Project Profile

Thermofor Catalytic Cracker Feed Preparation and Tower Deconstruction

Client	Oil Industry Leader
Location	Melbourne, Victoria
Duration	July 2016 to March 2018
Contract	Lump Sum Construct Only
Cost	$7.0 million

Project Overview

Deconstruction project for a major operational refinery that processes crude oil into a range of petroleum products 24 hours a day, 365 days a year, with a daily production rate of 13ML a day.

Located centrally within the operating facility is a Thermofor Catalytic Cracker (TCC) used to convert the high-boiling, high-molecular weight hydrocarbon fractions of petroleum crude oils into more valuable gasoline, olefinic gases, and other products.

In 2016 the refinery owner sought to demolish the Thermofor Catalytic Cracker in two phases, the first being the demolition of the Feed Preparation and Fractionation Units within the Cracker units, approximating 300m² of the total 750m² site. The second phase was the mechanical demolition of a 100m high tower containing several large vessels.

Since 1997, the Thermofor Catalytic Cracker had only been maintained on an as needs basis and therefore the condition of the residual materials such as hydrocarbons remaining within the pipework and vessels, was unknown.

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Phase 1

McMahon Services was engaged to first prepare a dilapidation study to determine the status of residual hydrocarbons and other hazardous materials remaining within the Feed Preparation and Fractionation Units. The second step was to safely demolish all plant, equipment and structures, and included:

- Removal of redundant refinery process plant and associated facilities to standards that satisfied State and local Government and regulatory requirements
- Provision and maintenance of site perimeter security fence around established work-zone
- Pre-cleaning and preparation of safe-work zones including cleaning of surface drainage systems associate with the Thermofor Catalytic Cracker
- Removal of hazardous materials and their appropriate disposal from site
- Removal of redundant plant and equipment, pipework systems, structures, steam utilities, water systems, plant-air systems, electrical distribution system, instrumentation and controls, and above ground concrete structures.

Over 1200t of scrap metal was removed from site resulting in a project recycling rate of 90%. 200t of friable asbestos was safety removal and disposed of at EPA approved receiving stations. Works were completed on time, on budget and nil safety or environmental incidents.

Phase 2

Following the success of the first phase of works, McMahon Services assisted contractor Broadspectrum with the mechanical deconstruction of a 12m by 12m by 100m high tower containing several large vessels. The methodology developed for the works resulted in the use of a Favco M2480D tower crane with a lifting capacity of 300t, operating height of 70m, boom height of 125m and working radius of 20m. Other methods including the use of ultra-high reach demolition methods.

Demolished structures required additional structural members, bolted-return-brackets, lifting lugs and bracing to ensure elements did not break apart during deconstruction and for ease of lowering to ground levels. A lift of 125t comprising of a 10m by 4.6m diameter surge separator vessel located at the top of the tower was completed, with the largest lift being 193t relating to a concrete section which was saw-cut out of the overall structure.

Wind speeds are a significant risk to the project requiring major lifts to occur only when the wind speed was below 10m/s. Additional risks are that the works are being undertaken inside an operational refinery with limited and tight access to the site.

Works include the removal and safe disposal of 320t of asbestos containing materials including asbestos lagging pipes, asbestos insulated surge tank and a kiln tank containing internal friable asbestos materials. Asbestos is safety removal and disposed of at EPA approved receiving stations.

The lower 30m of the structure were demolished using excavators with demolition shear attachments. Over 1,000t of steel and 1,300t of concrete was recycled, achieving a 98% recycling rate for the project.

The client presented McMahon Services with an award for their commitment to continued safety performance improvement for their safe work achievements on the project.

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