FUELS INDUSTRY
Association of South Africa

LEARNING FROM 2023 IOGP PROCESS SAFETY EVENTS

(Pages 69 -89)

2023 IOGP PS EVENTS *(Pages 69 -89)*

- 37 Process Safety events listed between pages 69 to 89

Categories	Number of events	Fatality/injury
Injury and/or fatality	3	1
Fire/explosion damage >$100,000 direct cost to the company	4	
LOPC (A release above threshold quantity in any 1 hour period)	30	

Injuries

Date	What went wrong?	Failed Barrier	Corrective Action
8 Sep 2023	Rental compressor Incident. **WHAT WENT WRONG?** Valve cap released due to being under pressure, injuring tech.	1. Operating in accordance with procedures – PTW, Isolation of equipment, 2. Overrides and inhibits of safety systems, 3. Shift handover, Equipment or materials not secured	No details
14 March 2023	Contract lease operator was performing work in the enclosed dehydration unit when glycol (est. 360-375 Fahrenheit) was released from the unit contacting the IPs body. A contract automations tech. stopped to assist with first aid and provided transport to ER. The IP was given medical treatment beyond first aid and was admitted to the burn unit for evaluation and treatment. **WHAT WENT WRONG?**	Plans and procedures	Under litigation hold.

Injuries

Date	What went wrong?	Failed Barrier	Corrective Action
24 Feb 2023	Worker was managing high fluid levels in the low pressure knock out (LPKO) vessel while bringing wells online at the facility and was found unresponsive. Unexpected release resulting in Oxygen depleted atmosphere. **Fatality**	Process Containment	1. Review small building design with focus on ventilation and alarms. 2. Reinforce existing practice of not draining process fluids within enclosed spaces or near ignition sources. 3. Reinforce use of personal multi-gas protection monitors to verify acceptable atmospheric conditions, especially prior to building / enclosure entry and during activities involving process fluids. 4. Ensure lone worker policies and safety-critical tools are functioning as intended – including calibration and testing – and supervisors are accountable for monitoring use and adherence.

Fire Events

Date	What went wrong?	Failed Barrier	Corrective Action
10 Feb 2023	A Production Tech and a maintenance crew were prepping for a job at the central tank battery when they heard a loud noise and saw flames coming from two fiberglass tanks at the adjacent SWD facility. All personnel immediately left the area. When they reached a safe distance, the fire department and supervisors were notified. When the fire department arrived, they applied water and foam to the tanks and surrounding area. No injuries were reported. A total of 50 barrels of produced water, fresh water, and foam were recovered. **WHAT WENT WRONG?** The specific failure was not identified, however an equipment failure causing sparking potential, grounding failure, or anti-static protection is the most likely cause of this fire.	**BARRIERS:** 1. Ignition Control 2. Asset design and integrity Hazardous atmosphere (explosive/toxic/ asphyxiant)	1. Identify cost effective options for tank and containment liner replacement. 2. Ensure that replacement equipment has appropriate grounding and anti-static protection.

Fire Events

Date	What went wrong?	Failed Barrier	Corrective Action
26 Apr 2023	Frac Blender caught fire during frac operation and spread to two pump trucks before being extinguished by local fire department. Clutch bearing failed causing clutch plate to spin out of its housing, striking an adjacent hydraulic pump which released hydraulic oil and ignited. Blender Operator did not activate blender e-kill switches prior to evacuating their post on the blender. No fatalities	1. Structural Integrity 2. Response to emergencies 3. Asset design and integrity	1. Add fire suppression verbiage to Frac WOSPs. Blenders and frac pumps are required to have automatic fire suppression systems installed and operable prior to fracking. In addition, one portable fire suppression unit will be kept onsite and confirmed operable prior to fracking. 2. Evaluate location of e-kill switches and move, as deemed appropriate, to locations on equipment away from where personnel hazards may occur or replace with switches that automatically kill the equipment (ex. 2. vibration switches). 3. Evaluate capabilities of service party fire suppression support and determine if continued use reduces risk.

Fire Events

Date	What went wrong?	Failed Barrier	Corrective Action
15 May 2023	While circulating bottoms up prior to washing over a fish, the well returned gas cut fluids to the tank. The pump operator noticed the gas and engaged the emergency shut down and instant neutral simultaneously, but the engine began to run away and ignited the remaining gas in the area. The well was secured via hydraulic closing unit and TIW valve, and site evacuated. Emergency services were called and the local fire department arrived on scene to extinguish the fire. Gas reached engine and caused runaway. No fatalities	Ignition Control	No details

LOPC Events

Date	What went wrong?	Failed Barrier	Corrective Action
30 Jan 2023	At 09:30, mechanic foreman was notified of a gas leak on the gas lift recycle valve. Foreman dispatched a mechanic to the location, unit was isolated and the mechanic found a cracked nipple. Necessary repairs were made. Foreman and SSHE were notified. No waters were affected. Nipple crack caused by vibration.	1. Structural Integrity 2. Asset design and integrity Inadequate maintenance/inspection/testing	Review site inspection and maintenance processes.
11 Feb 2023	Driver loading truck left the loading control area and was not monitoring the loading operation. Overfilled the tanker trailer. Driver inattention.	1. Operating in accordance with procedures – PTW, 2. Isolation of equipment, Overrides and inhibits of safety systems, 3. Shift handover, Lack of attention/distracted by other concerns/stress	Review site inspection and maintenance processes.

LOPC Events

Date	What went wrong?	Failed Barrier	Corrective Action
7 Feb 2023	Oil Spill – valve failure due to weather. **WHAT WENT WRONG?** Weather froze valve and broke.	Process Containment Inadequate design/specification/management of change	No details
01 June 2023	Vac truck driver unloading unaware of tank level. **WHAT WENT WRONG?** Competency, incorrect isolation.	Process Containment Inadequate training/competence	
10 June 2023	Ball valve on top of pump became open due to vibration, causing release.	Process Containment Inadequate maintenance/inspection/testing	No details
11 June 2023	Crude released to secondary containment due to exterior corrosion. **WHAT WENT WRONG?** Pipe was severely corroded on the outside.	Process Containment Inadequate maintenance/inspection/testing	No details

LOPC Events

Date	What went wrong?	Failed Barrier	Corrective Action
13 Feb 2023	A lease operator reported a release of oil at the central tank battery. Crew on site was in process of cleaning bulk production separator and began emptying all fluid from it. The crew believed that the separator was empty, and they opened the manway cover to inspect the splash plate. Opening the cover resulted in 7.78 barrels of oil spilling onto the pad surface. **WHAT WENT WRONG?** Crew did not verify that separator was empty before opening manway cover.	1. Operating in accordance with procedures – PTW, Isolation of equipment, Overrides and inhibits of safety systems, Shift handover, etc. 2. Execution of activities Equipment or materials not secured	Review equipment clearing procedures and training.

LOPC Events

Date	What went wrong?	Failed Barrier	Corrective Action
13 Apr 2023	At approximately 12:30, a plant operator received a LEL alarm (20%) from the compression building. The operator turned the building ventilation system on to displace the LEL's. Once the LELs had dissipated and operator cleared the building and entered to ESD the compressors. After the compressors had been ESDed and no LELs were present in the building operations began to source the leak. It was found that one compressor was leaking gas. The unit was blown down and isolated from the process for repair.	1. Structural Integrity 2. Asset design and integrity	Review maintenance and inspection procedures.
26 Apr 2023	Plant Operator noticed steam coming from the Glycol Re-Boiler area during heavy thunderstorm and hail event. A thermocouple for a temperature indicator had developed a leak, allowing heat-medium to release to impermeable secondary containment and atmosphere.	Structural Integrity	Review plant inspection and maintenance procedures.

LOPC Events

Date	What went wrong?	Failed Barrier	Corrective Action
01 May 2023	Breaking Containment: At 17:23, a contractor crew was preparing for a pipeline tie-in. While performing a bevel cut with a torch to remove a section of pipe, a flash fire and liquid condensate fire occurred resulting in burns to three contractors.	No details: Under litigation	No details
03 June 2023	Lightning strike: Foreman was notified of a lightning strike and fire at a common point tank battery. No one was on location or in the area. The fire burnt out on its own and released fluids were contained inside secondary containment. All six 400 bbl steel tanks were damaged (3 of the tanks were out-of-service).	Structural Integrity	No details
04 June 2023	At 03:00, a flowback hand noticed that the tank battery was overflowing oil into the impermeable containment. The well was isolated, and vacuum trucks were called to recover the free-standing liquid out of the containment. A PW load was pulled at 15:00 on the same day and at this time the well was making 8 barrels of Produced Water (PW)/hr. Over the next 12 hours the well started making 41 barrels PW/hr causing the tank to overflow due to unforeseen increases in production.	Risk assessment and control	Improve risk assessment for abnormal conditions / production amounts.

LOPC Events

Date	What went wrong?	Failed Barrier	Corrective Action
5 Feb 2023	At approximately 05:45, a ½-inch swaged up to 1-inch fitting broke off of the high-pressure lean glycol going to the heat exchanger on the glycol contactor tower due to a lack of bracing for about 15 feet of 1-inch piping. A production lease operator noticed the leak and notified group on-call. On-call mechanic parked his truck at the entrance to the facility due to natural gas leaking out of the ½-inch fitting. **WHAT WENT WRONG?** Lack of bracing. Design/installation less than adequate.	1. Structural Integrity 2. Asset design and integrity	1. Create process to track progress of events for which metered data is not available – supplement to existing process for flaring incidents. 2. Install bracing to support piping and pump. 3. Asset design and integrity Inadequate design/specification/management of change

Date	What went wrong?	Failed Barrier	Corrective Action
05 Sep 2023	After performing a strainer cleaning and removing the lock out, the valve that is used to verify zero energy for the work area was inadvertently left open. The compressor was then started remotely. This caused a gas release to the atmosphere. No personnel were in the area. There were no reported injuries. Personnel found the open valve when investigating why the compressor failed to start. 1. The de-isolation of central delivery point CDP compressor #1 was completed but the de-isolation column of the compressor isolation log was not completed. A 3/4-inch vent valve on the discharge of the compressor was left open and gas exited the valve. 2. The vent valve was not one of the valves on the compressor isolation log, and the de-isolation column of the compressor isolation log did not require a verifier. 3. The 3/4-inch vent valve was commonly used to verify zero pressure prior to opening the flange due to its proximity to the work. There was no flagging/tagging present on the valve when found open, and the electronic energy isolation tracker used during normal operations was not in use at the time of the event. 4. Organizational pressure to get the unit online which may have resulted in rushed work leading to the incident	1. Operating in accordance with procedures – PTW, Isolation of equipment, Overrides and inhibits of safety systems, Shift handover, etc. 2. Policies, standards and objectives Management System 3. Organization, resources and capability 4. Plans and procedures 5. Execution of activities	1. Revise the Isolation Log to include all valves used for isolation or verification of zero energy. 2. Develop guidance on when to use the energy isolation tracker consistent with normal operations during the commissioning process. 3. Conduct a review of past investigations

LOPC Events

Date	What went wrong?	Failed Barrier	Corrective Action
01 Sep 2023	MSO received active hi hi alarm at facility. Lacts had been down for monthly proving. MSO called 2nd MSO that was on the route with him to ask him to investigate. 2nd MSO reported that all looked fine but the lact was not running. Original MSO showed back up to find that oil had exited from the tanks and determined that the new ZZ battery was still producing into the facility and sales lact was still down. Dimensions of spill were (115ft x 54ft x 2in) resulting in a total release of 19.3442 bbls, all of the spill was oil. 19 bbls were recovered. The cause of the leak was failure of the lact to restart. 2nd MSO had last been by the area approximately 3 hours previously. The release was contained on pad. Failure of the lact to restart.	Process Containment	No details: Inadequate use of safety systems
19 Sep 2023	Compressor PRV release. **WHAT WENT WRONG?** Mechanical damage/failure.	Process Containment Inadequate maintenance/ inspection/testin	No details

LOPC Events

Date	What went wrong?	Failed Barrier	Corrective Action
11 Oct 2023	Sales gas line leak due to corroded pipe. **WHAT WENT WRONG?** Internal corrosion.	Process Containment Inadequate maintenance/inspection/testing	No details
09 Nov 20	Oil leak.	1. Operating in accordance with procedures – PTW, 2. Isolation of equipment, 3. Overrides and inhibits of safety systems, 4. Shift handover,	No details: Inadequate work standards/procedures
13 Nov 2023	Circulation pump valve leak. 1” line on circulation pump was open and plug was out.	Process Containment	No details: Inadequate/defective warning systems/safety devices

LOPC Events

Date	What went wrong?	Failed Barrier	Corrective Action
14 Apr 2023	Spill due to pinhole in tank. Internal corrosion made hole at bottom of tank causing leakage.	Process Containment Inadequate maintenance/inspection/testing	No details
20 Apr 2023	Nipple on belly came off while replacing a KO causing release.	1. Operating in accordance with procedures – PTW, Isolation of equipment, 2. Overrides and inhibits of safety systems, Shift handover, etc. Inadequate training/competence	No details
4 Mar 2023	At 10:00, a lease operator was performing their rounds when the operator discovered that oil had been released from the recycle line after a cap to the recycle pumps screen came loose. The lease operator isolated the lines and re-installed the cap on the screen. A bolt was missing on the pot's strainer, allowing for the oil to be spilled into lined containment.	1. Process Containment 2. Asset design and integrity Inadequate design/specification/management of change	Review inspection and maintenance practices.

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Thank You

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