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# 2016 PSE Tier 1 and 2 Events



# Tier 1 and 2 OVERVIEW- GOM

## TIER 1

Date	Incident ID	Asset	Description
25 -May 2016	<u>1641266</u>	Perdido	OVERFILL OF METHANOL HULL TANK TO OPEN DRAIN SUMP
12 -May 2016	<u>1633160</u>	Brutus-Glider	APPROXIMATELY 1926 BARRELS OF OIL RELEASED TO GOM DUE TO RUPTURE OF A SUBSEA FLOW LINE JUMPER
11-Sept 2016	<u>1709277</u>	FPSO Turritella Stones	LWC/LOPC-2 WORKERS BURNED BY STEAM RELEASE
25-Oct 2016	<u>1738245</u>	Brutus	LOPC-PROCESS FLUID OBSERVED LEAKING FROM UNDER HP SEPARATOR

## TIER 2

Date	Incident ID	Asset	Description
16-Feb 2016	<u>1576807</u>	WD-143	LOPC – GAS RELEASE DURING MAINTENANCE REPAIRS
27-March 2016	<u>165985</u>	Noble Don Taylor	LOW TORQUE ASSEMBLY BECAME DAMAGED RELEASING 10BBLS OF ENCORE BASE
1-May 2016	<u>1627071</u>	Auger	LOPC – FIREWATER PUMP DIESEL TANK OVERFILLED, ROSEBUDS
4-May 2016	<u>1629050</u>	Transocean Deepwater Thalassa	LOPC – SBM RELEASED DURING TRANSFER OPERATIONS
10-Jun 2016	<u>1651893</u>	Auger	FGC2 DOUBLE BLOCK AND BLEED VALVE LEAK
22-August 2016	<u>1696774</u>	Noble Globetrotter I	LOPC- VALVE MISALIGNMENT RESULTS IN TANK OVERFLOW
18-Oct 2016	<u>1734277</u>	Olympus	LOPC - SCALE INHIBITOR LEAK THROUGH OPENED SIGHT GLASS VALVE
26-Nov 2016	<u>1757281</u>	FPSO Turritella	LOPC-HC GAS RELEASE ON GAS SALES SKID FROM VALVE BLEED PORT.

# Tier 2: West Delta 143: GAS RELEASE FROM VALVE WHILE PREPARING FOR MTC ACTIVITIES

**Overview:** While making operator rounds, individuals noticed a gas smell and began troubleshooting. The source of gas was discovered to be a small packing leak on the Flow Control Valve (FCV) on a condensate line. In an attempt to isolate and change the packing, operations bled the line to atmosphere through a ½" low point drain and experienced a release of 350kg of natural gas.

FIM INCIDENT #1576807 Date: 02/16/2016

## Findings/Root Causes:

- It was an acceptable practice to de-pressurize the 1026 psig line to atmosphere by manipulating the low point drain valve.
- Condensate was de-pressurized as a liquid by using the low point drain. It was viewed as normal conditions when only gas was coming out of the low point drain. This and other evidence indicate inconsistencies across operations on how condensate is viewed and handled (liquid vs. gas).
- The operators believed they could control the flow of natural gas through the ½" drain ball valve. The sudden slug of condensate caused them to lose control of the valve and barrier.

## Learnings/Corrective Actions:

- Offshore leadership and operators interrupted execution of depressurizing the line differently. Offshore leadership assumed the operators would depressure to flare.
- The team bypassed the gas detection system before opening the drain valve to prevent a nuisance platform ESD. The team anticipated a potential gas cloud and thought to manage using manual mitigations rather than the automated system.
- The team concluded that changing the valve packing was a low risk job and could be performed under single isolation. This is acceptable under HSE0008 PR-06 Appendix 1 Mechanical Isolation Guide. However not acceptable using the UAD Hazard Factor Calculation spreadsheet.



# **Tier 2: PT Wells: Noble Don Taylor**

## **LOW TORQUE ASSEMBLY BECAME DAMAGED RELEASING 10BBLS OF ENCORE BASE**

**Overview:** While reciprocating pipe during WOC, the attached chiksan assembly became tangled due to air hoist operator not being present to keep the adjoined temporary piping in alignment. As a result, a crossover and low torque assembly became damaged releasing 10bbls of Encore Base with 7 gallons reaching the GOM. The moon pool contained the spill to water. The job was stopped, full open safety valve in string closed, and clean up measure were initiated recovering all fluid including the 7 gallons in water..

FIM INCIDENT #1602607 Date of Incident: 3/27/16

### **Findings/Root Causes:**

- Investigation revealed the tugger operator wasn't present, as required, which caused TPW to tangle and become damaged and ultimately led to the release

### **Learnings/Corrective Actions:**

- No additional information

# Tier 2-Auger FIREWATER PUMP DIESEL TANK OVERFILLED

**Overview:** While performing weekly Fire Water Pump(FWP) run test worker began filling the day tank with diesel; upon completion of performing the run test, worker shut down the FWP and reported back to work station. Approximately 35 minutes later a second worker walked near the FWP and identified the diesel day tank overfill line releasing diesel into the skid below the FWP. Worker immediately shut the fill valve. Approximately 1.62oz escaped the skid pan and entered the gulf.

FIM INCIDENT #1627071 Date of Incident: 05/01/16

## Findings/Root Causes:

- The diesel fuelling operation was not part of the normal weekly CLAIR on the FWP since it only needed to be fuelled approximately once a month. This was only the second time the mechanic had filled the tank. The mechanic stated that they left the area and forgot to come back because they were printing drawings for another job that they were sponsoring. Our belief is that the mechanic left to go to 9:00 am break and since this was not a normal part of the weekly CLAIR activities simply forgot that they were filling the diesel tank.
- The level safety devices on the diesel tank have been treated as low priority equipment based on several pieces of evidence

## Learnings/Corrective Actions:

- The CLAIR shop papers stated that the tanks needed to contain enough fuel for 30 minutes of run time. The DEP states that the minimum amount of fuel needed is for 8 hours of run time
- **Update SMART and P&ID's to include the fire water pump safety devices and set points**
- Update CLAIR shop papers to include fuelling procedure and tank volume requirements

Change the notification priority on the diesel day tanks (PBE-271 & PBE-272) from an alert to an alarm requiring immediate action by an operator

# Tier 2: PT Wells: Transocean Deepwater Thalassa

## Expansion Joint Failure

**Overview:** While transferring SBM (synthetic base mud) to the OSV (offshore support vessel), approximately 954bbls of SBM was released to the Mud Pump Room containment area from Transfer Pump #. The expansion joint on the discharge side of the transfer pumped failed. The job was stopped and rig management was notified. Immediate plans were put in place to clean up all fluid and replace the failed expansion joint. All fluid was contained within secondary containment ( the mud pump room) and designed drain tanks. No fluid reached the GoM

FIM INCIDENT #1629050 Date of Incident: 05/04/16

### Findings/Root Causes:

- No additional information

### Learnings/Corrective Actions:

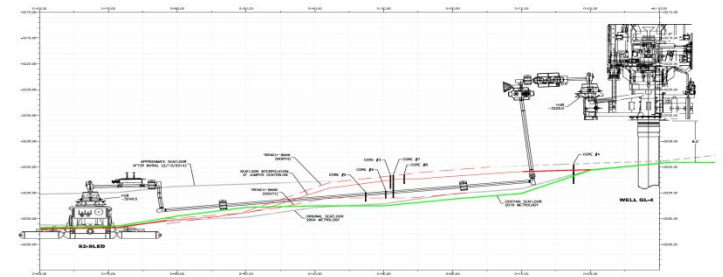
- No additional information

# Brutus- Glider Tier 1

LOPC-SHEEN OBSERVED

FIM INCIDENT #1633160 Date of Incident: 05/12/16

FROM FIM WRITE-UP



At approximately 7:55 am on Thursday, May 12th, a helicopter observed a sheen from the Glider subsea tieback system at Brutus. Shell estimates based on a monitored drop in pressure in the subsea infrastructure that 2100 barrels of oil were released. We are determining the cause of the release. There are no reports of injuries. Glider subsea field was shut-in from the platform. Spill response was initiated and a ROV was deployed to perform diagnostics to further understand the source of the leak.

## Findings/Root Causes:

- The investigation team looked at this event through two different work streams.
  - Failure of a load limiting joint on a jumper line at the Glider G4 well
    - The G4 jumper failed due to the moment load placed on the “belly” of the jumper in combination with typical forces (e.g. settlement, thermal expansion) placed on subsea kit. The forces on the jumper lined up in ways that were not foreseen in the modeling or risk discussions
  - Operations continued flowing the well for 7 hours
    - The leak happened during a ramp up from a xylene soak and aligned with moves that an operator had just made minutes prior to the leak starting
    - Since the feedback from the leak was very typical with the behavior of the system normally seen after xylene soaks, operations believed that the system was ok until the abnormal conditions had lasted normal than typically seen.

## Learnings/Corrective Actions:

- Updated risk registers/risk models to add this scenario to our planning. Also added leak scenarios to the subsea training program to assist with leak recognition for subsea control operators

# Tier 1-PERDIDO METHANOL TANK OVERFILL

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**Overview:** On Wednesday May 25<sup>th</sup>, 2016 at approximately 13:50, Perdido Operations began a methanol transfer operation from the MV Claire Candies to the Perdido Spar. During the Methanol bunkering operation at approximately 15:12 the control room operators noticed a rise in the oil bucket in the open drain sump. The bunkering operation was shut down and secured. At that time it was determined that the rise in the open drain sump was likely due to the bunkering operation and the decision to terminate the operation was made. It is believed the methanol flowed from the Hull Methanol Storage tank to the open drain sump through the overfill line.

Calculations show that approximately 4,400 gallons overflowed from the methanol tank to the open drain sump.

FIM INCIDENT #1641266 Date of Incident: 05/25/16

## Findings/Root Causes:

- The methanol tank filling procedure calls for the tank to be filled to 70% volume.
- The high level alarm coincides with the procedure and is set to 70% with a shutdown at 75%.
- The tank configuration is such that it appears that the tank is 21 feet tall, but in actuality, the tank is 14 feet tall with several 7 foot “chimney’s” extending up to 21 feet. The level device is guided wave radar and is located at the top of a chimney, measuring from 21 feet
- The tank has a siphon breaker at 13.75 feet on the overflow line, this correlates to 62% volume. The overflow lines has a configuration that forms a self starting, so once the siphon breaker is covered the methanol begins to siphon out of the overflow and into the sump.
- The crew used a procedure that instructed them to fill the tank to 70% full. The procedure was still in unapproved draft form.

## Learnings/Corrective Actions:



# Tier 1-PERDIDO METHANOL TANK OVERFILL (Con't)

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The investigation team was unable to find any record of previous procedures or MOC's to show changes to the procedures. However, there were statements made by operators with several years of experience on Perdido that the procedures read differently at one time. Uncertain whether they simply used methods they had adapted or if a different procedure existed at one time.

## Learnings/Corrective Actions:

- The closing of the nitrogen pst creates a vacuum on the overflow line, which keeps it from being able to siphon. As soon as the pst was bypassed, the siphon began again.
- Further research revealed that Perdido had experienced this same incident in 2013. The nitrogen shut in and was left in that state for a couple weeks. The methanol did not overflow to the same extent and was slowly drawn down to the day tanks over time.
- The failure of the sump pump to start was not causal to the overflow, however, the failure to start was the only thing to alert us to the overflow. Had the pump started, the potential existed to continue the cycle of filling the tank and siphoning out.
- A new procedure has been drafted, MOC'd, approved and is in place, which states to fill to 55%.
- Alarm and shut down settings have been changed to match procedures.
- A drawing of the tank is being included in the procedures to clarify tank configuration.
- Other recommendations are being developed.

# Tier 2: AUGER DOUBLE BLOCK AND BLEED

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## Overview

While making rounds, a mechanic heard what was perceived to be a leak. After further inspection, it was discovered that there was a crack on a double block and bleed valve. The control room was notified and FGC2 was immediately shut down within 60 seconds of the detected leak. The valve has since been replaced.

FIM INCIDENT #1651893 Date of Incident: 06/10/16

## Findings/Root Causes:

- Reciprocating compressors had vibration exceeding the recommended levels
- During a controls upgrade project, single block valve was replaced with a double block valve of substantially more weight and length
- Tubing was routed to valve with an offset that caused side loading on the valve.
- DEP's prohibit use of threaded valves as root valves. Existing design was grandfathered in (replacement in kind) and assumed to be okay as it had been threaded for the life of the compressor.

## Learnings/Corrective Actions:

- Remove threaded connections from rotating equipment wherever possible.
- Update DEP's to specifically prohibit Double block and bleed valves as root valves in rotating equipment service.
- Install tubing with expansion loops or Stainless Steel braided hose tubing on any valves on rotating equipment that see high vibration.
- Perform vibration analysis where applicable on compressors having high vibration to understand harmonics and optimal operating range.

# Tier 2: PT Wells Globetrotter Tank Overflow

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## Overview

While conducting a negative test, employee lined up to pump base oil from the starboard base oil tank to the cement unit. During the transfer, fluid was noticed coming from the Starboard Slop Tank vent line. All transfers were stopped. After further investigation it was found that the drain line from the discharge piping of the base oil line was left open, resulting in the Slop tank overflowing and 8 bbls of base oil spilling on the deck and 83 bbls of base oil were contained in the slop tank. All Base oil was contained on the deck and none entered the sea.

FIM INCIDENT #1696774 Date of Incident: 08/22/16

## Findings/Root Causes:

- Valve left open during operations
- Procedure Followed Incorrectly::Checkoff misused.

## Learnings/Corrective Actions:

- No additional information

# Tier 1: Stones Workers Burned by Steam

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## Overview

DURING REPAIR OF STEAM VALVE LOCATED ON THE MAIN DISCHARGE LINE OUT OF STEAM BOILER LOCATED IN THE ENGINE ROOM OF THE TURRITELLA FPSO, TWO SUB-CONTRACTORS TO STONES SBM OFFSHORE LLC WORKERS WERE BURNED BY ACCIDENTAL STEAM RELEASE.

FIM INCIDENT #1709277 Date of Incident: 09/11/16

## Findings/Root Causes:

- Permitting practices were outside the approved Permit to Work Process. This led to gaps in:
  - **Hazard Communication.** Generic JSA discussed in the shop, not in the field.
  - **Isolation Practices.** Work Performed valve that was holding isolation.
- Deviations from work processes were considered normal.

## Learnings/Corrective Actions:

- Elevation of Permit to Work Coordinator role.
- Safety Coach intervention to focus on:
  - JSA best practices.
  - Communication.

# Tier 2: Olympus Scale Inhibitor Leak

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## Overview

At 2:25 PM on 10/18/2016 the Control Room received a low level alarm on the Scale Inhibitor Tank. They quickly trended the level and it was found that the level started dropping at 12:37 PM. The chemical skid was walked out and a valve was found open on the West Scale Inhibitor Pump sight glass allowing chemical to gravity feed through the sight glass into a containment skid

FIM INCIDENT #1734277 Date of Incident: 10/18/16

## Findings/Root Causes:

- The sight glass isolation valve was left open from previous activity\*.
- \*While it is not clear which activity might had been involved in manipulating the sight glass isolation valve, it was confirmed that the valve was not operated on the day of event.
- The sight glass isolation valve remained in open position during the event.

## Learnings/Corrective Actions:

- Cut off overflow tubing from calibration pots to skid above grating
- Add chemical skid valve status to standing orders
- Update monthly PM for non-operational chemical pumps
- Install rate of change alarms on chemical tanks

# Tier 1: Brutus Open Valve Release

## Overview

On October 25<sup>th</sup> 2016 while setting up to perform repairs on a pump an individual heard a blowing noise. Upon investigation the individual discovered oil being released in the vicinity of a nearby HP separator. Operators were called to the area to find the source of the leak. Initially it was believed that the release was coming from a flange on one of the meter runs adjacent to the separator. The platform was shutdown via automatic shutdown activation, blown down and the area secured. It was then discovered that the release was coming from an open drain line on the level safety bridle of the separator. The 2 valves on the level safety drain line were in the open state and the line did not have a plug in it. A month prior to the incident, the drain valves were opened to drain the line when a valve on the level safety bridle was changed out in the turnaround. The valves were believed to have been left open at the completion of the job.

FIM INCIDENT #1738245 Date of Incident: 10/25/16

## Findings/Root Causes:

- The process of managing bleeds/vents was based on individuals memory vs. a documented process.
- The job sponsor chose the two upstream valves at the jobsite based on the request of the construction crew.
- The job sponsor relied on his memory to close the valves but they were left open after the job was completed.
- The Process Team lead checked to ensure that the downstream drain valves were closed based on his experience that operators normally drained the bridle there.
- The vessel passed a nitrogen test and held liquids for 10 days prior to the leak occurring due to a sand bridge existing in the line.
- The post shutdown walk down was a visual inspection where individuals inspected the lines to ensure proper process flow inspecting lines based on which ones they believed would have been manipulated during the shutdown.

## Learnings/Corrective Actions:

- Accelerate the implantation timeline for the updated LOTO Process
- Implement the requirement for a bleed/vent process that documents all bleed points until March when the requirement that all assets utilized the bleed/vent policy that was piloted at Ram Powell becomes a requirement.

# Tier 2: Stones Gas Release From Valve Bleed

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## Overview

At 1407 hours on 26 NOV 2016 gas alarms resulted in a full ESD and blow down of the FPSO topsides production equipment. This was a result of investigating a potential sample point for the export/sales gas stream. Platform muster was initiated.

FIM INCIDENT #1757281 Date of Incident: 11/26/16

## Findings/Root Causes:

- Sampling system designed to obtain export gas sample was locked closed per Enbrige.
- Port on an active double-block-and-bleed valve was being investigated as a possible sample location.
- Plug on the port was removed on the active valve.

## Learnings/Corrective Actions:

- Facility had multiple issues with sample systems and experience in developing work-arounds to collect samples.