Mr. Andi Kemp
Natural Resources Wales,
Rivers House,
St Mellons Business Park,
St Mellons,
Cardiff,
CF3 0EY

26th November 2020

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

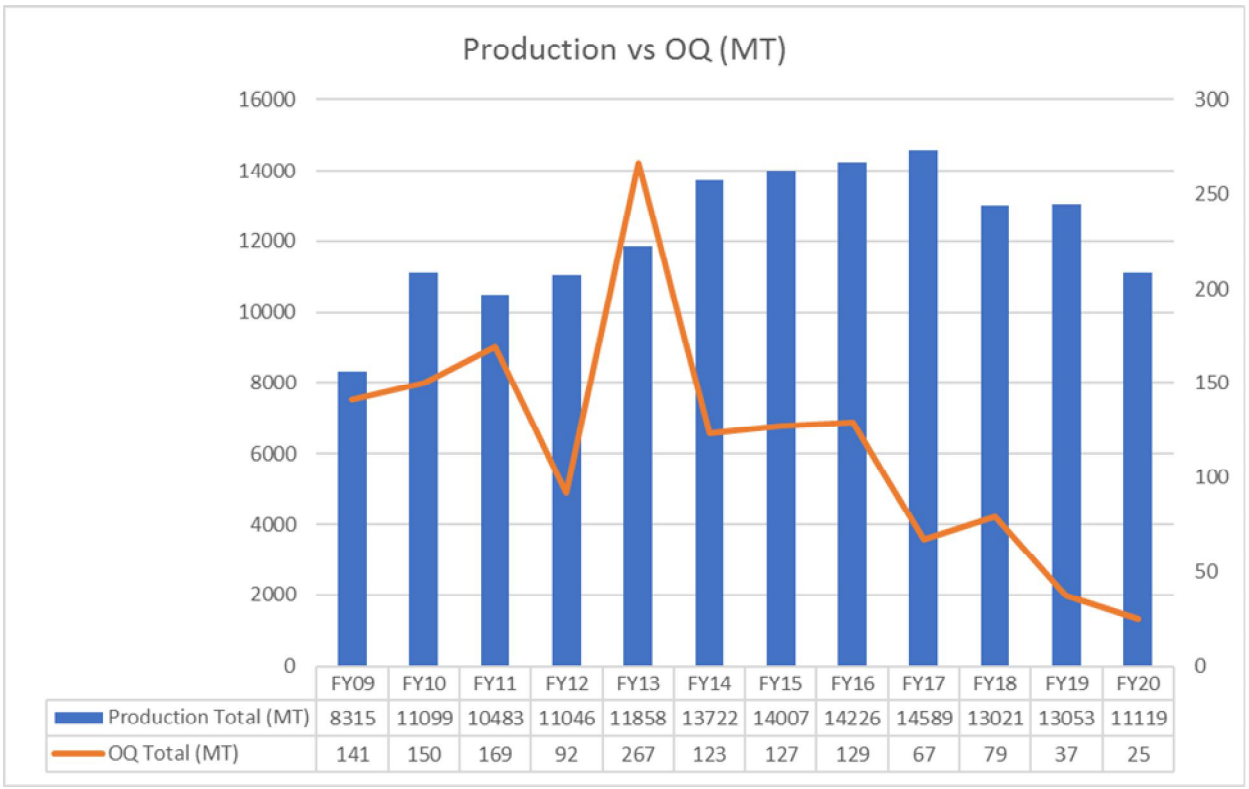
Dear Mr. Kemp

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

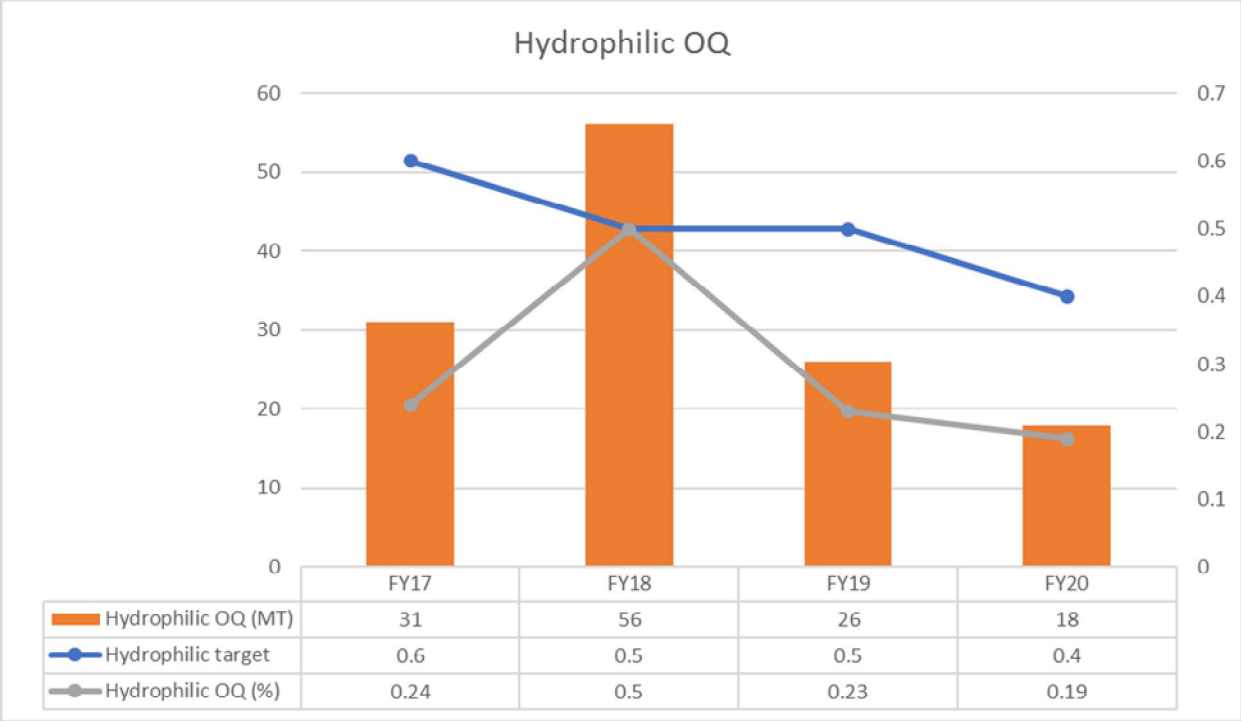
'Carry out periodic waste minimisation audits and water usage efficiency audits. If such an audit has not been carried out in the 2 years prior to the issue of this Permit, then the first such audit shall take place within 2 years of its issue. The methodology used and an action plan for increasing the 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 30.11.16 Cabot continues to identify improvement opportunities and the main features of these projects are highlighted below;

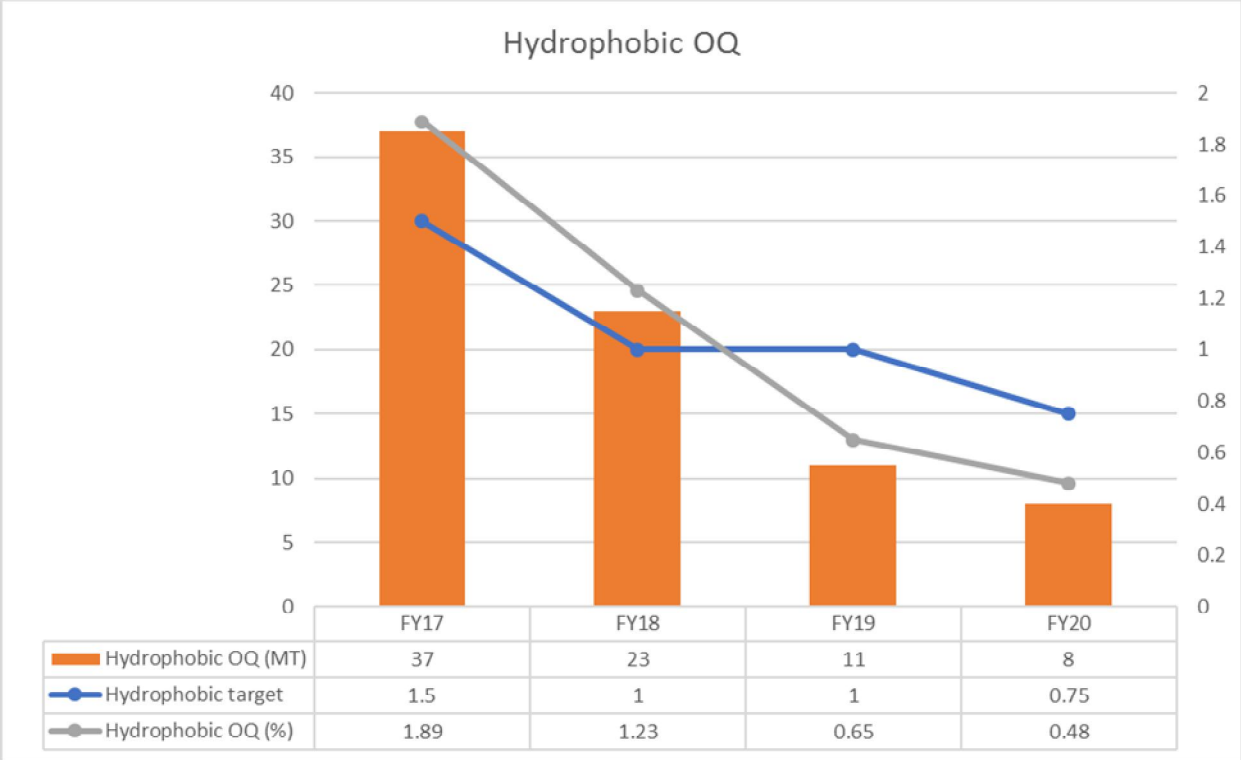
1) Reduction in Off Quality Material



	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
Production Total (MT)	8315	11099	10483	11046	11858	13722	14007	14226	14589	13021	13053	11119
OQ Total (MT)	141	150	169	92	267	123	127	129	67	79	37	25



	FY17	FY18	FY19	FY20
Hydrophilic OQ (MT)	31	56	26	18
Hydrophilic target	0.6	0.5	0.5	0.4
Hydrophilic OQ (%)	0.24	0.5	0.23	0.19



	FY17	FY18	FY19	FY20
Hydrophobic OQ (MT)	37	23	11	8
Hydrophobic target	1.5	1	1	0.75
Hydrophobic OQ (%)	1.89	1.23	0.65	0.48

Reduction in off quality product is a constant initiative for Cabot, and it features on our site targets every year. As demonstrated in the graphs above, since the last report there has been a significant reduction in OQ, particularly in Hydrophobic grades. A number of projects have contributed to this success as highlighted below

- Identification of Key Process Variable (KPV) for both the batch and continuous treated processes, introduction of real time SPC monitoring of these KPV's

- A comprehensive response flow checklist (RFC) was developed for the treated process. The RFC directs the operators to act on Out of Control (OOC) key process variables as well as Key Material Characteristics (KMC). This results in us making proactive changes to maintain the product within specification.

- The laboratory was returned to a 12-hour shift pattern to support real time testing, the removal of delay between production and testing has reduced the time for action to be taken on any OOC/OOS product.

- The Laboratory have introduced In Process testing for the Hydrophobic grades, this was previously only tested as final product. This allows us to react to production drift in a timelier manner.

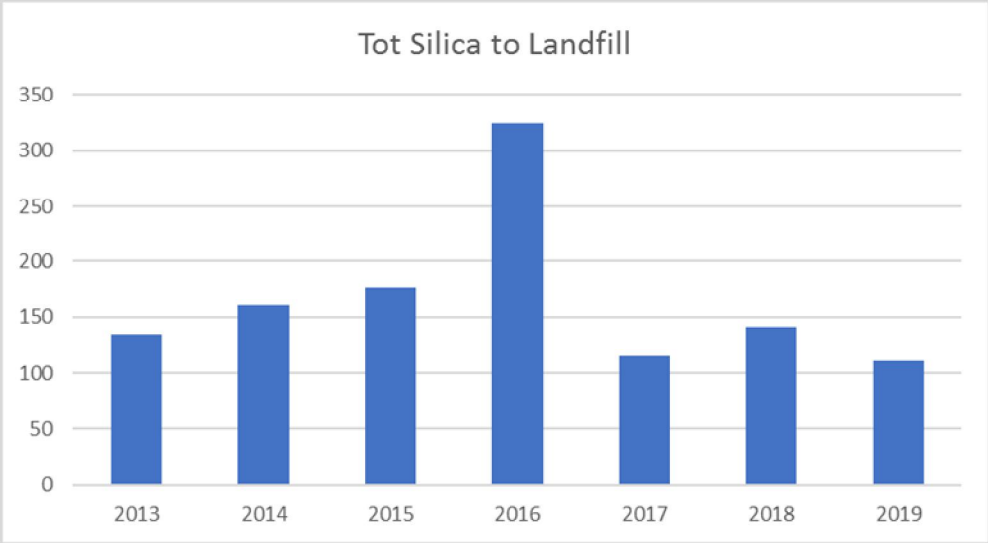
- Creating a joint Quality plan with our fence line partner has allowed for more focus on feedstock quality and earlier detection of feedstock fouling, which can contribute to OQ.

- Continued use of the 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

- Customers sourced to take a percentage of start-up material that would otherwise have gone to landfill (Microtherm and Pegasus)

2) Off Quality Silica Landfill Diversion

We are proactive in seeking alternative reuse options for waste silica that is currently disposed to landfill.

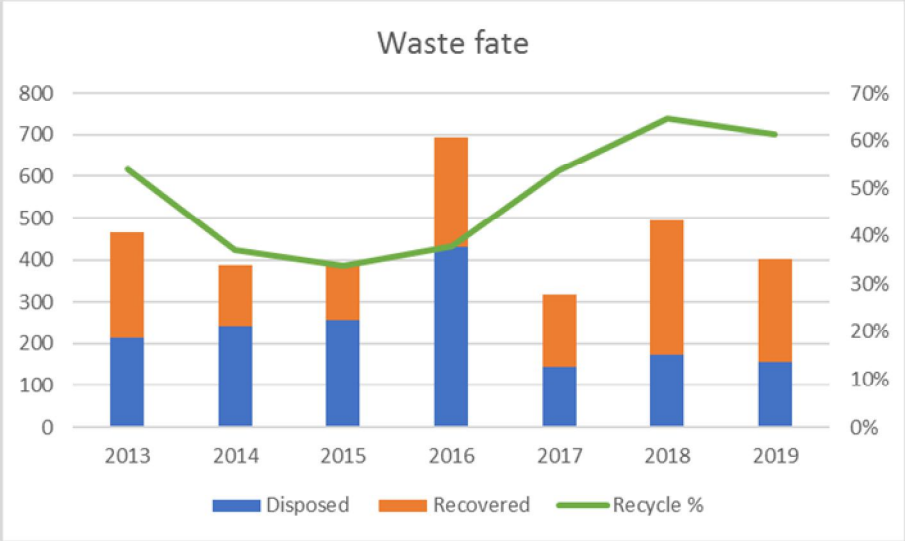


Since 2015 we have been working with a Waste Management Company, Pegasus Waste who have a product supply partner that manufacture polymeric systems. Various grades of off quality fumed silica from Barry were trialled by incorporating fumed silica (destined for landfill), into a polymeric roofing compound, successfully displacing Titanium Dioxide, a component in their formulation.

In 2018 we reached an agreement with an existing customer to replace an amount of their prime product with some of our start up material that broadly achieves the same specifications. The main parameter of concern with start-up material is not a concern for this customer. This resulted in up to 45% of our start up material being converted to saleable prime product over the last three years.

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; We continue to look for opportunities to reduce the amount of waste we generate and from the waste that is generated we firstly look for opportunities to reuse or recycle. Our waste recovery has increased to now over 60% of waste being recovered in some way.



Cabot have a longstanding commitment to provide refreshments to staff and at Barry this has historically been through the Klix coffee machines. These machines dispense drinks in single use plastic cups and when we explored this further, we found that around 80K cups were being used each year. While these cups were part of the recycle programme, we felt that we could do better and stop using single use plastic all together. We have replaced all the Klix machines on site for new drinks dispensers that require the user to have their own cup and we issued each member of staff a reusable travel mug carrying the Cabot sustainability logo. In addition, our canteen has stopped using single use plastics, replacing the polystyrene takeaway boxes and plastic cutlery for recyclable alternatives made from cardboard and wood. Just this small project has removed 80,000 single use plastic cups and 2,000 single use polystyrene takeaway boxes from our waste streams.
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Waste segregation still maintains a high focus for us, we provide colour coded bins at various location around site, each bin is labeled with information on what can and cannot be put in it. We manage an ongoing audit programme of weekly waste inspections to ensure high standards of waste segregation and recycling.

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.

4) <u>Packaging initiatives</u>

Our commitment to reducing the Environmental impact of our operations has led to us changing our approach to packaging and making more sustainable choices. A number of projects have been identified with regard to our current packaging as outlined below:

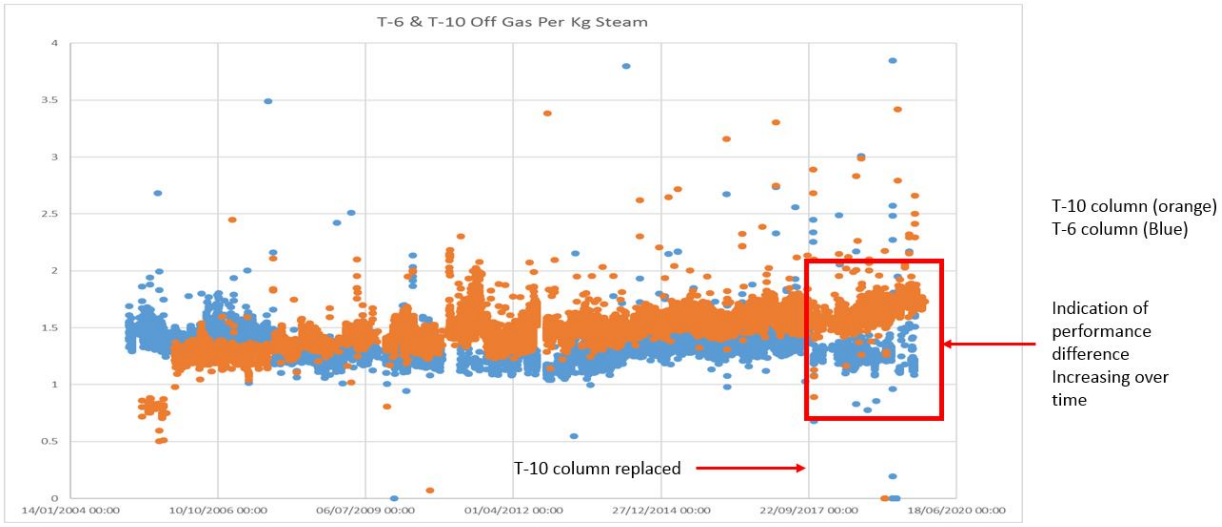
- Heat shrink foil used to seal pallets has been changed to a new supplier who incorporate up to 30% recycled content.

- We are looking to reduce overall paper usage in our paper bag packaging by moving from 3-layer to 2-layer bags or by reducing the 3-layer grammage, the goal is to try and reduce the amount of paper we use in our packaging by ~20%.
- We are trialling a move from white bags to a more sustainable brown bag. Currently the outer layer of the paper bags is a bleached white paper, the goal is to eliminate usage of bleached paper in favour of an unbleached brown paper to reduce environmental discharges of organochloride compounds.
- An FIBC recycling initiative is currently under test in conjunction with our FIBC supplier and select customers. Currently the FIBC are disposed of by the customer after contents are used. We have worked with the FIBC supplier to find options to reuse these bags. Trial FIBC'S have been supplied to a customer along with a bag return station, once the FIBC's are empty, they are added to the return station pallet. Once the pallet is full the FIBC'S are sent back to the bag manufacturer to be cleaned and reconditioned. These reconditioned bags are then resupplied to Cabot for reuse. If this trial is successful, we can look to role out recycle stations to all FIBC customers.

5) Water Efficiency

T-6 & T-10 Column Replacement
Barry Site operates a HCl desorption system, which utilises 2 columns in parallel T-6 & T-10. One of the columns, T-10, was replaced in 2017 and the T-6 column was replaced in 2020.
T-10 performance was shown to have higher column efficiency between 2017 and 2020, this is beneficial to site in terms of:

- Improved water separation efficiency (reduced water carryover – reduces potential for downstream equipment fouling)
- Lower strength byproduct HCl – Reduces site water addition to Absorption process
- Reduced steam usage – T-10 currently produces approx 25-35% more gas product than T-6 per Kg steam used.



In choosing a replacement for T-6 column we moved from a 14 Graphite tray replacement in kind to a 4-section structured packing tower. The benefits of this type of tower are outlined in the below table, measurement of the projected benefits of moving to this technology will be communicated in the next report.

Replacement in kind DN-910 Graphite Trays 14 Sections	13,000 Kg/Hr (1030Kg/Hr Silica)	• Proven technology • Column life could be extended to potential 8-10 years with additional Halar/ECTFE lining	• Fragile internal trays (Graphite) • Susceptible to damage under pressure "swing" caused by DCL trip or leak • 20 column joints and leak points
DN-700 Column **Structured Packing 4 Sections**	20,000 Kg/Hr (1580Kg/Hr Silica)	• +10% Steam Efficiency • 4 column joints, fewer leak points - PSM improvement • Internals more robust (Carbon Fibre Composite) structured packing. • Additional operational flexibility (80% of current site requirement on single column) • Internal demister will separate 99% of droplets. Improved AHCl product quality. Further decreases downstream "fouling" issues • Annual maintenance cost saving of ~£5k per annum for column re-torquing • Column life extended to potential 8-10 years with additional Halar/ECTFE lining	• Unproven Desorption technology at Cabot • Structured packing more effected by "fouling" than trays. Would be impacted by gross Silica carryover. Process downtime to clean/restore • Existing site spares not suitable for this column. Would require additional purchase

6) Sustainability 2025

In conjunction with the publication of our 2019 Sustainability Report Cabot Corporation announced a challenging set of Sustainability goals, stating

"At Cabot, we understand the role we play in leading and setting an example in our industry. We know we must live up to our responsibilities, honour our commitments and be accountable to our stakeholders. Advancing progress in sustainability is one essential way we will continue to demonstrate and maintain our leadership.

Through our commitment to operate responsibly, conserve resources and develop innovative performance materials, we will be relentless in our pursuit of solutions to the sustainability challenges of our customers, our communities and our world."

Sustainability 2025 sets out 11 target areas for improvement, as detailed in the below;

CABOT CORPORATION **SUSTAINABILITY GOALS 2025**

CARING FOR OUR PEOPLE AND COMMUNITIES

Community Engagement

100% OF LOCATIONS engaged in our communities

CONTRIBUTE **$10M** to help our communities thrive

Occupational Health & Safety

REDUCE injuries and significant process safety events by **50%**

Retention, Diversity & Development

Foster INCLUSION and support DEVELOPMENT

Increase DIVERSE REPRESENTATION

ACTING RESPONSIBLY FOR THE PLANET

Emissions

REDUCE greenhouse gas emissions intensity by **20%**

REDUCE SO_2 emissions intensity by **40%**

REDUCE NO_x emissions intensity by **50%**

Energy

EXPORT **200%** of the amount of energy imported

REDUCE energy intensity by **10%**

Waste & Spills

REDUCE the waste disposal from operations by **20%** and ultimately ELIMINATE manufacturing waste

Water

REDUCE water withdrawal intensity by **20%**

Environmental Compliance

100% of facilities certified with an environmental management system

BUILDING A BETTER FUTURE TOGETHER

Product Sustainability

ASSESS SUSTAINABILITY impacts of our top product applications

100% of our new products and processes will have a SUSTAINABILITY BENEFIT

Suppliers' Sustainability

ENGAGE our key suppliers on sustainability

Economic Value Generated & Distributed

INVEST **$1B** in capital and technology

Target: 2025. Baseline: 2019, except NO_x and SO_x (2012), GHG and energy intensity (2005). Capital and community investments: our FY2020 – FY2025.

Upon reviewing the corporate goals, the leadership team have agreed that the following three areas will provide the most impact in Barry.

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,

Sian Llewellyn

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