

## *Inpex Ichthys Cryogenic Tanks Platform Lifts*

**Client: Laing O'Rourke Australia Pty Ltd**

### **Overview**

Construction of Inpex's Ichthys LNG Facility at Blaydin Point, Northern Territory is ranked among the most significant oil and gas projects in the world. AEC was engaged by Laing O'Rourke to undertake rigging design and lift engineering for the four most challenging lifts on this mega-project.

### **The Challenges**

The four cryogenic tank roof platforms were not initially designed to be lifted as pre-assembled units. They are curved in plan and weights range from 273Te (LNG platforms) to 392Te (propane platform). The total lifted weight (including rigging) for the propane platform was 516 tonnes, with a plan area of 1,060 square meters. The number of lift points ranged from 19 to 26.

Prior to AEC becoming involved, a structural failure had occurred during a trial lift of the Tank 1 LNG Platform in March 2016. Many personnel on the project doubted that the platforms could be safely lifted and were predicting that the platforms would need to be split into smaller units and assembled on top of the tanks. This would have caused further significant delays to the project.

Space between the tanks for the crane was limited and the largest crane that would fit (Liebherr LR 11350) was only just adequate for the lifted weight and reaction. Hook height was very limited because the addition of required mast sections results in reduced crane capacity.

The platforms were fabricated in Indonesia. The weld procedures and testing of the welds carried out by the fabricator were found to be sub-standard. Subsequent inspections in Darwin identified that many of the welds were non-compliant. AEC's scope included assessment of the lifts without repairing all of the non-compliant welds.

### **The Solution**

At the time that AEC was engaged in April 2016, Laing O'Rourke had already purchased the rigging for the failed trial LNG platform lift. Therefore AEC's approach was to utilise the existing custom spreader beams. Significant changes were required to the rigging geometry so it wasn't possible to re-use any of the original slings. Load cells and turnbuckles were added to provide a way of accommodating sling length tolerances and obtaining the required load distribution to the many lift points.

The existing top level lifting beams weren't adequate for the heavier and larger butane and propane platforms. AEC identified these as the longest lead items and fast-tracked the design of these beams, whilst providing on-site technical support for the LNG platform lifts.

### **Outcome**

AEC's innovative design approach enabled the propane and butane platform lifts to be carried out successfully and within the target time frame. Many customised rigging items such as "boomerang" links and twisted links were designed by AEC to enable this success.

AEC provided site support for the lifts and was able to provide technical assurance in meetings with Inpex and JKC. This prevented many potential delays. The LNG platform lifts won CICA Category A Lift of the Year in September 2016. The butane and propane platform lifts weren't carried out in time to enter the 2016 competition, but were larger and more challenging than the LNG platform lifts.



**Propane Platform Lift – 516 tonnes on the Crane Hook.**



**Propane Platform Lift – 11<sup>th</sup> September 2016.**

