



Neil Marsden
Grange Resources Pty Ltd

Noise Assessment of the Grange Resources operations at Albany Port

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Short Technical Report

Attention: Neil Marsden	Reference: 60W-05-1649-TRP-185163-0 -
Company: Grange Resources Pty Ltd	Date: 5 May 2006
Facsimile:	Pages: 1 of 10
Email: neil@grnl.com.au	Project No.: 60W-05-1649
From: Phil Lucas	Reviewed: Hugh Richardson

This Facsimile is Commercial-in-Confidence. If this Facsimile does not reach the intended recipient, please telephone the number above (reverse charges). Thank you

Dear Neil,

Re: Noise Assessment of the Grange Resources operations at Albany Port

Attached is our report summarising our noise assessment of the operations at Albany Port.

This is an update to our previous report (60W-05-1649-trp-146013-1 issued in November 2005) and reflects an updated equipment layout.

If you required further details or clarification please don't hesitate to contact the undersigned,

Yours sincerely

VIPAC ENGINEERS & SCIENTISTS LTD

A handwritten signature in cursive script that reads "Phil Lucas".

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**Senior Project Engineer
Vipac Scientists & Engineers
Perth**

INTRODUCTION

Vipac Scientists & Engineers was commissioned by Grange Resources to assess the noise impact of the operations proposed for their shiploading operations at the Albany Port, and in particular whether it can comply with Environmental Protection (Noise) Regulations 1997.

LAYOUT

The approximate position of the Port operations is shown in Figure 1 below.

Figure 1- Position of the Proposed Port operations (shown bottom right)



Note the port operations layout is shown in more detail in Appendix A

Examinations of aerial photographs reveal the locations of the nearest noise sensitive premises. The nearest residential noise sensitive premises together with 100m and 450m influencing circles are shown in Figure 2 whilst the nearest industrial premises is shown in Figure 3. Note that the criterion for industrial premises is 60dB(A) at the boundary at all times. We have selected one point shown circled as representative of the worst-case position as it is quite close to the proposed positions of most of the noise sources.

Figure 2 Nearest Noise sensitive Premises (Residential) and Influencing Circles



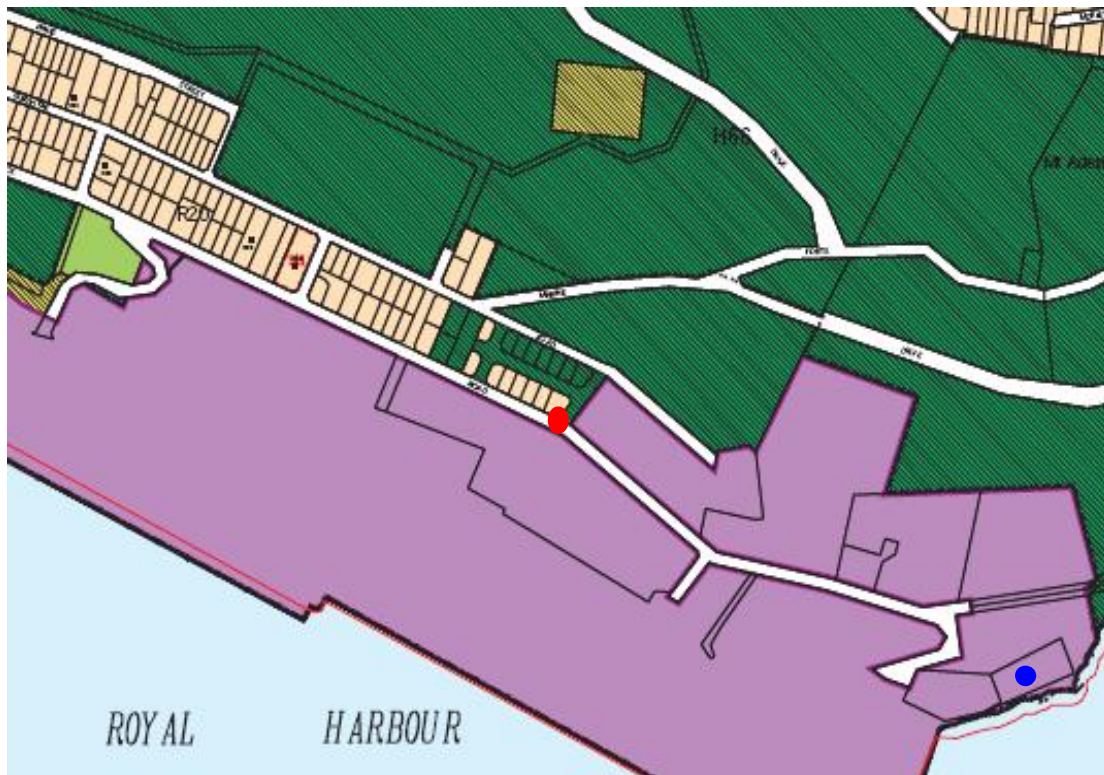
From the above circles and the town planning map (Figure 4) we calculate a maximum allowable noise level of 45 to 46 as explained in the following section (Criteria).

Figure 3 Nearest Noise sensitive Premises (Industrial)



The red dot in Figure 4 is the nearest residence to the Grange Port facilities; the blue dot is industrial premises. The port is industrial. The boundary between residential provided by the City of Albany Town Planning map indicates the industrial land represents between 50 and 55% of the influencing circles. The influencing circles are shown in red.

Figure 4: City of Albany Town Planning Map



Details of layout of the proposed Port operations plant is shown in Appendix A. A list of plant items proposed is set out in Appendix B with estimated sound powers for each.



CRITERIA

The noise criteria as defined by Environmental Protection (Noise) Regulations 1997 is summarised in Table 1 below.

Table 1 EPA Assigned Noise Levels

Type of premises receiving noise	Time of day	Assigned level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
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 + IF	55 + IF	65 + IF
	0900 to 1900 hours Sunday and public holidays	40 + IF	50 + IF	65 + IF
	1900 to 2200 hours all days	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35 + IF	45 + IF	55 + IF
Noise sensitive premises at locations further than 15 metres from a building		60	75	80
Commercial premises		60	75	80
Industrial and utility premises		65	80	90

'IF' represents an influencing factor which increases along with the number of busy roads, and commercial and industrial areas that surround the noise sensitive premises.

Proximity of the residences near the Port to the industrial-classified land indicates an IF of between 10 and 11. This ignores traffic on the Port road, which may approach the level of a main road during peak seasons. The night-time LA10 assigned levels used for the nearest residence is therefore 45 to 46 dB(A).

Penalties apply for noise that has characteristics of impulsive, tonal or modulation. Purchasing specifications will need to exclude equipment that may have impulsive, tonal or modulation characteristics.

RESULTS

The assumptions of sound power and noise emission at the source are based on the equipment summary and layout at Appendices A and B. We used best estimates of sound power related to electrical power of drives with gearboxes and pumps. However note that these are generic estimates only and are no substitute for actual measured data or manufacturers noise specifications. Where plant is clearly defined as enclosed in masonry or steel (colorbond clad) structures, we used a calculated spectrum attenuation assuming thicknesses of 0.6mm and 90mm for steel and masonry respectively. Drives for conveyors and the shiploader were left un-enclosed, as a suitable acoustic enclosure was difficult to identify. Detailed design will allow this shortcoming to be addressed.



Equipment suppliers should meet, as a minimum, the levels indicated. Purchase specifications should aim for noise emission levels better than those indicated.

Table B2 shows the resultant sound pressure at 2 m based on assumed noise emissions. The same table shows the resultant noise emissions at the receiver.

Our initial assessment of the noise from the slurry and shiploading operations at Albany Port is 47dB(A) at the nearest noise sensitive site and thus is just above the assigned level. None of the drives on the shiploader are treated, and they are the source of the majority of noise impacting the nearest noise sensitive site. Enclosing all drives on the shiploader in appropriately sealed colorbond or similar reduces their collective sound pressure at the receiver to below 40 dB(A). The net result could then bring the noise emissions well below the assigned levels and provide a substantial safety margin.

ANALYSIS

The levels shown in Table 2 were calculated assuming worst-case meteorological conditions.

Table 2 Sound Pressure noise levels at nearest residence from operations of proposed plant

	Assigned Level L10 night time dB(A)	Sound Pressure from Plant	Exceedances dB(A)
At nearest Residence	45	47.2	2.17
At nearest Industrial	60	60.7	0.72

The noise treatments proposed by Grange in the Table B1 in Appendix B are taken into account in noise propagation calculations. The exposed shiploader drives are considered sources at most risk with respect to noise impact (Sources 34 to 44 Table B2 in Appendix B). Providing low noise drives or enclosures for the exposed shiploader drives 40 and 42 will lower the propagated noise level to just under 45dB(A). Enclosures may be of colorbond steel sheeting, but should be well sealed from openings to the west-north-west to prevent breakout in the direction of the nearest neighbour. These treatments will provide the operator a means of meeting the requirements of the Regulations.

This analysis is based on machinery operating in good condition, with no faults causing tonal, or modulating noise emissions. Our assessment of the proposed machinery is that it will emit only broad-band noise with no tonality.

CONCLUSIONS

Noise from Grange Resources operations at the Albany Port may just exceed the assigned levels for nearest noise sensitive premises (industrial and residential). The large number of large drives near the shiploader is the principal basis of exceedance. The treatments proposed provide for the operation to just meet the Regulations

We recommend in detailed design that attention be given to providing shielding to drives associated with the shiploader. These will provide a safety margin to any deterioration during the life of the plant, and consequential noise increase.



APPENDIX A

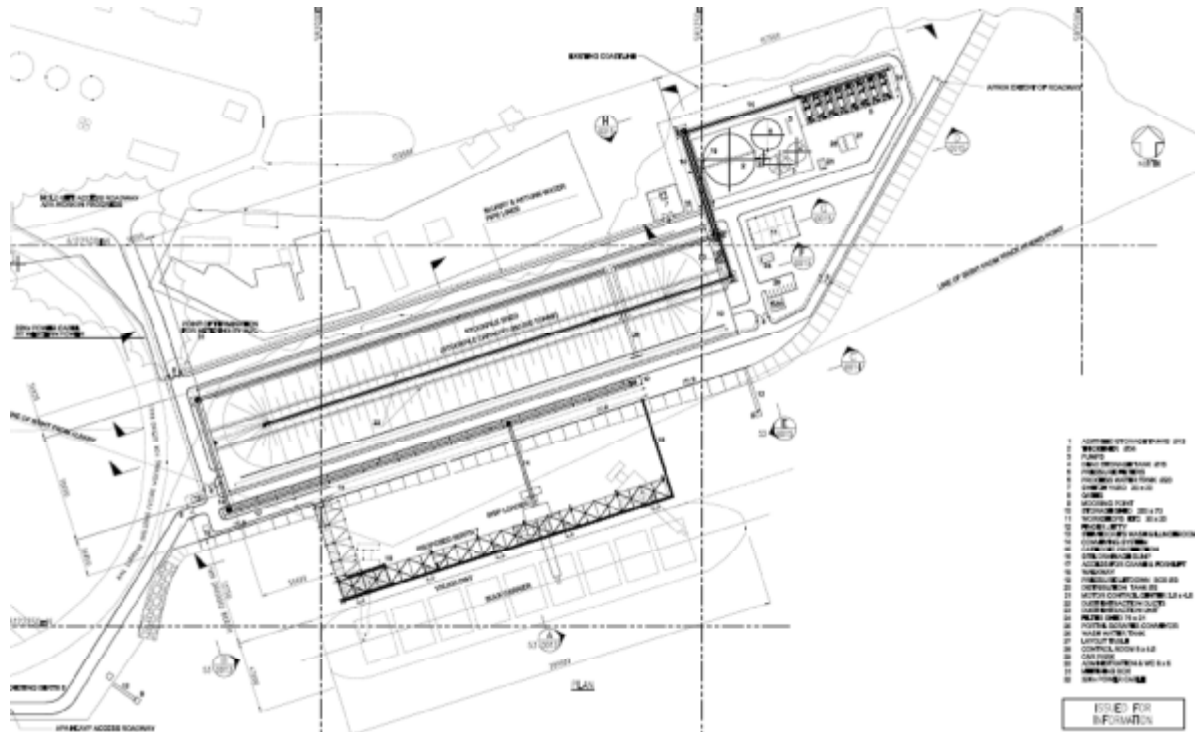


Figure A1 -Proposed layout of the Grange Resources de-slurry and shiploading operations at Albany Port



APPENDIX B

ProMet Engineers Pty Ltd

Project **Grange Filter Plant** C5161

rev P3

Equipment List - Albany Filter Plant										
Item No	Equipment Number				Description	# Operate	Power		Noise Characteristics	Equipment Position wrt Noise propagation
	Section	Type	Number	L			No	kW		
1	08	TK	001		Pressure Letdown Box	1			bubbling water overflowing into launder	
2	08	TH	001		Thickener	1	95		motor driving slow moving gearbox and thickener rakes	in the open
3	08	PP	001	A/B	Thickener U/F pumps	2	55		standard slurry pump,	outdoors but under thickener
4	08	TK	002		Distribution Tank (5 min residence)	1				
5	08	TK	003	A/B	Agitated Storage tanks (approx 10 hrs storage)	2				
6	08	AG	001	A/B	Tank Agitators	2	110		motor driving reduction gearbox and medium sized downdraught agitators	placed on the top of tanks at high level
7	08	TK	004		Dead Storage Tank	1				
8	08	PP	002	A/B	Storage Tank Pumps	1	110		standard slurry pump	outdoors
9	08	PP	003		Dead Storage Pump	1	110		standard slurry pump	outdoors
10	08	TK	005		Filter Feed Dilution Tank (5 min residence time)	1				
11	08	PP	005	A/B/C	Filter Feed Pumps	2	55		standard slurry pumps	indoors
12	08	TK	006		Filter Feed Distribution Box (5 min residence time)	1				
13	08	FL	001	A-H	Vacuum Disk Filters	8	11		motor driving slow moving disks	indoors
14	08	CV	001		Collection Conveyors	1	11		driving gearbox and filter disks, occasional pneumatic discharge	indoors
15	08	CV	002		Final Product Conveyor	1	45		driving gearbox and conveyor	entirely within enclosed gantry
16	08	PP	006		Filter Recirculation Pumps	1			standard slurry pump	indoors
17	08	PP	006	A-H	Vacuum Pumps	8	400		85dB at 1m from equipment	fully enclosed within brick building
18	08	SP	001	A-H	Filter Air-Water Separator	8			closed vessel	indoors
19	08	PP	007		Filtrate Pumps	1	45		submersible pump	indoors
20	08	TK	007		Process Water Tank	1				
21	08	TK	008		Treated Water Tank	1				
22	08	PP	007		Dilution Pumps	1	15		standard water pumps	
23	08	PP	008	A/B	Process Water Return Pumps	1	75		standard water pumps	outdoors, on seaward side of shed
24	08	PP	009	A/B	Treated Water Return Pumps	1	110		standard water pumps	outdoors, on seaward side of shed
25	08	CH	001		Product Spilling Chute	1			no large particles, filter cake only	within enclosed transfer
26	08	GA	001		Diverter Gate	1				within enclosed transfer
27	08	CV	003		Storage Conveyor	1	37		driving gearbox and conveyor	entirely within shed
28	08	CV	004		Storage Tripper Conveyor	1	37		driving gearbox and conveyor	entirely within shed
29	08	ZM	001		Tripper Mechanism	1				entirely within shed
30	08	SP	001		Storage Stockpile	1				entirely within shed
31	08	FE	001	A/B/C	Reclaim Belt Feeder, 2 duty, 1 spare	2	22		driving gearbox and conveyor	entirely within shed
32	08	CV	006		Reclaim Conveyor	1	45		driving gearbox and conveyor	entirely within shed
33	08	CV	006		Transfer Conveyor	1	37		driving gearbox and conveyor	entirely within enclosed gantry
34	08	CV	008		Shiploader Tripper Conveyor	1	45		driving gearbox and conveyor	entirely within enclosed gantry
35	08	ZM	002		Tripper Mechanism	1				entirely within enclosed gantry
36	08	CV	009		Shiploader Conveyor 1	1	95		driving gearbox and conveyor	entirely within enclosed gantry
37	08	CV	010		Shiploader Conveyor 2	1	22		driving gearbox and conveyor	entirely within enclosed gantry
38	08	SA	001		Product Sample Coffer	1	11		driving gearbox and conveyor	entirely within enclosed gantry
39	08	SA	001		Hydraulic drives for lifting of the boom	1	45		driving hydraulic pump	will enclose such that it is within eco H&S limits
40	08	SA	001		V/S drives for advancing shiploader	10	110		driving helical bevel gears	at ground level - in the open
41					V/S drives for Advancing tripper	4	44		driving helical bevel gears	enclosed within sheeted conveyor gantry
42					Shiploader slew Mechanism	3	66		driving helical bevel gears	on slew platform - in the open

P1 Albany prelim equipment list with Noise rev P3.xls 18/07/2005

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Table B1 – Equipment list proposed for Port operations.



Table B2 - Summary of noise emissions at source based on drive size, and resultant noise at receiver dB(A); from Figure A1 and Table B1.

NOTE: Enclosure type is 0 – none, 1 – sheet steel cladding, 2 – solid masonry or concrete enclosure.

Source Number	Equipment	average elevation	Description	Type	kW	Speed (rpm)	Number	Enclosure Type	SPL@2m	SdB(A)			
1	1,2,3	2	Thickener/storage tanks	Motor	55	1500	1	1	87.3	34.4			
		3		Pumps	110	1500	2	0	83.6				
		all											
2	6,8	6	Agitator	Motor	110	3000	1	0	94.8	42.7			
		8		Pump	55	3000	1	0	85.8				
		all											
3	11-19	13,14, 11,17,19,22		Motor	400	2000	8	2	84.8	16.5			
				Pump	400	2000	8	2	90.3				
4	15	2	Final Product	Motor	45	2000	1	0	88.3	35.6			
5	33	2	Transfer Conv	Motor	37	2000	1	0	87.4	36.6			
6	34	2	Shiploader trip	Motor	45	2000	1	1	88.3	24.2			
7	27,28,31,32	all	Misc in shed	Motors	45	2000	4	1	88.3	33.8			
				Pumps	45	2000	1	1	85.0				
8	a	36	Shiploader	Motor	90	1500	1	1	89.4	42.5			
		37		Motor	22	1500	1	1	81.7				
		39		Motor	45	1500	1	1	86.4				
		40		Motor	11	1500	10	0	76.6				
		41		Motor	44	1500	4	1	86.3				
		42		Motor	66	1500	3	0	88.1				
9	9	5		Motor	20	3000	1	0	85.5	32.8			
Receiver Location									Total Noise at Receiver				
<table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">E</td> <td style="padding: 5px;">N</td> </tr> <tr> <td style="padding: 5px;">582291</td> <td style="padding: 5px;">6122944</td> </tr> </table>										E	N	582291	6122944
E	N												
582291	6122944												
47.2													



Table B3 - Summary of noise emissions at source and residential receiver based on drive size, and resultant noise at receiver dB(A); from Figure A1 and Table B1.

NOTE: Enclosure type is 0 – none, 1 – sheet steel cladding, 2 – solid masonry or concrete enclosure.

Source Number	Equipment	average elevation	Description	Type	kW	Speed (rpm)	Number	Enclosure Type	SPL @ 2m	SdB(A)				
1	1,2,3	2	Thickener/storage tanks	Motor	55	1500	1	1	87.3	48.0				
		3		Pumps	110	1500	2	0	83.6					
		all												
2	6,8	6	Agitator	Motor	110	3000	1	0	94.8	56.3				
		8		Pump	55	3000	1	0	85.8					
		all												
3	11-19	13,14,		Motor	400	2000	8	2	84.8	28.7				
		11,17,19,22		Pump	400	2000	8	2	90.3					
4	15	2	Final Product	Motor	45	2000	1	0	88.3	50.6				
5	33	2	Transfer Conv	Motor	37	2000	1	0	87.4	48.5				
6	34	2	Shiploader trip	Motor	45	2000	1	1	88.3	39.4				
7	27,28,31,32	all	Misc in shed	Motors	45	2000	4	1	88.3	51.2				
				Pumps	45	2000	1	1	85.0					
8	a	36	Shiploader	Motor	90	1500	1	1	89.4	54.9				
	b	37		Motor	22	1500	1	1	81.7					
	c	39		Motor	45	1500	1	1	86.4					
	d	40		Motor	11	1500	10	0	76.6					
	e	41		Motor	44	1500	4	1	86.3					
	f	42		Motor	66	1500	3	0	88.1					
9	9	2		Motor	20	3000	1	0	85.5	47.1				
		5												
Receiver Location									Total Noise at Receiver					
<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">E</td> <td style="padding: 5px;">N</td> </tr> <tr> <td style="padding: 5px;">583077</td> <td style="padding: 5px;">6122944</td> </tr> </table>									E	N	583077	6122944	60.7	
E	N													
583077	6122944													

Table B3 - Summary of noise emissions at source and industrial receiver based on drive size, and resultant noise at receiver dB(A); from Figure A1 and Table B1.