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NETWORK SERVICE PROVIDER

DISTRIBUTION LOSS FACTOR

ANGLO COAL

CAPCOAL NSP

AUSTRALIAN ENERGY REGULATOR

FINANCIAL YEAR 2010-11

(AER REFERENCE: M2008/112)

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Document History and Status

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1. SUMMARY

The terms of Hill Michael's engagement with Capcoal Network Service Provider (NSP) 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:

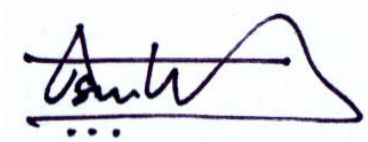
"Each year the Distribution Network Service Provider must determine the distribution loss factors to apply in the next financial year in accordance with clause 3.6.3(g) and provide these to NEMMCO for publication by 1 April. Before providing the distribution loss factors to NEMMCO for publication, the 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 year 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 **0.9938** for the EDL embedded generation connected to the **Capcoal 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 12th 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	QAAALV0001
TNI / MDA	QLIL/Ergon Energy
Generator NMI	7102000033

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	-3,321.40	15,749.65	16.70
Feb-09	5,554.15	8,702.35	21.22
Mar-09	4,820.39	12,931.55	23.86
Apr-09	2,399.97	15,520.89	24.89
May-09	90.66	18,555.64	25.06
Jun-09	-475.50	19,178.47	25.98
Jul-09	-726.93	19,729.23	25.54
Aug-09	-96.78	16,938.82	22.64
Sep-09	1,010.08	16,025.05	23.66
Oct-09	1,736.18	17,247.83	25.52
Nov-09	1,674.98	18,210.85	27.62
Dec-09	678.95	18,684.25	26.03

Table 1: Metered Data 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 13 January 2010, to obtain the projection from the mine (load) and the generator.

Generation Projection: EDL Power Station advises 75% of installed capacity will be available in 2010/11. This availability takes into account contingencies and planned outages.

Mine Load Projection: This forecast is based on Capcoal advice of expected consumption of 16 MWh/month between Jul 2010 to Dec 2010 and 21.5 MWh/month between Jan 2011 to Jun 2011.

Date	Generation (kW)[1]	Generation (MWh)	Mine Load (kW)[2]	Mine Load pf	Mine Load (MVA)
Jul-10	23,973	17,835.62	21.51	0.80	26.88
Aug-10	23,973	17,835.62	21.51	0.80	26.88
Sep-10	23,973	17,260.27	22.22	0.80	27.78
Oct-10	23,973	17,835.62	21.51	0.80	26.88
Nov-10	23,973	17,260.27	22.22	0.80	27.78
Dec-10	23,973	17,835.62	21.51	0.80	26.88
Jan-11	23,973	17,835.62	28.90	0.80	36.12
Feb-11	23,973	16,109.59	31.99	0.80	39.99
Mar-11	23,973	17,835.62	28.90	0.80	36.12
Apr-11	23,973	17,260.27	29.86	0.80	37.33
May-11	23,973	17,835.62	28.90	0.80	36.12
Jun-11	23,973	17,260.27	29.86	0.80	37.33

Table 2: Forecast Data for 2010-11

2.1.2 Network Connection Points

CAPNSP has only one customer – the embedded generator owned and operated by Energy Developments Ltd (EDL) – and therefore, CAPNSP has only one *distribution network connection point*. The Capcoal German 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 CAPNSP connection point to the EECL network service. Figure 1 below shows the location of the connection points and the network for which losses are calculated.

The EDL embedded generator's connection point is the Lilyvale transmission network connection point (QLIL) approved by NEMMCO. The only customer connected to CAPNSP is the embedded generator. The German Creek mine connection point is at the CAPNSP connection point to the EECL network service at Lilyvale.

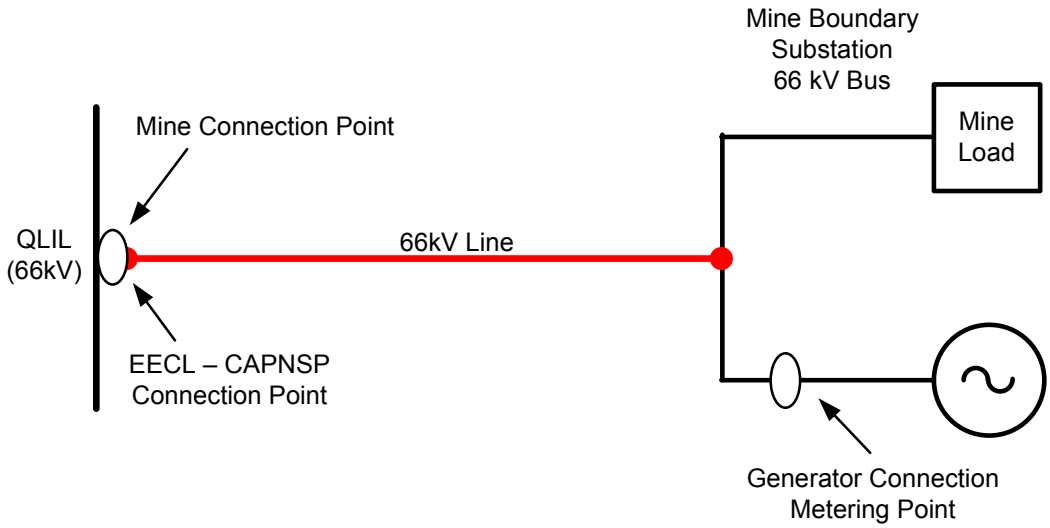

Figure 1: Simplified Representation of the Network

2.1.3 Methodology

EDL Generator DLF Calculation

The site specific DLF for the EDL embedded 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.

1. Request expected mine consumption and embedded generation forecasts for the 2010-11 financial year.

2. Prepare and review the network model for the CAPNSP 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 PSS/SINCAL network model (given in Attachment 1) represents the following:

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

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

   c. EDL 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 CAPNSP connection point at Lilyvale and the

EDL embedded generator connection point at the German Creek Mine 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	303	320	0.9830	0.9915
Aug-10	303	320	0.9830	0.9915
Sep-10	307	323	0.9840	0.9920
Oct-10	303	320	0.9830	0.9915
Nov-10	307	323	0.9840	0.9920
Dec-10	303	320	0.9830	0.9915
Jan-11	381	390	0.9910	0.9955
Feb-11	440	445	0.9950	0.9975
Mar-11	381	390	0.9910	0.9955
Apr-11	398	406	0.9920	0.9960
May-11	381	390	0.9910	0.9955
Jun-11	398	406	0.9920	0.9960
	Volume Weighted Average DLF			**0.9938**

Table 3: Volume Weighted Average DLF

ATTACHMENT 1 – SCHEMATIC OF CAPCOAL NSP

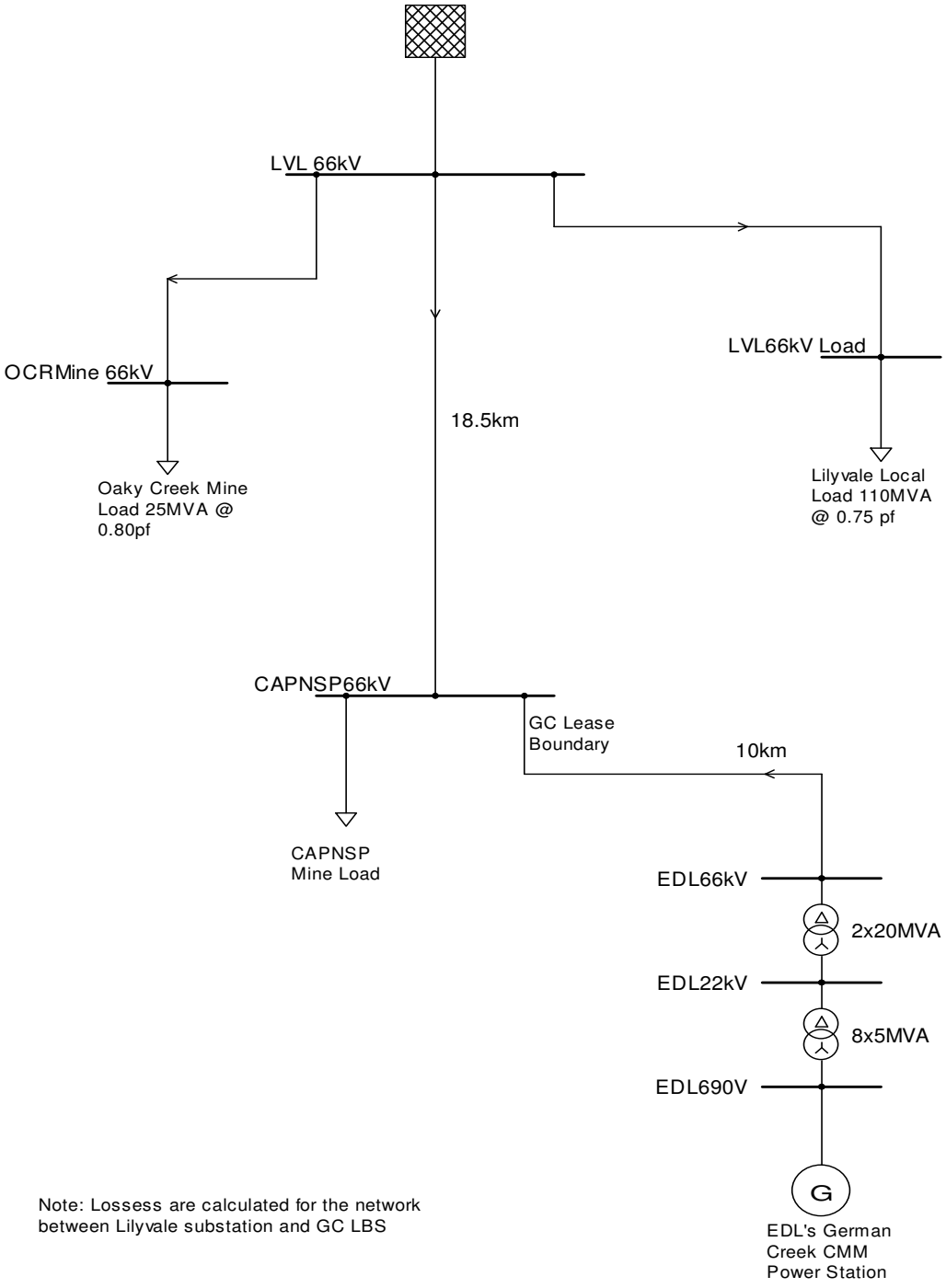

Figure 2: CAPCOAL Network as modelled in PSS/SINCAL