

Notifiable incident

Incident ID [6435](#)

Duty holder: Shell Australia Pty Ltd
Facility/Activity: Prelude FLNG
Facility type: Floating liquefied natural gas facility

Incident details	
Division	Occupational Health and Safety
Notification type	Incident
Incident date	11/03/2020 08:00 PM (WST)
Notification date	20/03/2020 02:35 PM (WST)
NOPSEMA response date	20/03/2020 04:30 PM (WST)
Received by	██████████
Nearest state	WA
Initial category type <i>(based on notification)</i>	Other
Initial category <i>(based on notification)</i>	Information provided to NOPSEMA
3 Day report received	
Final report received	
All required data received	
Final category type <i>(based on final report)</i>	Other
Final category <i>(based on final report)</i>	Information provided to NOPSEMA
Brief description	OHS-INFO-Unplanned release of lube oil from emergency diesel generator
Location	Engine room
Subtype/s	Spill
Summary <i>(at notification)</i>	<p>1200L of lube oil leaked from emergency diesel generator EDG10, all contained within secondary containment. Location of the emergency diesel generators is the aft machinery space. The leak was noticed earlier but the decision was made to continue to run the generator given that it was supplying power to Prelude, otherwise the general alarm would have tripped. There were no injuries and no fires.</p> <p>This was decided at the time to not be a reportable incident and was notified informally to the focal inspector ██████████ on 12/3.</p>
Details <i>(from final report)</i>	<p>1200L of lube oil leaked from emergency diesel generator EDG10, all contained within secondary containment. Location of the emergency diesel generators is the aft machinery space. The leak was noticed earlier but the decision was made to continue to run the generator given that it was supplying power to Prelude, otherwise the general alarm would have tripped. There were no injuries and no fires.</p> <p>This was decided at the time to not be a reportable incident and was notified informally to the focal inspector ██████████ on 12/3.</p> <p>** As Supplied by Duty Holder**</p> <p>Brief description of incident: Loss of Primary Containment (LOPC) of approx. 1200 litres of Lube oil into secondary containment. - During an online lube oil filter element replacement on EDG10, at approximately 20:00 on 11/03/2020, the operator opened the top of the housing on one side of the filter believing it to be offline. - The filter housing was in fact still online/partially online and once the filter housing top opened, lube</p>

oil began to leak from the lid.

- Operators attempted to box up filter but were unsuccessful, lube oil continued to leak into bund.
- Ops informed CCR and requested EDG10 load shed and shut down
- CCR monitored lube oil level and lube system parameters
- Ops mobilised to EDG30 SW1/CCW1 heat exchanger and lined up the valves for operation
- Inlecs mobilised to GMS room and EDG30 started and brought online
- EDGD10 unloaded and shutdown

Work or activity being undertaken at time of incident - Planned change out of lube oil filter on Essential Diesel Generator 10

What are the internal investigation arrangements? 5 Causal reasoning investigation undertaken

Was there any loss of containment of any fluid (liquid or gas)? Yes - Hydrocarbon. Estimated quantity - 1200 litres - volume in bund post clean up. Composition - 100 percent lubricant oil. Toxicity to people and environment - Yes. How detected - visual. Did ignition occur - No. Has the release stopped - Yes. Duration of release - 30 minutes. Estimated rate of release - 2400l/hour. What or where is the location of the release -Substructure (Essential Diesel Generator Room). What equipment was involved in the release? Duplex Lube oil filter. Is this functional location listed as safety-critical equipment? No. Ambient temperature C° Approx. - 34. Relative humidity % - High. Estimated inventory in the isolatable system Litres or kg 1200 litres. System pressure and size of piping or vessel - 4.2 Barg. Size piping (D) 2 inch line

Action taken to make the work-site safe - No action required to make site safe. Details of any disturbance of the work site - None.

Immediate action taken/intended, if any, to prevent recurrence of incident. - Ops informed CCR and requested EDG10 load shed and shut down. Responsible party - Control Room Operator. Completion Date - 11/03/20 Completed.

What were the immediate causes of the incident?

- During an online lube oil filter element replacement on EDG10, at approximately 20:00 on 11/03/2020, the operator opened the top of the housing on one side of the filter believing it to be offline.
- The filter housing was in fact still pressurised and once the filter housing top had been opened, lube oil began to leak from the lid.
- EDGD10 unloaded and shutdown (took 30min)

Has the incident resulted in an impact to the environment? Secondary containment of liquid which was successfully recovered. No impact to environment.

Has the investigation been completed? Yes

Root cause 1 The design of the valve is such that the handle is not well secured to the shaft and can be easily shifted, leading to the valve being in a different position to that which is indicated

Root cause 2 The procedure was generic and should have been more specific about the risks associated with confirming the filter is offline before opening cover.

Root cause 3 Operators, CCR and PTL assessed the situation and deemed the risk of power loss with only 1 emergency diesel generator available to be of higher potential consequence than approx. 30 minutes with lube oil collecting in the containment bund.

Full Report -

A 5 Causal reasoning investigation was undertaken as per the following by the engineering team.

The investigation looked at the following three areas:

1. Breaking containment on lube oil lead to a release – as the side of the filter (“A side”) that was believed to be offline was partially/fully online.

Findings identified that the 3-way valve line up was such that internally the “A side” was lined up whilst the “B side” was offline, therefore the operator believed that “A side” was offline due to the position of the valve handle indicating “B side” was online as per writing on valve. Although the handle was indicating one way, the internals were lined up differently as the valve handle had slipped relative to the valve internals itself. The design of the valve is such that the handle is not well secured to the shaft and can be easily shifted.

2. The operator opened the top of the filter without proving the filter was offline by using the bleed valve as the operator was not aware that the bleed valve existed.

The procedure and on the job specific demonstration that the operator received did not adequately identify the bleed valve and that it was required to be used prior to loosening the bolts. The procedure was generic and should have been more specific about the risks. The procedure specified that the vent/drain should be opened to drain the contents "where applicable".

3. The oil

leak continued for approx. 30 minutes after it was first identified.

The plant status was assessed by the operators, CCR and the Production Team Lead and the decision was made to continue to operate the engine for approx. 30 minutes after the leak was first identified which pressurised the oil system. This decision was assessed on the basis of the risk of power loss with only one emergency diesel generator available to be of greater potential consequence than approx. 30 minutes (time required to bring EDG30 online, transfer load and allow EDG10 to be shut down without loss of power) with lube oil collecting in the containment bund.

Actions to prevent recurrence of same or similar incident:

Action - Review if any similar duplex filter arrangements exist onboard. Responsible - Onshore Engineering. Completion Date - 31/03/2020

Action - Update procedure (OPS_PRE_001957) to be more specific about the use of a bleed / vent valve and the requirement to prove filters are offline before opening filter cover. Responsible - Mechanical Maintenance Team Lead. Completion date - 30/04/20

Immediate cause/s	TBC
Root cause/s	
Root cause description	
Release type	Hydraulic/fuel oil
Equipment	Gaskets/seals
Liquid (L)	1200

Duty inspector recommendation	
Date	20/03/2020
Duty inspector	
Recommendation	Do not conduct Major Investigation
Reasoning	Does not meet MI threshold based on information received
Supporting considerations	

Major investigation decision	
Date	20/03/2020
Decision	Do not conduct Major Investigation
Reasoning	Does not meet MI threshold based on information received
Supporting considerations	

Non-major investigation review and recommendation	
Date	23/03/2020
Inspector	
Risk gap	Moderate
Type of standard	Established
Initial strategy	Investigate

Recommended follow up strategy	
Recommended strategy	Investigate within 45 days
Supporting considerations	Risk gap is moderate, investigate at the next PI. However, this was discussed with the operator and it was noted that 1200 ltrs of lube had leaked at pressure with the engine running. The technician was trying to replace one of the duplex filters with the engine running. The filter had not been isolated correctly. Considering direction 780 wrt isolation issues, it is recommended that this be investigated within 45 days.

Non-major investigation decision

Date	03/04/2020
RoN	[REDACTED]
RoN review result	Agree with recommendation
Strategy decision	Investigate within 45 days
Supporting considerations	

Associated inspection

Inspection ID	2129
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