operation and Job Safety Analysis shall be carried out.

Causal Factors:

- *People (acts): Following Procedures: Improper lifting or loading*
- *People (acts): Use of Protective Methods: Failure to warn of hazard*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate communication*
- *Process (conditions): Organisational: Inadequate supervision*

High potential events by region

Kuwait **Function:Unspecified** **Category: Struck by** **Activity: Lifting, Crane, Rigging, Deck operations**

Narrative:

Pulling out 3 ½" EUE tubing was in progress at one of the Drilling Rig on 12th June 2011. The Driller sent a floor man on the man rider winch to the derrick board with a sledge hammer (approximately 10 lb) to release the elevator which was stuck. The floor man donned the man-riding safety harness with the hammer tied up with a rope to the front 'D' rings of safety harness. The hammer was placed between the straps of the harness while he ascended to the monkey board. During this activity four rig crew (3 floor man and the driller) were standing on the rotary and was installing the safety clamps on the tubing. When the floor man on the man riding winch moving closer to the elevator, the hammer slipped from the safety harness straps and fell down. Due to the impact of falling the hammer slid from the rope knot and fell from a height of approximately 90 f. One of the floor men was injured, as the hammer fell on his right shoulder. The IP sustained a fracture in the right scapula resulting in a lost workday case.

What went wrong:

- *Employee involvement not effective*
- *Technical Analysis not effective*
- *Work planning and risk assessment not effective*
- *Storage of materials not effective*
- *Vertical communication between supervisor and subordinates not effective.*
- *Correct tools or equipment not available*
- *Training effort not effective*
- *Job oversight not effective*
- *Risk assessment not effective*
- *Wrong tool for the job*
- *Implementation of SPP not effective*
- *No Work Planning or risk assessments performed*
- *No inspection of tools*
- *Assessment of skill level/competency not effective*

Corrective actions and recommendations:

- *Permit to work (PTW) process to be implemented at rig site. Permit issuers and applicant shall be trained on permit to work system and on developing JSA's. Documents on PTW training to be maintained at rig site. Rig specific JSA's (Job Safety Analysis) shall be developed and implemented for critical and non-routine activities.*
- *Manufacture designed tethered type hand tools shall be provided for man riding operations in order to secure hand tools properly to a suitable anchor point with a specially designed tool lanyard, which can prevent dropped object incidents. Man riding operation check list to be developed and implemented. Requirement for the Inspection tools used while working aloft shall be included on the man riding operations check list. Ensure completed check list to be documented at rig site. All Rig crew shall be trained as per Company HSE training matrix.*

Causal Factors:

- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *People (acts): Use of Protective Methods: Failure to warn of hazard*
- *People (acts): Inattention/Lack of Awareness: Lack of attention/distracted by other concerns/stress*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate/defective tools/equipment/materials/products*
- *Process (conditions): Organisational: Inadequate training/competence*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate communication*
- *Process (conditions): Organisational: Inadequate supervision*

Oman **Function: Production** **Category: Pressure Release** **Activity: Maintenance, Inspection, Testing**

Narrative:

The plant annual shut down was being completed. A pipeline PV had been removed for calibration and not replaced yet. Gas was introduced to the pipeline from the wellsite and leaked from the open flange of the removed PV. Leak pressure around 350psi for a short period. No injuries, no ignition.

What went wrong:

Failure to follow supervisor's instructions. Inadequate assessment of competence/skills required. Poor work activities planning. Inadequate communication between work groups. Poor Permit to Work control.

Corrective actions and recommendations:

Ensure PTW use is enforced. Job Safety Analysis to be done. Use of mechanical isolations to be extended and enforced.

Causal Factors:

- *People (acts): Use of Protective Methods: Inadequate use of safety systems*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*
- *Process (conditions): Organisational: Inadequate work standards/procedures*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*

High potential events by region

Qatar **Function: Production** **Category: Explosions or Burns** **Activity: Maintenance, Inspection, Testing**

Narrative:

Boiler B was being prepared for de-isolation after box-up. A report was then received that the fuel gas plugs inside the furnace wind box were not re-installed after maintenance/inspection was completed and before boxing up the unit.

What went wrong:

The report is not finalized

Corrective actions and recommendations:

The report is not finalized

<<No Causal Factors Allocated>>

Qatar **Function: Production** **Category: Struck by** **Activity: Maintenance, Inspection, Testing**

Narrative:

Refrigeration compressor Motor cooler fell off during start up of compressor motor. Cooler was found to have detached from the motor and fallen on the ground floor after tilting from first floor platform. Motor NDE side end cover also had fallen off on the compressor/motor platform. No injury as nobody was there in the vicinity at the time of the incident. Compressor was stopped from Man Turbo compressor control panel.

What went wrong:

On 7th August 2011 at 16 57 hrs, refrigeration compressor motor cooler fell off during start up of compressor/motor. Compressor was stopped from Man Turbo compressor control panel. Cooler was found detached from the motor & fallen on the ground floor after tilting on first floor platform. Motor NDE side end cover had fallen off on the compressor/motor platform. Propane gas probably seeped into the common Lube oil system of compressor and motor when the machine was in standby mode. Since lube oil system is common for motor as well as compressor, propane gas passed to motor chamber through Motor DE & NDE bearing housings. During the motor start up, extremely high energy release within the motor enclosure occurred. That resulted in the stripping of nut and bolt assemblies that hold the air/air heat exchanger on the top of the motor frame. As a result, cooler came off, fell in the compressor platform & subsequently through railings rolled down to the ground floor.

Propane gas probably seeped into the common Lube oil system of compressor and motor when the machine of compressor was in standby mode. Since lube oil system is common for motor as well as compressor, propane gas passed to motor chamber through Motor DE and NDE bearing housings. During the motor start up, extremely high energy release within the motor enclosure occurred. That resulted in the stripping of nut and bolt assemblies that hold the air/air heat exchanger on the top of the motor frame. As a result, cooler came off, fell in the compressor platform & subsequently through railings rolled down to the ground floor.

Corrective actions and recommendations:

- *Start up Purging of motor: a) Motor purging in the startup interlock to be implemented. Compressor starting circuit to be modified to inhibit compressor from starting without purging the motor. b) All operational areas, that all units that are fitted with a pre-start purging system are purged prior to start up for the minimum period shown on the purging system dataplate. c) The flow rate of the protective purging gas used on the pre-start purging systems should be checked with motor manufacturer to confirm that it is sufficient to dilute any internal release of flammable gas (e.g. entering the motor via common lube oil systems) to below its lower explosive limit, and if necessary, the findings should be applied corporate-wide.*
- *Logic modification to trip machine in case of loss of vibration/temperature signal. Bently Nivada/UCP panel logic to be modified to trip the compressor in the event of loss/bad signal/cable fault for motor and compressor vibration, bearing temperature and motor winding temperature.*
- *Compressor suction valves: Since the suction valves are having class IV leakage, isolation valves upstream of present valves are recommended to be installed for both the compressors.*
- *Motor protection relay setting to be confirmed in coordination with Loher to ensure motor protection in all fault scenarios.*
- *A survey is recommended to determine the current status of all HV Ex n and Ex e type motors installed, together with their control measures, and if necessary, the findings should be applied corporate-wide.*
- *A corporate-wide survey to check rotor and stator discharge risk assessments and ensure that any control measures have been completed in accordance with the motor application and location.*

Causal Factors:

- *People (acts): Following Procedures: Overexertion or improper position/posture for task*
- *People (acts): Use of Protective Methods: Inadequate use of safety systems*
- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate maintenance/inspection/testing*
- *Process (conditions): Work Place Hazards: Hazardous atmosphere (explosive/toxic/asphyxiant)*
- *Process (conditions): Organisational: Inadequate work standards/procedures*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*

High potential events by region

Qatar **Function: Production** **Category:Confined Space** **Activity: Maintenance, Inspection, Testing**

Narrative:

A FHSE Coordinator noticed, while conducting area rounds, that one worker was inside an acid gas removal unit without a contractor HSE Officer or Holewatch present.

The HSE Officer had left the scene to replace a gas monitor with a flat battery giving instructions for the job to stop. With the job stopped, the contractor Supervisor was called to a meeting, delegating responsibility to the job Lead Man (Foreman), also giving instructions for no further CSE. The Holewatch had left the scene to go to the toilet and the entry had been apparently un-barricaded.

Once the Supervisor/HSE Officer/Holewatch had left, a decision was taken at the scene for a worker to re-enter the vessel to retrieve some tools, without CSE precautions.

What went wrong:

The report has not been finalized

Corrective actions and recommendations:

The report has not been finalized

<<No Causal Factors Allocated>>

Qatar **Function: Production** **Category: Explosions or Burns** **Activity: Production Operations**

Narrative:

- *Sever vibration (line shaking) was observed on 160-0G-2352-10"-G48-0 (Recycled Gas from 2nd Stage Off-Gas Compressor to Unit 100)*
- *As a consequent to that the nearby line (Flare Blow-down line 14") was observed bouncing on its cantilever support.*
- *It was dissipated completely after 2 hrs*

What went wrong:

The report is not finalized

Corrective actions and recommendations:

The report is not finalized

<<No Causal Factors Allocated>>

Qatar **Function: Production** **Category: Other** **Activity: Maintenance, Inspection, Testing**

Narrative:

A contractor restarted Steam Turbine Generator A (STG A) after preventive maintenance.

- *Generator Fans left in Manual mode and not started.*
- *electricity local provider Grid #1 put out of service for Preventive maintenance.*
- *High windings temperature (no pre-alarm) initiate a signal to open Generator and Excitation voltage breakers of STG A*
- *Synchronization was initiated for STGA from CCR by Panel Operator*
- *Excitation breaker closed manually to build up the Generator voltage by Electrical Field Maintenance.*
- *STG A synchronize on the Electrical Network*
- *STG A produce high value of MVar*
- *Extra MVar produced by STG A exported to electricity local provider Grid #2*
- *Electricity local provider Grid #2 trips due to high export MVar (Reverse MVAR Protection)*
- *After Tripping of Grid #2, the electrical Network in Island mode.*
- *The Master STG C took the Maximum Load followed by STG B*
- *STG A Load was at the minimum and trips due to Reverse Power.*
- *Higher load would have resulted in total plant shutdown/blackout if a second STG tripped*

What went wrong:

- *Fans in manual mode*
- *No pre-alarm for the generator windings temperature*
- *Synchronization out of sequence*

Corrective actions and recommendations:

- *Lesson 1: Air coolers for the generator were not in service (high winding temperature). Logic must be modified - STG must start only if coolers are in auto mode*
- *Lesson 2: Synchronization initiated and excitation breaker closed at the same time. Results in Production of MVar (STG A) in Export extra MVar to Grid, Communication between Trades must be improved*

Causal Factors:

- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Organisational: Inadequate communication*

HIGH POTENTIAL EVENTS BY REGION

Qatar **Function: Production** **Category: Other** **Activity: Maintenance, Inspection, Testing**

Narrative:

The contractor CO_2 department was assigned to carry out inspection, testing and Maintenance activity on Gaseous Extinguishing system. After completion of the inspection it was found that the 5 reserve bank CO_2 cylinders were empty at ground 80kg instead of a normal of 125kg

What went wrong:

The report is not finalized

Corrective actions and recommendations:

The report is not finalized

<<No Causal Factors Allocated>>

UAE **Function: Construction** **Category: Struck by** **Activity:Transport - Land**

Narrative:

A contractor bus and pick-up had head on collision.

What went wrong:

The incident happened when both vehicles were traversing the gatch road: bus heading towards Asab and the Toyota Hi-lux pick-up heading towards Habshan. Bus was travelling and located at the left side of road and the pick-up was speeding as indicated by the 35 metres tyre skid marks on the road down to the collision point. Vehicles collided head-on and heavy damage was observed

Corrective actions and recommendations:

1. *Re-train all drivers with an approved 3rd party consultant. They all should have professional Defensive driving course.*
2. *Introduce road patrols in the absence of IVMDs.*
3. *Introduce speed breaks (humps) before blind spots.*
4. *Empowerment of workers. Increase the awareness of the workers on how to report unsafe acts and practices.*

Causal Factors:

- *People (acts): Following Procedures: Violation unintentional (by individual or group)*
- *People (acts): Following Procedures: Work or motion at improper speed*
- *People (acts): Use of Protective Methods: Failure to warn of hazard*
- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*

UAE **Function: Drilling** **Category: Struck by** **Activity: Drilling, Workover, Well Services**

Narrative:

On 28th May, at approximately 14:00 Hrs, while an assistant driller was reciprocating the drill string, the drill string, Kelly and travelling blocks began to rapidly descend. The Kelly landed out in the bushing with the travelling block lying on top of the Kelly and against the derrick substructure. No persons were injured.

What went wrong:

- *Management/Supervision/Employee Leadership*
  - *Inadequate identification of worksite/job hazards*
- *Communication*
  - *Inadequate communication methods*
- *Work Rules/Policies/Standards/Procedures*
  - *Lack of Policies/Standards/Procedures for the task * inadequate job safety analysis*

Corrective actions and recommendations:

- *Never leave driller's consol unattended when the pumps are running or the rotary table is turning.*
- *Always operate Elmagco brake by hand.*
- *Do not use rubber O rings or weights to hold the lever in the ON position. If any exception to this is required (e.g. running very heavy string casing) then a Risk Assessment should be undertaken and the operation should be conducted under a Permit to Work.*

Causal Factors:

- *People (acts): Use of Protective Methods: Equipment or materials not secured*
- *Process (conditions): Work Place Hazards: Congestion, clutter or restricted motion*
- *Process (conditions): Work Place Hazards: Inadequate surfaces, floors, walkways or roads*
- *Process (conditions): Work Place Hazards: Hazardous atmosphere (explosive/toxic/asphyxiant)*
- *Process (conditions): Work Place Hazards: Storms or acts of nature*

High potential events by region

UAE **Function: Drilling** **Category: Pressure Release** **Activity: Drilling, Workover, Well Services**

Narrative:

On 26th Feb. 2011 approximately at 22:00 hrs., after making up the 20" casing head housing assembly to the 20" casing string the casing string was picked-up with the 20 landing joint (P/Up weight = 550,000 lbs). Circulation was established and the lowering of the 20" casing string took place (Slack off weight = 535,000 lbs) aimed for landing the casing with the casing head housing at the landing ring. After lowering the casing string (with housing) over a distance of 25 ft and with the casing head housing below rotary table whilst centring the casing head housing in the 30" bell nipple, the landing joint disconnected from the 20" casing string (stripped-out). The casing then fell down over the remaining distance of 35 ft. Until the casing head housing landed on the 30" landing ring. As a result of the disconnect of the landing joint, the full volume of the 20" landing joint was released whilst still pumping. The pressure release and fluid release from the landings joint resulted in a high risk event because people were standing in the vicinity without expecting this to happen. The worst outcome from such an incident could have been a fatality.

What went wrong:

- *Work Planning*
  - *Inadequate work planning*
- *Communication*
  - *Inadequate vertical communication between supervisor and person*

Causal Factors:

- *People (acts):* *Following Procedures: Violation unintentional (by individual or group)*

UAE **Function: Production** **Category: Pressure Release** **Activity: Production Operations**

Narrative:

On 24th April, at approximately 12:40 Hrs, during start-up of train 5, while lining-up the production header to train 5, a sudden pressure pulsation (Hydraulic hammer) occurred that caused movement of the inlet header, resulting in displacement of the inlet pipe and damage to pipe supports. Due to rupture of vent and drain lines, gas and approximately 2 bbls of liquid was released. No other damage or personnel injuries were reported.

What went wrong:

- *Communication*
  - *Inadequate communication between shifts*
- *Work Planning*
  - *Inadequate work planning*
- *Management/Supervision/Employee Leadership*
  - *Inadequate management of change system*

Corrective actions and recommendations:

- *Ensure plant status is properly recorded in the shift log books and shifts are properly handed over particularly during plant start up and shutdown conditions.*
- *Develop and encourage the use of standard production start-up checklists.*
- *Apply Management of Change (MOC) process for facilities upgrade.*

Causal Factors:

- *People (acts):* *Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*

High potential events by region

UAE **Function: Production** **Category: Struck by** **Activity: Lifting, Crane, Rigging, Deck operations**

Narrative:

On 22nd September 2011, at approximately 11:30 Hrs, an inspection was planned to assess the integrity of BCDS heaters. The crew obtained a work permit and associated certificates to execute the task. There was no Task Risk Assessment (TRA) performed and there was no formal working procedure for the installation of burners of the heater. The heater was isolated and eight burners were removed. After inspection and repairs, the heater was being assembled for installation. Our labourers were using chain block to lift the burner. Vane blades of the burner were used as lifting lug and due to excessive tension/stress lead to slippage of the burner and the burner fell down on to the erected scaffolding. Outcome: Two labourers were struck by the falling burner and sustained minor facial injuries.

What went wrong:

- *Management/Supervision/Employee Leadership*
  - *Inadequate identification of worksite/job hazards*
  - *Inadequate leadership*
- *Work Rules/Policies/Standards/Procedures*
  - *Lack of Policies/Standards/Procedures for the task * inadequate job safety analysis*
- *Engineering/Design*
  - *Inadequate technical design * design output inadequate*
- *Training/Knowledge Transfer*
  - *No training provided * need for training not identified*

Corrective actions and recommendations:

- *Conduct Task Risk Assessment (TRA) prior to execution of non-routine tasks*
- *Lifting and slinging should be performed by trained/certified workers*
- *Ensure heavy equipment installed at heights are equipped with proper lifting lugs*

Causal Factors:

- *People (acts): Following Procedures: Violation unintentional (by individual or group)*
- *People (acts): Following Procedures: Improper position (in the line of fire)*
- *People (acts): Use of Protective Methods: Failure to warn of hazard*
- *People (acts): Use of Protective Methods: Inadequate use of safety systems*
- *People (acts): Use of Protective Methods: Personal Protective Equipment not used or used improperly*
- *People (acts): Use of Protective Methods: Equipment or materials not secured*
- *People (acts): Use of Protective Methods: Disabled or removed guards, warning systems or safety devices*

UAE **Function: Production** **Category: Struck by** **Activity: Lifting, Crane, Rigging, Deck operations**

Narrative:

On 15th April 2011 in the OAG plant area and during the lifting of a motor shaft of the Air Compressor, the overhead monorail axe snapped and the lifting chain block fell to the ground slightly injuring the right hand fingers of the vendor representative. Medical treatment was immediately provided to the injured employee.

What went wrong:

The vendor used inadequate lifting technique, there was no specific risk assessment carried out for this activity and the supervision at site was inadequate.

Corrective actions and recommendations:

Always ensure that a proper task risk assessment is carried with the presence of the concerned personnel who will be involved in the activity. Never deviate from the PTW procedure. Vendor must attend the TRA and countersign acknowledging his understanding of job and associated safety requirements. PTW must also be countersigned by the vendor before the start of the job. All vendor activities to be carried out under close supervision of company job officer.

Causal Factors:

- *People (acts): Following Procedures: Violation unintentional (by individual or group)*
- *People (acts): Following Procedures: Improper position (in the line of fire)*
- *People (acts): Following Procedures: Improper lifting or loading*
- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *People (acts): Use of Protective Methods: Failure to warn of hazard*
- *People (acts): Use of Protective Methods: Inadequate use of safety systems*
- *People (acts): Use of Protective Methods: Personal Protective Equipment not used or used improperly*
- *People (acts): Use of Protective Methods: Equipment or materials not secured*
- *People (acts): Inattention/Lack of Awareness: Lack of attention/distracted by other concerns/stress*
- *Process (conditions): Protective Systems: Inadequate/defective guards or protective barriers*
- *Process (conditions): Protective Systems: Inadequate/defective Personal Protective Equipment*
- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate/defective tools/equipment/materials/products*
- *Process (conditions): Work Place Hazards: Congestion, clutter or restricted motion*
- *Process (conditions): Organisational: Inadequate training/competence*
- *Process (conditions): Organisational: Inadequate work standards/procedures*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate communication*
- *Process (conditions): Organisational: Inadequate supervision*

High potential events by region

UAE **Function: Production** **Category: Explosions or Burns** **Activity: Production Operations**

Narrative:

The washout exposed the gas pipeline and created an unsupported span of 51-meters where san supporting the pipeline was eroded

What went wrong:

A rupture from a neighbouring water pipeline washed-out the earth supporting our gas line

Corrective actions and recommendations:

Lessons Learned

- *Future pipelines should not be laid alongside any GRP pipelines whenever possible*
- *Ensure qualified welders are available and maintained for emergency pipeline repairs.*

Recommended Corrective Actions

- *Continue to supply the customers via other pipelines.*
- *Keep the current mode of operation under minimal pressure.*
- *Maintain items "a" and "b" until neighbouring water pipeline decommissions its GRP pipelines.*
- *Expedite the setting-up of the UAE Gas Network Emergency Repair System (UGNRS) or at least create as soon as possible a specific Emergency Pipeline Repair System (EPRS) for similar wash out cases.*
- *Management to liaise with neighbouring water pipeline management to determine the scheduled decommissioning dates of the GRP pipelines and future disposition.*
- *Determine the critical unsupported spans of all pipelines in the UAE Gas Network.*
- *Create Standard Operating Procedure (SOP) for Pipeline Depressurization and Stabilization in case of emergency within the UAE Gas Network such as unsupported spans due to washout, and natural disasters including pipeline damage from third party activity.*

Causal Factors:

- *Process (conditions): Protective Systems: Inadequate/defective guards or protective barriers*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Organisational: Inadequate communication*
- *Process (conditions): Organisational: Poor leadership/organisational culture*

Yemen **Function: Production** **Category: Explosions or Burns** **Activity:Transport - Air**

Narrative:

A chopper landed close (300 m) to a block valve station while depressurization of the pipeline was ongoing, without any prior information.

What went wrong:

- *No information given by production to logistic regarding the venting in progress.*
- *No information given by logistic to the control room that a helicopter was going to land.*
- *Helipad at 300 m from the block valve station*

Corrective actions and recommendations:

- *Written instructions have been issued that*
  - *logistic shall inform the control room at least 15 minutes before landing at any block valve station*
  - *Production shall inform logistic of any operation which can affect helicopter safety operation*

Causal Factors:

- *People (acts): Following Procedures: Violation unintentional (by individual or group)*
- *People (acts): Use of Protective Methods: Failure to warn of hazard*
- *Process (conditions): Work Place Hazards: Hazardous atmosphere (explosive/toxic/asphyxiant)*
- *Process (conditions): Organisational: Inadequate communication*

Yemen **Function: Production** **Category: Pressure Release** **Activity: Maintenance, Inspection, Testing**

Narrative:

A 5 kg CO_2 extinguisher was under maintenance and was standing upright (with its rusted support) in the workshop. The cylinder fell and its head hit the bench and broke. The sudden gas release (160 bar) caused the cylinder to move at high velocity across the workshop, hit several places and finally came out via an open door. The 2 workers in the workshop were not injured.

What went wrong:

- *The support was rusted and it was not possible to remove the extinguisher from its support on the boat.*
- *The cylinder was in vertical position, not secured.*
- *Weak point observed on the threaded head due to corrosion.*

Corrective actions and recommendations:

- *All workers are to be reminded regularly of the risks and hazard associated with high pressure gas cylinder handling.*
- *Awareness campaigns shall also include the worker doing only the handling.*

Causal Factors:

- *People (acts): Use of Protective Methods: Equipment or materials not secured*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate supervision*

HIGH POTENTIAL EVENTS BY REGION

Offshore

Qatar **Function: Production** **Category: Other** **Activity: Maintenance, Inspection, Testing**

Narrative:

Personnel were carrying out preventive maintenance on platform1 and platrom2 LCR CO_2 gaseous system on 8 and 9 July 2011 respectively. During their PM activity they found the Nitrogen cylinders for the main and reserve banks on platform1 & platform2 were empty.

What went wrong:

- *No ITM program has been conducted since commissioning the system*
- *No means of cylinder content weight verification/weight monitoring system is available at the LCR CO_2 system.*

Corrective actions and recommendations:

- *ITM activity on all gaseous fire protection systems installed in main plant and Offshore*
- *Obtain information from vendor about suitable weight monitoring systems (e.g. Load cell) that can be installed in each deluge skid.*
- *Install Pressure gauges on the nitrogen cylinders to check the pressure inside the cylinders*

Causal Factors:

- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate maintenance/inspection/testing*

Qatar **Function: Production** **Category: Other** **Activity:Unspecified - other**

Narrative:

During PM by contractor, two CO_2 cylinders on DG-B were found to be empty. They are weighing 97kg. Two cylinders from DG-A were found weighing 110kg and 106kg. Full cylinder should weigh 120Kg

What went wrong:

The report is not finalized

Corrective actions and recommendations:

The report is not finalized

<<No Causal Factors Allocated>>

Qatar **Function: Production** **Category: Other** **Activity:Unspecified - other**

Narrative:

During PM by contractor, two CO_2 cylinders on DG-A were found to be weighing 100 and 87kg. Two cylinders from DG-B were found weighing 104kg and 105kg. Full cylinder should weigh 120Kg.

What went wrong:

The report is not finalized

Corrective actions and recommendations:

The report is not finalized

<<No Causal Factors Allocated>>

UAE **Function: Drilling** **Category: Struck by** **Activity: Drilling, Workover, Well Services**

Narrative:

During Pulling Out Of Hole (POOH) 7" Mono-Bore completion joints, the wire rope sling designed to hold one length of tubing joint with a Single Joint Elevator (SJE), was intentionally overloaded, causing the wire rope to part. The SJE assembly fell down on top of the power tong and the parted wire rope hit the shoulder of the power tong operator, resulting in bruises to the shoulder.

What went wrong:

Failure to identify hazard

Corrective actions and recommendations:

- *Update the JSA of POOH 7" tubing to include the hazards identified when engaging the power tong along with personnel safe position.*
- *An engineering review to standardize the SJE assembly provided by the service companies and integrated with the rig lifting gears to ensure integrity of each component with safe barriers in place. A survey to be done with all rigs to recommend better SJE assembly to mitigate consequences in case similar failure takes place. Determine the suitable total length of the SJE assembly for each rig to facilitate and give the driller enough freedom between the spider elevator and SJE*

Causal Factors:

- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*

High potential events by region

UAE **Function: Production** **Category: Pressure Release** **Activity: Production Operations**

Narrative:

Slight leakage of sour gas from electrical cables manhole.

What went wrong:

Leaking spool piece of an underground pipeline.

Corrective actions and recommendations:

Inspection of whole line and replacement was carried out as appropriate.

Causal Factors:

- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate maintenance/inspection/testing*

UAE **Function: Production** **Category: Exposure Electrical** **Activity: Production Operations**

Narrative:

Total black out occurred due to tripping of Gas Turbines cause by flash over of 11KV bus bar at bus section panel of the gas processing platform.

What went wrong:

Inadequate maintenance procedure

Corrective actions and recommendations:

Complete review and redesign of 11kv loading system

Causal Factors:

- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate maintenance/inspection/testing*

UAE **Function:Unspecified** **Category: Other** **Activity:Transport - Air**

Narrative:

While preparing for take off, the aft cross-bar tube of the skid of A6-FLZ helicopter suddenly broke, causing the helicopter to tilt and rest on its aft. The crew immediately shutdown the engines. The 11 passengers and crew safely disembarked without further incident.

What went wrong:

Metal fatigue on the cross bar member

Corrective actions and recommendations:

- *Reduce the retirement life of all cross tubes from 20,000 to 10,000 landing cycles.*
- *Non Destructive Testing (NDT) intervals to be increased at 5,000 and 7,500 landings in addition to the maintenance manual requirements*
- *Conduct independent audit by third party*

Causal Factors:

- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate maintenance/inspection/testing*

HIGH POTENTIAL EVENTS BY REGION

North America

Onshore

USA **Function: Production** **Category: Pressure Release** **Activity: Production Operations**

Narrative:

A three person corrosion monitoring crew was in the well house removing a corrosion coupon. When the coupon plug was removed from the access fitting, the tool operator heard a hissing sound he interpreted as a leaking hammer union. In the process of replacing the coupoon plug, the tool operator accidently opened the service valve and bleed valve simultaneously. The bleed valve allowed more gas to reach the bleed than it could vent, and the can ruptured into 2 pieces with enough force to propel it across the well house. The tool operator immediately closed the bleed valve and re-inserted the coupon plug to isolate the pressure.

What went wrong:

- *An engineering review was not conducted on the bleed valve. A correctly engineered bleed valve would not have passed enough pressure to rupture the bleed can.*
- *The bleed can evolved over more than 20 years of use without engineering review or MOC. The container was incapable of safely venting the maximum gas possible from the upstream equipment.*
- *Failure to follow procedure. Despite having performed it correctly in the past, rushing to relocate the plug with the union leaking caused the tool operator to open the valves out of procedural order.*

Corrective actions and recommendations:

- *Immediately cease use of the bleed can and temporarily stop all coupon pulling activities.*
- *MOC and engineering review for each coupon pull, until a general design is complete.*
- *Review training on the procedures.*
- *Re-design the bleed system to ensure that the valve and can are considered as a system and appropriately sized to the other components.*
- *Ensure that an MOC and engineering evaluation is performed if either the bleed valve or can are modified.*

Causal Factors:

- *People (acts): Following Procedures: Violation unintentional (by individual or group)*
- *Process (conditions): Protective Systems: Inadequate/defective guards or protective barriers*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*

USA **Function: Production** **Category: Explosions or Burns** **Activity: Production Operations**

Narrative:

A worker at the well site was transferring fluids between the produced water and condensate tanks. In the course of transferring the condensate into the condensate tank, the worker stated he instinctively felt that something was wrong. As he was preparing to shield himself, a blast of condensate knocked him into the transfer truck and soaked him in condensate. He ran down wind (eastward) toward the site entrance to escape the scene and call for aid.

What went wrong:

- *Inadequate grounding during condensate transfer operation - The incident investigation group concluded that the ignition source for the internal combustion explosion was from a static electrical discharge. The static electrical discharge was made possible when transport operator connected the ground clip from the transport truck to the handrail of the ladder rather than to the ground clip on the tank as required by contract company procedure.*
- *Injection of oxygen into condensate tank during off-loading operation. - The Transport operator used air pressure from the transport truck to transfer the condensate into the storage tank. Hydrocarbon entrained air manifests itself in the vapour space of the tank potentially creating an explosive environment in the vapour space above the condensate level.*

Corrective actions and recommendations:

- *Verification that contract companies have an established process for training and competency assessment of their employees and that equipment provided is appropriately suited for the work.*
- *Review off-loading procedures to ensure they contain sound engineering practices for handling non-conductive, flammable, and combustible fluids.*

Causal Factors:

- *People (acts): Following Procedures: Violation unintentional (by individual or group)*
- *People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products*
- *People (acts): Use of Protective Methods: Inadequate use of safety systems*
- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*
- *Process (conditions): Organisational: Inadequate training/competence*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate supervision*
- *Process (conditions): Organisational: Poor leadership/organisational culture*

High potential events by region

USA **Function: Production** **Category: Other** **Activity:Transport - Air**

Narrative:

The pilot positioned the helicopter for a west-southwest departure from an offshore platform due to prevailing wind conditions. After clearing the edge of the helideck, the helicopter started a slow yaw to the right. The pilot added full left pedal; however, this did not stop the rotation. After 360 degrees of rotation, the rotation quickened, the pilot stated that he "didn't have a tail rotor," and lowered the collective and rolled the throttle to idle. The pilot deployed the emergency floats, and the helicopter impacted the water slightly nose low and in a right drift. The helicopter rolled over immediately to the right and stayed afloat. The pilot egressed the helicopter through the broken windscreen area, the left seat pilot egressed through the pilot's open door, and the passenger egressed through the left passenger door.

What went wrong:

The wreckage was recovered to the operator's facilities where an examination of the wreckage was performed. An inspector with the Federal Aviation Administration provided oversight for the examination, assisted by the operator and an investigator from Bell Textron. The examination of the engine, tail rotor gearbox, tail rotor drive shaft, main gear box, and main rotor system did not reveal evidence of a pre-existing mechanical malfunction or anomaly.

Corrective actions and recommendations:

All pilots received refresher training with a focus on multi-mode tail rotor failures. Annual pilot training will be enhanced to include more comprehensive training on loss of tail rotor effectiveness and avoidance techniques. Operator issued a Safety Alert on "Unanticipated Right Yaw" or "Loss of Tail Rotor Effectiveness"

Causal Factors:

- *Process (conditions): Organisational: Inadequate training/competence*

South America

Onshore

Argentina **Function: Drilling** **Category: Struck by** **Activity: Lifting, Crane, Rigging, Deck operations**

Narrative:

During derrick lifting operations in rigging up activities, the machinist involved heard a strange noise. He moved closer to the derrick and at that moment the winch chain became loose and struck him on his forearm, producing a fracture to his arm.

What went wrong:

No warning systems in place. Lack of judgement.

Corrective actions and recommendations:

- *Improve competencies for risk evaluation.*
- *Assure warning systems are in place where required.*

Causal Factors:

- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*

Argentina **Function: Production** **Category: Exposure Electrical** **Activity: Construction, Commissioning, Decommissioning**

Narrative:

A live-line work crew was performing power energization tasks at a 10.4kV transformer. One of the crew members was on a man lift basket installing XS fuses. When installing the second fuse in the main phase a fault occurred, energizing the transformer's surrounding fence. Another crew member was leaning on the fence at that moment and received the electrical discharge.

What went wrong:

- *Roles and responsibilities were not clear.*
- *Poor work planning.*
- *Lack of procedure for the task.*

Corrective actions and recommendations:

Improve planning. Assure correct roles and responsibilities are assigned. Improve contents of procedures for these tasks.

Causal Factors:

- *Process (conditions): Organisational: Inadequate work standards/procedures*
- *Process (conditions): Organisational: Inadequate supervision*

High potential events by region

Bolivia **Function: Construction** **Category: Struck by** **Activity:Transport - Land**

Narrative:

At 05:00 a.m. a bus transporting contractor's personnel from town to work place collided frontally with a pick up of other contractor company. The pick up crossed lane causing the accident. As result 14 people were injured. Both land and air evacuation were performed. One person injured was classified as LWDC.

What went wrong:

- *Procedures not followed (inappropriate circulation hours)*
- *Lack of rest habits control*
- *Lack of supervision*

Corrective actions and recommendations:

- *Improve safety awareness towards procedures completion*
- *Set rest hours control*
- *Improve leadership commitment and supervision skills*
- *Communication of lessons learned*

Causal Factors:

- *People (acts): Use of Protective Methods: Inadequate use of safety systems*
- *People (acts): Inattention/Lack of Awareness: Improper decision making or lack of judgment*
- *People (acts): Inattention/Lack of Awareness: Fatigue*
- *Process (conditions): Organisational: Inadequate work standards/procedures*
- *Process (conditions): Organisational: Inadequate hazard identification or risk assessment*
- *Process (conditions): Organisational: Inadequate supervision*
- *Process (conditions): Organisational: Poor leadership/organisational culture*

Ecuador **Function: Drilling** **Category: Struck by** **Activity: Drilling, Workover, Well Services**

Narrative:

Severe damage to the structure and integrity of the system of pulleys and block drill traveller Petrex 5899.

When beginning the crew shift, the crown-o-matic functioning test was performed and continued make up 4 ½" tubing stands, picking tubing up from the racks. When the driller pulled out one stand, he thought that there were only 2 joints connected, but actually there were 3 joints (complete stand) and the driller did not reduce the speed. For this reason the travelling block continued to rise, coming closer to the crown. The driller realized his mistake and tried to stop without success. The block continued moving until it hit and broke the spikes of the clasps of the front ends that hold the wood protection, when it hit the crown block bases and sheaves No 2 and No 4 leading to the breaking of the edge of the sheave's channel that guides the cable.

What went wrong:

- *Underestimation of risk by overconfidence.*
- *It maintains a general risk matrix for armed activity stops.*
- *The beams have a considerable separation, allowing the passage of the travelling block and the blow to the pulleys.*

Corrective actions and recommendations:

- *Inspection and repair of crown by an expert.*
- *Inclusion of risk matrix; Arm stops with tubing.*
- *Adapt and strengthen the wooden beams in the area of the crown.*
- *Review operating procedures crown-o-matic.*
- *The driller did not comply in the operation procedure of the crown-o-matic.*

Causal Factors:

- *People (acts): Following Procedures: Work or motion at improper speed*
- *People (acts): Use of Protective Methods: Failure to warn of hazard*
- *People (acts): Inattention/Lack of Awareness: Lack of attention/distracted by other concerns/stress*
- *Process (conditions): Organisational: Inadequate training/competence*

High potential events by region

Offshore

Trinidad & Tobago **Function: Production** **Category: Explosions or Burns** **Activity: Production Operations**

Narrative:

At 15:55hrs on one Offshore Platform, an alarm both audible and flashing was detected on the Fire and Gas panel in the control room, identifying "Fire on Pump Deck".

The operator observed Shore Line Pump #04 to be on fire and the alert alarm was activated and an announcement was immediately made following which, the Emergency Response Team was activated.

The supply vessel (which was alongside the neighbouring Platform) was requested to come to the Platform to provide assistance with extinguishing the fire.

The Emergency Response Team #01 and Operations & Maintenance personnel responded to the emergency.

The fire was extinguished at approximately 16:15hrs following which, boundary cooling was applied to the area.

What went wrong:

The R-CAT method was used to conduct the investigation, and demonstrated that the fire on Shore Line Pump #04 came about as a result of two events that occurred in series:

- *The Pump was starved for liquid as a result of a blockage by foreign object*
- *Volatile mixture (un-burnt fuel) around/in the turbo charger*

There were 2 fires each driven by a separate fuel source:

- *Natural gas driven fire, which was coming from either the corroded engine fuel gas line to Shore Line Pump #04 or a build-up of un-burnt fuel in the turbo charger*
- *The second fire was fed by ignition of leaked/leaking liquid hydrocarbon coming from the leaking mechanical seals*

Corrective actions and recommendations:

What went well:

- *There were no fatalities and no injuries to personnel*
- *There was minimal environmental damage*
- *The recently installed Fire & Gas and Fire-Water systems functioned*
- *The contracted vessel was in the field at the time of the fire and was able to readily lend assistance in extinguishing the fire and providing boundary cooling*

Opportunities for improvement:

- *The on-site emergency response procedure for mustering was not adhered to*
- *Critical activities for the inspection of the Shore Line Pump #04 train were not completed due to logistics and operations constraints*
- *Critical findings from the inspection of the Shore Line Pump #04 train was not communicated to the Maintenance Manager in a timely manner; as such any opportunity to repair or replace defective parts, which may have prevented this incident from occurring were not undertaken*
- *The alarm history log was not available so it was not possible to ascertain whether safety systems were indeed functional.*
- *A major overhaul was not conducted on the Shore Line Pump #04 train as per the manufacturer's requirements*

Causal Factors:

- *People (acts): Following Procedures: Violation intentional (by individual or group)*
- *Process (conditions): Protective Systems: Inadequate/defective warning systems/safety devices*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate design/specification/management of change*
- *Process (conditions): Tools, Equipment, Materials & Products: Inadequate maintenance/inspection/testing*
- *Process (conditions): Organisational: Inadequate work standards/procedures*