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31 July 2016

Mr Gerard Hocking
Senior Marine Adviser
Environment Protection Authority
Regulation and Compliance Division
GPO Box 2607
Adelaide SA 5001

Dear Gerard

**July 2016 quarterly update**
**Adelaide Brighton Cement Ltd (ABC) Environmental Improvement Program (EIP):**
**01 January 2016 – 30 October 2017**

I refer to Adelaide Brighton Cement's Environmental Improvement Program. As required, I provide the July 2016 quarterly update report (attached).

Yours sincerely

**Tim Radimissis**
**Compliance Manager SA Operations**

| Adelaide Brighton Cement Ltd (ABC) Environmental Improvement Program (EIP) 1 January 2016 – 30 October 2017<br>July 2016 quarterly update | | |
|---|---|---|
| **Compliance Action** | **Description** | **Actions and outcomes** |
| **3** | *By 30 June 2016, ABC will have implemented new operating controller assessment technology in the Cooler Bag filtering process. The intent is to optimise bag life and Cooler Bag performance associated with the 4A gas stream by a noticeable percentage. An analysis report detailing the effectiveness of this change will be provided to the Environment Protection Authority (EPA) for assessment.* | In May 2016, new operating differential pressure controller technology was commissioned into the Cooler Bag filtering process. The primary intention of the technology is to optimise the overall life of the bags, which will subsequently increase the longer term performance of the Cooler Filter Bag process. A full analysis on the effectiveness of new bags and the Cooler Bag Filter performance will be provided once a longer term assessment has been conducted. This analysis will primarily require an assessment of the bag life and condition assessed by intermittent inspections as the process allows and by a more comprehensive inspection when the bags are removed at our next scheduled major plant shutdown in January 2017.<br><br>Note: This project will be evaluated in conjunction with Compliance Action 4 below (new bag type) as both are variables that form part of improving the overall performance of the Cooler Bag Filter. |
| **4** | *By 3 March 2016, ABC will have completed a trial of new filter bag technology in the Cooler Bag filtering process. The intent is to optimise bag life and Cooler Bag performance associated with the 4A Stack gas stream by a noticeable percentage. An analysis report detailing the effectiveness of the trial actions (bag life performance) will be provided to the EPA for assessment.* | During the March 2016 shutdown, a new type of filter bag was installed as a trial in the Cooler Bag house of kiln 4. The new bag type was chosen based on the findings of a 12 month investigation. The new higher quality bag features a heavier weave and a reinforced cuff that is predicted to greatly increase the lifespan of the bags and therefore the performance of the bag filter in reducing emissions. The bags were trialled in one of the six cells, 280 bags in total.<br><br>Assessments of the performance of the new bags (undertaken during recent unscheduled maintenance shutdowns) have indicated significantly improved performance as predicted. The wear rate has been far less than that of the pre-existing new bags. As a result, we have ordered a further 560 bags of the new bag type to install into two chambers/cells of the Cooler Bag Filter at the next possible opportunity.<br><br>A full analysis on the effectiveness of the new bags will be submitted once a longer term assessment has been conducted in line with the same requirements mentioned in Compliance Action 3 above. |
| **5** | *By 30 June 2016, ABC will have determined and installed suitable back-up power supply provisions for Stack 4A and Stack 4B emission monitors during power failures, to ensure that particulate emissions are monitored at all times.* | Back-up power has been installed on Stack 4A and 4B emission monitors. Although site power failures are a rare and typically short event, this project will allow particulate levels to be measured during these periods.<br><br>Note: the project was delayed by approximately one month as the main contracting company originally awarded the project when into liquidation and alternate arrangements had to be made. |

| Adelaide Brighton Cement Ltd (ABC) Environmental Improvement Program (EIP) 1 January 2016 – 30 October 2017<br>July 2016 quarterly update | | |
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| **8** | *By 30 June 2016, ABC will have a dedicated water truck/cart and will have commenced applying dust suppressant/sealing agents (typically green) in real-time, to all external raw material stockpiles and unsealed access areas whenever they are being worked or used. This action item will assist in reducing fugitive particulate emissions from these sources.* | Since January 2016 a dedicated water cart has been used to apply dust suppressant and unsealed road sealing agents (typically green) in real-time, to all external raw material stockpiles and unsealed access areas whenever they are being worked or used. |
| **9** | *Commencing on 1 January 2016, ABC will have a preventative maintenance and cladding replacement program for the main Clinker Storage Gantry. Actions outlined in the maintenance and replacement program will be carried out continuously throughout this EIP. This action item will assist in reducing fugitive particulate emissions from this source*. | A quarterly monthly preventative maintenance program (ref: BLD 5100 PO53), which includes a comprehensive internal and external inspection and subsequent action plan, has been implemented.<br><br>The Gantry is under negative pressure due to large dust collector and any sealing of openings helps to reduce fugitive dust escaping the building.<br><br>In the first quarter of 2016, the sealing of the eaves and cladding on western side (Victoria Road) of the Gantry using a crane was completed after an inspection.<br><br>In the second quarter of 2016 an inspection identified an opening on the north west side on the Gantry, directly adjacent the eaves. The job has been scheduled for repair. |
| **13** | *From 31 January 2016, and to be continued throughout this EIP, ABC, will undertake a Noise Impact Mapping/ Modelling Program. The modelling program will be undertaken by Acoustic Consultants employed by ABC, who will manage and complete the modelling program in addition to the current noise monitoring program that has been in progress for the last four years. The Program will continue to inform noise abatement actions to be undertaken on site.* | A comprehensive noise mapping and model was developed and submitted to EPA (ref: 50B-15-0069-TRP-472941-3). The model was based on sound pressure measurements and surveys of all primary noise emitting sources (mechanical plant and equipment) on-site. Noise prediction was carried out using the validated SoundPlan acoustic modelling software and assessed against the EPA 2007 Noise Policy.<br><br>The model is based on both worst case scenario meteorological conditions (5 m/s wind in the direction of the adjacent community) and under neutral (no wind) conditions to ensure maximum community impacts are captured. The model was calibrated/validated against actual readings taken late at night to ensure minimal traffic impacts on the measurements at a series of noise sensitive residential locations.<br><br>The model can be used both as a predictive tool and will be updated as noise abatement projects are implemented. |

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| **13 (cont'd)** | *Regular reports from monitoring and modelling undertaken will be provided to the EPA for assessment within 1 calendar month of any such report being received by ABC from the engaged acoustic consultants. Noise abatement actions to be implemented will need agreed by the EPA and be reasonable and practical and ensure the best possible outcomes for the adjacent community*. | Several noise studies were commissioned and completed by Vipac Engineering in the first four months of 2016 and submitted to the EPA. The studies include:<br>• A pre-March shutdown (ref: 50B-16-0007-TPR-799543-2). Key items/intent:<br>– Determine baseline noise levels in the adjacent community, with full plant running, prior to implementation of noise abatement projects (refer to Compliance Action 14 below).<br>– 16 X day and night attended noise measurements at residential locations.<br>– Day time EPA noise policy guidelines achieved at all 16 locations.<br>– Night time EPA noise policy guidelines not achieved at 3 out of the 16 measurement locations.<br>– Traffic is a dominant noise source in the area.<br>• Unattended continuous noise monitoring (ref: 50b-16-0007-tpr-799543-2). Key items/intent:<br>– 24/7 continuous monitor installed on roof of ABC Social Clubrooms opposite main plant on Victoria Road from the 9 February to 5 April 2016 to measure noise activities before, during and after major kiln 4 shutdown, which occurred from 27 February to 19 March.<br>– The dominant noise source during the entire period was traffic which heavily influenced the measurements.<br>– EPA noise level guidelines were exceeded by 7 to 9 dB(A) during the shutdown. This could be due to either ABC activities or extraneous traffic sources adjacent the measurement unit.<br>– During the shutdown period noise levels were within or slightly exceeded the night time noise guidelines by 1-3 dB(A).<br>– Dates outside the shutdown – no significant change in measured noise levels could be correlated to the listed shutdown times. Traffic and the continuous noise measurement of LAeq (all noise sources) the most likely cause.<br>• Updating of predictive noise model post noise abatement projects and attended night time measurements within the adjacent community (ref: 50B-16-0007-TPR-473094-2). Key items/intent:<br>– Determine noise levels post noise abatement projects.<br>– 16 residential locations compared against pre and post noise abatement projects.<br>– Noise reduction ranging from 1 to 4 dB(A) achieved at 10 locations (predominantly locations closer to the plant.<br>– Of the 16 night time residential locations measured, 13 comply with the EPA night time noise guidelines and 3 are marginally above the night time noise guidelines under worse-case weather conditions – mild wind in the direction of the residential locations.<br>A presentation summary of all noise report findings was sent to Community Liaison Group members prior to the 27 June 2016 quarterly meeting and discussed at the meeting. |

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| **14** | *Adelaide Brighton Cement will undertake the following identified noise abatement works which will reduce noise emissions from the site:*<br>*(a) By 30 April 2016 ABC will replace/upgrade the entire operational chain assembly of the Limestone Reclaiming Conveyor System in the limestone shed.*<br>*(b) By 31 January 2016 ABC will install an energy efficient and quieter motor system in Cement Mill 1 Dust Collector.*<br>*(c) By 30 April 2016 ABC will install an upgraded noise abatement silencer in Stack 4B.*<br>*(d) By 31 March 2016 ABC will have designed, manufactured and installed an effective noise abatement solution for the Cement Mill 1 Compressor.* | (a) Operational chain assembly of the Limestone Reclaiming Conveyor System in the limestone shed was completed during March 2016 major shutdown.<br>Community feedback very positive – *'noise can not longer be heard'.*<br>***Noise intensity reduced by 10 db(A) at the source***<br><br>(b) Installation of an energy efficient and quieter motor system in Cement Mill 1 Dust Collector was completed during January 2016 Cement Mill annual shutdown – *significant reduction in noise intensity.*<br>***Noise intensity reduced by 11 db(A) at the source***<br><br>(c) Installation of an upgraded noise abatement silencer in Stack 4B was completed during March 2016 major shutdown.<br>***No noise intensity measurements could not be ascertained due to height of stacks and related hazards***<br><br>(d) The design, manufacture and installation of an effective noise abatement solution for Cement Mill 1 Compressor was completed in March 2016 – '*complete abatement - no noise can be heard emanating from original outlet source '*<br>***Noise intensity reduced by 11 db(A) at the source*** |

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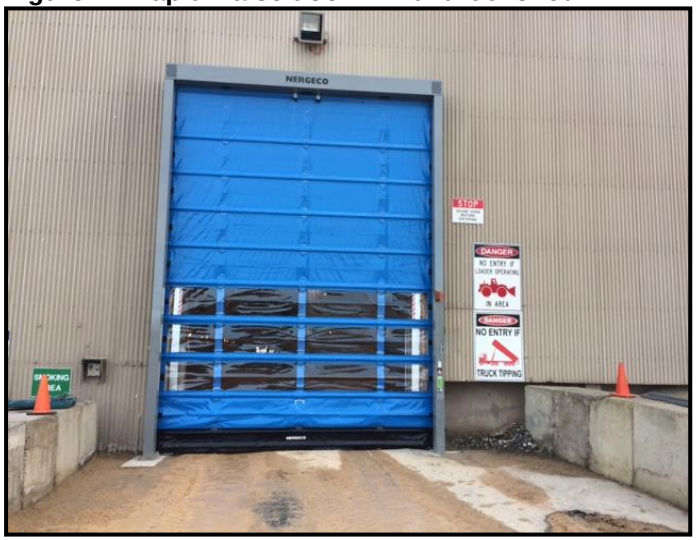
| **15** | *By 31 October 2017, ABC will replace all required personal access (PA) doors site wide. PA doors are to be of a self-closing and self-sealing design. This action will assist in reducing fugitive particulate emissions from buildings and reduce noise in dust sensitive areas containing fire alarm sensors.* | A comprehensive inspection, maintenance and replacement program is in place. In quarter 1 of 2016, 23 new doors were replaced. The new doors are self closing and sealing, contain a rubber flange at bottom for high wear areas as required (prevents damage when opening and closing), prevent alarms going off from load centres (dust ingress) and fugitive dust escaping buildings. Also, all major site doors are locked and controlled under a Shift Supervisor's master key.<br><br>Existing doors are continually being inspected and maintained by site personnel as required.<br><br>In quarter 2 of 2016 a large rapid raise door was installed on the southern side of the 'Wallaroo' raw material storage shed.<br><br>**Figure 1 - Rapid Raise door – 'Wallaroo' shed**<br>  |

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| **16** | *By 30 November 2016, ABC will ensure a vibration study/impact assessment is undertaken in the adjacent community to determine affected areas and any associated impacts. The outcome of the study will be an action plan to determine vibration impacts associated with plant operations. The action plan will be submitted to the EPA for assessment by 31 December 2016.* | An independent external consultant firm has been engaged to initiate this program. During the March 2016 plant shutdown and post shutdown, three ground vibration monitors were placed along the ABC boundary on Victoria Road and in the plant to determine activities/vibration with plant off and on.<br><br>Results have recently been submitted to the EPA for consideration. The next phase of the project will be will include a technical assessment by the consultants on the community areas to be surveyed and subsequently tested for ground vibrations. |
| **17** | *From 31 January 2016 and continuing through to 31 October 2017 ABC, will implement and undertake a site greening/earth-care program. Plantings of native trees and shrubs will be undertaken in the following areas:*<br>• *Southern area of the site adjacent to Cement Mill 1 Gantry and on the river side of railway line;*<br>• *Schroder Park extension area (most southern end of plant);*<br>• *Victoria Road, adjacent to the Limestone Reclaimer Shed; and*<br>• *Along the western boundary of the main limestone stockpile at the northern end of the site.* | In July 2016, greening/earth-care work has commenced at the southern end of Victoria Road, adjacent to the reclaimer shed. The works have included:<br>• Removal and mulching of approximately 15 large dead or diseased trees, including stumps; and<br>• Planting/irrigating of approximately 450 trees and scrubs, including about 80 mature trees. |

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| **8** | *By 28 February 2016, ABC will implement a particle deposition tray program in the adjacent community to analyse the nature and extent of the deposition of particulate material Potentially/that may originate originating from the plant.*<br><br>*By 31 March 2017, ABC will provide a detailed report to the EPA outlining the findings of the deposition tray program.* | A cross functional ABC team was assigned to the project. Commencing in February 2016, 14 deposition trays were placed in the following locations:<br>• 9 X trays in the adjacent community;<br>• 3 X trays on-site along the ABC boundary on Victoria Road (EPA trial monitors); and<br>• 2 X neutrals (Sellicks Hill and Largs North)<br>The positioning of the trays was based on community feedback, wind direction assessments and air modelling/assessments from our two community ambient air monitors.<br><br>Note: initial trial samples were compromised due media used on the trays to prevent water ingress which has subsequently made the analysis by CSIRO and University of Adelaide extremely complex. No results have been received to date.<br><br>Revised program:<br>At the March 2016 Community Liaison Group Meeting, Tony Bazeley, a long term Community Liaison Group member, joined the program. With Tony's assistance and contacts, the University of Adelaide Innovation Centre, CSIRO and Lindsay Hope (see below) were all commissioned to be part of the program.<br><br>Note: The University of Adelaide Innovation Centre and CSIRO will be undertaking scanning electron microscopy/light diffraction and x-ray diffraction analysis of the deposition material.<br><br>In May 2016, Lindsay Hope of SA Environment Pollution Monitoring Services was engaged to independently manage, update and coordinate the entire program. Lindsay has over 40 years experience in air pollution monitoring/quality with 30 of those years with the EPA. His management will provide independence to the program. Lindsay, in consultation with ABC and Tony Bazeley has agreed on an enhanced program including:<br>• Retention of the original 9 based community locations and the Largs North neutral.<br>• 9 X monthly fallout trays to measure fallout rate (mg/day) – customised tray with elevated sides and grids to ensure material retained in trays.<br>• 6 X day sampling events when wind is in direction of residential locations – day time only to ensure no hydration of any cementitious material (3 winter/3 summer – all 9 locations).<br>• Customised larger trays for day sampling to ensure enough material is captured for analysis.<br>• Worked with CSIRO and University of Adelaide testing services to ensure optimum medium for particulate capturing and effective analysis (minimise interferences as much as possible). |