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E2.4 Air Quality Monitoring Program

The licensee must develop an Air Quality Monitoring Program which must be submitted for EPA's review and approval prior to WTP commissioning. The monitoring program must include fit for purpose monitoring strategies and methods that will demonstrate air stripper and displacement tank emissions will meet emission limits while the WTP is in operation. The licensee must ensure the air quality monitoring program has commenced when WTP operations begin to demonstrate the effective operation of the WTP emission control system.

E2.5 VOC Breakthrough Action Plan

Prior to the commencement of WTP operations, the licensee must submit a VOC breakthrough action plan to EPA for review and comment. As a minimum, the plan must:

1. propose a preferred method to monitor VOC breakthrough in the activated carbon treatment units. The preferred method must have an adequate lower detection limit to achieve meaningful comparison with licensee defined carbon breakthrough trigger(s);
2. nominate a VOC breakthrough trigger(s); and
3. define, in detail, breakthrough actions for implementation upon measurement of a VOC concentration at and above the nominated breakthrough trigger level.

The licensee must ensure the VOC breakthrough action plan has commenced when WTP operations begin.

E3 Headland Park - Early Works

E3.1 Air Quality Management Plan

The licensee must develop and implement an Air Quality Management Plan (AQMP) for the Headland Park Early Works Project. The AQMP must include work and management practices that represent best available technology and best environmental practice for emission control.

E3.2 Ambient Air Monitoring Program and Reactive Management Strategy

The licensee must develop and implement an Ambient Air Monitoring Program (AAMP) and a Reactive Management Strategy (RMS) to monitor fugitive emissions from the project and prevent exceedences of air quality criteria.

The AAMP must include each of the following elements:

1. the nomination and establishment of a network of real-time particulate monitoring sites within and/or beyond the project boundary for the purposes of monitoring project emissions using short (maximum 15 minute) averaging periods. These "management" monitoring sites shall be used to inform day to day reactive management measures. The management monitors should be fit for purpose but need not comply with AM 22 of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*;
2. the nomination and establishment of a suitable number of ambient PM10 monitoring sites at relevant locations, that are predicted to be the most impacted, for the purpose of determining compliance with OEH 24 hour average concentration criterion of 50 µg/m³. These "compliance" monitoring sites must be maintained so as to be capable of continuously monitoring the parameters specified in the table below;
3. the nomination and establishment of a suitable number of ambient monitoring sites to monitor chemicals known to be present in the contaminated soil to be used on-site as fill, for the purpose of determining compliance with the criteria used in the document *Air Quality and Health Impact*

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Assessment Early Works – Headland Park dated September 2011;

4. the establishment of a suitable program to monitor odour at locations on and off site; and
5. the establishment of a real time meteorological monitoring station.

The RMS must include:

1. at least hourly review of real time monitoring data;
2. well defined monitoring trigger levels and appropriate trigger actions to prevent any exceedence of air quality criteria; and
3. regular review of monitoring activities, trigger levels and mitigation actions, that are based on monitoring data and site emission control performance.

Details of the AAMP and RMS including the type, location and frequency of monitoring to be undertaken, trigger levels and trigger level actions, must be submitted to the EPA for comment.

Site operations must not commence until the licensee receives and implements all formal written requests from the EPA on the program and strategy.

The licensee must ensure that the ambient air monitoring program is underway when excavation begins in order to demonstrate the effective operation of the emission controls used for the project.

Any sampling required by the licensee must be analysed by a laboratory accredited by NATA or equivalent, for the relevant sample analysis and matrix.

Parameter	Units of measure	Frequency	Averaging period	sampling method
PM10	ug/m3	Continuous	24-hour	AM-22
Siting				AM-1 and AM-4
Measurement				AM-2 and AM-4

E3.3 Tar hot spot works management

Pre-excavation investigation works must be undertaken to accurately identify the geographic extent and location of the hot spot.

Excavation of the hot spot must only occur:

1. between the hours of 10am and 4pm; and
2. when the wind direction is from the south south west, being between the angles of 190° and 220°.

Tar impacted materials must be immediately removed from the site to an appropriately licensed facility in covered vehicles. However, if immediate removal is not possible due to prevailing circumstances at the site, tar impacted materials must be immediately placed in a sealed container and stored in such a manner that prevents air emissions until the material is removed from the site.

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Controls to eliminate odour from the tar hot spot works must include the provision of covers for the excavation, minimisation of exposed surface areas, application of dust suppressants where appropriate and the placement of unaffected material as soon as possible.

In the event the excavation of the tar hotspot cannot occur under the wind direction requirements outlined above and the wind conditions remain unfavourable for an extended period of time, the tar hotspot excavation may be undertaken within a temporary enclosure.

If a temporary enclosure is to be used to cover the tar hot spot excavation site, the licensee must provide the EPA with sufficient information to demonstrate emissions from hot spot excavation works will be captured and treated effectively.

E3.4 On-site meteorological weather station establishment, measurements and actions.

A real time meteorological weather station must be established and maintained on site so as to be capable of continuously monitoring the parameters specified in the table below.

Web based telemetry including the capability of notifying appropriate staff where wind speed trigger levels are reached must be established and implemented using meteorological station data.

A site inspection must be undertaken to review dust control measures:

1. During work hours where wind speed exceeds 8 m/s during work hours; and
2. Outside of work hours where wind speed exceeds 8 m/s averaged over a 1 hour period and is dominated by an easterly direction.

Parameter	Units of measure	Frequency	Averaging period	Sampling method
Rainfall	mm	Continuous	1 hour	AM-4
Wind speed @10 metres	m/s	Continuous	15 minute	AM2 and AM-4
Wind direction @ 10 metres	Degrees	Continuous	15 minute	AM2 and AM-4
Temperature @ 2 metres	Degrees C	Continuous	15 minute	AM-2 & AM-4
Temperature @ 10 metres	Degrees C	Continuous	15 minute	AM-4
Sigma theta @ 10 metres	Degrees	Continuous	15 minute	AM-2 & AM-4
Solar radiation	W/m2	Continuous	15 minute	AM-4
Additional requirements Siting and Measurement				AM-2 & AM-4

E3.5 Fill material pre-classification

Site materials originating from parts of the Barangaroo Site other than the Headland Park Site that

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are to be used as fill must comply with the maximum criteria and daily mean criteria listed in the table below.

Prior to the receipt of materials from parts of the Barangaroo site other than the Headland Park site, material testing results for the material to be received must be reviewed and compared with the criteria in accordance with the project Materials Compliance Management System.

Materials originating from parts of the Barangaroo Site other than the Headland Park site must not be received on the Headland Park site until test results have been reviewed and it is confirmed that the material complies with the fill criteria.

Constituent	Maximum Criteria mg/kg	Daily Mean mg/kg
Benzene	5.2	2.8
Ethylbenzene	10	2.8
Toluene	12	3.3
Xylene (total)	43	12
2-methylnaphthalene	200	55
Cyanide	2	0.6
Acenaphthene	19	5.2
Naphthalene	170	160
Phenol	3	0.8
Dibenzofuran	53	15
Trimethylbenzenes	30	8
Styrene	7	2

E3.6 Exception reporting

The licensee must submit to the EPA an exception report within two working days of notification of a result where the project criteria have been exceeded (see note below). The report must include details of the exceedence and outline the circumstances that led to the exceedence and any changes to site management practices to prevent future exceedences.

Note: Exceedences of PM10 criteria must be investigated and actioned, but details may be reported to the EPA monthly in the Air Emission Monitoring Report required by condition E1.1

- E3.7 Wet cutting methods must be used for sandstone extraction and block shaping. Water sprays and/or misting facilities must be used to prevent visible dust emissions from sandstone extraction and block shaping where wet cutting is not adequate.

E4 SISCO and SEPR Trial

- E4.1 For the purposes of the SISCO and SEPR Pilot Trial ("the trial") authorised by licence condition A1.1 and A1.4 the trial must be conducted in accordance with the document titled "*Revised WORK PLAN and TRIAL MANAGEMENT PLAN Surfactant Enhanced In Situ Chemical Oxidation*"

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(S-ISCO®) & Surfactant Enhanced Product Recovery (SEPR™) Block 5 and Hickson Road Pilot Trial – September 2011". ("the WP&TMP"). The soil and groundwater, soil vapour sampling and process and performance monitoring results must be carried out as specified in the WP&TMP. A summary and interpretation of all monitoring activities and sampling results specified in the WP&TMP must be provided to the EPA on a weekly basis. This summary must report against contingency triggers in the WP&TMP. The report must demonstrate that the management controls and procedures are sufficiently and accurately assessing the location of the injection front to determine plume movement and temperature. The report must include also any instances where triggers have been reached and a description of what contingencies were implemented. As soon as practicable after the completion of the trial and in any case within a maximum of 18 weeks of completion, the licensee must prepare and submit to the EPA a detailed assessment report on the trial. The report must summarise all aspects of the trial including a commentary on the success or otherwise on the stated objectives. The report must be provided to the Manager Sydney Industry, Environment Protection Authority, PO Box 668, Parramatta NSW 2124. Note: The summary and interpretation of sampling and monitoring results required in paragraph 2. above, may be submitted to the EPA by email.

E4.2 The trial success soil/groundwater criteria as noted in Appendix I of the TMP must be revised. The revised criteria can be either:

(a) The criteria for Area A from the ORWS HHERA; or

(b) OEH will accept a commitment from the applicant to formulate appropriate ecological criteria and present these in the ORWN HHERA.

The vapours from the pressure relief valves on the tanks used for treating water must be vented through the SVE charcoal bed;

Any treated water proposed for re-use or re-injection must meet the concentration limits specified in EPL condition L3 at Point 1; and

With respect to Contingency table (T21) an increased temperature of 15 degrees Celsius must trigger the addition of cold water into the wells.

E4.3 For the purposes of discharge points 14, 15 and 16 - the the breakthrough trigger for contingencies as per the Trial Management Plan is a VOC stack concentration of 10mg/m3 (5.1 ppm).

E5 Ambient Water Quality

E5.1 Ambient Water Quality Monitoring Reporting

Commencing one month from the first day of operations of the ambient water quality monitoring network and monthly thereafter or unless otherwise agreed in writing by the EPA, the licensee must submit to the Manager Sydney Industry, Environment Protection Authority, PO Box 668 Parramatta NSW 2124, a monthly Ambient Water Quality Monitoring Report. The report must include all results for ambient water quality monitoring around the site, an interpretation of those results and any relevant site management responses.

E5.2 Ambient Water Quality Trigger

A management trigger for turbidity at Points 2 and 3 must be established as outlined in Section

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3.3.2 of Appendix 4 of the document entitled WATER & STORMWATER MANAGEMENT SUB-PLAN - BARANGAROO STAGE 1 prior to any discharges from the works. If the trigger is exceeded the licensee must implement the actions listed in Section 3.3.6 of Appendix 4 of this document.

E6 Completed PRPs

E6.1

PRP Number	Description	Completed Date
U1	Provide Discharge Dilution Criteria Report and Revised Stormwater and Water Management Plan	June 2011

E7 Special Dictionary

Note: SPECIAL DICTIONARY

For the purposes of the monitoring requirements in condition M2.2 (Points 5, 8 and 13) – under the heading Pollutant the words "metallic compounds" means the heavy metals copper, zinc and mercury (organic and inorganic).

For the purposes of the monitoring requirements in condition M2.2 (Points 1 – 4) under the heading Sampling Method the words "Method approved in writing by the Authority" means the Approved Methods Publication as in the Protection of the Environment Operations (General) Regulation 1998.

For the purposes of condition P1.1 the acronym LVA means Licence Variation Application. For the purposes of condition O3.1 the acronym CNVMP means construction noise and vibration management plan.

Note: **Clarifying Notes.**

To further clarify the terms of this licence the licensee should note:

The licensee is responsible for compliance with all activities permitted by this licence:

Administrative (A) conditions

All relate to the premises.

Discharge Points (P) conditions

Points 5, 8 and 13 relate to Ambient Air Monitoring Stations;

Points 14, 15 and 16 relate to the SISCO and SEPR Trial;

Points 17 & 18 relate to air discharges from the Water Treatment Plant;

Point 1 relates to water discharges from the Water Treatment Plant; and

Points 2, 3 and 4 relate to Ambient Water Quality Monitoring.

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Limit (L) Conditions

L1.1, L2.1, L2.2, and L2.3 relate to the premises;
L2.4 relates to specific Points as noted;
L3.1 relates to specific Points as noted;
L4.1 relates to hours of work at specific locations as permitted by Project Approvals (as noted);
and
L5 and L5.1 relates to the premises.

Operating (O) Conditions

O1.1, O2.1, O3.1 O4.1 relate to the premises;
O5.1 relates to the sewer relocation activity;
O5.2 relates to the SISCO and SEPR Trial; and
O5.3 relates to the Water Treatment Plant.

Monitoring (M) Conditions

M1.1, M1.2 and M1.3 relate to the premises;
M2.1 and M2.2 relate to specific Points as noted;
M3.1 and M3.2 relate to the premises;
M4.1 relates to the premises;
M5.1, M5.2, M5.3 and M5.4 relate to the premises;
M6.1, M6.2 and M6.3 relate to the premises;
M7.1 relates to specific Points as noted; and
M8.1 relates to specific Points as noted.

Reporting (R) Conditions

R1.1, R1.2, R1.3, R1.4, R1.5, R1.6, R1.7, R1.8 relate to the premises;
R2.1 and R2.2 relate to the premises; and
R3.1, R3.2, R3.3 and R3.4 relate to the premises.

General (G) Conditions

G1.1, G1.2 and G1.3 relate to the premises; and
G2.1 relates to the premises.

Special (E) Conditions

E1.1 relates to the premises;
E2.1, E2.2, E2.3, E2.4 and E2.5 relate to the Water Treatment Plant;
E3.1, E3.2, E3.3 E3.4, E3.5, E3.6 and E3.7 relates to Headland Park Early Works;
E4.1, E4.2 and E4.3 relate to the SISCO and SEPR Trial;
E5.1 and E5.2 (Ambient Water Quality) relate primarily to works at Barangaroo South; and
E6 relates to the premises as noted.

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Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

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flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder described at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence; the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 months. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .

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TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non-putrescible), special waste or hazardous waste

Mr Stuart Clark

Environment Protection Authority

(By Delegation)

Date of this edition: 25-October-2010

End Notes

- 1 Licence varied by notice 1123651, issued on 06-Jun-2011, which came into effect on 06-Jun-2011.