Notifiable incident

Incident ID	**5531**
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	29/06/2018 12:00 AM (WST)
Notification date	29/06/2018 03:30 PM (WST)
NOPSEMA response date	05/07/2018 12:00 AM (WST)
Received by	[redacted]
Nearest state	WA
Initial category type *(based on notification)*	Dangerous Occurrence
Initial category *(based on notification)*	Damage to safety-critical equipment
3 Day report received	02/07/2018
Final report received	31/08/2018
All required data received	31/08/2018
Final category type *(based on final report)*	Dangerous Occurrence
Final category *(based on final report)*	Damage to safety-critical equipment
Brief description	OHS-DSCE-PFHE Room level instruments not meeting performance standards
Location	
Subtype/s	Facility integrity
Summary *(at notification)*	PFHE Room level instruments not meeting performance standards for SD001 Emergency Shutdown.

Details *(from final report)*	PFHE Room level instruments not meeting performance standards for SD001 Emergency Shutdown. In addition to the standard bilge high level alarms, the Plate Frame Heat Exchanger (PFHE) Room bilge area has 4 High High Level switch units (720LSZ-4201A/B/C/D), one in each corner of the room, which activate an automatic shutdown and isolation of the SW2/CCW2 systems. These HH level switches are Safety Critical Elements with the functionality to detect room flooding in the PFHE room. They are part of a barrier for MAE-09: Sea/Cooling Water/Flooding of PFHE Room, and since the water systems are in use, this MAE is active. During the first yearly Preventative Maintenance test undertaken by Asset (previous testing completed in SHI yard by SHI) to ensure the integrity of the barrier, it was found that these level switches may not detect level in case a flooded room. The level switches are a tuning fork type, with the tuning forks located/ protected within a still well. To test the integrity of each unit, the still well was immersed in a bucket of water by lifting the bucket under the still well. When undertaking this test, the alarm did not activate. Further investigation found that the inside of the still well was dry including the switch forks. The still well that protects the switch has no vent to allow the air to escape when the water level rises, thus preventing the water to rising and coming in contact with the forks. This was found to be common across all 4 level switches. A further test was conducted to check the functionality of the switches by placing a hand inside the still well to active the level switches to ensure that the control loop worked correctly. This part of the test was successful and all alarms and functions in control room functioned satisfactory. A change has been implemented on the still wells to allow air to escape in case of immersion in water. The units are planned for re-test by 3/7 to confirm functionality. The temporary change implemented immediately after the incident (as described in the 3-day report) was tested as fully functional. Subsequently, the permanent change of drilling holes in the stilling wells was implemented and tested as fully functional. There are no other SCE tuning forks applications on Prelude whereby the tuning fork stilling well is installed in open air. All other tuning forks are installed within vessel stilling wells. Therefore, wider issues with these types of instruments are not expected. It has been verified that these PFHE room level instruments were tested during construction, however the method used was a dry method. No evidence has indicated a wider issue with testing of equipment, and the design for these instruments is unique for SHI.
Immediate cause/s	SCE Level Switch units, 720LSZ-4201A/B/C/D, did not meet the performance criteria for SD001 Emergency Shutdown.
Root cause/s	ED - DESIGN - Design specs - problem not anticipated
Root cause description	Still wells for tuning forks had no vent to allow air to be displaced during immersion testing.

Duty inspector recommendation	
Date	15/08/2018
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	15/08/2018
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	15/08/2018
Inspector	[redacted]
Risk gap	Moderate
Type of standard	Established
Initial strategy	Investigate

Recommended follow up strategy	
Recommended strategy	Investigate
Supporting considerations	Flood detection system not operational. Initial conversation with the operator indicated a design issue creating an air lock which renders the sensors inoperable. Moderate risk gap - investigate.

Non-major investigation decision	
Date	15/08/2018
RoN	[redacted]
RoN review result	Agree with recommendation
Strategy decision	Investigate
Supporting considerations	

Associated inspection	
Inspection ID	1772