PENRICE QUARRY AND MINERALS

DUST MANAGEMENT PLAN

22/9/2010

Responsible Manager: Randy Klemm
Mine Environmental / Quality Manager
Penrice Quarry & Mineral
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1. INTRODUCTION

1.1 OPERATION DESCRIPTION AND BACKGROUND

Penrice Quarry and Mineral (PQM) currently operate a mine 2.5 km north of Angaston, South Australia, that produces high grade (chemical grade) limestone for the Penrice Soda Products (PSP) Osborne Soda Ash and Sodium Bicarbonate manufacturing plant. The mine is owned by PSP and was acquired in 1989 from ICI Australia Ltd. The mine also processes high grade limestone for cement/lime manufacture and wine glass containers and various stone types for aggregates, civil use, for foundry flux and the manufacturing of pavers.

1.1.1 ENVIRONMENTAL SETTINGS

The mine site is located near Angaston in the eastern Barossa Valley foothills at the northern end of the Barossa Valley. The site is adjacent to scattered rural and residential housing and the adjacent settlement of Penrice. PSP currently owns PM 120 and leases PM 86 private mine areas, owns ML 6233, MPL 75 and MPL118 and owns additional land west of the site not under any mining lease or license.

1.1.2 CLIMATE

The regional climate is classified as Mediterranean with cold wet winters and hot dry summers. Climate data for Nurioopta\(^1\), 10km west of the site, was used for the purposes of this document (www.bom.gov.au) along with data collected from the weather station installed on the Penrice site that has been in operation since 15\(^{th}\) February 2009. Approximately 500mm of rainfall is received per annum with most rainfall occurring in the winter months. Wind direction varies throughout the year. Stronger winds can be expected in the afternoons, which can result in gully winds. These winds have potential to influence noise and dust levels on and off site (Appendix 1 Seasonal wind roses).

1.2 PURPOSE AND SCOPE

The Dust Management Plan has been prepared in fulfilment of commitments made by PQM to the Penrice Community Consultative Group (PCCG) and the implementation of the Environmental Improvement Plan (EIP) Stage 2.

The plan applies during the construction, operation and shut down phases of the mine site. The plan will be subject to ongoing review and change to ensure that it remains relevant and effective.

All commitments and procedures contained within this plan and the performance of PQM against the EIP and EPA operating licence conditions will be audited internally by PQM.

1.3 RELATED DOCUMENTS

Additional Penrice documents that compliment this dust management plan include:

- Jaeckeli Creek Management plan dated 27\(^{th}\) March 2009
- Strategic Visual Amenity Plan dated April 2010
- Revegetation Plan Eastern side dated December 2006
- Revegetation Plan Western side dated September 2008
- MOP/MARP dated 25\(^{th}\) September 2009
- Health Safety Environment Australia & MAQOHS study dated 18 March 2009 and 27\(^{th}\) August 2009
- EPA Monitoring results for the period 1/4/2009 to 31/3/2010
1.4 REGULATORY CONTEXT

Penrice Quarry & Mineral is required under the Environmental Protection Act 1993 to hold an EPA Authorisation (licence). A licence conditions is the requirement for an Environmental Improvement Plan (EIP) which outlines environmental improvements and time frames for these actions to be completed.

2. POTENTIAL IMPACTS

In the assessment of environmental impacts, dust is more conventionally referred to as ‘particles’ or ‘airborne particulates’. The measurement used on site for dust monitoring is PM$_{10}$: particulate matter with an equivalent aerodynamic diameter of 10µm or less.

2.1 REGIONAL SOURCES

Airborne particulates can originate from both anthropogenic and natural processes in the landscape. These sources may affect air quality on either a local or regional scale. Airborne particulate sources in the vicinity of Penrice Mine operations include:

- Mechanical land disturbances from surrounding horticultural properties (e.g. harvesting grapes)
- Vehicle movements along unsealed haul roads, tracks and paddocks
- Live stock movement
- Burning and incinerating
- Exhaust fumes

2.2 MINING SOURCES

A wide range of mining activities can generate dust, and these are usually visible and readily identifiable. The potentially significant sources of airborne particulates from the site have been assessed as being limited to:

- Dust lift off from exposed mining areas, open areas or rehabilitated surfaces;
- Dust lift off from stockpiles (overburden, topsoil and mined concentrate;
- Dust lift off from haul roads and tracks resulting from light vehicle and heavy earthmoving traffic;
- Dust generation from crushing and screening processes;
- Loading and transportation of material.

The majority of any airborne particulates from the site are likely to be visible dust, with a potential for some fine particulate (PM$_{10}$).

2.3 BACKGROUND STUDIES

A Personal Respirable Dust Monitoring program undertaken on 18th March 2009 by MAQUOSH found that based on the measured respirable quartz concentrations at PQM being typical of the exposure experienced by employees and contractors, the risk to health from exposure to respirable quartz is low and adequately controlled under the conditions of monitoring. The studies used personal respiratory monitors on a number of employees at the mine site and also tested for the percentage of quartz in deposited dust samples. Penrice has periodically tested through independent monitoring programs, the exposure level of its workers to PM10 and respirable quartz dust with results consistently significantly lower than the national OH & S requirements for exposure.
Dust collected from locations around the mine site has been independently tested to determine the levels of respirable quartz present to confirm the potential health risk. The samples tested, showed respirable quartz levels less than 0.1% and 0.5% of the samples where the typical SiO$_2$ (bound silica) content is typically 2% - 5%.

The EPA placed their TEOM dust and weather analysing caravan on a property neighbouring the mine (approximately 700 metres from the western boundary) from 1$^{st}$ April 2009 to 31$^{st}$ March 2010. Over this period there were 13 days of exceedances for the PM$_{10}$ as measured against the NEPM Standard. Analysis showed that for 5 of these days the majority of particles came from the direction of the mine (Appendix 4).

The wind roses produced by the EPA have given Penrice a good understanding and baseline of the seasonal directions and speed of the winds. This data can now be used for the placement and planning of Dusttrak systems. In winter the predominant wind is a westerly whereas in the summer the predominant winds are gully winds which come from the E, ENE, ESE, S, SSW, SSE & N. Changing the positions of the Dusttrak systems will vary year to year depending on the season’s temperatures. Once they are changed they will stay in that position until alternate seasonal temperatures (biannually). Appendix 1, wind roses supplied by the EPA for the period 1$^{st}$ April 2009 to 31$^{st}$ March 2010.

### 3. OUTCOMES AND CRITERIAS

The objective of this plan is for PQM to minimise and limit nuisance impacts to local residents and adjacent land users from dust generated by mining operations.

Site records (as measured at the site boundary) will demonstrate compliance with the following measures (performance indicators) as described in the “Outcomes & Criteria” of the MOP/MARP:

- Where the average PM$_{10}$ dust entering the site is less than 50ug/m$^3$ for any 24 hour period, the average PM$_{10}$ dust leaving the site (including both ambient and mine related dust) will not exceed an average of 50ug/m$^3$ for that particular 24 hour period.

- Where the average PM$_{10}$ dust entering the site exceeds 50ug/m$^3$ for any 24 hour period, the average PM$_{10}$ dust leaving the site must not exceed the measured level entering the site.

Data will be acquired using a minimum of 3 fixed continuous Dusttrak monitors at the site boundaries, and this data will be read in conjunction with the onsite weather station. The Dusttrak is calibrated to measure onsite dust, and to determine reasonable error limits (with adjustment to the compliance limit if necessary) to a standard agreed with the EPA.

Penrice will determine the appropriate number and location of the Dusttrakks to the satisfaction of all stakeholders by June 2011.

Penrice will provide a summary of the calendar day average data to PIRSA, the PCCG and EPA every quarter. Any exceedance of the daily compliance limits above will be reported to EPA and PIRSA within one working day.
4. ENVIRONMENTAL OBJECTIVES AND PERFORMANCE INDICATORS

The primary objective of this Dust Management Plan is to comply with the NEPM Standard as described in the agreed outcomes and criteria in the MOP/MARP and to have no nuisance impacts to local residents and adjacent land uses from dust generated by mining operations.

This objective will be achieved through establishing:

- Measurable environmental performance indicators and targets; and
- Relevant dust control management actions and responsibilities; and
- A monitoring system that can report performance against these targets.

Environmental objectives, targets and performance indicators have been identified that will ensure sensitive receptors are protected and are described in table 1.

5. IMPLEMENTATION STRATEGY AND MANAGEMENT ACTIONS

PQM has made the following commitments to dust management in the PCCG, all of which have been captured in Stage 1 and Stage 2 of the Dust EIP’s (Appendix 3 & 4). These actions are current and implemented.

1. Minimise clearing of vegetation
2. Not stripping topsoil during periods of high winds [above 14m/s]
3. Watering with dust suppressant additive, internal roads and dust generating areas as required
4. All site traffic is required to adhere to the site speed limit to minimise dust generated by vehicle movement.
5. Growing of temporary ‘stubble’ crops to bind soil and decrease wind velocity at ground level.
6. Re-establishment of pasture as soon as possible.
7. Dust suppressant applied to stockpiles with dye to form an erosion resistant crust.
8. Ensure management tasks and daily activities are in accordance with revegetation plans, SVAP, Jaeckeli Creek Management plan, Revegetation Plan Eastern side and Revegetation Plan Western side.
9. Using sprinkler/fogging systems around high activity infrastructure areas.
10. Installation of a weather station as a high wind warning system to enable the site to initiate dust control mechanisms in a timely manner when required.
11. The establishment of dust monitoring sites at strategic locations around the operation.
12. Regularly review monitoring data and investigate high results. Implement corrective actions to eliminate the causal factors.
13. Penrice will provide a summary of the calendar day average data to PIRSA, the PCCG and EPA every quarter.
14. Regular communications will be made through the PCCG and a complaints management system, including investigations, actions and feedback implemented.
15. Upgrade the dust suppressant system of the aggregates crushing plant using DustChem 76.
16. Bituminising main entrance road to weighbridge.

Key management actions and responses that have been identified to assist in achieving the dust management objectives are detailed in Table 1.
Table 1 Management Actions for Dust

These management actions are implemented by Penrice at all times and special importance must be placed on these actions on known high wind days

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Action</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Induction</td>
<td>• Induction for all employees will include information on:</td>
<td>Mine Manager (Production Manager in lieu)</td>
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<tr>
<td></td>
<td>• Potential sources of dust</td>
<td></td>
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<td></td>
<td>• Dust Management Plan, Monitoring program and licence conditions</td>
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<td></td>
<td>• Speed limits onsite and staying on designated roads</td>
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</tr>
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<td></td>
<td>• Who to report dust issues too</td>
<td></td>
</tr>
<tr>
<td>Windy conditions</td>
<td>• Monitor wind and weather forecasts (Bureau of Meteorology) and cease</td>
<td>Mine Manager (Production Manager in lieu)</td>
</tr>
<tr>
<td></td>
<td>section (or all) of the mining operation where dust can not be</td>
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</tr>
<tr>
<td></td>
<td>controlled.</td>
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<tr>
<td></td>
<td>• Do not assume wind direction according to the weather station</td>
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<tr>
<td></td>
<td>as large structures will affect wind direction (eddies). Check all</td>
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<td></td>
<td>boundaries when monitoring dust conditions</td>
<td></td>
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<tr>
<td>Traffic</td>
<td>• Adhere to site speed limits and designated roads</td>
<td>Drivers</td>
</tr>
<tr>
<td></td>
<td>• Tarping of loads exiting site</td>
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<td></td>
<td>• Use of wheel and truck wash when leaving site</td>
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<td></td>
<td>Note: All drivers are subjected to Penrice’s condition of entry. Any</td>
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<td></td>
<td>driver that does not adhere to these conditions of entry may be</td>
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<td></td>
<td>banned from site</td>
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<tr>
<td>Open Area</td>
<td>• Minimise open areas exposed to wind erosion as much as practical by</td>
<td>Mine Manager (Production Manager in lieu)</td>
</tr>
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<td>completing an annual assessment of areas suitable for stabilisation,</td>
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<td></td>
<td>and carry out stabilisation works.</td>
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<td></td>
<td>• Tree shelter belts will be maintained along site boundaries where</td>
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<td></td>
<td>appropriate, to assist with containing dust lift-off from open areas.</td>
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<tr>
<td>Dust suppression</td>
<td>• Operate water carts during dry, windy conditions and during the</td>
<td>Mine Manager and Site supervisor</td>
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<td>summer months, generally from September to May, across the site to</td>
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<td></td>
<td>apply water to unsealed operational areas (i.e. roads and loading</td>
<td></td>
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<td></td>
<td>areas)</td>
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<td></td>
<td>• All unsealed roads being used for heavy vehicle traffic within the</td>
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<td></td>
<td>mine area will be treated with dust suppressant additives where</td>
<td></td>
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<tr>
<td></td>
<td>appropriate.</td>
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<tr>
<td></td>
<td>• Apply suppressant dyes to all non-active stockpiles prone to wind</td>
<td></td>
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<tr>
<td></td>
<td>erosion.</td>
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<td></td>
<td>• Maintain sprinkler systems and shade-cloth barrier fencing in</td>
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<td></td>
<td>an operational condition surrounding the dust prone areas of the site.</td>
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<tr>
<td></td>
<td>• Maintain dust suppressant additives to sprays on crushing plants</td>
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<td></td>
<td>such as DustChem 76</td>
<td></td>
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<tr>
<td>Clearing and</td>
<td>• Conduct topsoil stripping only during suitable wind and weather</td>
<td>Production Manager</td>
</tr>
<tr>
<td>mining</td>
<td>conditions, so as to minimise the generation of dust.</td>
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<td></td>
<td>• After re-establishment of the soil profile (post mining), vegetative</td>
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<td></td>
<td>cover will be planted, as part of the progressive rehabilitation</td>
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<td></td>
<td>program.</td>
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<tr>
<td>Crushing &amp;</td>
<td>• Daily inspections of sprinklers and dust suppressant systems to</td>
<td>Plant Operator</td>
</tr>
<tr>
<td>screening</td>
<td>ensure operational and record as being checked on Plant Maintenance</td>
<td></td>
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<tr>
<td>including mobile</td>
<td>Sheet</td>
<td></td>
</tr>
<tr>
<td>crushers</td>
<td>• Continually monitor dust suppressant systems during crushing &amp;</td>
<td></td>
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<tr>
<td></td>
<td>screening operations of the plant</td>
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<td></td>
<td>• On days where dust can not be controlled shut down operations</td>
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<td></td>
<td>until dust can be satisfactorily managed</td>
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<tr>
<td>Load &amp; haul</td>
<td>• Loader operators to monitor loading conditions and call on water</td>
<td>Machine operators</td>
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<td></td>
<td>truck to dampen muckpiles in dusty conditions</td>
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<tr>
<td></td>
<td>• Haul truck operators to monitor road conditions and call on water</td>
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<tr>
<td></td>
<td>trucks to dampen roads when dust starts to come off roads</td>
<td></td>
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<tr>
<td></td>
<td>• Haul truck operators to reduce speed on days to minimise dust</td>
<td></td>
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<tr>
<td></td>
<td>• Haul truck operators to ensure water sprays are operational when</td>
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<tr>
<td></td>
<td>tipping in the main Osborne crusher</td>
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<td></td>
<td>• On days where dust can not be controlled shut down operations</td>
<td></td>
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<tr>
<td></td>
<td>until dust can be satisfactorily managed</td>
<td></td>
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<tr>
<td>Drill &amp; Blast</td>
<td>• Maintain dust encapsulation systems on drill rigs</td>
<td>Blast Coordinator</td>
</tr>
<tr>
<td></td>
<td>• Monitor wind and weather forecasts (Bureau of Meteorology) to</td>
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<tr>
<td></td>
<td>determine days when blasting can not occur due to adverse weather</td>
<td></td>
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<tr>
<td></td>
<td>conditions.</td>
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</tbody>
</table>
All actions undertaken for mitigation of dust during dusty conditions will be recorded by the site supervisor. They will document all Dusttrak readings, wind directions, area omitting dust and actions undertaken. This information will be used to determine compliance when auditing and reporting.

An initial wind speed threshold will be set at 7.5 m/s. Generally dust is noticeably mobilised at the Quarry at 8m/s or over 28km/hr.

Initially north easterly, easterly and south easterly wind conditions will be targeted to prevent dust from being blown towards local residents (where most of the dust complaints have come from). Exact wind condition and wind speed will need to be fine tuned via experience gained during the early stages of monitoring, and in response to any dust specific public complaints.

North westerly, westerly and south-westerly wind conditions will be targeted to prevent dust being blown towards the towns of Angaston and Penrice.
Table 2: Matrix showing a course of action for controlling dust.

This area would be shut down if dust could not be controlled

<table>
<thead>
<tr>
<th>Description</th>
<th>Wind Speed m/sec (average for 2 hour period)</th>
<th>Wind Speed km/hr</th>
<th>DustChem 76 operational on fixed plant</th>
<th>Water sprays on offending plants</th>
<th>Dust suppressants system on</th>
<th>Screen covers on</th>
<th>Sprinklers turned on</th>
<th>Stockpiles sprayed with suppressant</th>
<th>1st Water truck out</th>
<th>2nd Water truck being used</th>
<th>Bitterns applied to roads</th>
<th>Drilling Operation shut down</th>
<th>Load &amp; Haul Operation shut down</th>
<th>Osborne Plant shut down</th>
<th>Aggregate plant shut down</th>
<th>METSO crushe shut down</th>
<th>Gravel Sales loading shut down</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calm</td>
<td>0.0 - 0.2</td>
<td>&lt; 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Light Air</td>
<td>0.3 - 1.5</td>
<td>1 - 5</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Light breeze</td>
<td>1.6 - 3.3</td>
<td>6 - 11</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Gentle breeze</td>
<td>3.4 - 5.4</td>
<td>12 - 19</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Moderate breeze</td>
<td>5.5 - 7.9</td>
<td>20 - 28</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Fresh breeze</td>
<td>8.0 - 10.7</td>
<td>29 - 38</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Strong breeze</td>
<td>10.8 - 13.8</td>
<td>39 - 49</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Near gale</td>
<td>13.9 - 17.1</td>
<td>50 - 61</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Gale</td>
<td>17.3 - 20.7</td>
<td>62 - 74</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Strong gale</td>
<td>20.8 - 24.4</td>
<td>75 - 88</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Storm</td>
<td>24.5 - 28.4</td>
<td>89 - 102</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Violent storm</td>
<td>28.5 - 32.6</td>
<td>103 - 117</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>Hurricane</td>
<td>&gt; 32.7</td>
<td>&gt; 118</td>
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</tr>
</tbody>
</table>

* Responsible Person

PC = Production Coordinator, MC = Manufacturing Coordinator, BC = Blasting Coordinator, TL = Team Leader
Table 2 Continued

* The Mine QA / Environmental Manager has overall responsibility of dust management, but the area coordinator have responsibility for the day to day operations of suppressing dust,

- The above dust control methods apply during Penrice operating hours (6:00am to mid night, Monday to Friday and 6:00am to 6:00pm Saturday & Sunday)
- When there are significant rain events all the control methods mentioned above would be turned off
- The winter period for this operation is normally from April to end of August and this is when some of the above dust mitigation systems are turned off, but where rain events have not occurred for more than a few days and dust starts to appear parts on roadways and crushing plants, appropriate actions would be put in place to suppress any dust
- In the event that plant and equipment is turned off to control dust, it will be resumed when dust from stockpiles and haul roads is no longer visible / visibly carrying around the site. If upon resumption dust “problem” remains, the plant will be turned off until a further suitable time is assessed for re-start.
- On the break down of any equipment used in the control of dust (water sprays or water trucks) the section of plant or quarry affected by this breakdown will immediately cease work until the problem is fixed if other measures cannot be implemented effectively.
- Table 2 is only used as a guide as to how dust is controlled. Very hot days with no wind can cause dust problems. As indicated above with no wind we would not need the second water truck, but on previous experiences both water trucks need to be out starting at 6:00 in the morning to control traffic dust on the site. Each day has its own variations in weather conditions so dust must be managed according the conditions on the day
6. MONITORING

Monitoring is required to enable an assessment of the effectiveness of the dust management controls and improvements to be made where required.

A detailed dust monitoring program already occurs at the Penrice mine site using dust fall out gauges. There are six dust fall out gauges located at various locations around the site collecting dust fall out. This data has been collected since 1997. The dust is collected over a 6 month period, the calcium content of the dust is weighed, and then is graphed to look at half yearly trends. The six dust fall out gauges will remain as part of Penrice’s dust monitoring programme. (See photo 1)

Continuous Dusttrak PM10 monitors and Hi Vol TSP dust samplers have now been in use at various locations on and off site to date, however this dust management plan has determined that to be most accurate and effective the Dusttrak Monitors will be located at various locations on the mine boundary as described in Figure 1. As part of this Dust Management Plan the Hi Vol TSP Dust Sampler will be decommissioned as Penrice believe effective management of dust on site comes from real time data not from dust results that occurred four weeks prior.

Dusttrak #2 & #4 is the same mobile unit that will be moved when the seasons change. In winter the predominant wind is a westerly and would be placed at location #4 whereas in the summer the predominant winds are gully winds which come from the E, ENE, ESE, S SSW SSE & N so the monitor would be put at location #2.

As part of the calibrations and maintenance programme the Dusttrak Monitors will be checked and calibrated for zero weekly and the results recorded, plus will be sent back to the supplier for yearly calibration checks. Maintenance and downloading of data will be done monthly on each monitor. The location of each monitor for this period will be

• **Dusttrak #1**: Silt Trap at Winch House
• **Dusttrak #2**: Summer period, Old Managers House, Winter period, Opposite Schwartz’s House on Kalimna Road
• **Dusttrak #3**: Corner of Salem & Penrice Road

Over a 12 month period commencing 1st October 2010, Penrice will undertake a trial analysing the most effective management strategies and data analysis from the Dusttrak monitors, including verification of 24 hour measurement periods and rolling averages.

Dust Monitoring will be undertaken by Penrice using the following techniques;

1. Continuous real time weather monitoring will be undertaken onsite with alarm set for continuous exceedances of wind speeds above 10m/s for more than a two hour period. This wind speed has been chosen from the Beaufort scale (Table 3)
2. Dust data will be acquired using 2 fixed and 1 mobile continuous Dusttrak monitors at the site boundaries. The Dusttrakrs are calibrated to measure onsite dust, and to determine reasonable error limits.
3. Six Dust Fall-out gauges. Dust from these gauges will be sent to Amdel for weighing
4. A complaints register will be maintained, any complaints received will be investigated, and the dust suppression methods reviewed. Suitable remedial actions will be undertaken as necessary and practicable.

The monitoring approach established in this plan incorporates aspects that are used to demonstrate performance, namely the continuation of existing total dust monitoring at the site (TSP and PM$_{10}$) and regular site inspections.
Figure 1: Dust Fall-out Gauge
Figure 2: Dusttrak positions around site as deduced from EPA caravan data and wind movements (note: Dusttrak 2 and 4 are the same unit)
6.1 DEFINITIONS

Dust is considered to be any particle suspended within the atmosphere. Particles can range in size from as small as a few nanometres to 100 microns (µm) and can become airborne through the action of wind turbulence, by mechanical disturbance of fine materials or through the release of particulate rich gaseous emissions.

Other definitions include:

- **Nuisance Dust** - describes dust particles ranging in size from 1mm to 50 µm, which reduce environmental amenity without necessarily resulting in material environmental harm.
- **Fugitive Dust** – refers to dust derived from a mixture of sources or a source not easily defined and includes dust generated from vehicular traffic on unpaved roads, materials transport and handling and un-vegetated soils and surfaces.
- **PM10** – a criteria air pollutant consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 microns. Used for health standards because there small size allows them to get deep within the lungs.

7. PERFORMANCE INDICATORS

PQM will where reasonable and practicable, endeavour to implement ‘Best Available Technology Economically Achievable’ (BATEA) to prevent or minimise the generation of dust from mining activities. The effectiveness of the Dust Management Program will be reviewed against the following indicators:

- Compliance with licence criteria and guideline values for ambient air quality.
- The level of substantiated complaints received and registered.
- The level of complaints satisfaction achieved.
- The absence of fugitive dust originating from cleared areas, product stockpiles and sources of mining activities
- Number of compliance days
- Audit results of our compliance with actions compared to the wind speed requirements

Using these performance indicators Penrice will undergo continuous review of its dust management procedures and will adjust target levels as improved resources, capabilities or technical understanding is achieved.

8. STAKEHOLDERS CONSULTATION AND INVOLVEMENT

Penrice engages in regular consultation with the following stakeholders regarding dust emissions and management strategies:

- Environmental Protection Agency (EPA)
- Penrice Community Consultative Group (PCCG)
- Primary Industries Resources South Australia (PIRSA)
- Neighbours
9. AUDITING

Penrice will assess internally its compliance with this Dust Management Plan and with the existing licence on a monthly and annual basis or as required for specific projects. Penrice will submit the annual Compliance Report with the EPA as per licence requirements. In addition, it will undertake monthly audits of the effectiveness of the dust mitigation program and will make this information available to the EPA and to PIRSA on a quarterly basis. This information will be communicated regularly to the Penrice employees at the weekly team meeting.

10. REVIEW AND REVISION

This management plan will be reviewed and revised by Penrice:

- If there are major changes to its operations;
- In response to issues raised by the EPA or PIRSA;
- In response to issues raised through community feedback; and
- In response to any incident which results in a failure to meet any of the commitments of this plan.

11. REPORTING

11.1 PERFORMANCE REPORTING

Dust control activities and monitoring results will be made available for stakeholders review in the Annual Environmental Report which is completed and submitted in July each year. Penrice will provide a summary of the calendar day average data to PIRSA, the PCCG and EPA every quarter which is consistent with the MOP/MARP. Any exceedance above the daily compliance limits will be reported to EPA and PIRSA within one working day.

11.2 INCIDENT REPORTING

Incidents of high dust levels will be reported to Penrice site management, and recorded in the electronic incident database system. The same system is used for management of complaints. A management response to prevent further impacts and control or mitigate further dust emissions will be formulated, tracked and implemented.

In accordance with the site EPA licence, any incidents that have created dust issues will be reported to the Environment Protection Agency (EPA).

11.3 COMPLAINT HANDLING

All complaints received by Penrice are handled according to Penrice complaint procedures. The complainant shall supply substantiated evidence that the dust has left the boundary of the site before investigative actions are taken towards the complaint.

- All complaints received have recorded time, location and concern with as much detail as possible
- Confirm acceptable follow up time/day with complainant
- Complete incident report form

The complainant will be contacted and an investigation of the complaint initiated within 24 hours of the receipt of the complaint. If requested the findings of the investigation will be explained and discussed with the complainant.

Details of the complaint, the investigation, management actions implemented and follow up is recorded within the incident database system. All complaints recorded are included in the annual report.
Appendix 1: Wind Speeds (Beaufort scale) Related to Readily Observed Field Conditions

<table>
<thead>
<tr>
<th>Beaufort No.</th>
<th>Description</th>
<th>Wind Speed Equivalent*</th>
<th>Specification for Estimating Speed over Land</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>m/sec</td>
<td>Km/hr</td>
</tr>
<tr>
<td>0</td>
<td>Calm</td>
<td>0-0.2</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>1</td>
<td>Light Air</td>
<td>0.3-1.5</td>
<td>1 - 5</td>
</tr>
<tr>
<td>2</td>
<td>Light breeze</td>
<td>1.6-3.3</td>
<td>6 - 11</td>
</tr>
<tr>
<td>3</td>
<td>Gentle breeze</td>
<td>3.4-5.4</td>
<td>12 - 19</td>
</tr>
<tr>
<td>4</td>
<td>Moderate breeze</td>
<td>5.5-7.9</td>
<td>20 - 28</td>
</tr>
<tr>
<td>5</td>
<td>Fresh breeze</td>
<td>8.0-10.7</td>
<td>29 - 38</td>
</tr>
<tr>
<td>6</td>
<td>Strong breeze</td>
<td>10.8-13.8</td>
<td>39 - 49</td>
</tr>
<tr>
<td>7</td>
<td>Near gale</td>
<td>13.9-17.1</td>
<td>50 - 61</td>
</tr>
<tr>
<td>8</td>
<td>Gale</td>
<td>17.3-20.7</td>
<td>62 - 74</td>
</tr>
<tr>
<td>9</td>
<td>Strong gale</td>
<td>20.8-24.4</td>
<td>75 - 88</td>
</tr>
<tr>
<td>10</td>
<td>Storm</td>
<td>24.5-28.4</td>
<td>89 - 102</td>
</tr>
<tr>
<td>11</td>
<td>Violent storm</td>
<td>28.5-32.6</td>
<td>103 - 117</td>
</tr>
<tr>
<td>12</td>
<td>Hurricane</td>
<td>&gt;32.7</td>
<td>&gt;118</td>
</tr>
</tbody>
</table>

*Wind speed equivalent at a standard height of 10m above ground

This table needs to be read in relation to the weather conditions of the day. If it is raining and windy there will be no dust so no action may be taken even though it may be a high wind day. This is typical of a winter period.
EPA South Australia
Wind Rose
Station: Angaston

1 Apr 2009 to 1 Jun 2009

Magnitude (m/s)
11.22% calm
99.9% Valid Data present.
EPA South Australia

Wind Rose

Station: Angaston

Magnitude (m/s)

9.11% calm
98.5% Valid Data present.
EPA South Australia
Wind Rose
Station: Angaston

Magnitude (m/s)
7.61% calm
99.3% Valid Data present.
EPA South Australia
Wind Rose
Station: Angaston

Magnitude (m/s)
9.51% calm
97.2% Valid Data present.
EPA South Australia
Wind Rose
Station: Angaston

Magnitude (m/s)
11.2% calm
100.0% Valid Data present.
# Environment Improvement Program

Pursuant to requirements under the
Environment Protection Act 1993

## 1 Tracking and reference information

<table>
<thead>
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<td>Penrice Soda Holdings Limited.</td>
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<tr>
<td>EPA authorisation number</td>
<td>2333</td>
</tr>
<tr>
<td>Site to which this EIP applies</td>
<td>Penrice Mine and Quarry, Penrice Road Angaston SA 5353 CT 5184/592 CT 5185/25 CT 5197/221 CT5197/247 CT5197/296 CT5197/303 CT5197/306 CT5197/310 CT5197/312 CT5197/313 CT5197/317 CT5197/316 CT5197/311 Rail Line CT5320/711 Gerlach's CT5962/464 Gerlach's CT5800/64 Gerlachs</td>
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<td>Document produced by</td>
<td>Penrice Soda Holdings Limited</td>
</tr>
</tbody>
</table>

Submitted by: ...Darrin Wright, General Manager Safety, Health, Environment & Quality (Penrice)...... ...Approved by: ..................................
2 General description

Brief

Penrice Soda Products is licensed under the Environment Protection Act, 1993 to operate a mine and quarry site. Processes undertaken at the site allow for formation of dust from different sources; vehicle movements, product loading and crushing and excavating. Weather conditions have a substantial influence on the dust emissions. Application of improved operations for dust reduction strategies would benefit the mine and the community.

Environmental authorisation compliance

Penrice Soda Products is required to develop an Environmental Improvement Program to address the following:

1. A course of action to reduce or eliminate dust generated from:
   a. Fixed Plant;
   b. Mobile Plant;
   c. Overburden mounds and stockpiles;
   d. Internal road networks (including drag out onto Penrice Road).

2. A plan to install a continuous dust monitoring system to monitor levels of dust emissions from the premises.

3. Ensure that the EIP sets out timeframes for the implementation of the measures proposed in paragraph 1 and a maintenance schedule for the fixed plant, mobile plant and internal road networks.

4. Submit a copy of the EIP to the authority for assessment, on or before the 1st April 2009.

5. If the EIP submitted in accordance with paragraph 4 is not acceptable to the authority, resubmit a revised version of the EIP (including any additions or alterations that are required by the authority) within 28 days of being so advised by the authority, and implement the EIP once approved in writing by the authority.

Once a specified program is fully implemented, dust emissions from the premises will reduce, resulting in an improved environmental outcome.

Referenced documentation

In developing this Environmental Improvement Program, Penrice Soda Products has considered these other relevant documents:

- Correspondence from the EPA to Penrice dated 4th March 2009 (Notice of Variation of Licence Condition)
- Environment Protection Act 1993 (amended volume 20/11/08)
- Terms of reference and minutes of advisory meetings of the Community Consultation Group (CCG)

Intent

Penrice Soda Product will be committed to reduce the dust emissions emanating from the premises by implementing dust mitigation strategies over a period of time.

The EIP will act as a regulatory tool under the Environmental Protection Act 1993 to provide for scheduled improvements at Penrice Mine and Quarry to meet section 46(1) of the Environmental Protection Act 1993 and general community and environmental duty for dust mitigation.

The EIP will focus on reducing dust emissions into the community so there are no nuisance impacts of dust generated by mine site operations.

The EIP strategy for dust reduction will be monitored with dust monitoring equipment for nuisance dust in the area and visual rating system for drag out onto Penrice Rd with associated records maintained. The data from these systems will determine timeframe and success of reduction targets.
3 Table of intended approach

<table>
<thead>
<tr>
<th>Requirement: Develop an Environmental Improvement Program to reduce or eliminate dust</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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<tbody>
<tr>
<td>1.1 Shrouding around Primary Crusher</td>
<td>Sept</td>
<td></td>
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<tr>
<td>1.2 Develop a plan for dust extraction around Primary Crusher</td>
<td>Sept</td>
<td></td>
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<tr>
<td>1.3 Shrouding / enclosure around the aggregate plant</td>
<td>Sept</td>
<td></td>
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<tr>
<td>1.4 Undertake a feasibility study to install a new glass lime and sand crushing and screening plant extension to existing aggregate plant</td>
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<tr>
<td>1.5 Investigate the opportunity to eliminate the return transfer of Osborne stone less than 50mm. If not possible, investigate enclosing the transfer plant.</td>
<td>June</td>
<td></td>
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<tr>
<td>1.6 Undertake a feasibility study to close down the fine mill temporary plant</td>
<td></td>
<td>Dec</td>
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<tr>
<td>1.7 Develop a plan for dust extraction at Aggregate Crusher</td>
<td>Sept</td>
<td></td>
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<tr>
<td>1.8 Engineer transfer points to enable lifting</td>
<td></td>
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<tr>
<td>1.9 Install fogging to primary and aggregate crushers</td>
<td>Sept</td>
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<tr>
<td>1.10 Examine feasibility of installing fogging nozzles to other points on conveyor lines</td>
<td>June</td>
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<td>1.11 Review the water supply system to feed sprays and foggers on aggregate plant</td>
<td>June</td>
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<td>1.12 Review the potential for dust screens on all fixed plant</td>
<td>Aug</td>
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<td>2 Mobile Plant</td>
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<tr>
<td>2.1 Review and improve spray nozzles and spray points on mobile crushers</td>
<td>June</td>
<td></td>
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<tr>
<td>2.2 Review locations for all mobile crushers and move where appropriate</td>
<td>June</td>
<td></td>
<td></td>
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<tr>
<td>2.3 Install moundling / shrouding around mobile crushers</td>
<td>June</td>
<td></td>
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<tr>
<td>2.4 Review the water suppressant for exiting stone wagons</td>
<td>Sept</td>
<td></td>
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<tr>
<td>2.5 Review, and improve where required, the shrouding around the train load out point</td>
<td>June</td>
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Submitted by: Darrin Wright, General Manager Safety, Health, Environment & Quality (Penrice)...

Approved by: ..................................................
<table>
<thead>
<tr>
<th></th>
<th>Overburden mounds and stockpiles</th>
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<th>2010</th>
<th>2011</th>
<th>2012</th>
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<tr>
<td>3.1</td>
<td>Investigate and assess feasibility for use of suppressants on stockpiles</td>
<td>June</td>
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<tr>
<td>3.2</td>
<td>Review and improve, where appropriate, water suppressing systems for stockpiles</td>
<td>June</td>
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<tr>
<td>3.3</td>
<td>Investigate and assess shrouding for stockpiles</td>
<td>June</td>
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<tr>
<td>3.4</td>
<td>Review and improve stockpile management (Loader load-out techniques)</td>
<td>June</td>
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<table>
<thead>
<tr>
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<th>Internal road networks</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Design and implement a new entrance to the site (main entrance)</td>
<td>Dec</td>
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<tr>
<td>4.2</td>
<td>Install a wheel wash at the &quot;old weigh bridge&quot;</td>
<td>Dec</td>
<td></td>
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<tr>
<td>4.3</td>
<td>Seal road from new weighbridge to exit of site</td>
<td>June</td>
<td></td>
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<tr>
<td>4.4</td>
<td>Implement and manage a truck tarping policy</td>
<td>June</td>
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<tr>
<td>4.5</td>
<td>Review and upgrade or replace existing truck wash</td>
<td>June</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Dust monitoring system</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>EPA to undertake particle size monitoring within the boundary of the Quarry</td>
<td>June</td>
<td></td>
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<tr>
<td>5.2</td>
<td>Agree with EPA an appropriate ongoing monitoring system</td>
<td>June</td>
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<tr>
<td>5.3</td>
<td>Implement dust monitoring system as required</td>
<td>June</td>
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</table>

This table of stages provides a general indication of the focus of activities at the site during the period of the EIP. This table is intended as a guide, and therefore does not include the compliance actions required to be completed by PSP Pty Ltd. These compliance actions are included in the following section.

Submitted by: Dann Wright, General Manager Safety, Health, Environment & Quality (Penrice)
Approved by:.................................


Site Map

Activity corresponding to the Site Map is as follows:

1. Entrance and Exit to site
   a. Sealing of internal road up to the new weighbridge
   b. Relocation of the entrance to the site
   c. Relocation of the truckwash
   d. Implementation of a wheelwash
   e. Enforced tarping of trucks

2. Glass sand shed
   a. New glass sand crushing plant

3. Stockpiles
   a. Install shrouding and wind breaks
   b. Suppressant usage
   c. Stockpile management (loading trucks) also chicken hill BL area

4. Aggregate Plant
   a. Dust extraction on the aggregate crusher
   b. Fogging system at transfer points
   c. Improved water supply and storage for suppressant application

5. Primary Crusher (PC1)
   a. Dust extraction
   b. Shrouding/shed enclosure
   c. Improved water suppressant when tipping

6. Load Out Point (Train)
   a. Eliminate the return transfer of stone less than 50mm
   b. Improved water suppressant for exiting stone wagons

7. Mobile crusher (western side)
   a. Shrouding
   b. Suppress muck pile prior to entering crusher

8. Western MPL
   a. Water trucks
   b. Treat topsoil stockpiles with suppressant/grass

9. Mobile crusher (Chicken Hill – Lucas)
   a. Investigate relocation
   b. Shrouding
   c. Use of water suppressants
4. EIP compliance actions

PSP Pty Ltd has committed to undertake the following specific actions to demonstrate that it will achieve compliance with the requirements of the Environment Protection Act 1993. The compliance actions listed below are the tasks through which PSP Pty Ltd will demonstrate compliance with the condition of EPA License 2333. Each compliance action will correspond to the numbers on the site map (previous page).

Compliance action 1
By 30th June 2009, Penrice Soda Holdings Ltd will agree with the EPA an appropriate dust monitoring system detailing measuring systems and target levels for airborne emissions and drag out.

Compliance action 2
By 31st May 2009, Penrice Soda Holdings Ltd will identify each fixed (i.e. non-mobile) dust emitting activity.

Compliance action 3
By 30th September 2009, Penrice Soda Holdings Ltd will install appropriate dust extraction technology at the primary crusher and at the aggregate plant crusher.

Compliance action 4
By 30th September 2009, Penrice Soda Holdings Ltd will develop a plan to implement shroudings / enclosures around dust emitting activities identified in compliance activity 2.

Compliance action 5
By 31st December 2009, Penrice Soda Holdings Ltd will construct a new main entrance to the Quarry (off Penrice Rd) that will include relocation of the truckwash.

Compliance action 6
By 31st December 2009, Penrice Soda Holdings Ltd will develop an appropriate engineering plan to ensure that stockpile transfer points luff (up and down).

Compliance action 7
By 30th June 2010, Penrice Soda Holdings Ltd will implement engineering controls to ensure the stockpile transfer points luff.

Compliance action 8
By 30th June 2010, Penrice Soda Holdings Ltd will seal the internal road from the point of the main entrance to the weighbridge.

Compliance action 9
By 30th June 2010, Penrice Soda Holdings Ltd will review the train load out point and develop an appropriate environment improvement plan.

Compliance action 10
By 31st December 2010, Penrice Soda Holdings Ltd will investigate the feasibility of closing down the Fine Mill plant.
ENVIRONMENT IMPROVEMENT PROGRAM

STAGE 2

Pursuant to requirements under the
Environment Protection Act 1993

1 Tracking and reference information

<table>
<thead>
<tr>
<th>Document number</th>
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<tr>
<td>Licensee</td>
</tr>
<tr>
<td>EPA authorisation number</td>
</tr>
<tr>
<td>Site to which this EIP applies</td>
</tr>
</tbody>
</table>

Document produced by Penrice Soda Holdings Limited

Submitted by: ...Darrin Wright, General Manager Safety, Health, Environment & Quality (Penrice) ...
Approved by: ..................................
2 General description

Brief

Penrice Soda Products is licensed under the Environment Protection Act, 1993 to operate a mine and quarry site. Processes undertaken at the site allow for formation of dust from different sources; vehicle movements, product loading and crushing and excavating. Weather conditions have a substantial influence on the dust emissions. Application of improved operations for dust reduction strategies would benefit the mine and the community.

Environmental authorisation compliance

Penrice Soda Products is required to develop an Environmental Improvement Program (EIP) to implement a course of action to reduce or eliminate dust generation. This stage 2 EIP is going to address:

1. the following area of dust emitters:
   a. Dragout
   b. Aggregate plant
   c. Internal road networks sales yard and Brighton loading
   d. Primary Crusher

2. Ensure that the EIP sets out timeframes for the implementation of the measures proposed in paragraph 1 and a maintenance schedule for the fixed plant and internal road networks.

3. Submit a copy of the EIP to the authority for assessment, on or before the 1st May 2010.

4. If the EIP submitted in accordance with paragraph 4 is not acceptable to the authority, resubmit a revised version of the EIP (including any additions or alterations that are required by the authority) within 28 days of being so advised by the authority, and implement the EIP once approved in writing by the authority.

Once a specified program is fully implemented, dust emissions from the premises will reduce, resulting in an improved environmental outcome.

Referenced documentation

In developing this Environmental Improvement Program, Penrice Soda Products has considered these other relevant documents:

- Correspondence from the EPA to Penrice dated 4th March 2009 (Notice of Variation of Licence Condition)
- Environment Protection Act 1993 (amended volume 20/11/08)
- Terms of reference and minutes of advisory meetings of the Community Consultation Group (CCG)

Intent

Penrice Soda Product will be committed to reduce the dust emissions emanating from the premises by implementing dust mitigation strategies over a period of time.

The EIP will act as a regulatory tool under the Environmental Protection Act 1993 to provide for scheduled improvements at Penrice Mine and Quarry to meet section 46(1) of the Environmental Protection Act 1993 and general community and environmental duty for dust mitigation.

The EIP will focus on reducing dust emissions into the community so there are no nuisance impacts of dust generated by mine site operations.

The EIP strategy for dust reduction will be monitored with dust monitoring equipment for nuisance dust in the area as well as community response and site observations. The data from these systems will determine timeframe and success of reduction targets.

Submitted by: ...Darrin Wright, General Manager Safety, Health, Environment & Quality (Penrice) .......
Approved by: ..................................
### 3 Table of intended approaches

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Design and implement an effective wash bay / wheel wash facility for vehicles to use before entry to the truckwash</td>
<td>28/2/2010</td>
</tr>
<tr>
<td>1.2</td>
<td>Install Dust Cham. 75 dust suppressant to the Aggregate Crushing plant</td>
<td>30/4/2010</td>
</tr>
<tr>
<td>1.3</td>
<td>Upgrade the water supply on sprays to the Primary Crusher (to 1200 PSI as currently at 100 PSI) to provide fogging system to the Primary Crusher</td>
<td>31/8/2010</td>
</tr>
<tr>
<td>1.4</td>
<td>Cement treat all roads in the sales yard and the Brighton Lite loading area</td>
<td>30/11/2010</td>
</tr>
</tbody>
</table>

This table of stages provides a general indication of the focus of activities at the site during the period of the EIP. This table is intended as a guide, and therefore does not include the compliance actions required to be completed by PSP Pty Ltd. These compliance actions are included in the following section.

Submitted by: Darrin Wright, General Manager Safety, Health, Environment & Quality (Penrice)...
Approved by: 

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Site map – Dust generating activities

Submitted by: Darrin Wright, General Manager Safety, Health, Environment & Quality (Panrico)
Approved by: 

Site Map

Activity corresponding to the Site Map is as follows:

1. Wheel wash, (Old weighbridge)
   a. Install wheel wash
   b. Educate drivers on best practices for efficiency

2. Aggregate Plant
   a. Install Dust Chem 76
   b. Fine tune transfer points for efficiency
   c. Record usage for efficiency

3. Primary Crusher (PC1)
   a. Upgrade sprays to higher PSI (1200 PSI) for improved fogging and efficiency

4. Sales yard
   a. Cement treat all roads in sales yard
   b. Cement treat roads in Brighton Lite Loading area

Submitted by: ... Darrin Wright, General Manager Safety, Health, Environment & Quality (Penrco) ...... ...
Approved by: ........................................
4. EIP compliance actions

PSP Pty Ltd has committed to undertake the following specific actions to demonstrate that it will achieve compliance with the requirements of the Environment Protection Act 1993. The compliance actions listed below are the tasks through which PSP Pty Ltd will demonstrate compliance with the condition of EPA License 2333. Each compliance action will correspond with an activity on previous page, except for compliance action 5 which is whole site.

Compliance action 1
By 28 February 2010, Penrice Soda Holdings Ltd will have installed a wheel wash situated before the truck wash, for exiting vehicles to reduce drag out.

Compliance action 2
By 30th April 2010, Penrice Soda Holdings Ltd will install appropriate dust suppression technology (Dust Chem 75) at the aggregate crushing plant.

Compliance action 3
By 31st September 2010, Penrice Soda Holdings Ltd will have upgraded the sprays to the primary crusher to higher PSI (1200PSI)

Compliance action 4
By 30th November 2010, Penrice Soda Holdings Ltd will have cement treat all roads in the sales yard and the Brighton Lile loading area

Compliance action 5
By 31st July 2010, Penrice Soda Holdings Ltd will have completed a dust management plan.

Submitted by: ... Darrin Wight, General Manager Safety, Health, Environment & Quality (Penrice) ....... ....
Approved by: ........................................