Notifiable incident

Incident ID	6361
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	03/02/2020 02:20 AM (WST)
Notification date	03/02/2020 10:34 AM (WST)
NOPSEMA response date	03/02/2020 10:45 AM (WST)
Received by	[redacted]
Nearest state	WA
Initial category type *(based on notification)*	Dangerous Occurrence
Initial category *(based on notification)*	Unplanned event - implement emergency response plan
3 Day report received	07/02/2020
Final report received	01/05/2020
All required data received	01/05/2020
Final category type *(based on final report)*	Dangerous Occurrence
Final category *(based on final report)*	Unplanned event - implement emergency response plan
Brief description	OHS - UPE Loss of Power Resulting in GA and Muster
Location	
Subtype/s	Emergency response, Muster, Power failure
Summary *(at notification)*	While transitioning from Main Steam Generator to Emergency Diesel Generator, Steam Turbine generator tripped resulting in a loss of power which resulted in a loss of plant air leading to and ESD and EDP resulting in a full muster. Muster was completed in 10 minutes and power restored.

Details *(from final report)*	While transitioning from Main Steam Generator to Emergency Diesel Generator, Steam Turbine generator tripped resulting in a loss of power which resulted in a loss of plant air leading to and ESD and EDP resulting in a full muster. Muster was completed in 10 minutes and power restored. ** As Supplied bu Duty Holder** Brief description of incident - On tripping of the breakers on STG the EDGs (2 off) tripped. This caused a temporary power outage Work or activity being undertaken at time of incident - Switching power load from Steam Turbines Generators to Essential Diesel Generators What are the internal investigation arrangements? Causal Reasoning Investigation How effective was the emergency response? Effective Response and full muster achieved. Will the equipment be shut down? Yes. Steam Production System has been shut down. Essential Diesel Generators Restarted. Immediate action taken/intended, if any, to prevent recurrence of incident - Power restored on EDGs to support life support and essential services. Responsible - Prelude OIM. Completion Date - Completed What were the immediate causes of the incident? Under Investigation ** As Supplied by Duty Holder** Has the investigation been completed? Yes Root cause 1 High cooling water return temperature caused EDG-10 to trip Root cause 2 Reduced flow through cooling water heat exchangers caused the high cooling water temperature Root cause 3 Marine fouling due to reliability issues with the ECU caused the reduced flow Other root causes - The load being carried by EDG-10 was instantaneously transferred to EDG-30, which exceeded what EDG-30 could handle, causing it to also trip. Full Report: A Causal Learning investigation was conducted by a team facilitated by the Senior Incident Investigation Coach and composing of onshore and offshore personnel including; Technical Health and Safety Manager, Electrical Engineer, Energy and Utilities Engineer, and a Production Technician. The team gathered data through interviews with personnel directly involved in the incident as well as witnesses and subject matter experts from Operations, Maintenance, and Engineering; review of operational logs; and photos of the relevant areas of the asset. The investigation team determined that the opening of the breakers on the STG coincided with - but did not cause - the EDG trip, as originally suspected. As detailed within the root causes area above the investigation team identified that the power loss occurred when both EDG 10 and 30 sequentially tripped due to the presence of a high cooling water return temperature and load exceedance respectively. Actions to prevent recurrence of same or similar incident: Action - Complete separate ECU reliability investigation (bus duct covers, gearboxes, ECU pump, line cleaning). Responsible - EPST Team Lead, Engineering Manager. Completion Date - 30 June 2020. Action - Ensure that a process is established to regularly review the SW1 Performance, and carry out remedial activities (e.g. intrusive cleaning) as required to maintain performance at specified levels. Responsible - Utilities Surveillance Team Lead. Completion Date - 1 June 2020 Action - Check and align the operation of SW1 system with Basis of Design. Responsible - Utilities Surveillance Team Lead. Completion Date - 1 July 2020.
Immediate cause/s	TBC
Root cause/s	

Root cause description	Root cause 1 High cooling water return temperature caused EDG-10 to trip Root cause 2 Reduced flow through cooling water heat exchangers caused the high cooling water temperature Root cause 3 Marine fouling due to reliability issues with the ECU caused the reduced flow Other root causes - The load being carried by EDG-10 was instantaneously transferred to EDG-30, which exceeded what EDG-30 could handle, causing it to also trip.

Duty inspector recommendation	
Date	03/02/2020
Duty inspector	[redacted]
Recommendation	Do not conduct Major Investigation
Reasoning	Does not meet MI threshold based on information received
Supporting considerations	

Major investigation decision	
Date	03/02/2020
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	03/02/2020
Inspector	[redacted]
Risk gap	Nominal
Type of standard	Established
Initial strategy	Inclusion in annual stats/data analysis

Recommended follow up strategy	
Recommended strategy	Investigate
Supporting considerations	Note that the failure/trip was from the Essential Diesel Generators, not Emergency Diesel Generators. The inspectors understand that the Emergency Diesel Generators have remained functional. Emergency power has not been lost. Investigate as part of notification 6360 (HP Steam Leak / Trip). Risk is not serious/significant, but this has resulted in a serious of cascading General Alarms and Musters (including 6362) . It is recommended that this be included in the investigation for 6360.

Non-major investigation decision	
Date	09/07/2020
RoN	[redacted]
RoN review result	Agree with recommendation
Strategy decision	Inclusion in annual report stats / data analysis
Supporting considerations	

Associated inspection	
Inspection ID	