Power Transmission Substations
Noise Regulation 17 Variation

Western Power Corporation

Report and recommendations of the Environmental Protection Authority

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Summary and Recommendations

Introduction

Western Power Corporation ("Western Power") applied in 1998 to the Minister for the Environment under regulation 17 of the *Environmental Protection (Noise) Regulations 1997* ("the noise regulations"), for approval to vary from the prescribed standard, in relation to noise emissions from all of its noise-emitting facilities.

The application was referred by the Minister 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 will vary from a prescribed standard in the noise regulations, the EPA is to inform the Minister, assess the application, and report to the Minister.

The Western Power noise regulation 17 application has been split into several separate applications, as follows –

- Regional Power Stations – assessed in 2002, EPA Bulletin 1074, October 2002;
- Major Power Stations – to be assessed individually (Pinjar – Bulletin 1130, May 2004, Kalgoorlie, Geraldton, Kwinana); and
- Transmission Substations – the subject of this Bulletin.

This report considers only the noise emissions from 38 Transmission Substations, and provides the EPA's advice and recommendations, as required by noise regulation 17(3)(b).

Western Power proposes to implement a significant program of practicable noise reduction measures for the 26 substations that exceed the prescribed standard by more than 5dB(A). The application for a noise regulation 17 approval requests that the existing noise emissions be permitted as a variation to the prescribed standard, pending completion of the program, after which time an ongoing variation of 5dB(A) would be approved for those substations for which full compliance was not practicably achievable.

EPA Advice

Through this assessment the EPA has formed the view that –

- the current noise emission levels are likely to exceed the levels set in the prescribed standard in the regulations, for 34 of the 38 substations to which the application relates, and will comply for four substations;
- the community response to the noise emissions is generally tempered by the recognition of the essential nature of the service provided; and
- while noise reduction measures could possibly be implemented to achieve compliance at a cost of some $7m, a reasonable and practicable outcome can be achieved through the proposed Noise Mitigation Plan, which would result in all substations being brought either into full compliance or within 5dB(A) of compliance, at a cost of some $4.5m.

Recommendations

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

Contents

1. Introduction and Background

Western Power is a corporatised utility owned by the State Government of Western Australia that generates, distributes and supplies electricity to industrial, commercial and residential customers throughout Western Australia.

The Networks Business Unit of Western Power is responsible for the management, operation and maintenance of the power transmission network, including 113 transmission substations. Some 75 of these substations have been found to comply with the noise regulations, and the remaining 38 are the subject of the noise regulation 17 application.

Transmission Substations form an integral part of the power network, converting the incoming high voltage power to lower voltages suitable for supply to the smaller distribution transformers located in suburban streets, from which domestic power is supplied.

Transmission Substations are often situated in built-up areas close to noise-sensitive receivers. The site would usually contain two or three large transformers, one of which may not operate at night. The transformers emit a characteristic "hum" at a level which is capable of exceeding the prescribed standard for noise as set out in the *Environmental Protection (Noise) Regulations 1997* ("the noise regulations"). The presence of the Transmission Substations is generally well-accepted in the community, probably because of the essential nature of the service provided.

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."*

Western Power has applied to the Minister for the Environment for an Approval pursuant to noise regulation 17 to enable it to vary its noise levels from the prescribed standard in the noise regulations. In accordance with noise regulation 17, the Minister has referred the application for variation to the EPA for assessment.

The basis of Western Power's application in relation to the 38 non-complying Transmission Substations is that the cost of achieving full compliance, combined with the technical difficulty and disruption to operations over a considerable period, renders full compliance impracticable.

The estimated cost to ensure that the prescribed standard is met at all Transmission Substation sites is in the order of $7 million. Western Power believes it is unreasonable and impracticable for this amount of money to be spent to achieve full compliance when the community would consider that there was no significant improvement in their amenity to be gained by reducing noise that is less than 5dB(A) above the prescribed standard.

Western Power proposes to achieve this outcome by committing to a Noise Mitigation Plan (NMP) that would involve reducing noise from the 26 Transmission Substations that are more than 5dB(A) above the prescribed standard to meet either full compliance or a level that is within 5dB(A) above the prescribed standard. Depending on the ultimate

effectiveness of the selected noise reduction measures, it is estimated that up to 10 substations would be brought into full compliance. The NMP would thus result in noise levels at all Transmission Substations that either comply with the prescribed standard or are within 5dB(A) of compliance, at a cost of about $4.5 million (2003 costing). The EPA notes that this proposal was developed in consultation with the Department of Environment.

3. Noise Assessment

3.1 Noise emissions

Western Power has undertaken an extensive evaluation of the noise emissions from its Transmission Substations, both through its own monitoring and through the work of acoustic consultants. This has involved noise measurements at many substations and calculation of noise levels at noise-sensitive premises, for comparison with the assigned levels for those noise receivers. While the data for some Transmission Substations is of a predictive nature, the EPA is satisfied that the data and the supplementary technical documentation provided by Western Power is representative of the noise emissions.

The assigned levels that form the prescribed standard are expressed as L_{Amax}, L_{A1} and L_{A10} assigned levels, where L_{Amax} is a level not to be exceeded at any time, L_{A1} is a level not to be exceeded for more than 1% of a representative assessment period, and L_{A10} is a level not to be exceeded for more than 10% of a representative assessment period. While the L_{Amax} and L_{A1} assigned levels control noise emissions that are of short duration, the L_{A10} assigned level is set at a lower level to control continuous noise emissions. Because the noise emission of a substation is essentially constant, the L_{A10} assigned level has been used as the basis for the assessment. Further, because the night time (10pm to 7am) L_{A10} assigned levels are more stringent than the day time or evening L_{A10} assigned levels, only the night time L_{A10} assigned levels have been used in the assessment.

The noise emission from a Transmission Substation contains a tonal ("humming") character resulting from vibrations caused by expansion and contraction of the core (magnetoconstriction) which occurs at each change of flux linkage, that is, twice per mains cycle. This causes sound radiation from the transformer casing at 100Hz (twice the mains frequency of 50Hz), with some higher harmonics at 200Hz, 300Hz and above. In cases such as this, where it is not practicable to remove the tonality, the noise regulations require that the noise emission must meet the assigned level when a +5dB(A) penalty is added to the received noise level. Western Power's analysis therefore includes a +5dB(A) adjustment to the measured or calculated noise level.

Table 1 below compares the received noise levels at the nearest noise-sensitive premises with the allowable night time L_{A10} assigned level for each substation, in descending order of exceedance. The assigned level varies from one location to another, taking into account the proximity of industrial or commercial land uses and major or secondary roads. The second column shows the measured or calculated sound level received at the nearest noise-sensitive premises. The third column shows the exceedance, determined by adding 5dB to the received sound level to account for tonality, and subtracting the assigned level. Note that, in three of the last five cases, no adjustment is applied, as the tonality in the received noise was masked (obscured) by the background noise.

TABLE 1: EXCEEDANCES OVER ASSIGNED LEVELS

Substation	Night Time L_{A10} Assigned level – dB(A)	Noise Emission Level – dB(A)	Adjusted Exceedance – dB(A)
Crandon Street, Gosnells	37	56	24
Herdsman Parade, Wembley	37	55	23
Morrison Street, Como	38	50	17
Manning Street, Scarborough	38	49	16
Willmott Avenue, Margaret River	39	49	15
Murdoch Drive, Hedland	38	48	15
Darch Street, Yokine	42	52	15
Norma Road, Myaree	43	53	15
Coode Street, Morley	40	50	15
Fairway, Crawley	38	47	14
Wilkins Road, Kalamunda	39	48	14
Bank Street, Victoria Park	37	45	13
Broughton Way, Rockingham	38	47	14
Marshall Road, Malaga	44	52	13
Great Eastern Hwy, Sawyers Valley	39	46	12
Everingham Street, North Beach	43	50	12
Thomas Road, Byford	36	43	12
Adj. Grose Avenue, Cannington	44	51	12
Empire Avenue, Wembley Downs	38	44	11
Forrest Avenue, East Perth	45	50	10
Wheatley East Road, Quinninup	36	41	10
Annois Road, Bibra Lake	44	48	9
Alexander Road, Belmont	37	41	9
Arkana Road, Balga	42	46	9
Hawke Avenue, Wundowie	39	42	8
Rendezvous Road, Vasse	36	37	6
Boulder	41	41	5
Durlacher Street, Geraldton	39	38	4
Yornup	39	38	4
Curtin Avenue, Cottesloe	44	43	4
Northam	42	40	3
Railway Parade, Bayswater	45	42	2
Albany	40	37	2
QEII Medical Centre, Nedlands	41	42	1
Midland Junction	44	39	0
Pegs Creek	36	<36	0
West Kalgoorlie	37	<37	0
Holmes Road, Munster	45	35	0

The EPA notes that Western Power calculated the exceedances for Midland Junction, Pegs Creek and West Kalgoolie by subtracting the assigned level, determined to the nearest 0.1dB, from the adjusted noise emission level, also determined to the nearest 0.1dB, giving exceedances of 0.1 – 0.2dB(A). The noise regulations however specify that the assigned level is to be rounded to the nearest whole dB. If this is done, the exceedances for these three substations reduce to zero, and the noise emissions comply with the prescribed standard.

With regard to the Munster substation, the EPA notes that the residences near this site are within the boundary of Area B of the Kwinana Policy Area, and that Schedule 3 (2) (4) of the noise regulations sets higher assigned levels than those assumed by Western Power in its noise regulation 17 application. The emitted levels comply with the assigned levels.

Noting this, the EPA accepts the above assessment of noise emissions, and advises that, with the exception of the Transmission Substations at Munster, Midland Junction, Pegs Creek and West Kalgoolie, the remaining 34 Transmission Substations listed in Table 1 above do not comply with the prescribed standard.

3.2 Noise reduction

A summary of the possible means considered by Western Power for reduction of noise impact, for use separately and in combination, is set out below.

- Full noise enclosure –

  This involves construction of a "sealed" solid enclosure, usually of composite metal or masonry, around the transformer, avoiding the cooling system and high voltage lines. This approach can be highly effective for reducing noise, but is expensive and makes access to the transformer difficult. Cost ~$150,000 per transformer.

- Wave-trapping barrier technology –

  This is a new technology currently being developed at University of WA, open at the top and involving barriers on four sides, specially designed to attenuate sound at the frequencies of interest (100Hz, 200Hz, etc). Though less effective than full enclosure, this system is much cheaper and can also be demountable for maintenance. Cost ~$60,000-$80,000 per transformer.

- Earth bunds and masonry walls –

  These can be erected at the site boundary with less interference to operations than enclosures or wave-trapping barriers, but are likely to be less effective. Earth bunds in particular take up more space than walls and are not suitable for many sites. Cost ~$25,000-$70,000 per substation.

- Active noise control –

  This specialised technology involves generating an out-of-phase sound that cancels the sound emitted by the transformer. While it has potential for static sources generating specific frequencies, such as transformers, it would require considerable developmental work to match the cost-effectiveness of enclosures and barriers, but would be suitable to improve the noise-reducing performance of air vents in enclosures.

- Cooling fan, tap changer & other auxiliary noise –

  There are conventional noise reduction measures that can be implemented if these auxiliary items present a noise problem.

- Ensuring 'noise' is part of future purchase specifications –

  Noise specification for new transformers is a practical way of achieving progressive noise reductions over time, as transformers have a long life, and new items are generally quieter than the older ones. While this method, and those following, can be cost-effective, they are dependent on timing issues. Also, these methods are unlikely to provide sufficient noise reduction to achieve compliance in high-exceedance situations.

- Controlling the upgrade order and timing for minimum noise –

  The upgrading of a substation could be brought forward to introduce new, quieter, transformers earlier in noise-sensitive areas.

- Transformer 'swapping' from places of low potential noise impact –

  Although the change-over costs are substantial (~$50,000), it may be feasible to swap a newer, quieter, transformer from a less sensitive site with an older transformer from a more noise-sensitive site.

- Purchase of land buffers –

  Purchase of adjacent land is a practical means of preventing noise-sensitive development that may cause noise emissions to exceed prescribed standards, but depends on the availability of the land and its potential for other uses.

To achieve full compliance using the above measures would require that those Transmission Substations where the exceedance was above about 13dB(A) have full enclosures installed for some 30 transformers, at a cost of some $4.5 million. For the 23 substations below this level of exceedance, barriers and other measures become sufficient to achieve compliance. Western Power's analysis of the costs of applying the above measures, either singly or in combination, to achieve full compliance with the prescribed standard for all Transmission Substations, is about $7 million. The EPA accepts this estimate as realistic.

3.3 Noise Mitigation Plan

Western Power has developed a Noise Mitigation Plan, in consultation with the Department of Environment, that it considers will provide an acceptable outcome, providing either compliance or small residual exceedances of 5dB(A) or less above the prescribed standard for all Transmission Substations, using methods that are reasonably practicable in terms of both the cost and technical feasibility.

The rationale behind this proposal is that, by accepting exceedances of up to 5dB(A), the more economical and less disruptive wave-trapping barrier technique can be applied to all substations with the exception of the two with the greatest exceedances, (Wembley and Gosnells). Using a combination of full enclosures for these two substations, and wave-trapping barriers or walls and bunds for the remainder of the 26 substations that have exceedances of greater than 5dB(A), the cost of the Noise Mitigation Plan would be of the order of $4.5 million.

The Plan does not include noise reduction measures for those substations where the exceedance is 5dB(A) or less. For these sites, the cost saving is substantial, as mobilisation and associated site costs would be avoided.

The Noise Mitigation Plan is proposed to be implemented over a four-year period, after which time all Transmission Substations would be either in compliance with the prescribed standard or within 5dB(A) of compliance.

The proposed measures and likely costs (rounded to the nearest $5,000) are outlined in Table 2 below.

TABLE 2: PROPOSED NOISE MITIGATION PLAN

Substation	Exceedance over L_{A10} Assigned Level – dB(A)	Proposed Noise Reduction Measure	Estimated Cost of Measures, $,000	Likely Year of Completion
Gosnells	24	Full enclosure	430	1
Wembley	23	Full enclosure	300	1
Como	17	Wave-trapping barriers	215	1
Scarborough	16	Wave-trapping barriers	250	2
Margaret River	15	Wave-trapping barriers	205	2
Hedland	15	Walls/bunds	65	1
Yokine	15	Wave-trapping barriers	175	2
Myaree	15	Wave-trapping barriers	175	2
Morley	15	Wave-trapping barriers	175	4
Crawley	14	Wave-trapping barriers	175	3
Kalamunda	14	Wave-trapping barriers	175	3
Rockingham	14	Wave-trapping barriers	275	4
Victoria Park	13	Wave-trapping barriers	175	3
Malaga	13	Wave-trapping barriers	290	4
Sawyers Valley	12	Wave-trapping barriers	100	2
North Beach	12	Wave-trapping barriers	185	2
Byford	12	Wave-trapping barriers	190	4
Cannington	12	Land use planning	5	1
Wembley Downs	11	Wave-trapping barriers	235	2
East Perth	10	Wave-trapping barriers	120	4
Quinninup	10	Walls/bunds	45	2
Bibra Lake	9	Wave-trapping barriers	125	4
Belmont	9	Wave-trapping barriers	250	4
Balga	9	Wave-trapping barriers	250	4
Wundowie	8	Walls/bunds	25	2
Vasse	6	Walls/bunds	(Not costed)	4

With regard to Table 2, it should be noted that walls or bunds have been proposed at the Hedland substation because, unlike most other sites, there are residences only on one side of the substation, and a wall/bund should be effective in this case. In relation to Cannington, the reference to "land use planning" recognises that a new bypass road is to be built along the south-east boundary of the substation site, between the substation and the nearest residences. The EPA understands that the road is to be elevated, thus providing a significant noise barrier.

In considering the reasonableness and practicability of the proposed Noise Mitigation Plan, the EPA is mindful that this proposal relies heavily on the success of the wave-trapping barrier technique, which is still a developmental noise reduction measure. If the wave-trapping barrier is able to provide the predicted noise reduction of 13dB(A), then the outcome would be that, of the 19 substations for which the method is proposed, 10 would fully comply with the prescribed standard, seven would exceed it by 2dB(A) or less, and the other two would be 3dB(A) and 4dB(A) in excess, respectively. If the wave-trapping barrier only provided a noise reduction of 10dB(A) for example, then four of the 19 substations would be in full compliance and 13 substations would be within 5dB(A) of compliance. Como and Scarborough substations would then be more than 5dB(A) above the prescribed standard, and would require increased barrier height or full enclosure.

The EPA has considered the available technical information regarding this technique, based on demonstration units, and is of the view that Western Power has been appropriately conservative in its assessment of the likely effectiveness of the technique. The EPA considers that this method has potential to achieve the expected noise reduction values in a practical and cost-effective manner. The EPA notes that a pilot wave-trapping barrier project is being conducted at the Wembley Downs substation, and considers that a noise regulation 17 approval should contain a reporting requirement in order that the effectiveness and practicability of the technique can be confirmed during the life of the Noise Mitigation Plan.

The EPA therefore considers that the proposed Noise Mitigation Plan is a practical and effective way to reduce the noise emissions from all Transmission Substations so as to be either in compliance with the prescribed standard or not more than 5dB(A) in excess of it. The EPA would accept that the four-year time frame represents the best reasonably practicable timing, given the amount of detailed design work and disruption involved for each substation.

Notwithstanding the above, the EPA recognises that the technical skills required to oversee various phases of the Noise Mitigation Plan do not necessarily reside within Western Power, and considers that the services of a suitably qualified person or persons should be employed, either on staff or though a recognised acoustical consultancy.

3.4 Future Compliance

The EPA notes that, following completion of the Noise Mitigation Plan, there would be a gradual further reduction in noise levels as old transformers are replaced by newer, quieter ones. Thus, some substations with small residual exceedances may come into full compliance over time. However, the EPA notes that this is likely to be a very long term outlook, as power transformers can have useful lives in excess of 50 years.

4. Community Impacts and Consultation

The EPA notes that, except in a small number of cases, there is limited community complaint associated with Transmission Substations. Substations in their present form have been part of most communities for more than fifty years. It may be that the community response to the noise emissions is generally tempered by the recognition of the essential nature of the service provided.

The EPA notes that Western Power commissioned a consultant to conduct a perception survey of residents living in the vicinity of substations. This survey determined whether substation noise was a significant issue compared with other issues related to Western Power and to environmental factors affecting amenity, including local traffic noise. Respondents were asked to describe whether the noise from substations was noticeable, whether the substation noise was intrusive and whether substation noise affected their lifestyle. Respondents were also asked to indicate if Western Power should do more to control noise emissions.

Results from the noise perception survey indicate that noise mitigation works at low exceedance sites (not more than 5dB(A) above the assigned levels), would either not improve or only marginally improve the amenity of residents living in the area surrounding the substations.

The EPA considers that the findings of the survey provide support for the proposed Noise Mitigation Plan, which would result in all substations being brought either into full compliance or within 5dB(A) of compliance.

The EPA also notes that Western Power proposes to conduct a community information campaign as the Noise Mitigation Plan is put into effect, so that nearby residents are aware of the Noise Mitigation Plan.

The EPA therefore supports the proposed Noise Mitigation Plan as the basis for a noise regulation 17 approval.

5. Outline of Noise Regulation 17 Approval

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

- the approval should be restricted so as to apply only to the noise emitted by the transformers and their associated cooling equipment. Noise from other sources within the site, for example from mechanical plant in any workshops, would still need to meet the prescribed standard;
- noise limits should be set such that the existing noise emission levels are permitted for the duration of the Noise Mitigation Plan (four years). Because the noise emissions are essentially constant, this could be achieved by specifying only an L_{A10} limit for each substation, and making the L_{A1} and L_{Amax} assigned levels inoperable;
- because the typical operation of substations falls into two main time periods (day and night) the limits could apply over only two time periods, day time (0700 – 2200 hours) and night time (2200 – 0700 hours) all days. The daytime limits should be 0-10dB(A) above the night time limits to allow for the extra transformers (and fans in some cases)

that run during the day, and the higher assigned levels that normally apply during the day;

- after four years, only a 5dB(A) exceedance should be permitted. This should be implemented by setting the assigned levels at the same levels as in Table 1 of the regulations, except for the night time L_{A10} assigned level, which would be increased from 35 to 40dB(A) plus influencing factor;
- the normal adjustments for tonality, impulsiveness and modulation should continue to apply to the noise emissions;
- the provisions for abnormal events which may generate noise above the varied noise limits should be applied as in other noise regulation 17 approvals;
- Western Power should be required to do all that is reasonably practicable to achieve compliance with the prescribed standard in the implementation of the Noise Mitigation Plan; and
- there should be a requirement for progress reporting on the implementation of the Noise Mitigation Plan.

See Appendix B for preliminary drafting instructions for a noise regulation 17 approval.

6. Conclusion and Recommendation

The EPA concludes that –

- the current noise emission levels resulting from the operation of four of the 38 Transmission Substations for which noise regulation 17 approval has been requested, namely Munster, Midland Junction, Pegs Creek and West Kalgoolie, will comply with the prescribed standard, and no approval is needed;
- the noise emissions from the remaining 34 substations are likely to exceed the levels set in the prescribed standard in the regulations;
- while noise reduction measures could possibly be implemented to achieve compliance at a cost of some $7m, a reasonable and practicable outcome can be achieved through the proposed Noise Mitigation Plan, which would result in all substations being brought either into full compliance or within 5dB(A) of compliance, at a cost of some $4.5m; and
- the proposed Noise Mitigation Plan is supported by the results of a community survey around affected substations, which indicates that noise mitigation works at low exceedance sites would either not improve or only marginally improve the residential amenity of the area.

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).

The EPA also recommends that Western Power employs the services of suitably qualified persons to ensure that the Noise Mitigation Plan is implemented in the most efficient and effective manner.

Referenced material:

1. "Strategy for Management of Noise from Substations in the South-West and North-West Interconnected Systems", Western Power Corporation, March 2003

Appendix A

Details of Noise Limits

Appendix A – Assigned levels in regulations

Table 3 - 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 on any day to 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 explains the variation in assigned level for the nearest residences to the substations listed in Table 1 of this Bulletin.

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:

(1) The Approval may be cited as the *Environmental Protection (Transmission Substations Noise Emissions) Approval 2004.*

COMMENCEMENT:

(2) The Approval would come into operation on the day of publication in the *Gazette*.

INTERPRETATION:

(3) 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, Western Power (such as an accident or emergency, a breakdown of plant or equipment);

"assigned level" means a noise level determined under clause 6;

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

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

"$L_{A\ 10}$ assigned level" has the same meaning as in regulation 8(1);

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

"transformer noise" means noise emitted as the result of the operation of one or more electrical power transformers and their associated cooling equipment;

"Transmission Substation" means a premises owned or operated by Western Power Corporation for the purposes of electrical power distribution and located in or near a locality listed in Schedule 1 of this Approval;

"Western Power" means the body corporate known as Western Power Corporation, ABN 38 362 983 875; and

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

GRANT OF APPROVAL:

(4) Under regulation 17 (7), approval would be granted to Western Power to allow only the transformer noise emitted from a Transmission Substation to exceed or vary from the standard prescribed in regulation 7(1).

CONDITIONS OF APPROVAL:

(5) For the purposes of the Grant of Approval, and only to the extent specified in Clause 6, regulations 7(1) and (2) and 8(2) would not apply in relation to transformer noise emitted from a Transmission Substation while the Approval is in force and is being complied with. *(In other words, where the transformer noise is received at the part of a noise-sensitive premises that is more than 15m from a building that is directly associated with the noise-sensitive use, or at commercial premises or industrial/utility premises, Table 1 of the regulations would apply).*

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

a) transformer noise emitted from a Transmission Substation complies with the maximum permitted noise levels *(Clause 6 below);*

b) Western Power complies with the requirements relating to abnormal events *(below);* and

c) Western Power reduces transformer noise emissions from Transmission Substations as far as is reasonably practicable.

MAXIMUM PERMITTED NOISE LEVELS:

(6) (1) From commencement until 31 December 2008, Table 1 of the regulations should apply, except that transformer noise emitted from a Transmission Substation referred to in column 1 in the Table in Schedule 1, when received at that part of a noise-sensitive premises that is within 15 metres of a building that is directly associated with a noise-sensitive use, should be required not to exceed the L_{A10} assigned levels specified for that Transmission Substation in column 2 or 3, for the relevant time of day; and the L_{A1} and L_{Amax} assigned levels in Table 1 should not apply to that emission when so received *(see Schedule 1).*

(2) From 1 January 2009, Table 1 of the regulations should apply, except that transformer noise emitted from a Transmission Substation, when received at that part of a noise-sensitive premises that is within 15 metres of a building that is directly associated with a noise-sensitive use, should be required not to exceed by more than 5dB the $L_{A\ 10}$ assigned level determined for that Transmission Substation under regulation 8, for the period 2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays. *(Whether or not the L_{A1} and L_{Amax} assigned levels in Table 1 apply to the emission is not important, as the emission is essentially constant).*

NOISE FROM ABNORMAL EVENTS:

(7) An emission of noise that contravened the requirements for maximum permitted noise levels in Clause 6 would be taken not to breach a condition of the Approval if –

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

b) Western Power took all reasonable and practicable measures to stop the emission as soon as was reasonably practicable; and

c) Western Power 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 Western Power.

ABNORMAL EVENTS REGISTER:

(8) (1) Western Power should be required to keep an abnormal events register for the purposes of this Approval.

(2) If an abnormal event results in the emission of noise that contravenes Clause 6, Western Power must enter in the register the following particulars —

a) the nature of the event;

b) the date and time of the occurrence of the event;

c) details of the contravention, including the level and characteristics of the noise (if known) and the duration of the emission;

d) the measures taken by Western Power to stop the emission;

e) the measures (if any) taken by Western Power to prevent or minimise the possibility of —

(i) the occurrence of a similar event in the future; or

(ii) the emission of noise that contravenes Clause 6 if a similar event occurs in the future.

(3) Western Power is to make the register available for inspection by an inspector on request.

REPORTING:

(9) (1) Western Power should be required to provide to the Director, on a date approved by the Director, a report on the implementation of measures to achieve compliance with the requirements of Clause (6) (2) in each of the first five years from commencement.

(2) The report should contain the following information for the previous year –

a) a description of the noise reduction measures implemented at Transmission Substations;

b) a summary of monitored noise emission levels of Transmission Substations where noise reduction measures have been implemented;

c) assessment of compliance of the noise emissions with the requirements of Clause 6;

d) a summary of any abnormal events that resulted in the emission of noise that contravenes Clause 6; and

e) a summary of any community consultation or complaint response carried out in relation to noise emissions from a Transmission Substation.

(3) Where requested by the Director, Western Power would be required to provide more detailed reporting data for any period of the reporting year as specified by the Director.

SCHEDULE 1

TABLE: VARIATION TO ASSIGNED LEVELS UP TO 31 DECEMBER 2008

Column 1	Column 2	Column 3
Transformer Substation	L_{A10} Assigned level – 0700 – 2200 hours all days, dB(A)	L_{A10} Assigned level – 2200 – 0700 hours all days, dB(A)
Crandon Street, Gosnells	66	61
Herdsman Parade, Wembley	65	60
Morrison Street, Como	65	55
Manning Street, Scarborough	59	54
Willmott Avenue, Margaret River	64	54
Murdoch Drive, Hedland	63	53
Darch Street, Yokine	62	57
Norma Road, Myaree	63	58
Coode Street, Morley	60	55
Fairway, Crawley	52	52
Wilkins Road, Kalamunda	58	53
Broughton Way, Rockingham	57	52
Bank Street, Victoria Park	50	50
Marshall Road, Malaga	62	57
Great Eastern Hwy, Sawyers Valley	56	51
Everingham Street, North Beach	60	55
Thomas Road, Byford	53	48
Adj. Grose Avenue, Cannington	66	56
Empire Avenue, Wembley Downs	49	49
Forrest Avenue, East Perth	60	55
Wheatley East Road, Quinninup	51	46
Annois Road, Bibra Lake	58	53
Alexander Road, Belmont	51	46
Arkana Road, Balga	56	51
Hawke Avenue, Wundowie	57	47
Rendezvous Road, Vasse	52	42
Boulder	56	46
Durlacher Street, Geraldton	49	43
Yornup	49	43
Curtin Avenue, Cottesloe	54	48
Northam	55	45
Railway Parade, Bayswater	57	47
Albany	52	42
QEII Medical Centre, Nedlands	56	46