



Australind Plant Noise Regulation 17 Variation



Millennium Inorganic Chemicals Ltd



**Report and recommendations
of the Environmental Protection Authority**

**Environmental Protection Authority
Perth, Western Australia**

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1. Introduction and Background

Millennium Inorganic Chemicals Ltd (MIC) manufactures titanium dioxide pigments for the coatings and plastics markets. The Company operates two manufacturing facilities, which are located 15 - 20 kilometres north of Bunbury. The Kemerton plant refines the raw rutile into titanium dioxide whereupon it is transported to the Australind finishing plant by tanker. The finishing plant chemically treats the pigment, depending on its final use, before washing and drying the product. The product is then milled and packed before being transported to the Company's Perth warehouses. Most of the product is destined for overseas and is shipped from the port of Fremantle.

The Australind Plant, located at Lot 4 Old Coast Road, was established in 1963 and throughput has grown from 10,000 to 100,000 tonnes per annum. The plant operates under the Pigment Factory (Australind) Agreement Act 1986 and Environmental Protection Act 1986 Licence L6046. Under the licence conditions prior to the proclamation of the Environmental Protection (Noise) Regulations 1997 (noise regulations), the operators of the Australind Plant were required to ensure the noise emitted from the premises did not exceed 65 dB(A) at seven locations on its boundary. However, since the Australind Plant started its operation, residential density has increased with the nearest residents in Laura Avenue only 150 metres from the northern plant boundary. Noise emitted from the Australind Plant did not comply with the assigned noise levels at the nearest residences when the noise regulations were proclaimed in 1997.

A number of noise controls have been implemented over various noisy equipment items on the plant since 1997. MIC's acoustic consultants SVT Engineering Consultants (SVT) have assessed that as a result of those noise control measures, noise emission levels from the plant have been gradually reduced to no higher than 60 dB(A) at boundary locations. However, it has also been assessed that the noise from Australind Plant, under some circumstances, still exceeds the prescribed noise limits of the noise regulations at the nearby noise sensitive premises.

MIC wrote to the Minister for Environment to apply for a variation to the assigned noise levels under regulation 17 of the noise regulations in 2000. The company considered that the proximity of neighbours made it unlikely that its noise emissions could practicably comply with the prescribed noise limits.

This report presents the EPA's formal advice on the application under noise regulation 17(3)(b)(ii).

2. The Application

Noise regulation 17 provides that *“where a person is of the opinion that he or she cannot reasonably or practicably comply with a standard prescribed under these regulations ... that person may apply to the Minister for approval to allow the emission of noise in that case to exceed or vary from the standard.”*

MIC applied to the Minister for the Environment for an approval under regulation 17 of the Environmental Protection (Noise) Regulations 1997 for the noise emission from its Australind Plant operation on 1 February 2000. The application was referred to the EPA for its assessment and advice under noise regulation 17(2).

The basis of the application is that, although a number of noise controls have been implemented over the years, current noise emissions are not meeting the prescribed limits set out in the noise regulations. Because of the proximity of neighbours, MIC believes that it is unlikely that compliance with the noise regulations can be practically achieved. MIC's claim is supported by SVT Engineering Consultants in its noise assessment reports prepared in 2006 and 2008, respectively.

MIC intends to gradually increase its production capacity at Australind Plant to nominally 110,000 tonnes of pigment per annum, which will be achieved through efficiency improvements. MIC will be expected not to increase the noise emission levels from Australind Plant from this production expansion.

Australind Plant was required to meet 65 dB(A) at its plant boundary under licence conditions prior to the proclamation of the noise regulations in 1997. In its noise regulation 17 application, MIC applied to the Minister for confirmation of its noise emissions to the level of 65 dB(A) at specified sites around its plant boundary.

3. Noise Management

3.1 Noise sources

The noise assessments conducted by SVT have identified that the major noise sources contributing to the noise emissions include:

- 1) Neutralisation plant, which is on the northern boundary and adjacent to the closest residents. The main noise emitters are transfer pumps, a vacuum pump and the de-watering filter. The filtration section is usually operated during daytime hours.
- 2) Effluent cooling towers. There is a regulatory condition for effluent not to be discharged into the Collie River above 32°C. The cooling fans are operated sparingly and usually in the summer during the daytime.
- 3) Boiler house. Steam generation is required for heating slurries and wash water, and the final milling of pigment. There are two main boilers and three smaller units. Burners, air intake fans and the de-aerator are the principal noise emitters. This building is one of the major noise sources.
- 4) Water treatment. Groundwater is filtered and treated to provide high quality water for steam generation and pigment washing. Several electric motors are being considered for replacement with more efficient and quieter units.
- 5) Band drier area. This area includes the drier, conveying pigment blowers and surface treatment vacuum pumps. Improved drying and final milling efficiencies have seen the drier idled for extended periods, and its use is dependent on product grade mix. In the last 12 months it has operated only 1.8% of the time. The vacuum pumps are required for filtering pigment slurries. In 2001 the pumps were fully enclosed but the enclosures now require to be upgraded. Dry pigment is pneumatically conveyed throughout plant requiring air blowers. Extra noise dampening is planned on No.1 Spray Drier Stream Blower for 2010.
- 6) Spray drier No. 1 Bag House, which is located further south in the plant – away from the nearest noise sensitive residents. The building is generally noisy but key noise emitters are the de-watering filter vacuum pump and the air intake fan for the spray drier burner.

- 7) Micronisers & Microniser Hot Bag Filters (HBFs). Dried product is milled before solid/steam separation and then final packing. The micronisers (4) are enclosed but general noise inside the building is high. The exhaust gases from the HBFs (4) enter condensers. These condensers are located north facing outside the building about 20 metres in elevation. Steam ejectors on each condenser assist in maintaining a slight negative pressure for the solid/steam separation. These ejectors were the principal noise emitters. Three of the four ejectors are now redundant with the fourth planned to be redundant in 2010.
- 8) Packaging area. The major noise sources are the constant forklift movements within the shed for warehousing of pigment and the loading of trucks to Perth. Currently the loading of pigment trucks is performed during daytime on weekdays only. As it is located in the southern part of the plant – further away from the nearest noise sensitive residents – environmental noise impact from this area is not significant.
- 9) Main Cooling Towers. Two of the four towers have already been fitted with variable speed driven fans, which slow down during the night as ambient temperatures drop.

3.2 Surrounding noise sensitive premises

The noise emitted from the Australind Plant affects surrounding residences located to the north and south of the plant. The nearest affected premises to the north are at Laura Avenue, approximately 150 metres from the plant boundary. The southern plant boundary is bordered by the Bunbury Golf Course with the affected area extending to the northern area of Clifton Park, some 750 metres from the plant boundary. The east-west corridor has no impacted premises, with the Leschenault Inlet to the west and the Collie River to the east.

3.3 Noise emission levels

It has been assessed by SVT that night time noise immission (received) levels resulting from the Australind Plant ranged from 36 to 47 dB(A) at the closest northern residents on Laura Avenue. Noise from the plant was clearly audible under calm to light wind conditions but was significantly influenced by both wind direction and plant operating conditions near the northern boundary. The night time noise levels experienced by residents to the south of the plant ranged between 32 to 39 dB(A). Again, the noise immission levels were affected significantly by wind direction.

SVT has also identified that the noise impacts were significantly affected by wind speed. The noise emitted from the plant was readily masked by wind and wave generated noise as wind speed increased.

Table 1 compares the existing worst-case night-time noise immission levels from the Australind Plant at nearby residences at Laura Avenue to the north and Marriot Place to the south of the Plant with the assigned noise levels from the noise regulations. In the area around the plant, the worst-case scenario refers to calm conditions with temperature inversion.

Table 1. Comparison of worst-case noise immission levels with the $L_{A 10}$ assigned noise levels

Location		Day	Evening	Night
Laura Avenue	Worst-case noise immission level (dB(A))	47	47	47
	Assigned noise level (dB(A))	49	44	39
	Exceedance (dB)	0	3	8
Marriot Place	Worst-case noise immission level (dB(A))	39	39	39
	Assigned noise level (dB(A))	45	40	35
	Exceedance (dB)	0	0	4

The EPA notes that noise emissions from the Australind Plant exceed the assigned levels at Laura Avenue by 3dB during the evening/Sunday/public holiday period and by 8dB at night. The exceedance at Marriot Place is 4dB during the night period.

3.4 Intrusive noise characteristics

The noise regulations require that the noise emission is free of intrusive characteristics in terms of tonality, impulsiveness and modulation as defined in the regulations.

SVT conducted one-third octave band noise measurements at several locations to the north and south of the plant and assessed whether or not noise from the plant could be characterised as intrusive in nature. The results indicated that there was no evidence of intrusive characteristics in terms of tonality, impulsiveness and modulation at all measurement locations, even where the noise from the plant was dominant.

3.5 Noise control measures

The EPA would normally only recommend approval of a regulation 17 application in cases where the applicant demonstrated that they could not reasonably or practicably comply with the prescribed standard.

MIC removed plant equipment items associated with the sulphate process in 1988 which were mainly located in the northern section of the plant site. As a result, the noise emission level at the plant's northern boundary was significantly reduced by 4 dB.

The EPA notes that MIC has made continuing efforts in mitigating noise impacts in recent years. It is stated by MIC that about \$2.3 million has been spent on noise control or related measures since 2000, as summarised in Table 2.

Table 2. Noise Controls Implemented at the Australind Plant (2000 onwards)

Item	Year	Cost (\$) ¹
Bagging Area Extraction Fan	2001	10,000
Enclose sections in microniser building	2001	15,000
Project BN0021 – 1. Air inlet silencer on No. 1 Gas fired boiler 2. Air inlet silencer on No. 2 Gas fired boiler 3. External lagging on No.1 gas fired boiler inlet air duct 4. Sound proofing louvres in Compressor Building	2000	180,000
Project BN0124 – 1. Silencer on Spray Drier No. 1 bag house stack 2. Silencer on Spray Drier No. 2 bag house stack 3. External lagging on No.1 gas fired boiler inlet fan casing	2001	160,000
Low noise electric motors fitted to debottleneck upgrades	2001	40,000
Relocation of No.1 Spray drier cooling tower with quieter design	2001	1,900,000
Acoustic housing of surface treatment Nash pumps	2002	10,000
Closing access doors at boiler house	2005	Procedural
Not operating neutralisation filter from 1900 – 0700 hrs	2006	Procedural
Not operating effluent cooling tower fans from 1900 – 0700hrs	2006	Procedural
Pump enclosure on No.7 bore located on northern boundary	2008	1,000
Delay start of boilers for recommencement of base pigment delivery	2008	Procedural
Improved steam venting strategy	2008	Procedural
Sound curtains on new gas burners (main boiler)	2009	12,000
Shutting steam ejectors (4) on condensation circuit	2009	Procedural
Total		2,328,000

As a result of these efforts, the noise levels at the plant boundary have been gradually reduced in recent years, despite the gradual increase in the annual production at the same period, as shown in Figure 1. Figure 1 clearly demonstrates that, since 1995, the boundary noise level has been significantly reduced by about 4 dB to 54 dB(A) (measured as an annual average of seven locations) – with no location above 60 dB(A) – which is significantly lower than the target level of 65 dB(A) that the Australind Plant was required to meet at its boundary prior to 1997. MIC stated that the increase of 2 dB(A) in 2004-05 was due to the removal of asbestos cladding from buildings.

¹ Converted to 2009 dollars using CPI figures.

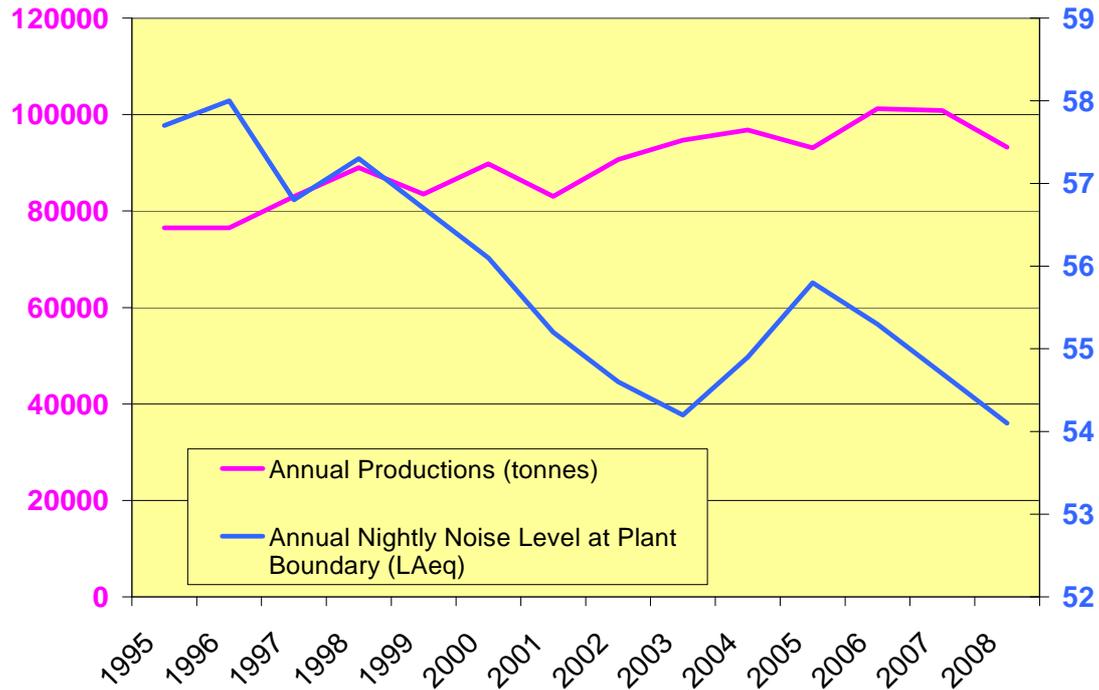


Figure 1. Changes of annual production and boundary noise levels from 1995.

SVT conducted a detailed study in 2008, which identified additional noise control measures that might further reduce the noise emission from the plant. The results indicated that although these noise control measures might be able to further reduce noise emission levels by about 3 dB at Laura Avenue, if implemented, they would still not be able to bring the noise emission into compliance. The indicative cost of these further noise control measures would be over \$973,500.

MIC evaluated these proposed additional noise control measures, and concluded that due to the high ambient noise in the area and low level of community concern about its noise emissions, the implementation of the proposed additional noise control measures would lead to only a small environmental improvement, out of proportion to the cost of implementation.

The EPA considers that any noise reduction, even small, would benefit the nearby residents, especially those at Laura Avenue. The EPA would recommend that MIC continue to investigate and implement any practicable noise control measures.

4. Community Impacts and Consultation

The EPA notes that MIC has established relationships with local councils and schools within the area. According to MIC, it has funded over a million dollars in local community projects and services in the past 10 years. The “Linking Communities” program developed by MIC involves community groups in the rehabilitation of river lands and wetlands. MIC has also conducted plant open days in 1999 and 2005 with another planned in 2010.

Currently, MIC monitors noise levels at affected premises twice daily. MIC has also developed a complaints resolution system, which logs complaints and ensures the complaint is dealt in a systematic manner with prompt feedback to the complainant. The

complaints resolution system provides the framework for investigative reporting, management review and the assignment of corrective actions.

According to MIC, the Australind Plant has received a total of 16 noise complaints since the complaints resolution system was established in 2002. These complaints are predominantly from the northern neighbours on calm nights. Two complaints were substantiated and caused by steam venting. One complaint was unsubstantiated due to a moderate strength wind blowing away from the complainant's residence. The source and magnitude of the noise for other complaints could not be verified when monitoring was conducted, or because the complaint was lodged well after the incident, making verification difficult.

The EPA notes that MIC invited neighbours to a presentation on the Noise Management Plan and the findings of the Environmental Noise Assessment on 5 August 2009. According to MIC, invitation letters were mailed to those neighbours located in the area within 1 km of the Australind Plant, as well as the ten local shire councillors. A total of 475 letters were posted. A public notice was also run for two weeks in the Bunbury Mail, which is a weekly newspaper with a 24,000 circulation. Fourteen residents attended the presentation onsite. The presentation covered such information as past and current plant noise from the Australind Plant; MIC's reasons for applying for a variation under regulation 17; and MIC's noise management plan.

MIC received seven responses from residents after the presentation. Of those responses, one resident opposed the regulation 17 variation, while most of the others were interested in learning about regulation 17 variations and were not disturbed by the plant noise.

5. EPA Assessment

In summary, the EPA's view is that, in light of extensive noise mitigation measures that have already been implemented and the current noise immission levels, MIC cannot reasonably be expected to comply with the noise regulations.

The EPA considers that granting a noise regulation 17 approval would be an appropriate response in this case. A noise regulation 17 approval would contain noise limits and conditions that MIC must comply with, as outlined below.

6. Outline of noise regulation 17 approval

The EPA considers that, should an approval be granted, the approval should contain the following features:

6.1 The approved noise limits at the nearest residences

Instead of setting noise limits at the boundary of the plant, the EPA would recommend approved noise limits at the two nearest residential localities to the north and south of the Australind Plant, respectively. MIC would be required to manage its operations and ensure that the noise emission from its Australind Plant complies with the approved noise levels in these two localities.

6.2 The Approved $L_{A 10}$, $L_{A 1}$ and $L_{A \max}$ noise limits

The noise regulations specify noise limits in the form of $L_{A 10}$ and $L_{A 1}$ assigned levels, that is, levels not to be exceeded for more than 10% and 1% of a representative assessment period; and $L_{A \max}$ assigned levels that are not to be exceeded at any time. The recommended noise level limits in Appendix B have been developed to be consistent with existing noise emission levels and with MIC's commitment of not increasing its noise emission.

6.3 Duration of the approval

MIC has requested that the approval period be to 2035 or upon plant closure. The EPA does not support this request, and instead the EPA would recommend a 5 year period for the approval, in order that a review should be triggered within a reasonable time frame. If required, MIC could apply for the extension of the approval before this approval expires. MIC would be required to demonstrate its efforts to further reduce the noise emission levels at that time.

6.4 Noise management plan

The EPA notes that MIC has already developed a noise management plan and managed its noise emissions in accordance with the noise management plan. MIC would be required to review and update its noise management plan to incorporate this approval. The plan should include a noise monitoring programme and a programme for provision of information to the community about noise emissions from the Australind Plant, as well as procedures for responding to complaints about noise emissions, for managing the operation to minimise noise emissions, and for implementing any practicable noise control measures to further reduce the noise emission levels.

6.5 Reporting requirement

MIC would be required to report annually to the Department of Environment and Conservation (DEC). The written report should include –

- evidence of compliance with the approved noise levels at the two reference neighbouring noise sensitive locations;
- noise reduction measures which have been implemented at the Australind Plant;
- record of noise complaints and enquiries from the community and actions that MIC took accordingly.

The purpose of this requirement would be to ensure best practice at all times.

7. Conclusions and Recommendations

The EPA concludes that –

1. Although the current noise emission levels from Australind Plant have been reduced to a level significantly lower than the target noise level of 65 dB(A) set before 1997 at its boundary, noise emissions exceed the levels set in the prescribed standard in the noise regulations at the nearby noise sensitive locations to the south and north of the plant.
2. While extensive noise reduction measures have been implemented, further noise reduction can not reasonably or practicably bring the noise from MIC into

compliance with the prescribed standard, due to the proximity of nearby residences.

3. The noise emission from MIC can be managed so as not to increase the current noise emissions from MIC to the nearby residences.
4. There is a good relationship between MIC and the community, and there do not appear to be strong community concerns at the levels of the noise emissions.

The EPA considers that the granting of a noise regulation 17 approval would be an appropriate response in this case, in that a noise regulation 17 approval would contain a legally-drafted set of noise limits within which MIC is allowed to continue its normal operations. The EPA does not support MIC's application to reinstate the 65 dB(A) target noise level at the boundary locations of Australind Plant. Instead, the EPA would recommend a set of noise limits at the closest residence locations, which will be based on what MIC can best practicably achieve at these locations.

Recommendations

The EPA recommends that a variation to the prescribed standard in the noise regulations be granted in accordance with the attached preliminary drafting instructions (See Appendix B).

Appendix A

Noise Level Standards

Appendix A – Assigned levels in regulations

Table 1 - Assigned Levels Derived from Table 1 of Regulation 8 of the *Environmental Protection (Noise) Regulations 1997*

Type of premises receiving noise	Time of day	Assigned level, dB		
		L _{A 10} (slow)	L _{A 1} (slow)	L _{A max} (slow)
Noise sensitive premises, at locations within 15 metres of a building directly associated with a noise sensitive use.	0700 to 1900 hours Monday to Saturday	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays.	35 + influencing factor	45 + influencing factor	55 + influencing factor
Noise sensitive premises, at locations further than 15 metres from a building directly associated with a noise sensitive use.	All hours	60	75	80
Commercial Premises	All hours	60	75	80
Industrial and utility premises	All hours	65	80	90

“**L_{A max} assigned level**” means an assigned level which, measured as a L_{A Slow} value, is not to be exceeded at any time;

“**L_{A 1} assigned level**” means an assigned which, measured as a L_{A Slow} value, is not to be exceeded for more than 1% of the representative assessment period;

“**L_{A 10} assigned level**” means an assigned which, measured as a L_{A Slow} value, is not to be exceeded for more than 10% of the representative assessment period; and

“**influencing factor**” means the influencing factor determined under Schedule 3 of the regulations.

Note: The influencing factor in the residences neighbouring the Australind Plant is in the range 0 – 7 dB(A).

Appendix B

Preliminary Drafting Instructions for a Noise Regulation 17 Approval

**PRELIMINARY DRAFTING INSTRUCTIONS
FOR A NOISE REGULATION 17 APPROVAL**

**Environmental Protection (Australind Pigment Plant Noise
Emissions) Approval 2010**

Approval of the Minister under the *Environmental Protection (Noise) Regulations 1997* regulation 17 (7).

1. Citation

This approval is the *Environmental Protection (Australind Titanium Dioxide Plant Noise Emissions) Approval 2010*.

2. Terms used

In this approval -

assigned level has a meaning given in regulation 8;

Australind Plant means the pigment production plant operated by Millennium Inorganic Chemicals Limited and located at Lot 4 Old Coast Road, Australind;

Director means the Director of the Environmental Regulation Division, Department of Environment and Conservation;

L_A 1 approved level means an approved level which, measured as an L_A Slow value, is not to be exceeded for more than 1% of the representative assessment period;

L_A 10 approved level means an approved level which, measured as a L_A Slow value, is not to be exceeded for more than 10% of the representative assessment period;

L_A max approved level means an approved level which, measured as a L_A Slow value, is not to be exceeded at any time;

L_A Slow has the meaning given in regulation 2(1);

Laura Avenue means any place on Laura Avenue, between Cecil Street and Old Coast Road, Australind;

Marriot Place means any place at or adjacent to the intersection of Marriot Place and Wayne Way, Australind;

Millennium Inorganic Chemicals means Millennium Inorganic Chemicals Limited.

regulation means a regulation of the *Environmental Protection (Noise) Regulations 1997*;

representative assessment period has the meaning given in regulation 2(1);

start day means the day on which notice of this approval is published in the *Gazette*.

3. Approval for noise emissions to vary from prescribed standard

Approval is granted to Millennium Inorganic Chemicals to allow the level of noise emitted from the Australind Plant at the time set out in column 2 of the Table to exceed the standard prescribed under regulation 7(1)(a) if the level of noise emitted from the plant when received at a location set out in column 1 of the Table does not exceed the approved noise levels set out in columns 3, 4 and 5 of the Table in relation to the location and the time.

Table

Location	Time of day	L _{A 10} Approved level (dB)	L _{A 1} Approved level (dB)	L _{A max} Approved level (dB)
Laura Avenue	0900 to 1900 hours Sunday and public holidays	47	54	69
	1900 to 2200 hours all days	47	54	59
	2200 hours 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays.	47	52	59
Marriot Place	2200 hours 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays.	39	45	55

4. Duration of approval

- (1) The approval has effect for five years from the start day or a longer period that applies under subclause (2).
- (2) If Millennium Inorganic Chemicals applies for a further approval under regulation 17 in relation to noise emissions from the Australind Plant within the first four years in which this approval has effect, this approval continues to operate until the Minister grants, or refuses to grant, the further approval.

5. Condition of approval

The approval is subject to the condition that Millennium Inorganic Chemicals ensures that clauses 6 to 8 are complied with.

6. Ongoing noise impact minimisation

Millennium Inorganic Chemicals is to identify further and ongoing opportunities for reducing noise emissions from the Australind Plant.

7. Noise management plan

- (1) Millennium Inorganic Chemicals is to submit to the Director within 3 months of the start day a noise management plan.
- (2) The noise management plan is to include the following –
 - (a) a noise monitoring programme to monitor noise emitted from the Australind Plant;
 - (b) a programme to monitor weather conditions relevant to noise emissions from the Australind Plant;
 - (c) a program for provision of information to the community about noise emissions from the Australind Plant;
 - (d) procedures to be adopted by Millennium Inorganic Chemicals in responding to complaints about noise emissions;
 - (e) procedures to be adopted by Millennium Inorganic Chemicals to continuously reduce noise emissions from the Australind Plant;
 - (f) any other matter that the Director may require.
- (3) At any time after receiving a noise management plan the Director may, by notice in writing, require Millennium Inorganic Chemicals to provide a revised noise management plan including details of any matters specified in the notice.
- (4) A revised noise management plan required under subclause (3) is to be provided within 14 days or by such other time as the Director specifies in the notice.

8. Annual reports

- (1) Millennium Inorganic Chemicals is to prepare a written report –
 - (a) for the year beginning from the start day to 31 December of the year; and
 - (b) for each following year.
- (2) The report for a year is to contain the following –
 - (a) evidence that the noise emitted from the Australind Plant complies with the approved noise levels at Laura Avenue and Marriot Place;
 - (b) record of noise complaints and enquiries from the community and actions Millennium Inorganic Chemicals took accordingly; and
 - (c) any noise reduction measure that Millennium Inorganic Chemicals has implemented or proposes to take.
- (3) Millennium Inorganic Chemicals is to give the report of a year to the Director by 31 March of the following year, or by such other time as the Director approves.
- (4) On the request of the Director, Millennium Inorganic Chemicals is to give the Director any assistance or information necessary to enable the report to be understood by the members of the public.