Sons of Gwalia Ltd, Greenbushes Operations
Noise Regulation 17 Variation

Sons of Gwalia Ltd

Report and recommendations of the Environmental Protection Authority

Environmental Protection Authority

Perth, Western Australia

Bulletin 1148

Regulation 17 Report 8

September 2004

ISBN 0 7307 6786 8
ISSN. 1030 - 0120

Summary and Recommendations

Introduction

Sons of Gwalia Ltd (SGW) applied on 11 February 1998 to the Minister for the Environment (the Minister) under regulation 17 of the *Environmental Protection (Noise) Regulations 1997,* for approval to vary from the prescribed standard, in relation to noise emissions from its Greenbushes Operations.

The basis of the application is that it is not practicable for the noise emissions to meet the prescribed standards. SGW routinely operates on a 24-hour basis and in close proximity to the Greenbushes townsite. Noise emissions are strongly influenced by the effects of meteorological conditions, particularly in winter where the dominant wind direction enhances noise propagation from the mine site to the township.

SGW requires a noise regulation 17 approval to enable it to operate within the prescribed standards for noise under the *Environmental Protection Act 1986.*

SGW expects that its noise emissions will reduce over time as mining operations move further away from the Greenbushes townsite, or underground, and as part of its commitment to continuous improvement. To this end SGW has committed to:

(i) Further noise abatement work on the primary crusher;
(ii) A stepped reduction in its prescribed noise limits (by 3 dB) after two years of its noise regulation 17 approval;
(iii) Renegotiating its prescribed noise limits via the regulation 17 approval process in 5 years time; and
(iv) Implementing all practicable noise mitigation measures in the interim.

The Minister referred the application to the Environmental Protection Authority (EPA) for assessment, as required under noise regulation 17(2).

Where the EPA is of the view that noise emissions vary from a prescribed standard in the noise regulations, the EPA is to so inform the Minister, assess the application, and report to the Minister. This report provides the EPA's advice and recommendations on SGW's application for its Greenbushes Operations, as required by noise regulation 17(3)(b).

EPA Advice

Through this assessment the EPA has concluded that –

- Under certain operational and meteorological scenarios, SGW's current noise emission levels from its Greenbushes Operations are likely to exceed the prescribed standard in the regulations, when determined at residences in the nearby Greenbushes townsite; and

- Whilst noise reduction measures have been implemented, the nature of the mining and processing activities, the proximity of the mine to the Greenbushes townsite and the effect of the prevailing meteorological conditions on sound

propagation means that it is unlikely to be reasonably practicable for SGW to achieve total compliance with the prescribed standard for noise.

Despite these findings, the EPA have formed the view that, in the short term, some noise improvements are feasible at this site and therefore proposes that the noise regulation 17 approval be drafted to achieve a reduction in existing noise levels.

Recommendations

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

Contents

1. Introduction and Background

Mining activity commenced at Greenbushes in 1882 following an initial discovery of alluvial tin deposits. The Greenbushes townsite was founded in 1886 and, to a large extent, has developed alongside and as a result of the neighbouring mining and forestry industries. The Greenbushes town continues today to be heavily reliant on the mining industry for employment and for financial support.

Tantalum and lithium production is now the focus of mining activities at the Greenbushes site. The mine has been under the ownership and control of Sons of Gwalia (SGW) since 1990, with hard rock mining commencing in 1992. As a consequence the Greenbushes landscape is dominated by the open cut mine immediately to the south of the townsite.

Key operational features of the Greenbushes site are:

- Open pit mining;
- Underground mining;
- Crushing and grinding of ore;
- Primary and secondary plants for tantalum recovery (largely via gravity separation);
- Lithium carbonate plant;
- Lithium minerals processing plant;
- Tailings storage facilities;
- Waste rock landforms; and
- Water storage facilities.

Greenbushes Operations have undergone some significant changes in recent times. Critical developments have been an upgrade to the processing facilities to increase production capacity, and also the creation of an underground mine, at the base of the existing main pit (Cornwall Pit), in readiness for further underground mining development. Additional reserves to the south of the main pit, and further away from the Greenbushes townsite, have been the focus of recent mining activity.

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."*

On 11 February 1998 SGW applied to the Minister for the Environment (the Minister) for an approval, pursuant to noise regulation 17, to enable its Greenbushes Operations to vary its noise emissions from the prescribed standard in the noise regulations. In accordance with noise regulation 17, the Minister referred the application for variation to the Environmental Protection Authority (EPA) for assessment.

SGW submitted its final technical noise assessment of its Greenbushes Operations to the EPA in June 2003. That report is entitled "Greenbushes Operations – Application for

Variation to Prescribed Noise Standards (June 2003)" and was released for public comment.

The basis of the application is that whilst SGW is committed to continuous noise improvement at its Greenbushes mine it is not practicable for noise emissions to meet the prescribed standards. SGW routinely operates on a 24-hour basis and in close proximity to the Greenbushes townsite. Noise emissions are strongly influenced by the effects of meteorological conditions, particularly in winter where the dominant southeasterly wind direction enhances noise propagation from the mine site to the township.

3. Noise Management

3.1 Noise Emission Levels

The EPA is satisfied that SGW has developed a detailed understanding of its noise emissions as a result of a long-term noise monitoring and noise prediction programme for Greenbushes.

A permanent noise monitoring station is located at the top of a noise bund that separates the mine site from the Greenbushes township. $L_{A\,10}$ noise levels have been recorded on an hourly basis at this location since 1998.

Results from the noise monitoring station provide a good indication of noise emissions from SGW's Greenbushes Operations, however, on occasions, noise levels recorded at the monitoring station can be affected by extraneous noise sources such as rainfall, traffic and wind.

It is noted that since the permanent monitoring station is located on top of the bund, and closer to the mine site than the actual residences, noise levels recorded at the monitoring location are significantly higher than those received at noise sensitive premises in the Greenbushes town. So that SGW can use the monitoring data to provide a reasonable indication of actual noise levels received in the town, they have investigated the relationship between the noise levels recorded at the monitoring station and noise levels in town. Noise attenuation values have thus been established for strategic locations within the Greenbushes township based on reasonable worst-case wind conditions. These attenuation values have been determined through noise measurement and have been confirmed by noise prediction data.

In particular, SGW use two specific locations in town for noise analysis. These assessment points, Location 1 and Location 2, are typical of worst-case locations for noise reception within Greenbushes and are shown by Figure 1. The attenuation values for these reporting sites in town are -12 dB(A) and -14 dB(A), for Location 1 and Location 2 respectively. This means that noise received at these locations will be 12 and 14 dB(A) below the noise levels recorded at the permanent monitoring site under worst-case wind conditions.

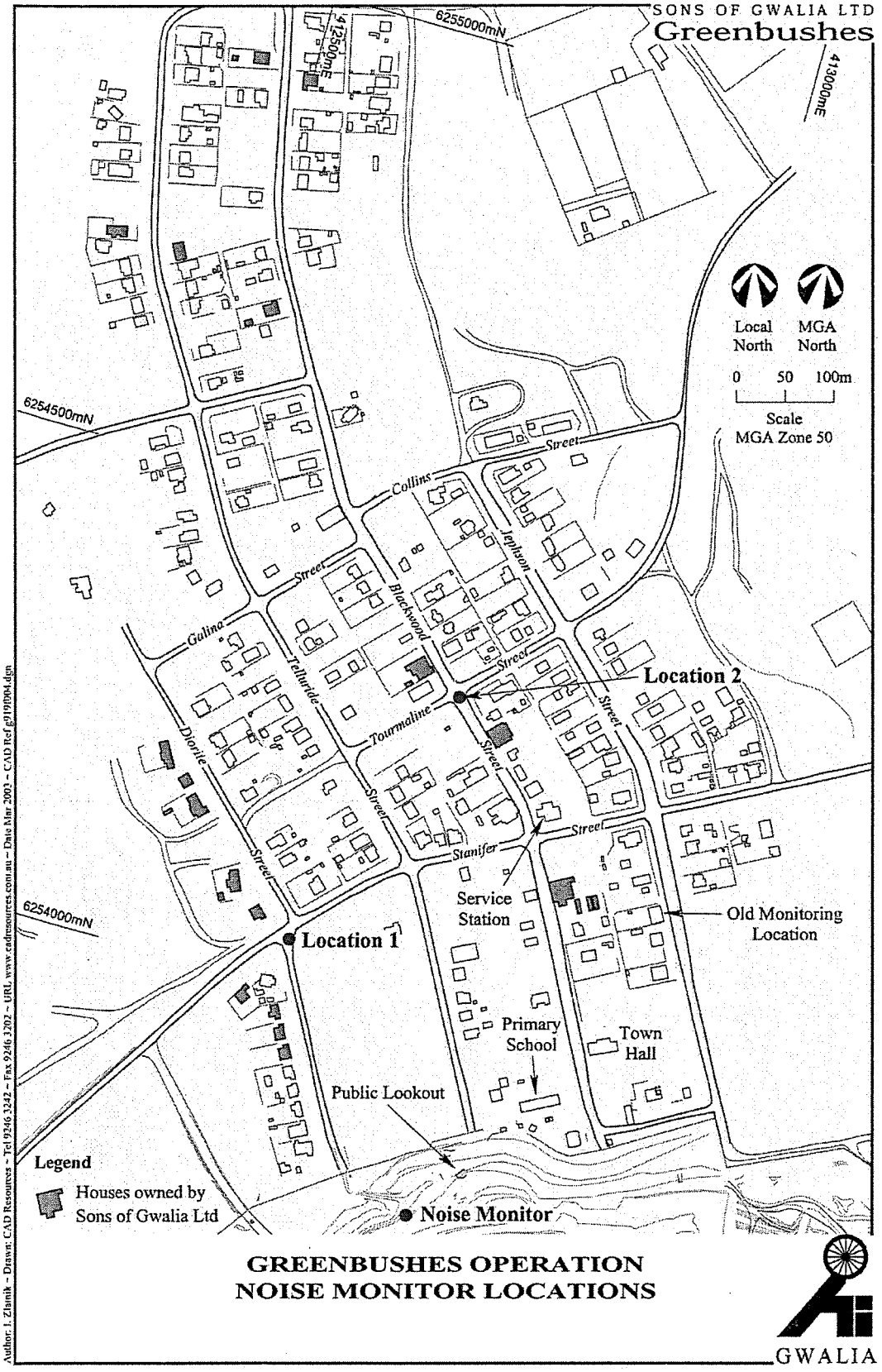

Figure 1: Greenbushes Townsite and Noise Assessment Locations

Table 1 presents the noise monitoring data recorded at the permanent noise monitoring station from January 2001 to February 2003.

Table 1: Noise Data Collected at the Permanent Monitoring Station

Time Period	Percentage of Time $L_{A\,10}$ dB(A) Recorded Levels were within Noise Range (%)						
	<49	50-54	55-59	60-64	65-69	70-74	75-79
Day	2	16	20	36	25	0	1
Evening	12	34	25	23	6	0	0
Night	16	30	25	23	6	0	0

Note: *"Day" refers to the time period 7am to 7pm, Monday to Saturday.*
"Evening" refers to the time period 9am to 7pm, Sundays & Public Holidays; and 7pm to 10pm, all days.
"Night" refers to the time period 10pm to 7am, Monday to Saturday; and 10pm to 9am, Sundays & Public Holidays.

For comparative purposes, the $L_{A\,10}$ assigned levels prescribed by the noise regulations are 47 dB(A), 42 dB(A) and 37 dB(A), for the day, evening and night time periods respectively. Given that noise attenuation for the typical worst-case location in town is 12 dB(A), then from Table 1 it can be determined that the prescribed noise limits are being exceeded for 62%, 54% and 84% of the time, for the day, evening and night. These percentage exceedances could be considered absolute worst-case because greater noise attenuation between the monitoring location and the residences in town would be expected in all but the worst weather conditions.

The noise monitoring data has been further analysed in Table 2 to show the likely magnitude of regulatory exceedance at the worst-case Greenbushes location. This table relates to noise monitoring data recorded between July 1999 and February 2003 at the permanent monitoring station. From this table, noise emissions could exceed daytime assigned levels by 6 dB, evening levels by 10 dB and nighttime levels by 14 dB.

Using an acoustic model, SGW has also undertaken extensive noise prediction calculations, based on worst-case meteorological conditions. These noise predictions show a good correlation with the average measured data taken at the permanent monitoring station (as presented in Table 2). The predictions also demonstrate that a considerable noise reduction (of about 6 dB) is possible when the mining activity moves south, further away from the townsite. If these predictions are borne out in practice then the resulting noise emission scenario could be:

- compliance with prescribed noise limits during the daytime;
- virtual compliance with prescribed noise limits during the evening, with some very occasional, minor exceedances; but
- continued exceedance during the nighttime by up to 7 dB.

Predicted noise results are shown in Table 3.

Table 2: Extent to which Noise Levels are Likely to Exceed the Prescribed Standard

	$L_{A\,10}$ Noise Level (dB(A))		
	Day	**Evening**	**Night**
Mean (μ)	60	58	57
Standard Deviation (σ)	2.3	3.2	3.1
Mean plus 2 Standard Deviations ($\mu + 2\sigma$)	65	64	63
Attenuation Factor between Monitoring Station and Location 1	-12	-12	-12
Calculated Level for Location 1 (Based on $\mu + 2\sigma$)	53	52	51
Assigned Levels	47	42	37
Regulatory Exceedance	6	10	14

Note: For a normally distributed data set approximately 95% of the data will be with 2 standard deviations of the mean. However, it should be noted from Table 1, that whilst the monitoring results go close to representing normally distributed data, they are not perfect normal distribution data sets.

Table 3: Predicted Existing and Future Noise Levels

	$L_{A\,10}$ Noise Level (dB(A))		
	Day	**Evening**	**Night**
Current Predicted Noise Levels (2003)			
At Noise Monitoring Station	61	60	62
At Location 1	49	49	50
Regulatory Exceedance	2	7	13
Future Predicted Noise Levels (2005)			
At Noise Monitoring Station	53	52	54
At Location 1	43	43	44
Regulatory Exceedance	-4	1	7

Note: The noise levels quoted for Location 1, within the Greenbushes townsite, are taken directly from predicted data. Therefore the difference between the noise level at the monitoring station and at Location 1 do not equal 12 dB(A) in all cases. It is expected that for future mining scenarios, where the mining activity is further away from the town, the noise bund would provide less barrier attenuation to noise. This effect is reflected in the predicted data results.

It is the EPA's view that, through a detailed noise monitoring and prediction programme, SGW has demonstrated that it is currently unable to comply with the prescribed noise

limits at all times. This situation is likely to perpetuate, irrespective of the fact that future changes to mining activities are expected to result in a considerable reduction in noise received within the Greenbushes township.

It should be noted that SGW's regulation 17 application does not relate to noise from safety warning devices on the mobile mining fleet (as these are exempt from the noise regulations); nor does it include noise from blasting (since the company is able to comply with the blasting requirements of the noise regulations).

3.2 Noise Reduction

The EPA only recommends approval of noise regulation 17 applications in cases where the applicant can demonstrate that it is not reasonable or practicable to comply with the prescribed noise standard.

SGW has provided evidence of having implemented a program of noise reduction over a number of years. Combined with the fact that mining activities have either moved further away from the Greenbushes township or deeper into the Cornwall Pit, these measures have been successful in realising progressive noise level reductions from Greenbushes Operations over time.

A significant feature of the Greenbushes Operations is the large earth bund immediately to the south of the Cornwall Pit, where the mining operations interface with the Greenbushes township. The closest building to the mine site is the Greenbushes Primary School, which is located approximately 50 metres from the pit crest. The closest residence is approximately 200 metres from the pit crest. The bund is roughly 10 metres high, is well vegetated, and has a viewing platform atop the bund catering for visitors.

The earth bund creates a significant noise shadow zone that benefits the town. Broadly speaking the effect of the noise bund extends some 700 metres from the pit crest, reducing noise levels at a number of noise sensitive locations.

Other noise reduction measures that have been implemented by SGW are:

- Addition of noise dampening material to the crusher feed bin.
- Changes to standard operating procedures for the crusher feed bin.
- Alterations to the drill rig to reduce drill chatter.
- Replacement of mufflers on the truck fleet.
- Shrouding cooling fans at the Lithium Minerals Plant.
- Modification of the secondary mill gearbox.
- Construction of smaller noise bunds at strategic locations.

SGW has also considered the feasibility of other noise reduction strategies in some detail.

One noise reduction option investigated was to raise the barrier to the townsite by placing a fence on top of the existing earth bund. This was calculated to deliver a 0.3 to 1 dB(A) improvement at some locations in town. Based on the cost to implement such a proposal; the likelihood for reduced improvement over time as the mining fleet moves away from

the barrier; and the significant loss of vegetation to the bund, SGW considered this option not to be practicable.

SGW has also investigated possible improvements to its mobile fleet. Noise control options available include: constructing roadside earthen bunds; lining the engine bays; and adding attenuators to all mobile machinery. The best possible improvement that could be expected from implementing these measures is about 1 dB(A) when received in town. Given the limited noise benefit offered by these noise reduction options, they are not considered practicable at this time.

A formal application, which was rejected by the Department of Minerals and Energy, was made by SGW under the *Mines Safety and Inspection Regulations 1995* to replace the reversing beepers on its mobile fleet with visual alarms during the night. SGW have committed to a further investigation of "smart alarms" as a possible alternative, but initial tests highlighted some problems with these noise-reduced alarms. The EPA considers that a solution to this problem is important because, even though these noise sources are exempt from the noise regulations, they can cause considerable annoyance to local residents. The Department of Environment (DoE) has advised the EPA that it will work with industry and other Government departments to pursue noise-reduced alternatives for vehicle safety alarms.

Noise modelling undertaken by SGW has identified the primary crusher as the most significant contributor to noise levels in the Greenbushes town. SGW is currently considering a range of options for addressing this source of noise. Considerable investigative work has gone into one proposal, which was to install a noise enclosure around the primary crusher bridge. It has been predicted that installing this enclosure could reduce noise from the crusher by between 11 and 12 dB(A), which, in turn, could reduce the overall noise level received at the townsite by between 3 and 4 dB(A). The noise enclosure option has been independently costed at between $64,000 and $79,000 (excluding SGW labour costs, the costs of shutdown and other incidentals).

Since submitting its noise regulation 17 report, SGW has provided an additional commitment to further investigate noise control options for the primary crusher, and to achieve a measurable noise reduction from this source within two years of the commencement date of the noise regulation 17 approval. The EPA accepts that it may take some time for SGW to consider and implement the best practical noise control option for its crusher, however, the EPA is of the view that it is necessary for this predominant noise source to be treated in the short-term.

Based on advice from SGW, ameliorative treatment to the crusher might include:

- Installation of a different (and measurably quieter) crusher.
- Relocation of the crusher to a location that is measurably quieter.
- Changes to the current crusher operation that will measurably reduce noise emissions.
- Construction of a tunnel between the ROM and the crusher feed.
- Cladding of the current crusher enclosure with noise attenuating materials.
- Cladding of individual components of the current crusher that are identified as significant sources of noise.

In view of the above discussion, it is the EPA's determination that, at this time, SGW have implemented all reasonable and practicable measures to reduce noise and yet still cannot comply with the prescribed limits for noise.

4. Consultation

As part of this noise regulation 17 application, SGW has embarked on a community consultation programme to address noise as an environmental issue. This consultation has included two community surveys - which were conducted in December 2000 and March 2003 - as well as advertisements in the local papers.

The community surveys were delivered to all households in the town of Greenbushes and in the surrounding area. The survey results suggest that the majority of residents who responded to the surveys do not find noise intolerable from SGW's Greenbushes Operations. In the 2003 survey 6% of the respondents within the town believed that noise from SGW's mining activities "should be addressed", whilst 3% of town respondents believed that processing noise "should be addressed". Noise from the rockbreaker attracted greater criticism from the community, with 16% in town believing that it "should be addressed". Clearly there is a residual level of concern about noise within the Greenbushes community and some room for improvement; nevertheless, these survey results suggest that noise is being managed effectively by SGW.

The surveys also indicated a clear improvement in the community's perception of noise from 2000 to 2003, which reflects well on the company's overall performance in recent times.

Upon its release, SGW's noise regulation 17 application was made available to the public, via distribution to the Bridgetown-Greenbushes Shire, the Bridgetown Public Library, the Greenbushes TeleCentre and the Battye Library. No comments were received by the EPA on the regulation 17 application.

5. Outline of Noise Regulation 17 Approval

In the light of the above discussion, the EPA recommends the granting of a noise regulation 17 approval to SGW for the Greenbushes Operations.

Whilst the EPA notes that the level by which the prescribed noise limits are exceeded in the Greenbushes townsite is high, particularly at night, it also recognises that noise emissions at these high levels are relatively short term. For the majority of the time, noise emissions from the Greenbushes Operations would be within 5 dB(A) of the regulatory levels for the day and evening periods, and within 10 dB(A) at night.

The EPA also acknowledges the good relationship that SGW has with the local Greenbushes community and the extent to which the community feels allied to the company. This is evidenced by the relatively high response rates to community surveys and the absence of any recent complaints about noise.

The EPA recommends that the noise regulation 17 approval contain the following features:

1. $L_{A\,10}$ noise limits of 56/54/53 dB(A) initially

It is recommended that, initially, the following noise limits apply to SGW's Greenbushes Operations:

- Day, 0700 to 1900 hours - $L_{A\,10}$ 56 dB(A)
- Evening, 1900 to 2200 hours - $L_{A\,10}$ 54 dB(A)
- Night, 2200 to 0700 hours - $L_{A\,10}$ 53 dB(A)

In the worst case (i.e. at night) this translates to a variation in the prescribed noise limit of 16 dB(A). During the daytime and evening periods the varied levels would represent a permitted increase of 9 and 12 dB(A) respectively.

These levels would apply at noise sensitive premises in the Greenbushes townsite and would so equate to levels of 68 dB(A), 66 dB(A) and 65 dB(A) at the permanent noise monitoring location. Based on noise monitoring data, SGW currently comply with these noise levels for 98% of the time.

The EPA considers that any noise that has been recorded above these limits (currently indicated as occurring for 2% of the time) would likely be the result of extraneous noise sources or unexpected mining events, such as a breakdown of equipment. The EPA recommends that such matters be handled under an "abnormal" events clause in the regulation 17 approval, similar to those previously drafted for approvals pertaining to Wesfarmers Coal, Wespine and Port of Esperance. An abnormal events clause would require SGW to report on the incident, but it would not be a breach of the regulation 17 approval if the noise emission was caused by an event that could not have been prevented or could not have been foreseen by SGW.

The EPA believes that, whilst the $L_{A\,10}$ noise limits will be the primary compliance tool for SGW monitoring purposes, it is also necessary for $L_{A\,max}$ noise limits to apply to the Greenbushes Operation. This will address the matter of short-term noise emissions from the mine that could potentially reach quite high levels. Without $L_{A\,max}$ limits, any noise emissions from the mine that were present for less than 10% of the time would be left uncontrolled. It is recommended that $L_{A\,max}$ noise limits that are 15 dB(A) higher than the suggested $L_{A\,10}$ limits be applied.

Notwithstanding the prescribed noise limits recommended above, the EPA recommends that an overriding clause be incorporated into the approval that requires noise to be kept as low as is reasonably practicable at all times. Such a clause will reinforce SGW's commitment to continuous improvement and supports the principle of best practice noise management.

2. Commitment to attenuate noise from the crusher

The EPA recommends that SGW's commitment to address noise from the primary crusher be incorporated into the regulation 17 approval as a specific condition. The crusher is currently the dominant noise emission source from the mine site and it is critical that this

source be addressed to achieve meaningful noise improvements within the Greenbushes townsite.

It is recommended that a condition of the approval require SGW to submit a plan to the DoE for approval to effectively reduce noise from the primary crusher within one year of the commencement of the approval. This gives the company adequate time to analyse and plan the most effective noise improvement strategy for the crusher. SGW should then be required to implement the approved noise reduction measure (or measures) to the crusher, within two years of the commencement of the approval. SGW would also be required to report to the DoE at this time, providing details on the level of the noise reduction achieved as a result of implementing this measure (or measures).

3. Staged noise reduction after two years

Recognising that a measurable improvement to noise emissions can be achieved by attenuating the crushing plant, the EPA considers that it is appropriate to set a staged reduction in SGW's prescribed noise limits to co-ordinate with the implementation of this improvement (i.e. after two years of commencement of the approval). In light of the evidence before it, the EPA recommends a 3 dB reduction as a realistic target.

4. Five year horizon

The EPA considers that, over the longer term, further noise improvements could be realised within the Greenbushes townsite and considers that it is important to build a long-term improvement into the approval. Substantial noise reductions are particularly likely if mining activity continues to move southwards, away from the Greenbushes townsite.

However, the EPA recognises that, at this stage, the prospect of a noise reduction has only been established through prediction and is based on a number of assumptions about future mining activities. Furthermore, the EPA acknowledges that SGW needs to maintain some flexibility in operational management, both in its ability to respond to the market demand for its product, and also to the quality of the product being extracted, as this is only predictable to a certain extent.

Therefore, the EPA recommends that a five year horizon be placed on the noise regulation 17 approval, with a review of the prescribed noise limits at that time. SGW would be required to submit a revised report at this time providing evidence of up-to-date noise monitoring and any noise improvement plans.

The EPA recommends that a clause be included in the noise regulation 17 approval that allows the approval to continue in force until such time as a new approval is granted, subject to the application for a revised approval being submitted by the horizon date.

5. Reporting requirement

It is recommended that the approval include a reporting requirement that is triggered when noise levels recorded at the permanent noise monitoring station exceed such levels as would indicate the prospect of noise exceeding the permitted levels within the approval

(which relate to the Greenbushes townsite). In such cases SGW should investigate the incident and communicate the outcome of the investigation to the DoE.

It is recommended that SGW report its noise emission levels on an annual basis, with noise incident reports to provide the following detailed information –

- The date and time of the incident.
- The level of the noise and the duration that it was above the permitted level.
- The sources contributing to the noise emission.
- The meteorological conditions that may have influenced sound propagation.
- The mobile mining fleet operating at the time of the incident and the approximate location of the fleet at the noisiest times.
- Other mining and processing activities taking place at the time of the incident.
- Practicable noise reduction measures that could have been implemented to reduce the noise or measures that need to be put in place to prevent the noise emission from re-occurring in the future.
- Any reasons why noise could not have been reduced or why the incident constituted an "abnormal" event.

In addition to its regulation 17 approval requirements the EPA would also encourage SGW to summarise its annual noise monitoring and its noise incident reports within its Annual Environmental Report, and so provide public, accountable information on its noise performance.

6. Conclusion and Recommendation

The EPA concludes that –

- Under certain operational and meteorological scenarios, SGW's current noise emission levels are likely to exceed the prescribed standard in the noise regulations, when determined at the nearby Greenbushes townsite; and

- Whilst noise reduction measures may continue to be implemented by the company, the nature of the mining and processing activities; the proximity of the mine to the Greenbushes townsite; and the effect of the prevailing meteorological conditions on sound propagation means that it is unlikely to be reasonably practicable for SGW to achieve total compliance with the prescribed standard for noise.

Despite these findings, the EPA believe that, in the short term, some noise improvements are feasible and therefore proposes that the noise regulation 17 approval be drafted to achieve reductions in existing noise emissions from SGW's Greenbushes Operations.

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

Appendix A

Details of Noise Limits

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 Greenbushes townsite is 2 dB at representative noise-sensitive locations.

Appendix B

Preliminary Drafting Instructions for a Noise Regulation 17 Approval

PRELIMINARY DRAFTING INSTRUCTIONS
FOR A NOISE REGULATION 17 APPROVAL

AUTHORITY:

The Approval would be granted by the Minister for the Environment under regulation 17 (7) of the *Environmental Protection (Noise) Regulations 1997* after receiving a report from the Authority for the purposes of the regulation.

CITATION:

The Approval may be cited as the *Environmental Protection (Sons of Gwalia Greenbushes Operations Noise Emissions) Approval 2004.*

DURATION OF APPROVAL:

The Approval would come into operation on the day of its publication in the *Gazette* and would stop being in force five years from this date, unless revoked before this time or extended because of a further regulation 17 application (in which case the Approval should continue in force until the Minister either grants of refuses the subsequent application).

INTERPRETATION:

The following terms may need definition:

"abnormal event" means an unexpected event, the occurrence of which is beyond the immediate control of, and could not reasonably have been foreseen by, Sons of Gwalia (such as an accident or emergency, a breakdown of plant or equipment or extreme weather conditions).

"assigned level" means a noise level determined in accordance with this approval, as specified in clauses relating to "Maximum Permitted Noise Levels".

"construction work" has the same meaning as in regulation 13, and includes operations such as vegetation clearing and topsoil removal at the commencement of a new mining area, rehabilitation of decommissioned mining areas and construction of perimeter bunds to act as noise barriers.

"commencement" means the day on which the Approval comes into operation.

"commercial premises" has the same meaning as in regulation 2(1).

"Director" means the Director of the Environmental Management Division, Department of Environment.

"impulsiveness" has the same meaning as in regulation 9.

"industrial and utility premises" has the same meaning as in regulation 2(1).

"$L_{A\ max}$ assigned level" means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded at any time.

"$L_{A\ 10}$ assigned level" means an assigned which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 10% of any period of 4 hours.

"$L_{A\ Slow}$" has the same meaning as in regulation 2(1).

"mine site" means the premises known as Greenbushes Operations occupying Mining Leases 01/3, 01/6, 01/7 and 01/16, and General Purpose Leases 01/1 and 01/2, Greenbushes, Shire of Bridgetown-Greenbushes. The premises includes, but is not necessarily limited to, the following:

- Mining voids and haulage ways;
- Waste dumps;
- Tailings / residue disposal areas;
- Crushing and screening facilities;
- Primary Tantalum processing plant;
- Lithium processing plant;
- Secondary processing plant including roasters and furnaces;
- Workshop and associated infrastructure; and
- Water supply dams.

"modulation" has the same meaning as in regulation 9.

"noise-sensitive premises" has the same meaning as in regulation 2(1).

"Sons of Gwalia" means the body corporate known as Sons of Gwalia Ltd, ABN 46 008 994 287.

"regulation" means regulation of the *Environmental Protection (Noise) Regulations 1997.*

"tonality" has the same meaning as in regulation 9.

GRANT OF APPROVAL:

Under regulation 17 (7), approval would be granted to Sons of Gwalia to allow the noise emitted from the mine site to exceed or vary from the standard prescribed in regulation 7(1).

CONDITIONS OF APPROVAL:

For the purposes of the Grant of Approval, regulations 7(1) and (2), 8(2) and 9(3) would not apply in relation to the noise emitted from the mine site while the Approval is in force and is being complied with.

However, the Approval would be granted on the condition that –

a) Sons of Gwalia reduces noise emissions from the mine site as far as is practicable;

b) noise emitted from the mine site complies with the maximum permitted noise levels (below);

c) noise emitted from the mine site complies with the requirements for tonality, impulsiveness and modulation (below);

d) Sons of Gwalia complies with the requirements relating to abnormal events (below);

e) Sons of Gwalia complies with the requirements relating to noise control of the crushing plant (below); and

f) Sons of Gwalia complies with the reporting requirements (below).

MAXIMUM PERMITTED NOISE LEVELS

Noise emitted from the mine site, when received at a premises of a kind referred to in column 1 of an item in Table 1 or 2 of Schedule 1, at any time of the day referred to in column 2 of the item, should not exceed any of the assigned levels specified opposite the time of day in column 3 of the item (see Schedule 1).

Should the assigned levels in regulation 8 be varied by amendment to the regulations then the higher level should be taken to apply to noise emitted from the mine site, irrespective of whether that higher level is found in the regulations or in this Approval.

PERMITTED TONALITY, IMPULSIVENESS AND MODULATION

Noise emitted from the mine site, when received at a premises referred to in column 1 of an item in Table 1 or 2 of Schedule 1, should be required to be free, for at least 90% of any period of 4 hours, from any tonality, impulsiveness and modulation.

DETERMINING LEVELS OF NOISE EMISSION

For the purpose of assessing the level or character of noise emitted from the mine site, the following would not be taken into account –

a) noise emissions of a kind referred to in regulation 3;

b) noise emitted as a result of construction work carried on at the mine site.

NOISE FROM ABNORMAL EVENTS

An emission of noise that contravened the requirements for maximum permitted noise levels or for tonality, impulsiveness and modulation, would be taken not to breach a condition of the Approval if –

a) the emission was the result of an abnormal event;

b) Sons of Gwalia took all reasonable and practicable measures to stop the emission as soon as was reasonably practicable; and

c) Sons of Gwalia notified the Director of the occurrence of the abnormal event within 21 days after the day on which it occurred, or within any further time allowed by the Director on the application of Sons of Gwalia.

ABNORMAL EVENTS REGISTER

Sons of Gwalia should be required to keep an abnormal events register for the purposes of this Approval.

NOISE CONTROL PROGRAMME FOR CRUSHING PLANT

Within 12 months of commencement of this Approval Sons of Gwalia should be required to submit a report to the Director, in a form approved by the Director, that sets out the measure or measures that Sons of Gwalia proposes to take to reduce the level of noise emitted from the crushing plant, when received at premises within the Greenbushes townsite.

Sons of Gwalia should be required to implement the measure or measures identified in the above mentioned report, within two years of the commencement of this Approval.

REPORTING REQUIREMENTS

Sons of Gwalia should be required to provide an annual report to the Director, in a form approved by the Director, containing the following information for the previous year –

a) a summary of the noise levels, determined from the results of monitoring carried out at Sons of Gwalia's permanent noise monitoring station;

b) details of any noise events recorded at Sons of Gwalia's permanent noise monitoring station, where the noise level measured was more than 12 dB above the assigned levels specified for item 1 of Table 1 in Schedule 1 (including the noise level of that event and the time at which that event occurred);

c) a summary of noise emission levels of significant individual plant items which have been in use at the mine site; and

d) a summary of noise reduction measures which have been implemented at the mine site.

Where requested by the Director, Sons of Gwalia should be required to provide more detailed reporting data for any period of the reporting year as specified by the Director.

SCHEDULE 1 – MAXIMUM PERMITTED NOISE LEVELS

Table 1: For the period from commencement to two years after this date

	Column 1	Column 2	Column 3	
Item	Type of premises receiving noise	Time of day	Assigned level (dB)	
			$L_{A\ 10}$	$L_{A\ max}$
1.	Noise sensitive premises, at locations within 15 metres of a building directly associated with a noise sensitive use.	0700 to 1900 hours	56	71
		1900 to 2200 hours	54	69
		2200 to 0700 hours	53	68
2.	Noise sensitive premises, at locations further than 15 metres from a building directly associated with a noise sensitive use.	All hours	60	80
3.	Commercial premises	All hours	60	80
4.	Industrial and utility premises	All hours	65	90

Table 2: For the period beyond two years of the date of commencement

	Column 1	Column 2	Column 3	
Item	Type of premises receiving noise	Time of day	Assigned level (dB)	
			$L_{A\ 10}$	$L_{A\ max}$
1.	Noise sensitive premises, at locations within 15 metres of a building directly associated with a noise sensitive use.	0700 to 1900 hours	53	71
		1900 to 2200 hours	51	69
		2200 to 0700 hours	50	68
2.	Noise sensitive premises, at locations further than 15 metres from a building directly associated with a noise sensitive use.	All hours	60	80
3.	Commercial premises	All hours	60	80
4.	Industrial and utility premises	All hours	65	90

Note: The $L_{A\ 10}$ assigned levels for noise sensitive premises, at locations within 15 metres of a building directly associated with a noise sensitive use, drops by 3 dB after two years of the Approval coming into operation.