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NETWORK SERVICE PROVIDER

DISTRIBUTION LOSS FACTOR

OAKY CREEK COAL NSP

AUSTRALIAN ENERGY REGULATOR

FINANCIAL YEAR 2010-11

(AER REFERENCE: M2008/112)

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1. SUMMARY

The terms of Hill Michael's engagement with Oaky Creek Coal Network Service Provider (OCCNSP) include calculation of distribution loss factors in accordance with Section 3.6.3 (i) of the National Electricity Rules (NER). An extract of the relevant clause from the current version (Version 24) of the NER is given below:

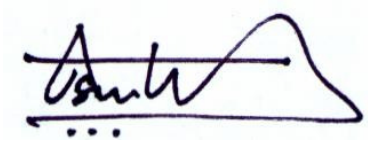
"Each year the Distribution Network Service Provider must determine the distribution loss factors to apply in the next financial year in accordance with clause 3.6.3(g) and provide these to NEMMCO for publication by 1 April. Before providing the distribution loss factors to NEMMCO for publication, the Distribution Network Service Provider must obtain the approval of the AER for the distribution loss factors it has determined for the next financial year."

Hill Michael has calculated the distribution loss factors based on the metered data for 2009 and the proposed generation and mine load projections for the financial 2010-11. The estimates of loads are subject to change. The embedded generation is dependant on the mine for fuel (coal seam methane gas), therefore, changes to the production level of the mine will impact the generation output.

The site specific DLF calculated using a Marginal Loss Factor (MLF) approach is **0.9989** for the Envirogen generation connected to the **Oaky Creek Coal NSP**. This distribution loss factor has been calculated in accordance with the methodology approved by the QCA as described in **Report NCM 17699 Determination of Distribution Loss Factors for Embedded/Local Generators**.

In addition to the NER obligations, as required by the Australian Energy Regulator, this report has been provided to IES (Intelligent Energy Systems) for independent positive certification. Additional supporting evidence has been provided to IES to enable independent verification of calculations.

SIGNED, on the 22nd day of January 2010



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2. METHODOLOGY AND CALCULATIONS

2.1 METERED DATA - GENERATION AND CONNECTION POINT

The reconciled metered data for the parent meter and the revenue meter at the generator (National Metering Identifiers are given below) have been obtained from the authorised Metering Provider.

Parent NMI	QAAALV0004
TNI / MDA	QLIL
Generator NMI	7102000028

Below is the summary of the half hourly metered data based on the most recent data available for a consecutive 12 month period at the time of determining loss factors. The mine load is estimated based on the difference between the connection point and the generation metered data.

- Connection Point (MWh): This is the total energy from connection point meter.

  Net negative energy indicates that the energy provided by generation is higher than the energy consumed by the load for that month. The converse is true for Net positive energy.

- Generation (MWh): This is the monthly energy output of the generator measured at the generator revenue meter.

- Estimated Mine Load (MW): Sum of Connection Point (MWh) and Generation (MWh) converted to MW. The conversion between MWh to MW is calculated based on 24 hours a day operation of the mine.

Date	Connection Point (MWh)	Generation (MWh)	Estimated Mine Load (MW)
Jan-09	2,084.24	5,641.60	10.38
Feb-09	1,918.30	4,824.62	10.03
Mar-09	2,453.62	7,938.73	13.97
Apr-09	3,487.32	7,956.28	15.89
May-09	2,785.73	7,949.95	14.43
Jun-09	813.10	9,638.96	14.52
Jul-09	171.14	12,618.41	17.19
Aug-09	1,149.67	12,475.25	18.31
Sep-09	1,001.78	12,965.05	19.40
Oct-09	1,926.84	12,309.42	19.13
Nov-09	3,983.33	10,735.75	20.44
Dec-09	4,229.65	9,853.89	18.93

Table 1: Metered Data and Estimated Mine Load for 2009

2.1.1 Generation and Load Projection for 2010/11

A planning meeting was co-ordinated between the mine and the generator on the 12 January 2010, to obtain the projection from the mine (load) and the generator.

2.1.1.1 Generation Projection for 2010/11

Envirogen Power Station has provided 19 MW estimated generation availability (91% of installed capacity) for 2010/11. This availability takes into account contingencies and planned outages. The installed capacity of the power station is 21 MW. The generation availability depends on the availability of Coal Seam methane fuel from the mine activity and the power transfer capacity limitation of the transformer.

Date	Generation (kW)	Generation (MWh)
Jul-10	19,000	14,136
Aug-10	19,000	14,136
Sep-10	19,000	13,680
Oct-10	19,000	14,136
Nov-10	19,000	13,680
Dec-10	19,000	14,136
Jan-11	19,000	14,136
Feb-11	19,000	12,768
Mar-11	19,000	14,136
Apr-11	19,000	13,680
May-11	19,000	14,136
Jun-11	19,000	13,680

Table 2: Generation Forecast Data for 2010-11

2.1.1.2 Mine Load Projection for 2010/11

The mine load forecast is based on the historical load data as the Oaky Creek Coal NSP advices that there will be no significant load variations during the next year.

Distribution of the mine loads have been considered as given in the Table 3 below. Refer Attachment 1 for the network model developed for the analysis.

Month	Estd Mine Load (MWh)	Load Locations									
		Ind Feeder @ 37.88%		German Creek Feeder @ 10.15%		Oaky North @ 25.37%		Oaky 1 @ 17.00%		Aquilla Feeder @ 9.60%	
		MW	MVA @ pf=0.82	MW	MVA @ pf=0.78	MW	MVA @ pf=0.76	MW	MVA @ pf=0.74	MW	MVA @ pf=0.8
Jul-10	12,790	6.51	7.94	1.74	2.24	4.36	5.74	2.92	3.95	1.65	2.06
Aug-10	13,625	6.94	8.46	1.86	2.38	4.65	6.11	3.11	4.21	1.76	2.20
Sep-10	13,967	7.35	8.96	1.97	2.52	4.92	6.48	3.30	4.46	1.86	2.33
Oct-10	14,236	7.25	8.84	1.94	2.49	4.85	6.39	3.25	4.40	1.84	2.30
Nov-10	14,719	7.74	9.44	2.07	2.66	5.19	6.82	3.48	4.70	1.96	2.45
Dec-10	14,084	7.17	8.74	1.92	2.46	4.80	6.32	3.22	4.35	1.82	2.27
Jan-11	7,726	3.93	4.80	1.05	1.35	2.63	3.47	1.77	2.39	1.00	1.25
Feb-11	6,743	3.80	4.64	1.02	1.31	2.55	3.35	1.71	2.31	0.96	1.20
Mar-11	10,392	5.29	6.45	1.42	1.82	3.54	4.66	2.37	3.21	1.34	1.68
Apr-11	11,444	6.02	7.34	1.61	2.07	4.03	5.31	2.70	3.65	1.53	1.91
May-11	10,736	5.47	6.67	1.46	1.88	3.66	4.82	2.45	3.31	1.39	1.73
Jun-11	10,452	5.50	6.71	1.47	1.89	3.68	4.85	2.47	3.33	1.39	1.74

Table 3: Approximation of Forecast Load Distribution for 2010-11

2.1.2 Network Connection Points

The Oaky Creek Network Service Provider (OCCNSP) operates a 66 kV distribution network which is connected to the Ergon Energy Corporation Limited (EECL) Lilyvale distribution substation.

Clause 3.6.3 of the National Electricity Rules (NER) discusses distribution losses in the context of the National Electricity Market (NEM). In particular, a Distribution Network Service Provider must calculate the Distribution Loss Factor (DLF) for the connection points on its distribution network.

OCCNSP has only one customer – the embedded generator owned and operated by Envirogen (Oaky) Pty Ltd – and therefore, OCCNSP has only one distribution network connection point. The Oaky Creek mine is a customer of EECL and the mine distribution network connection point is located at the Lilyvale 66 kV bus. The mine connection point is also the OCCNSP connection point to the EECL network service. The site specific DLF for this connection point has been calculated in accordance with the methodology approved by the Queensland Competition Authority (QCA) as described in **Report NCM 17699 Determination of Distribution Loss Factors for Embedded/Local Generators**.

Figure 1 below shows the location of the connection points and the network for which losses are calculated. The connection point for the generator is a Tee-off at Pole 114 on the Aquila Feeder (The Aquila Feeder is owned by OCCNSP). Oaky Creek Coal NSP has advised us that the isolator / switch between the Aquila Feeder and the German Creek Feeder is intended to be operated open under normal conditions, the model used reflects this arrangement.

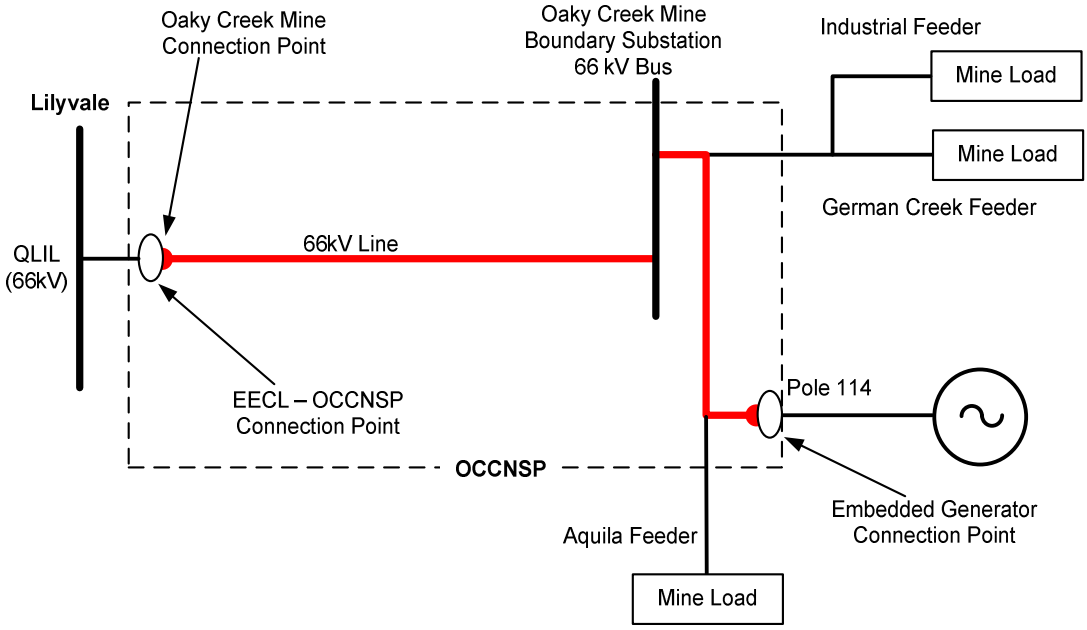

Figure 1: Simplified Representation of the Network

2.1.3 Methodology

Envirogen Generator DLF Calculation

The site specific DLF for the Envirogen generator is calculated using a Marginal Loss Factor (MLF) approach in accordance with the methodology approved by the QCA as described in **Report NCM 17699 Determination of Distribution Loss Factors for Embedded/Local Generators**.

The DLF is a static loss factor applied to the embedded generator distribution network connection point for the full financial year. The steps undertaken to calculate the DLF are summarised below.

The Envirogen embedded generator's connection point has been assigned to the Lilyvale transmission network connection point (QLIL) and this has been approved by NEMMCO

1. Request expected mine consumption and embedded generation forecasts for the 2009-10 financial year.

2. Prepare and review the network model for the OCCNSP distribution network by incorporating any proposed changes to the network occurring in the period leading up to the financial year for which the embedded generator DLF is being calculated.

   The DINIS network model (given in Attachment 1) represents the following:

   a. Lilyvale (QLIL) 66 kV connection point as an **infinite bus**;

   b. Oaky Creek mine load at the 66 kV bus at the Mine Boundary Substation;

   c. Envirogen Generation connection to the 66 kV network.

3. Using the Network Model and Load Flow Analysis, the following steps are performed

   - Note the loss on the NSP network for initial generation (A). The NSP network is between the 66kV OCCNSP connection point at Lilyvale and the Envirogen embedded generator connection point at the Boundary Substation
   - Increment the generation by 1 MW and note the new loss on the NSP Network (B).
   - Run a set of load flow studies for each month of the next financial year using the forecast mine load and embedded generation data.
   - The loss due to the increment in generation per MW is calculated (B-A)/1000.

4. Calculate the MLF and DLF in accordance with the methodology approved by the QCA as described in **Report NCM 17699 Determination of Distribution Loss Factors for Embedded/Local Generators**.

2.1.4 Distribution Loss Factor

The loss under existing generation on the NSP network is noted (A), then the generation is incremented by 1 MW and the new loss on the NSP network is observed (B). The difference in the loss after the 1 MW increment is (B-A)/1000 per MW. The marginal loss factor is 1 less the loss per MW of generation increment.

The volume weighted DLF is weighted on the average forecast generation per month.

Period	A (kW) NSP Loss	B (kW) NSP Loss for Increment in Generation	MLF [1 - (B-A)/1000]	DLF SQRT (MLF)
Jul-10	17.20	19.30	0.9979	0.9989
Aug-10	17.00	19.10	0.9979	0.9989
Sep-10	16.90	18.90	0.9980	0.9990
Oct-10	17.00	19.00	0.9980	0.9990
Nov-10	17.00	18.90	0.9981	0.9990
Dec-10	16.90	19.00	0.9979	0.9989
Jan-11	20.10	22.70	0.9974	0.9987
Feb-11	20.30	22.90	0.9974	0.9987
Mar-11	18.20	20.60	0.9976	0.9988
Apr-11	17.50	19.70	0.9978	0.9989
May-11	18.00	20.30	0.9977	0.9988
Jun-11	18.00	20.30	0.9977	0.9988
Volume Weighted Average DLF				**0.9989**

Table 4: Volume Weighted Average DLF

ATTACHMENT 1 – SCHEMATIC OF OAKY CREEK COAL NSP

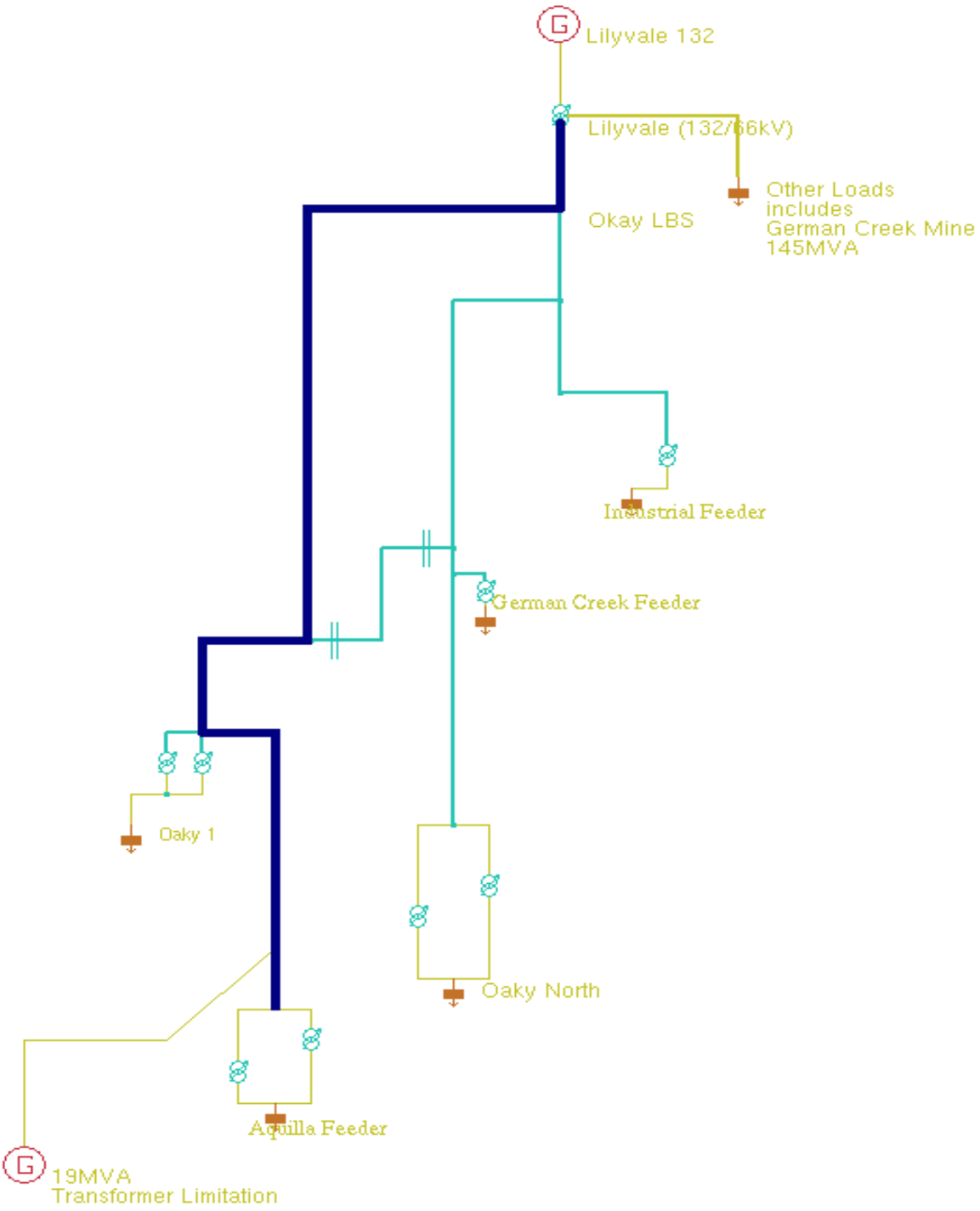

Figure 2: Oaky Creek Coal Network as modelled in DINIS