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**ORICA AUSTRALIA PTY LTD.
ENVIRONMENTAL NOISE AUDIT OVERVIEW
2012-2013**

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Rev 00

Prepared for: Orica Australia Pty Ltd
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1.0 INTRODUCTION

As part of Orica Australia Pty Ltd (*Orica*) Site Noise Management Plan (*SNMP*) for Kooragang Island *Atkins Acoustics* was commissioned by (*Orica*) to conduct environmental noise audits during 2012-2013. This report presents an overview of the results and findings from the audits and an assessment of operational noise from the site including plant associated with the expansion of the ammonium nitrate manufacturing plant (*the Project*).

In addition to the works undertaken as part of the first phase of the *Orica* expansion reported in the Environmental Noise Audit Report dated November 2012, site noise reduction works have been undertaken as part of the *Orica* site noise reduction program (*SNRP*). Details of those works are reported in the *Atkins Acoustics* Environmental Noise Audit report dated March 2013.

2.0 OVERVIEW

As part of *Orica's* commitment to control noise impacts from the Kooragang Island operations, the NSW Department of Planning (*Department*) concluded that any additional noise emitted from *the Project* must be controlled to achieve noise contributions at least 10dBA below the agreed existing levels determined prior to the approved uprate works.

2.1 Compliance Noise Monitoring

As part of *Orica* commitment and the Site Noise Management Plan (*SNMP*), six (6) assessment locations were selected for the purpose of assessing noise compliance and trends, three (3) locations at Stockton and three (3) on Kooragang Island.

The locations (*Figure 1*) identified in the *SNMP* were selected to allow for reliable and secure access for noise measurement. The locations identified as R4 and R6 due to access and instrumentation security were relocated from riverside locations to secure roadside positions. Additionally due to access the monitoring location R1 (294 Fullerton Street) was changed to 284 Fullerton Street.

- R1 - 284 Fullerton Street, Stockton.
- R2 - 218 Fullerton Street, Stockton.
- R3 - 186 Fullerton Street, Stockton.
- R4 - Roadside (south) opposite Ammonium Nitrate Area
- R5 - Riverside (central) opposite Administration Building.
- R6 - Roadside (north) north of Ammonia Plant.

Figure 1 Compliance Noise Monitoring Locations



3.0 STATUTORY REQUIREMENTS

Noise assessment criteria for *the Project* are documented in Schedule 3 'Specific Environmental Conditions' of the *Department* Project Approval (08_0129) dated 1 December 2009 include the following.

NOISE

Noise Limits

30. The Proponent shall ensure that noise levels from the operation of the Project are at least 10dB(A) below noise levels from Orica's Existing Operations as specified by conditions 31 & 32 below.

Existing Operations - Noise Verification Program

31. Prior to the commencement of construction the Proponent shall prepare and implement an Existing Operations Noise Verification Program to the satisfaction of the Director-General. The Program shall:
- (a) be undertaken by a suitably qualified and experienced person;
 - (b) identify future reference points that will be used to demonstrate compliance;
 - (c) collect new or review existing data, and report on the seasonal background levels for the noise catchment; and
 - (d) confirm the noise levels from Orica's Existing Operations.

Note: Some construction activities may occur under the Project Approval provided that such activity are not undertaken during the monitoring period or that Orica can demonstrate that the activity would not contribute to the background noise level, to the satisfaction of the Director-General..

Noise Management Plan

32. Prior to the commencement of operations of the Project, the Proponent shall prepare and implement a Noise Management Plan in consultation with DECCW and to the satisfaction of the Director-General. The Plan shall:
- (a) be undertaken by a suitability qualified and experienced expert;
 - (b) demonstrate how noise levels from the Project would be managed to ensure noise levels would be 10dB(A) below noise levels from Orica's Existing Operations (see conditions 30 & 31);
 - (c) include a detailed monitoring program for reporting on ongoing compliance. The monitoring program shall:
 - outline the proposed receiver sites at Stockton and sites on Kooragang Island that would be monitored;
 - include both attended and unattended noise monitoring;
 - verify that actual noise levels from the Project are consistent with the predictions made in the EA; and
 - verify that noise levels from the Project are 10dB(A) below the noise levels identified in condition 31 for Orica's Existing Operations;
 - (d) provide details of any complaints received in the preceding year relating to noise generated by the Project, and action taken to respond to those complaints;
 - (e) detail procedures for implementing additional reasonable and feasible noise mitigation measures for the Project in response to exceedance of limits and/or noise complaints; and
 - (f) be updated annually, unless otherwise agreed to by the Director-General.

4.0 PROJECT SPECIFIC NOISE CRITERIA

Night-time attended noise audits reported for the reference monitoring locations on Kooragang Island (2011) confirmed that there was minimal influence from other industrial sources at those locations during nighttime hours. Nighttime attended and unattended measurements on Kooragang Island during 2012-2013 have confirmed that other than from immediate noise sources and prevailing winds there is minimal variation between the L_{A90} and L_{Aeq} levels and noise from *Orica* would be described as steady state.

Referring to the *Departments* Conditions for assessing noise trends and compliance status, operational noise resulting from *the Project* should be at least 10dBA below levels from *Orica's* pre-uprate. For compliance purposes *Table 1* presents a summary of the *Project* noise criteria.

Table 1: Project Noise Criteria
dBA re: 20 x 10⁻⁶ Pa

Assessment Location	Project Noise Criteria dBA
R4	52
R5	47
R6	46

4.1 Stockton Noise Criteria

Modelling reported for *the Project* (Atkins Acoustics Feb '09) predicted that noise contributions would satisfy *the Project* criteria, as levels would be 10dBA below the pre-uprate levels. *Table 2* presents a summary of noise levels predicted for the existing plant and *the Project* at the Stockton reference locations during calm weather conditions.

Table 2. Predicted Pre Uprate and Project Noise Contributions
dBA re: 20 x 10⁻⁶ Pa

Assessment Location	Predicted Sound Pressure Levels dBA	
	Pre-Uprate Noise Levels	Uprated Plant Contributions
Assessment Location R1	50	37
Assessment Location R2	53	41
Assessment Location R3	51	39

5.0 OVERVIEW OF MEASUREMENT RESULTS AND FINDINGS

For the assessment of noise from *the Project* it was recognised that demonstration of compliance would be difficult to confirm by direct measurement due to the variability of the ambient background levels and contributions being greater than 10dB below the pre-uprate level. Therefore for assessing compliance with *the Project* noise criteria in accordance with the *SNMP* it was proposed to:

- Update the site noise model following the commencement of operation of *the Project* to determine contributions from *the Project*; and
- undertake attended and unattended monitoring at the reference locations to assess changes in ambient background levels and noise trends.

5.1 Noise Model Updating

The site noise modelling reported in the *Kooragang Island Noise Assessment (Report Number 39.6357.R1:GACD03 Rev 3, Atkins Acoustics, 2009)* was updated to determine noise contributions from *the Project*. Compliance with the Project Approval conditions has been assessed against the pre-uprate noise levels. *Table 3* presents a summary of the predicted contributions pre uprate and for *the Project* (phase one).

Table 3. Predicted Baseline and Project Noise Contributions

L_{Aeq} re: 20 x 10⁶ Pa

Operating Plant Conditions	Predicted Sound Pressure Level dBA					
	R1	R2	R3	R4	R5	R6
Pre Uprate	50.4	52.1	49.9	66.3	62.6	59.1
Uprate Plant (Phase one) Ammonia Plant Compressor and 183L Generator	19.7	22.3	21.1	23.5	32.9	41.7

5.2 Site Attended Noise Monitoring

In accordance with the *SNMP* attended and unattended noise audits have been undertaken during 2012-2013 and measurements conducted in accordance with the Australian Standards AS1055-1997 '*Acoustics - Description and Measurement of Environmental Noise*' and the DECCW '*Industrial Noise Policy (2000)*'.

5.3 Review of Incident Reports

As part of audit and reporting requirements the *Sustainability Manager* has confirmed that no significant noise incidents during the twelve (12) month period have been reported. During unscheduled shut downs and start-ups of the Ammonia Plant two (2) noise incidents were reported (31 May 2013 and 1 June 2013). We have been instructed that *Orica* has committed to undertake noise monitoring and investigations during the next scheduled shut down of the Ammonia Plant. It is understood that the investigations will include onsite measurements to identify and rank noise sources,

and investigations to assess feasible and reasonable actions that may be considered to reduce site noise emissions during these events.

5.4 Site Attended Noise Measurements

Observations during site attended audits have confirmed that the ambient nighttime noise and background LA90 sound levels at Stockton are controlled by surf noise, general industrial activities on Kooragang Island, shipping movements on Newcastle Harbour, general waterway activities and local road traffic. Noise sources from *Orica* identified during audits at Stockton included the Ammonia Plant, cooling towers and general pipe noise. The audibility of noise from *Orica* is dependent on the assessment location and exposure to the site noise sources.

5.5 Unattended Noise Measurements

Noise measurements reported for Kooragang Island have shown that levels along Greenleaf Road vary as a consequence of the location and exposure to *Orica's* noise sources. Measurement have shown that noise from *Orica* is relatively constant and a function of prevailing weather conditions, location and exposure to specific production plants and/or service plant.

5.6 Assessment of Noise Trends

For assessing noise trends the *SNMP* recommended that future noise monitoring on Kooragang Island (R4, R5 and R6) be considered. Baseline levels established for Kooragang Island are reported in *Atkins Acoustic (September/November 2012)* and used for assessing noise trends (*Table 4*).

Table 4. Baseline Noise Trends

Reference Measurement Location	Ambient Background LA90 Sound Pressure Levels dBA			
	Baseline Levels (2012)		Measured Levels 2012-2013	
	Median Range	Median	Median Range	Median
R4 - Roadside (South)	61.2 - 62.9	62.0	59.0 - 64.3	59.6
R5 - Riverside (Central)	55.8 - 58.2	57.0	51.8 - 58.0	55.4
R6 - Roadside (North)	58.2- 60.6	59.8	53.0 - 60.5	57.7

The ambient nighttime RBL's summarised in *Table 4* show that the upper median 2012-2013 levels are similar to the 2012 levels, the lower median 2012-2013 levels due to the influence of prevailing weather conditions are lower than level report in 2012, and the 2012-2013 median levels are marginally lower than the 2012 levels. From the measurement results no specific noise trends have been identified.

6.0 FINDINGS AND RECOMMENDATIONS

This report presents a summary of noise audit measurements undertaken to assess operational noise from *Orica* and noise trends following the commissioning of works associated with the expansion of the ammonium nitrate manufacturing plant (*the Project*).

Attended and unattended audit noise measurements reported for the period from September 2012 to July 2013 to assess noise from *Orica* and evaluate noise trends.

Modeling has confirmed that noise contributions from *the Project* (*Table 3*) satisfy the project noise criteria.

Site noise audits have shown that noise levels measured during the 2012-2013 are within the normal range of pre-uprate operational noise levels and no specific overall noise trends have been identified.

Considering the *Review Process* documented in *Section 8.4* of the *SNMP*, the findings of the noise audits and that no significant noise incidents have been reported post commissioning of *the Project*, it is considered appropriate for *Orica* to review the quarterly frequency of the environmental noise audits. From the above findings it is recommended that annual audits be consideration. Notwithstanding the recommendation to reduce the frequency of scheduled environmental noise audits, reported noise incidents should be assessed and documented in accordance with the *SNMP* procedures.