



United Kingdom Production Unit
Point of Ayr Terminal
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9th October 2013

POINT OF AYR GAS TERMINAL
REPORT To Supplement Part B Notification to NATURAL RESOURCES WALES
TGU REBOILER REPAIR 22nd AUGUST 2013 to 3rd OCTOBER 2013

EXECUTIVE SUMMARY

The Tail Gas Unit at the POA Terminal was taken offline on the 22nd August 2013 to undertake a permanent weld repair on the shell of the Solvent Regenerator Reboiler (leak identified earlier in the year and a temporary repair completed at that point in time). During the TGU downtime, which was coincident with the plant shutdown window, the Lean/Rich Solvent Exchanger plate pack was also scheduled to be changed due to signs of fouling.

The planned scopes on the solvent reboiler were executed quite well with a minor delay due to unforeseen weather conditions preventing lifting operations completing on time. However during the change out of the exchanger plates it was found that the spare exchanger plates were defective and, due to the original OEM gaskets being long lead items, an alternative set of gaskets then needed to be sourced. The change was undertaken via BHP Billiton's Management of Change process in consultation with the OEM.

Overall, the scopes on the TGU were executed safely and the TGU was returned to full service, with emissions back in specification, on the 3rd October 2013 (refer to Attachment 1).

BACKGROUND

The Tail Gas Unit (TGU) was taken offline on the 22nd August 2013 in order to begin preparations to remove the Solvent Regenerator Reboiler for permanent repair. A temporary Belzona repair had been previously undertaken between 31st May 2013 and 7th June 2013 due to a leak of lean amine on the shell of the Reboiler. A permanent welding repair solution was subsequently put together by the BHP Billiton Integrity Engineer and Operations Team with an estimated duration of 35 days from TGU taken offline to TGU put back online. The reboiler needed to be taken away from site to facilitate the planned repair.

Due to the length of time required for the permanent repair, a request was made to NRW to operate the unit without the TGU, which was subsequently granted until the 26th September 2013. The number of days on which emissions exceeding the Plant's PPC permit were forecast was originally estimated at 21 days, since the plant was scheduled for a 14-days shutdown while the TGU repair was undertaken.

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The opportunity was also taken to change the plate pack of the Lean Rich Solvent Exchanger as it exhibited signs of fouling due to recent start ups and shutdown activity on the unit over the previous five months. A spare plate pack set was sent to Alfa Laval (OEM) for inspection and gasketing in advance of the planned change out date to allow a quick turnaround of the exchanger.

SUMMARY OF ACTIVITIES

Solvent Regenerator Reboiler Repair

The Tail Gas Unit was taken offline on the 22nd August 2013 in preparation for removal of the Solvent Regenerator Reboiler. The unit was subsequently washed, decontaminated, isolated and spaded before the exchanger was lifted on the 27th August 2013. The shell and tube bundle was separated onsite, cleaned and sent to Fabricom GDF Suez yard at Sandycroft, Flintshire for repair.

At Fabricom's yard, the temporary Belzona repair was removed and the shell was further cleaned in preparation for the permanent welded repair. The exchanger was re-inspected and several additional areas of significant pitting corrosion were found which needed a Belzona repair internally. The welding was subsequently completed and post weld heat treatment carried out (refer to Attachment 2). A Belzona repair was applied due to the additional corrosion identified. Once the permanent repair solutions were completed the reboiler's shell and tube bundle was put back together and pressure tested. The exchanger was returned to site on the 16th September 2013.

During the week of the 16th September the weather was not favorable due to high winds and rain and therefore the crane lift to return it to its final position could not be undertaken safely. This resulted in a potential delay to the reboiler's "Handover to Operations" date. A change in strategy was undertaken, where the insulation was completed at the ground level before it was lifted. The exchanger was lifted into place on the 20th September 2013 safely (refer to Attachment 3). The piping connections, despading and pressure testing were subsequently completed on the 26th September 2013.

Lean Rich Solvent Exchanger Plate Pack Changeout

The scope of the Lean Rich Solvent Exchanger Plate Pack changeout was started on the 11th September 2013 during the Plant Shutdown window. Typically, the actual change of the packs takes about 1 day based on previous experience. To pre-empt any potential issues with the rebuild, the spare plate pack was sent to Alfa Laval (OEM) for inspection and regasketing in the previous month and an Alfa Laval Service Engineer attended site to assist in the plate pack's changeout. After several days of pressure testing and plate adjustments in-situ, it was decided to remove the entire plate exchanger frame and send to Alfa Laval's workshop in Camberley, Surrey for rebuild due to failed pressure tests. A final test at the terminal's workshop highlighted that the exchanger plates were defective and a new/different plate pack was required. An immediate decision was made to purchase a plate pack with expected delivery within 4 days since the plates were available in Sweden and concurrently to send the "dirty plates" to Alfa Laval's workshop in Camberley for cleaning with a quick turnaround as a contingency.

On the 17th September 2013, Alfa Laval later communicated to BHP Billiton that the original specified gaskets (AL-EPDM type gaskets) for the exchanger were a long lead item and their expected delivery was at the end of October

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2013. This was unacceptable to BHP Billiton since it was not highlighted earlier. After several discussions and engineering input from both teams an alternative gasket (EPDM type gaskets) was identified by Alfa Laval as being suitable for the current operating conditions and could be fitted on the "dirty plates" that had now been cleaned and will remain suitable until the next planned shutdown in April 2014. At this point this pack will be changed out for the brand new plate pack with the original OEM specified gaskets. NRW was again consulted and informed of the current status of the Tail Gas Unit work and potential delay. An additional week's extension was granted by NRW to keep the TGU offline until the 4th October 2013.

The Lean Rich Solvent Exchanger re-gasketed plates were returned to site and the exchanger subsequently re-installed in-situ on the 1st October 2013. The exchanger and piping were despaded and pressure tested on the 2nd October 2013. This allowed circulation to re-commence on the Tail Gas Unit and auxillary systems to be brought online. The Tail Gas Unit was fully online by the evening of the 3rd October 2013 and the SO₂ emissions were back in specification at 2130 hrs. The hourly average specification met its target at 2240 hrs (refer to Attachment 1).

BHP Billiton is progressing the procurement of the new plate pack with the original OEM gaskets which should be available at the end of October 2013. A TGU amine sample has also been sent away to Alfa Laval Lab in Sweden for further compatibility tests as part of the Management of Change process.

Prepared By:



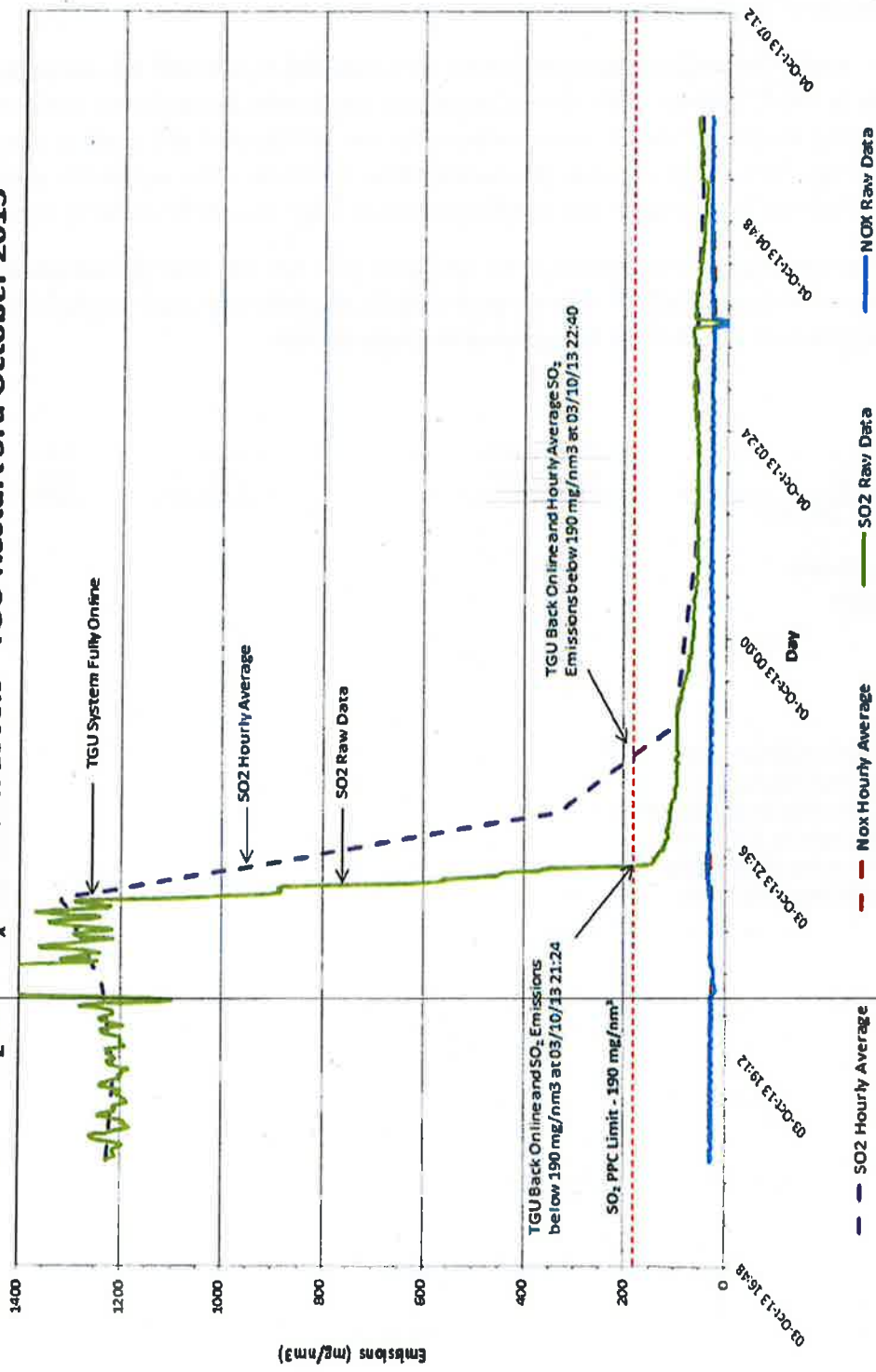
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Attachment 1 – Trend of SO₂ and NO_x Emission Levels during TGU Restart 3rd October 2013

TOX SO₂ and NO_x Emission Levels - TGU Restart 3rd October 2013



Attachment 2 – Permanent Repair of TGU Reboiler



Attachment 3 – Lifting Operations of Solvent Regenerator Reboiler

