

Mr Andi Kemp  
 Environment Agency Wales,  
 Rivers House,  
 St Mellons Business Park,  
 St Mellons,  
 Cardiff,  
 CF3 0EY

30<sup>th</sup> November 2016

**Ref: Permit BU2110IS – Condition 2.4.1.2 Waste minimisation and water efficiency 4 yearly progress report**

Dear Mr. Kemp

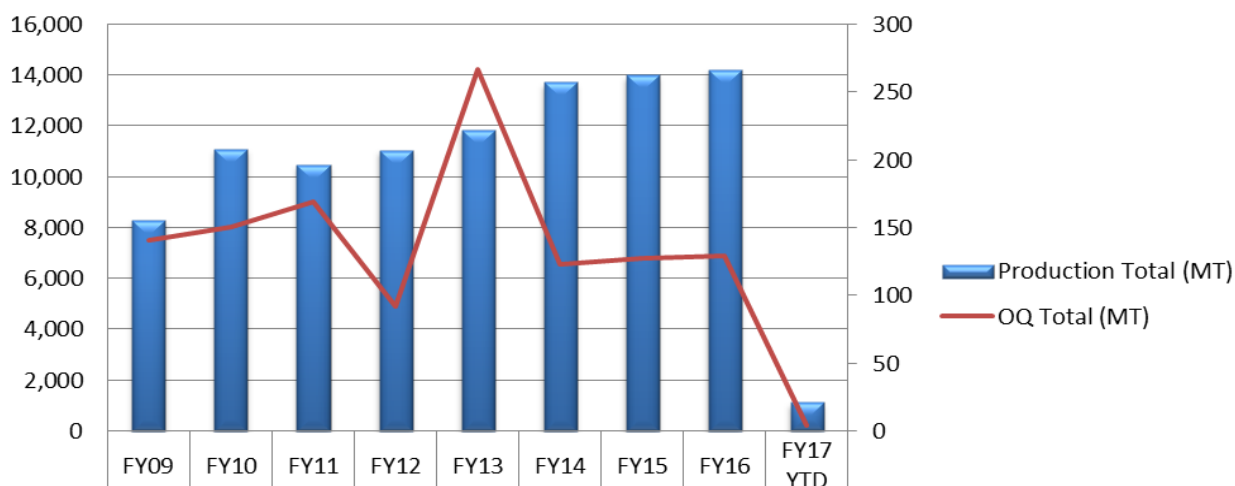
In accordance with our Environmental Permit, reference BU2110IS, please find enclosed our response to the Permit Condition 2.4.1.2, which specifies:

*‘Carry out periodic waste minimisation audits and water usage efficiency audits. If such an audit has not been carried out in the 2 years prior to the issue of this Permit, then the first such audit shall take place within 2 years of its issue. The methodology used and an action plan for increasing the efficiency of raw materials or water shall be submitted to the Agency within 2 months of completion of each such audit and a review of the audit and a description of progress made against the action plan shall be submitted to the Agency at least every 4 years thereafter.’*

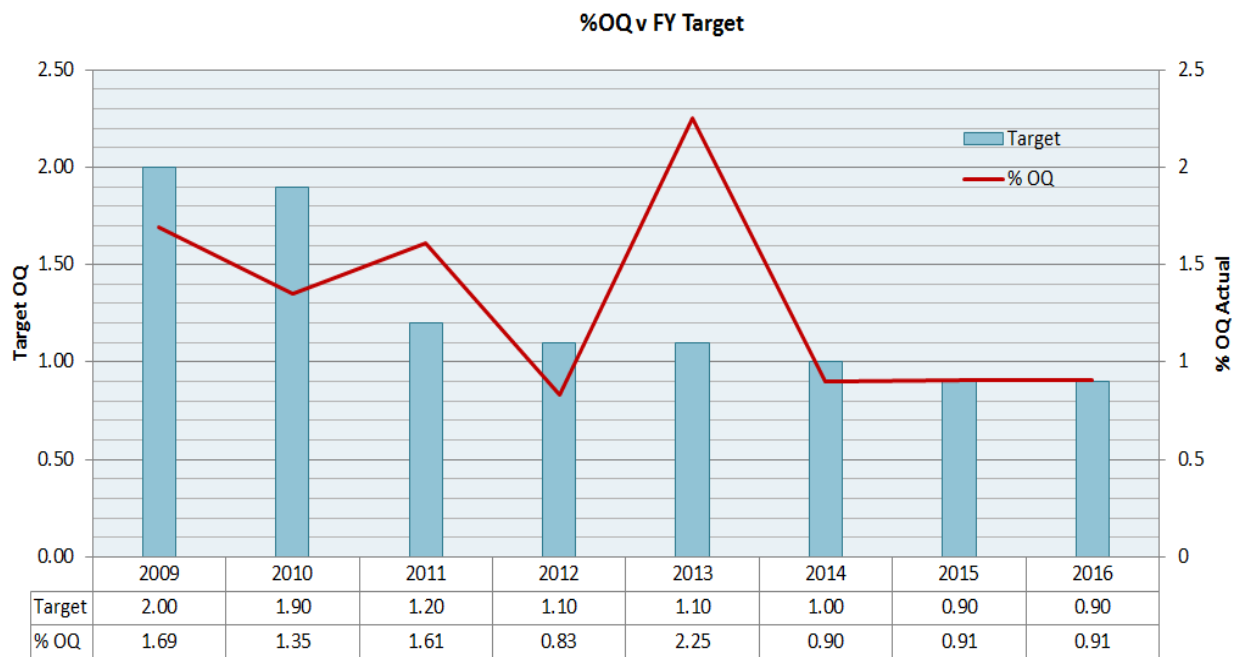
Since the last report dated 30.11.12 Cabot continues to identify improvement opportunities and the main features of these projects are highlighted below;

**1) Reduction in Off Quality Material**

**Production v OQ History (MT)**



|                       |      |       |       |       |       |       |       |       |      |
|-----------------------|------|-------|-------|-------|-------|-------|-------|-------|------|
| Production Total (MT) | 8315 | 11099 | 10483 | 11046 | 11858 | 13722 | 14007 | 14226 | 1127 |
| OQ Total (MT)         | 141  | 150   | 169   | 92    | 267   | 123   | 127   | 129   | 4    |

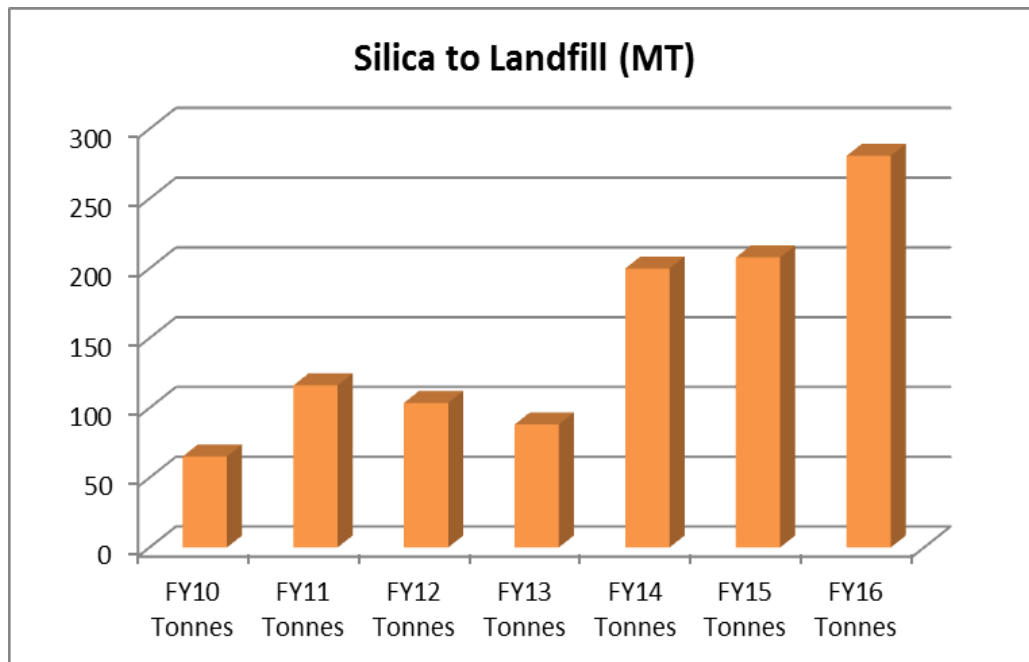


Over the past few years a number of quality improvement programmes have helped reduce the rate of off quality events. The highlights are mentioned below:

- Prime to prime grade changes to reduce the amount of transition material sent as sweeps/FS
- Grade change procedure updated with RFC to give clearer direction to operators on when to make adjustments and when to stop in the event of an OOS
- Grade change check sheets, start- up check sheets, Out of Specification check sheets to standardise transitions and to aid investigation when OOS event occurs. Aspen trends were also set up for use in conjunction with the OOS check sheets
- Monitoring 'Right First Time' metrics on Grade change
- H2 regulators, feedstock management to improve in process stability during steady state. Reducing variability.
- Customers sourced to take a percentage of FS material that would otherwise have gone to landfill (Microtherm and Pegasus)
- Denser performance study to find optimum operating conditions to achieve required tamped density
- Grade transparency study on LM150 to match Rheinfelden performance, resulted in a number of operational changes that improved process stability, reduction in the frequency of off quality events

## 2) Off Quality Silica Landfill Diversion

Since 2009 we have been proactive in seeking an alternative reuse option for waste silica that is currently disposed to landfill.



We explored the concrete block manufacturer recovery option at Knauf Insulation at Pontypool that was mentioned in your CAR report dated 13/11/2012:

*Waste - the reduction in off-specification silica sent to landfill is commended. Please provide an update on progress with the option for recovery of waste silica via glass wool production.*

*Response: A discussion was held with Mr. Warren Christy (SH&E Manager) at Knauff Insulation on November 4th 2013 ..... "Following our telephone conversation earlier I can confirm that with regard to silica as a glass fibre manufacturer, we add sand (containing silica) to our furnace as a raw material. We do not use fumed silica and upon discussion with our Technical Manager would not be required to. Unfortunately therefore I feel the waste stream you generate would not be suitable for our process. I look forward to speaking with you in the future and hopefully we can exchange ideas and good practices accordingly."*

During the past 15 months we have been working with a Waste Management Company, Pegasus Waste who have a product supply partner that manufacture polymeric systems. Various grades of off quality fumed silica from Barry were trialled by incorporating fumed silica (destined for landfill), into a polymeric roofing compound, successfully displacing Titanium Dioxide, a component in their formulation

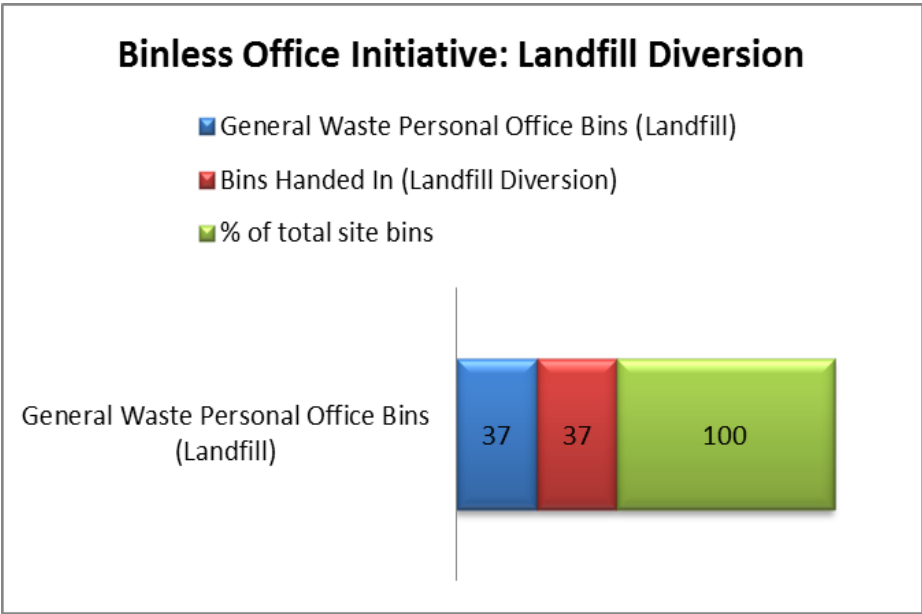
We are pleased to announce that we have recently been offered commercial terms for re-use of the off quality hydrophilic fumed silica strictly on a re-use basis; it does not include any waste management or treatment/disposal services for material destined for re-use, and the offer relies on Cabot providing the correct material description(s)/grades, etc. of material prior to being re-used in a manufacturing process.

Whilst success has been realised in the re use of hydrophilic off quality silica we continue to seek opportunities to find alternative uses for treated silica. If not reworked into the process the current disposal route is landfill but following successful re-use of untreated silica reuse we continue to pursue avenues for re-use of treated silica. .

3) Waste Management: Recycling Initiatives

As part of our on-going commitment to Environmental performance, we closely monitor the impacts of our operations on site; waste management being just one area to which we paid particular focus last few years. In 2009 a waste baler was introduced into the Warehouse and this project had initially increased the amount of recycled waste for plastic and card. Unfortunately, the company taking the Cabot waste went into receivership and it proved difficult to source another vendor to recycle the WPS bales.

In 2014 following the annual waste management review, we delivered a business solution to historical WPS landfilled waste through introduction waste compaction for WPS packaging. Along with the introduction of food and recycled waste, the compaction facility in the WPS helped to divert a significant amount of waste away from landfill. The initiative also involved successful engagement and influencing of employees at all levels across the site (Bin-less office initiative), the site exceeded the target set in FY15 (50% reduction on FY14 landfill) and have maintained equally encourage trends in 2016. This particular Barry site success story also featured in the latest Cabot’s Corporate Sustainability Report.



To maintain high standards of waste segregation and recycling we continue to carry out weekly inspection audits of waste storage areas. Where shortcomings are found these are acted upon quickly and communicated through a variety of mediums: Display screens around site, toolbox talks, individual refresher training and visual display boards.



Our induction programme for all employees and contractors includes a very comprehensive section on waste, correct segregation etc. When new recycling opportunities or changes in legislation occur in the future that impact on our current waste management practices, then we will review our practices and make changes accordingly.

#### Barry Waste Disposal Trends

| Waste Description (MT)  | CY14<br>MT total | CY15<br>MT total | Fate        |
|-------------------------|------------------|------------------|-------------|
| General Waste           | 29               | 20               | Landfill    |
| WPS Bales Paper         | 43               | 0                | Landfill    |
| Seabulk Liners and Bags | 5                | 2                | Landfill    |
| WPS Compactor 35yd RORO | 3                | 37               | New Recycle |
| Food                    | 0                | 3                | New Recycle |
| Dry Mixed Recycling     | 1                | 8                | New Recycle |
| Total Waste Site (All)  | 77               | 69               |             |

#### FY15 YTD % reduction    Comments

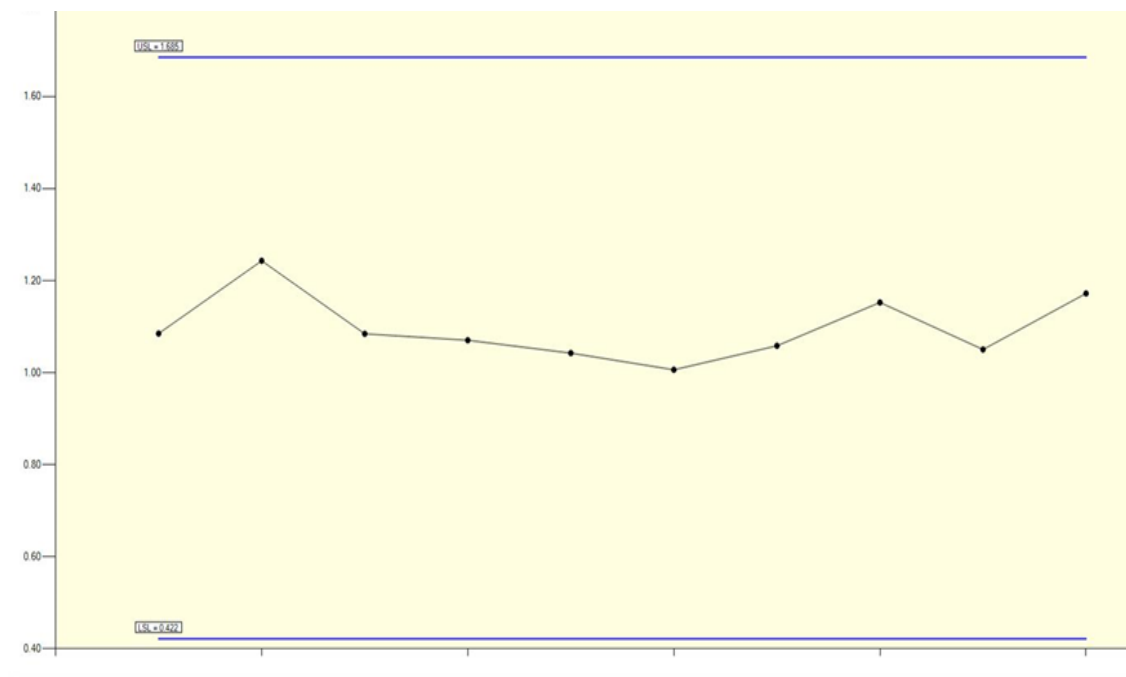
|      |                                                    |
|------|----------------------------------------------------|
| -30  | 20 MT to Landfill as General Waste v 29 MT in CY14 |
| -100 | Baled material compacted and incinerated in CY14   |
| -63  | Sea-bulk liners compacted and incinerated in CY14  |

#### 4) Water

##### **Potable Water (*from Dwr Cymru*)**

We have setup automated active monitoring & alarming through our IP21 & AEMS system to warn of progressive increases in the 'unmetered' water consumption onsite which would indicate a subterranean leak. In the event of a leak initiating, the system should alert the Production team within a matter of days (0-100te) rather than weeks.

##### **Unmetered Potable Water Flow Calc m3/hr via XStandard**



##### **Process Cooling Water (*from DCL*)**

In reviewing the main routes of river water through the plant, we identified the potential to reduce the instantaneous Cooling Towers blowdown rate from 3.00 m<sup>3</sup>/hr to around 2.5m<sup>3</sup>/hr with a potential saving of approximately 4,300m<sup>3</sup>. After some additional monitoring of the cooling system fouling rates via our TRASAR system & the performance of the WPS liquid ring vacuum pumps, the final savings for FY16 were nearer 5,200m<sup>3</sup> through further, short-term seasonal reduction in blowdown rates.

##### **Chemical Sewerage (*to DCL*)**

An opportunity to divert approx 1,600m<sup>3</sup> of surface water run-off from P-50 & P75 discharge from TK-40 to the Cadoxton River, via the Tilted Plate Separator was initiated in FY16 Q1. This uncontaminated rainwater used to be transferred to DCL chemical sewer which added needless volumes to their chemical treatment from Cabot.

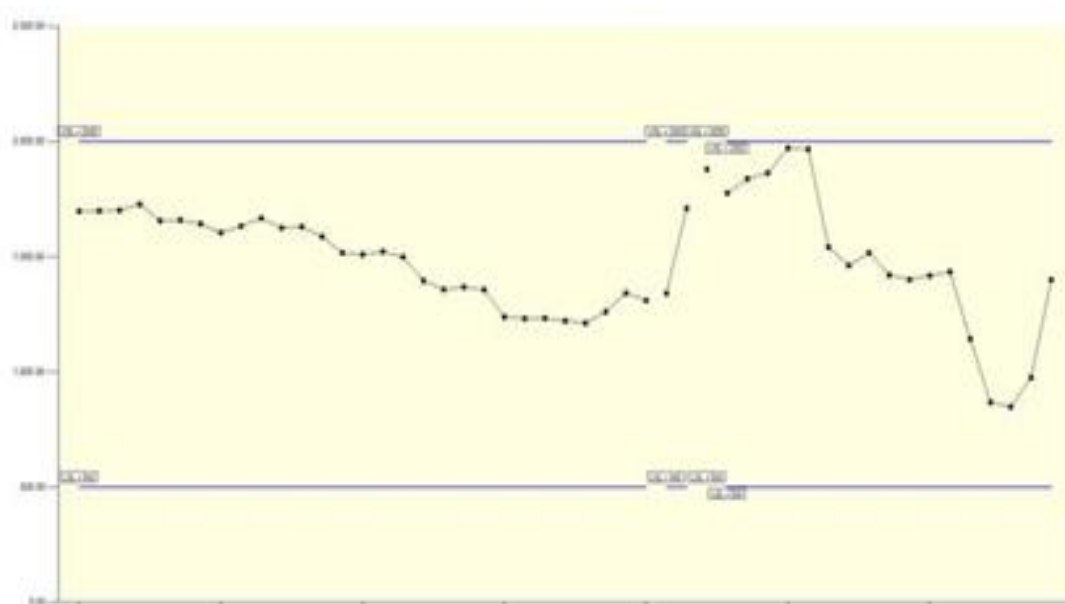
## 5) Instrument Air from DCL

Two improvements have been initiated through this year to reduce the total site instrument air consumption & so reduce overall energy use.

The first has been targeting the unmetered consumption of instrument air on jet pulsed filter units used across the site. A comprehensive survey was completed across the site & those which had the required instrumentation to adjustable & monitor pulse timings were scheduled throughout the year. This work was completed in FY16-Q4 but some improvement has already been seen in total air demand across the site.

In addition, as with the *Process Cooling Water*, new active monitoring within IP21/AEMS has been initiated for total instrument air flow to site to flag up step changes in air consumption in what is largely an unmetered network.

**Total Instrument Air to Site (Barg) via XStandard**

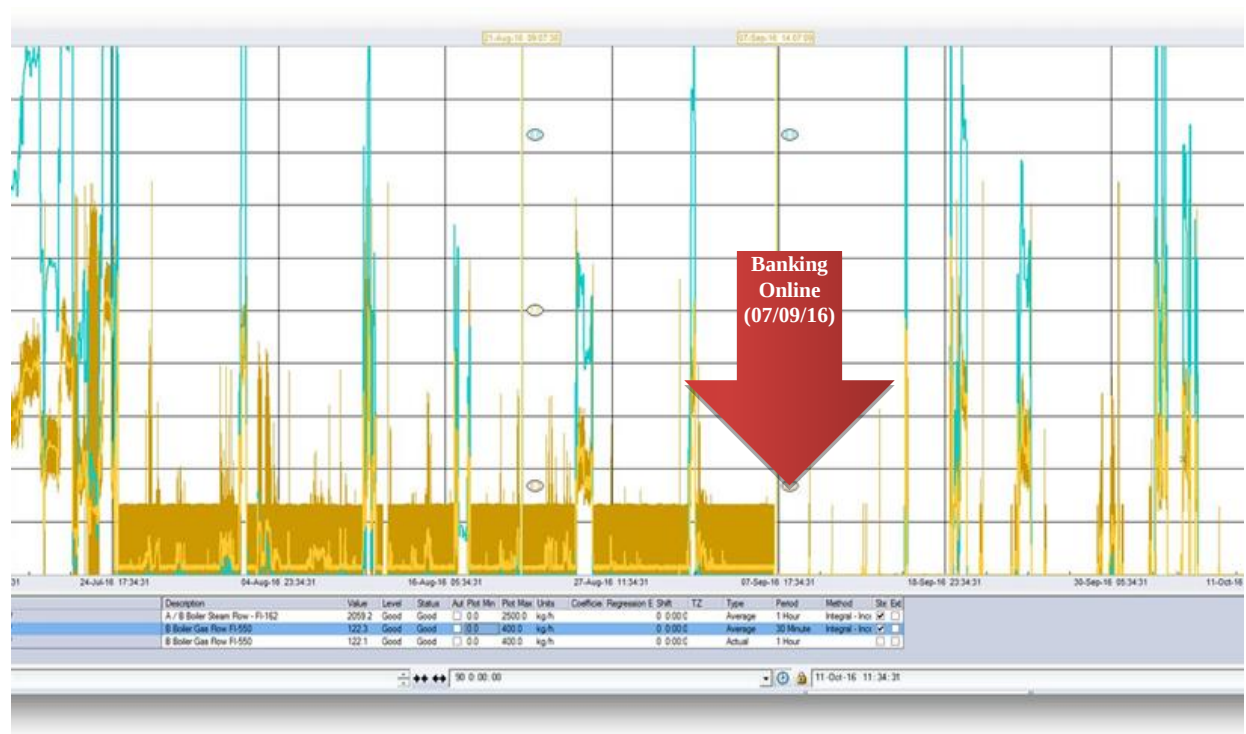


## 6) Natural Gas to Steam (Boiler Banking)

There are currently three steam generating plants on the Barry site; B-4 High Pressure Reactor Cooling Water System (*waste heat recovery*), Hydrogen Plant (*nGas fired reformer*) and the Package Boiler (*nGas fired boiler*).

Since the commissioning of B-4 waste heat recovery in 2012, the Package Boiler has been maintained at operating pressure to supplement the site's steam demand in the event of B-4 being unavailable through both planned maintenance & unplanned plant upsets. To achieve this, prior to June'16, the boiler consumed around £13k of nGas per year but an energy saving opportunity in the form of Boiler Banking arose in discussion with Spirax-Sarco. During the June'16 shutdown, we installed equipment which allows excess, live steam to be injected into the Package Boiler to maintain it as a hot standby without burning nGas fuel.

Using the excess steam in this manner is estimated to reduce the nGas demands on the Package Boiler by an estimated 301tonnes of CO<sub>2</sub>/year.



Implementing a strong Safety, Health and Environmental programme has been a long-standing commitment of Cabot's. This has required every employee to play a part in making sure we conduct work in a safe and environmentally sound manner. It also means going beyond compliance and we continually challenge ourselves to find opportunities for improvement and enhanced efficiency.

If I can provide you with any further information in support of permit Condition 2.4.1.2, then please do not hesitate to contact me.

Yours sincerely,

Paula Lloyd

Environmental Manager

Tel: +44 1446 709606

Fax: +44 1446 737123