

Falling Ice Mitigation Measures for Pluto LNG Plant

Client: Woodside Energy Limited Pty Ltd

Overview

AEC was engaged by Woodside to investigate potential mitigation measures to prevent damage to personnel, equipment and instrumentation due to falling ice at the Pluto LNG Gas Plant on the Burrup Peninsula, Western Australia. The flow of hydrocarbons at cryogenic temperatures through various flare lines leads to ice formations around the outer face of these flare lines, which in turn, begin to thaw and potentially dislodge from the piping, posing a significant dropped object risk to both personnel, process equipment and instrumentation. Several instances of falling ice have occurred throughout the site.

The Challenge

The project presented several challenges due to the large physical scope of the project. The mitigation measures were required across the majority of the plant and were required to be installed on a range of different supporting structures including throughout congested pipe rack structures and live process units. The majority of the flare lines are located at significant heights above grade, making ease of installation of potential solutions critical.

The height of the flare lines above grade and their supporting structures also increased the complexity of the project due to the increased energy dissipation requirements caused by the falling ice fragments. The design weight of these falling ice blocks was up to 100kg.

The main priority of the project was to reduce the risks to personnel either through direct contact with falling ice or indirectly via exposure to hydrocarbons through loss of containment due to damage to the process lines.

The Solution

Several different mitigation measures were chosen and designed to suit the varying applications. These included;

- Stainless Steel Wire Netting
- Structural Steel Grating Panels
- Stainless Steel Caging
- Access Prevention Measures
- Warning Signage

Each measure was designed to either dissipate the energy of the falling ice or prevent personnel from coming into contact with the falling ice. Where risks were deemed low enough warning signage was recommended to raise personnel awareness.

The scope was also divided into different priority levels based on the likelihood of personnel or vehicles accessing the areas under the affected piping.

Outcome

Due to the expansive scope of the project and the costs involved with installation of all mitigation measures, only the high priority scopes were progressed to fabrication and installation on site. In addition to structural design activities, AEC was involved with the implementation process, providing input to installation methodologies, preparing workpacks and fabrication inspection.

The attention to detail and ease of installation contributed to the successful installation of the high priority scopes.

