

# Notifiable incident

**Incident ID** [6553](#)

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

Incident details	
<b>Division</b>	Occupational Health and Safety
<b>Notification type</b>	Incident
<b>Incident date</b>	27/05/2020 03:00 PM (WST)
<b>Notification date</b>	30/05/2020 01:37 PM (WST)
<b>NOPSEMA response date</b>	30/05/2020 03:02 PM (WST)
<b>Received by</b>	██████████
<b>Nearest state</b>	WA
<b>Initial category type</b> <i>(based on notification)</i>	Dangerous Occurrence
<b>Initial category</b> <i>(based on notification)</i>	Damage to safety-critical equipment
<b>3 Day report received</b>	02/06/2020
<b>Final report received</b>	26/06/2020
<b>All required data received</b>	26/06/2020
<b>Final category type</b> <i>(based on final report)</i>	Dangerous Occurrence
<b>Final category</b> <i>(based on final report)</i>	Damage to safety-critical equipment
<b>Brief description</b>	OHS-DSCE - Crane annunciator panel fault
<b>Location</b>	Deck
<b>Subtype/s</b>	Electrical, Lifting operations
<b>Summary</b> <i>(at notification)</i>	Operator reported that the onshore engineering team identified a fault on the ██████ crane annunciator panel, inside the crane cabin. The panel were not compliant with Zone 2 requirements and would not trip on an ESD. This was investigated by offshore personnel late afternoon on 29 May and all 5 crane on board have the same issue. Cranes A-D on the topside have been isolated. Crane F, after the blast wall is being managed under an operational risk assessment.
<b>Details</b> <i>(from final report)</i>	<p>Operator reported that the onshore engineering team identified a fault on the ██████ crane annunciator panel, inside the crane cabin. The panel were not compliant with Zone 2 requirements and would not trip on an ESD. This was investigated by offshore personnel late afternoon on 29 May and all 5 crane on board have the same issue. Cranes A-D on the topside have been isolated. Crane F, after the blast wall is being managed under an operational risk assessment.</p> <p>** As Supplied by Duty Holder**</p> <p>Brief description of incident - Onshore engineering identified that ██████ crane annunciator panels, located within crane cabins, are not compliant with zone 2 requirements. Crane annunciator panels are fed by a 24v supply which are not isolated on ESD2 trip. Five ██████ cranes on the facility are impacted.</p> <p>Work or activity being undertaken at time of incident - Activity being undertaken: Routine operations</p> <p>What are the internal investigation arrangements? Causal Reasoning Investigation.</p> <p>Action taken to make the work-site safe - ██████ cranes A – D have been electrically isolated and</p>

removed from service. F crane which is located aft of blast wall is available for critical operations and is managed via Operational Risk Assessment

Immediate action taken/intended, if any, to prevent recurrence of incident:

Action - [REDACTED] cranes A – D have been electrically isolated and removed from service. F crane which is located aft of blast wall is available for critical operations and is managed via Operational Risk Assessment. Responsible - Prelude Service Coordinator. Completion Date - Completed.

Action - Operational Risk Assessment to be developed for critical use (limited) of cranes A - D.

Responsible - Prelude Service Coordinator. Completion Date 7/6/2020

Action - Engineering review and modifications to make annunciator panels compliant on all [REDACTED] cranes. Responsible - Lead Electrical Engineer. Completion Date - 20/7/2020

What were the immediate causes of the incident? Investigation to be completed.

Has the investigation been completed? No - Investigation to be completed

\*\* As Supplied by Duty Holder\*\*

Has the investigation been completed? Yes

Root cause 1 - Interpretation of the installation requirements for the Ex protection type 'ic'

Full Report:

An investigation into this non-compliance lead by the TA 2 for the SCE barrier IC003 has been completed.

The standards used where the relevant IEC 60079 standards for Equipment Installed in Explosive Atmospheres and the Prelude design specification, Ignition Source Management Execution Plan.

Background

The Prelude Safety Case and the Ignition Source Management Execution Plan requires that E&I equipment needing to operate / remain energized following an ESD and located either in an external area (regardless of its location in a hazardous or a non-hazardous area) or within Zone 2 indoors shall be suitable for use in Zone 1.

During the original installation inspection in 2017, it was identified that the annunciator panel was certified Ex 'ic' and considered suitable for a Zone 2 hazardous area. The supply to this panel is fed from a UPS and hence did not meet the project design requirements. It was considered that it was not possible to isolate the UPS supply immediately on an ESD due to other auxiliaries connected such as Manual Gross Override Protection (MGOP), Crane Radio and Crane Camera. A technical deviation was accepted to isolate the UPS supply after 180 seconds when an ESD 2 was activated, so if required the MGOP function would remain active for this duration.

Latest Finding

During work on the crane radio system, a question was raised over the installation of the crane annunciator panel and its compliance with the Zone 2 requirement with regards to the Ex protection type "ic".

Punch items were raised to further investigate the installation and the requirements of the IEC standard 60079 – 11.

The Ex 'ic' protection type is suitable for a Zone 2 hazardous area and is 'Safe with no countable faults' (i.e. safe in normal operation). The OEM Vendor's interpretation of the standard was that for Ex 'ic' the supply did not need to be considered and the protection type only applied to the device and therefore the installation was acceptable for Zone 2.

Reaching out within the Industry and Business there were several different interpretations of the requirements. It was therefore considered that an independent 3rd party review of the installation was required to settle the discussion between the OEM and Contractor and decide on a way forward.

The result of this review was that for Ex 'ic' protection the 24VDC power supply needs to be considered. The current arrangement does not satisfy the installation requirements for the protection type and that both the annunciator panel and its associated power supply are to comply with IEC 60079-11 as referred to in section 4.3 of IEC 60079-14. The circuit needs to be verified, either by a system certificate, or according to 12.2.5.2 of IEC 60079-14, the voltage (Uo), current (Io), and power (Po) of the associated apparatus does not exceed those of the apparatus, and that the capacitance and inductance in the circuit does not exceed the permitted values.

#### Current Status

Upon identification of the compliance issue, the electrical TA2 engaged with the offshore leadership team and a direction was given to isolate the Cranes A, B, C and D (located forward of the blast wall), all four cranes were identified out of service and electrical isolations were implemented. Review into the use of Crane F (located aft of the blast wall) identified no credible scenario where hydrocarbon could reach the cabin given current operational status. Operational Risk Assessments (ORA's) were initiated for all five cranes, the ORA for Crane F has been approved (crane F is available for use) with the ORAs for Cranes A, B, C and D currently under review and remain out of services.

#### Way Forward

In discussion with the vendor of the annunciator panel and the crane manufacturer [REDACTED] there is currently no power limiting device i.e barrier that can meet the requirements to make the installation Ex compliant.

The crane manufacturer has also confirmed that they are not aware of a replacement annunciator panel that is Ex compliant that meets the requirements of Prelude Safety Case.

It is not possible to operate the crane without the annunciator panel.

The medium-term solution is to separate the annunciator panel 24VDC power supply from the other consumers and isolate the panel supply immediately on an ESD, removing the potential ignition source.

The long-term solution is to investigate potential options with the crane manufacturer and the possibility of replacing the non-compliant Ex certified panel with a suitable alternative. This will follow the Asset Managing Threats and Opportunities process.

Actions to prevent recurrence of same or similar incident - Raise MTO item to investigate potential options with the crane manufacturer and the possibility of replacing the non-compliant Ex certified panel with a suitable alternative. Responsible - Electrical Engineer. Completion Date - 03 July 2020.

<b>Immediate cause/s</b>	TBC
<b>Root cause/s</b>	
<b>Root cause description</b>	Root cause 1 - Interpretation of the installation requirements for the Ex protection type 'ic'

#### Duty inspector recommendation

<b>Date</b>	01/06/2020
<b>Duty inspector</b>	[REDACTED]
<b>Recommendation</b>	Do not conduct Major Investigation
<b>Reasoning</b>	Does not meet MI threshold based on information received
<b>Supporting considerations</b>	

#### Major investigation decision

<b>Date</b>	02/06/2020
<b>Decision</b>	Do not conduct Major Investigation
<b>Reasoning</b>	Does not meet MI threshold based on information received
<b>Supporting considerations</b>	

#### Non-major investigation review and recommendation

<b>Date</b>	08/06/2020
<b>Inspector</b>	[REDACTED]
<b>Risk gap</b>	Moderate
<b>Type of standard</b>	Established
<b>Initial strategy</b>	Investigate

**Recommended follow up strategy**

<b>Recommended strategy</b>	Investigate ASAP
<b>Supporting considerations</b>	<p>Onshore engineering identified that [REDACTED] crane annunciator panels, located within crane cabins, are not compliant with zone 2 requirements. Crane annunciator panels are fed by a 24v supply which are not isolated on ESD2 trip. Five [REDACTED] cranes on the facility are impacted. [REDACTED] cranes A – D have been electrically isolated and removed from service. F crane which is located aft of blast wall is available for critical operations and is managed via Operational Risk Assessment.</p> <p>Inspectors [REDACTED] and [REDACTED] discussion with Shell on 17/06/2020 revealed that ORA had not yet been approved and the inspectors were unable to obtain documentary evidence for how the risk was being managed (i.e. documented evidence that cranes have been isolated and will not be used until the ORA is in place. And the evidence has been signed by an appropriate authority, e.g. OIM or operations manager.). It is recommended to elevate the investigation to ASAP on this basis.</p>

**Non-major investigation decision**

<b>Date</b>	17/06/2020
<b>RoN</b>	[REDACTED]
<b>RoN review result</b>	Agree with recommendation
<b>Strategy decision</b>	Investigate ASAP
<b>Supporting considerations</b>	

**Associated inspection**

<b>Inspection ID</b>	<a href="#">2253</a>
----------------------	----------------------