IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application by Hydro Developments Limited for resource consents for the Stockton Plateau Hydro Scheme

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STATEMENT OF EVIDENCE OF MICHAEL McSHERRY ON BEHALF OF BULLER ELECTRICITY LIMITED

Buller Electricity Limited

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WESTPORT

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1. QUALIFICATIONS AND EXPERIENCE

1.1 My name is Michael McSherry. I am the Chief Executive of Buller Electricity Limited, the electricity line company operating in the Buller Region.

1.2 I hold a Bachelor of Electrical Engineering degree from the University of Canterbury. I am a Chartered Professional Engineer and hold an International Professional Engineers Registration.

1.3 I specialise in electricity distribution and have worked in the electricity sector for over twenty years in engineering, operational and senior executive roles.

1.4 Experience which is relevant to my evidence includes:

a. Involvement in the electricity market since its inception in 1996

b. Purchase of electricity from the wholesale market, including the purchase of energy hedges

c. Setting Retail consumer tariffs

d. Negotiating Transmission contracts

1.5 I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note. I agree to comply with this Code of Conduct. This evidence is within my area of expertise, except where I state I am relying on what I have been told by another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

2. SCOPE OF EVIDENCE

2.1 The purpose of my statement is to discuss transmission options for the output of the HDL generation plant at Granity. This includes:

a. An overview of the current situation;

b. Discussion of regional supply issues;

c. Electricity related benefits of HDL; and

d. Other Issues.

3. EXECUTIVE SUMMARY

3.1 If HDL were to inject 30MW into the 33kV distribution network at Granity, under maximum loading conditions 2MW would transfer north to Karamea and 8MW to Solid Energy. 10MW would transfer south on each 33kV line from Ngakawau to Robertson Street in Westport with 8MW going to the central Westport region and the remaining 12MW being exported to the national grid.

3.2 Please note these are ballpark figures to illustrate potential capacity and actual capacity limits will need further detailed investigation.

4. INTRODUCTION

4.1 Buller Electricity operates a 33kV sub transmission system from Robertson Street in Westport to Karamea. The system has two separate circuits from Westport to Ngakawau (at the base of the Stockton mine) and continues with one circuit to Karamea. See the attached diagram.

4.2 The 33kV circuits from Westport to Ngakawau and the Ngakawau 33/11kV substation are currently being upgraded to transport the maximum amount of energy possible for the operations of the Solid Energy Stockton coal mine. This upgrade does not require resource consent as the physical assets do not change. The upgrade involves increasing the efficiency of the current assets.

4.3 The upgrade will allow a maximum of 10MW to be transmitted on each circuit. Solid Energy requires 8MW and 2MW are transported to Karamea.

4.4 The two circuits provide security of supply for the mining operations. If one circuit has a fault the protection equipment senses the fault and isolates it from the other circuit so supply is maintained. The capacity of the mining operation is maintained using one circuit.

5. REGIONAL SUPPLY ISSUES

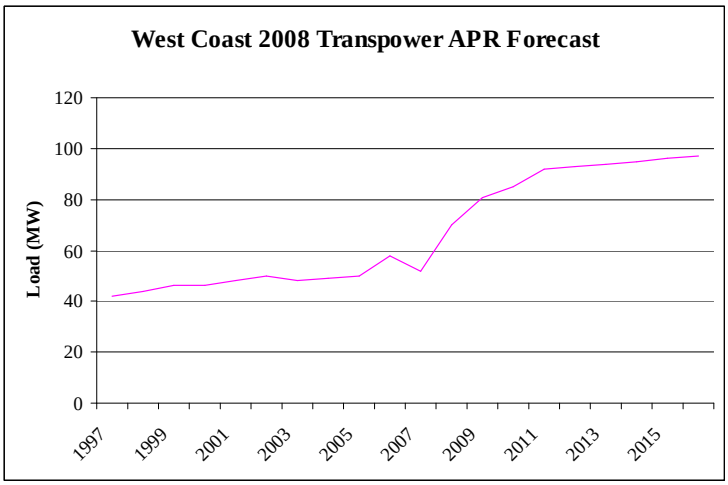
Background

5.1 Electricity supply in the West Coast and Buller region is dependent on connections through the Canterbury, Nelson and Marlborough regions of the national grid.

5.2 The transmission grid in the upper South Island comprises three 'electrical' regions – the West Coast, Canterbury and Nelson-Marlborough regions. In each of these regions of the grid, electricity demand significantly exceeds generation capacity and all three regions are dependent on electricity supply from South Canterbury, from large hydro generating schemes in the lower South Island or electricity from the North Island via the Cook Strait Cables.

5.3 In contrast, on an island wide basis, South Island generation capacity has generally exceeded peak demand. Subject to hydro lake levels and inflows, surplus supply is transferred from Benmore, through the Cook Strait cables, to the North Island. At times when hydro supply is limited in the South Island, electricity supply is transferred from the North Island to Benmore. The amount this occurs has increased in recent years as electricity demand in the South Island has grown significantly more than new generation developments. Although the actual transfer in each year depends on hydro supply availability, it is observed the net annual energy transfers are on average trending downwards. Last winter, large amounts of electricity were transferred to the South Island given low inflows into the major hydro schemes there.

5.4 Unless new generation is developed in the South Island this trend will continue with a growing dependence on North Island generation, particularly in dry periods. On average, South Island electricity demand growth between 2000 and 2007 was around 1.8% per annum. However, the 2008 Transpower Annual Planning Report indicates growth on the West Coast will almost double in the next four years from 50MW to 90MW as the graph below shows.



There are a number of step load increases, such as mining and dairy factory expansion, forecast to occur on the West Coast. While these load increases are not large in absolute terms, they have a significant regional impact. This is because many of the circuits have comparatively low ratings (raising thermal issues) and most of the load must be supplied by generation over long distances from outside the region such as the Waitaki Valley in the South Canterbury region (raising voltage issues).

5.5 Irrespective of the direction of transfers between islands, electricity supply from the lower South Island is imported into the upper South Island through the national grid.

5.6 The additional cost of transporting electricity into these regions is evident from spot market prices. For example, in April and May 2008, a number of half hourly spot market prices at Westport were more than 100% higher than Benmore.

5.7 Spot prices vary by half hour, reflecting the overall supply and demand balance, but price differences reflect the general flow of electricity from the lower South Island through Canterbury to the other regions. During peak demand periods, losses tend to rise and spot prices in regions with generation shortfalls rise proportionately more than others.

5.8 To further illustrate this point, Table 1 below shows how average weekly spot market prices at Greymouth, Westport, Islington and Stoke are typically higher than corresponding prices at Benmore.

Table 1: Average spot market prices vs Benmore (2008)

Islington		Stoke		Westport		Greymouth	
%	$/MWh	%	$/MWh	%	$/MWh	%	$/MWh
7.9%	10.53	11.7	15.51	12.8	16.95	16.3	21.64

5.9 Trends in spot market prices are reflected in retail prices, flowing through to consumers as Retailer pricing structures are designed to make a commercial return on all costs they incur. In areas of the grid where congestion occurs, retailers without local generation are more exposed to high spot prices when offering fixed price contracts to customers. This can tend to limit retail competition in such regions and/or increase retail prices relative to other regions.

5.10 The retail prices in the Buller and Greymouth regions, for example, are amongst the highest in the country. It is helpful to look at the estimated proportion of the retail price associated with the other cost components. In this regard, higher costs are either associated with higher energy (spot market) costs and/or higher estimated retailer margins, including the retailer's perception of spot pricing risks. The latter is an indication of the level of retail competition in a region. While there will be a number of factors involved, regions like Buller and the West Coast generally, have higher spot prices and higher than average retail margins. Any generation project can be expected to exert downward pressure on spot price differentials relative to other regions. In my opinion, these benefits should also flow through to lower retail price differentials. i.e. reducing the difference in the retail price paid by local consumers and prices paid elsewhere.

Energy Supply Diversity

5.11 On average, around 60% of New Zealand's annual supply requirements are met by hydro generation. This has significant benefits, being a renewable resource with minimal greenhouse gas emissions and being able to provide short term supply flexibility. However, security of electricity supply in New Zealand as we all now recognise, is vulnerable to droughts affecting the main hydro catchments.

5.12 New Zealand's vulnerability to hydro droughts is complicated by limited storage in lake capacity, highly variable inflows and an underlying poor correlation of inflows and electricity demand. Inflows tend to be lowest in the winter months when demand is highest and vice versa. Inflows into North Island catchments tend to be better correlated with demand but the national inflow pattern is dominated by South Island inflows.

5.13 It can be shown the average West Coast inflows are not correlated with average Waitaki inflows and are therefore more consistent with seasonal demand patterns. The HDL project, although relatively small scale compared to the major hydro schemes, could thus increase energy supply diversity in the New Zealand electricity system with corresponding seasonal security of supply benefits.

Transmission

5.14 West Coast generation could help defer the need for additional transmission upgrades to support electricity supply into the upper South Island. The lack of generation and ongoing demand growth in the upper South Island region mean that transmission capacity from the Waitaki Valley in South Canterbury via Christchurch will become tighter and ultimately need to be upgraded unless new generation is developed in the region.

5.15 Transpower has indicated that currently planned grid investments should enable reliable supply to be maintained in the upper South Island until 2017. Its preferred options at that stage are to install additional voltage support equipment at Islington (Christchurch) followed by new transmission capacity in 2030 (building new lines or replacing existing conductors). However, it is noted that these dates are sensitive to demand forecast assumptions. For example, under the demand forecast prepared by the Electricity Commission in 2005, additional voltage control equipment would be required in 2013 and new transmission capacity would need to be built between Twizel and Christchurch by 2019 (new transmission lines or replacing conductors on existing lines).

5.16 In its March 2008 Annual Planning Report, Transpower notes that new generation in the upper South Island (distributed in the West Coast and Nelson-Marlborough regions) will defer the top of the South Island voltage stability problems beyond 2023 and may also defer required transmission reinforcements from the Waitaki Valley into Christchurch for several years.

Other Alternatives

5.17 Greater reliance on transmission capacity could be considered an alternative to developing generation capacity within the region. However, we are all aware of the debate around upgrades to the transmission system into Auckland and the emphasis placed on alternatives such as generation. Additional transmission capacity through to the upper South Island will be required in time unless significant generation is developed in the upper

South Island and/or West Coast regions of the grid. This will also affect transmission capacity through to Christchurch from South Canterbury. Conversely, generation developments will defer the need for transmission investments and/or the need for demand curtailment as grid capacity becomes tighter. Delaying grid investments clearly has economic benefits. Importantly, increasing transmission capacity to transfer additional MW will not avoid transmission losses or avoid higher locational prices, both with year on year economic impacts.

Comment [rwb1]: Increasing transmission capacity generally reduces losses and reduces locational prices, for the same level of MW transfer. So I think this wording could be improved.

6. LOCAL SUPPLY ISSUES

6.1 The Buller Electricity distribution network and the Transpower transmission network have upper limits of capacity and capacity is also linked to security.

6.2 The two Buller circuits from Westport to Ngakawau have a design capacity of 10MW each but when operated in dual line security mode, as they currently do, the total capacity is 10MW, allowing for the redundancy of one circuit.

6.3 The supply circuit to the Stockton mine is a single 33kV circuit with a capacity of 8MW and has single line security. If this circuit has a fault, supply to the mine is lost.

6.4 The supply to Karamea is also a single 33kV circuit with a capacity of 2MW and has single line security. If this circuit has a fault, supply to Karamea is lost, but Buller Electricity Limited has installed diesel generators to maintain supply under fault conditions.

6.5 The Transpower transmission system into Buller operates at 110kV and is a dual circuit configuration giving redundancy of one circuit during a fault. Part of this configuration from Denniston to Kikiwa is constructed at 220kV with dual circuits and dual conductors giving this line a very high capacity. It was built with a 200MW coal fired generator envisaged on the mining plateau.

6.6 In its March 2009 Annual Planning Report, Transpower notes in section 17.9.1 that 100MW of generation can be connected to the West Coast 110kV network. This will increase with planned work to increase capacity from Inangahua to Kikiwa.

7. THE HDL CONNECTION

HDL propose to connect 30MW at Granity which is just south of Buller's Ngakawau substation.

Under the current configuration, 10MW would flow north to Karamea and the Stockton mine and 10MW would flow south on each of the circuits to Westport.

At Westport, 8MW would flow off to the Westport area and the remaining 12MW would flow into the transmission system.

Should a fault occur on one of the Buller circuits under these maximum loading conditions HDL would be required immediately to drop 10MW of generation. Depending on the configuration of the generators this could amount to all generation being dropped.

Once Buller's distribution system was stable, albeit with one circuit out of service, HDL could commence generation to 20MW, assuming Solid Energy were taking full load.

8. FUTURE HDL REQUIREMENTS

If HDL wish to inject more than 30MW into the Buller distribution system, there are other options to be considered.

Option 1

Upgrade the Buller 33kV system. It would be possible, depending on the amount of additional capacity required, to physically upsize the existing network and/or increase the voltage at which the system operates. This option would require resource consent to upsize the existing structures.

Option 2

Underground a third circuit from Granity to Waimangaroa. This would be an expensive exercise but would not require resource consent.

Option 3

Construct a new circuit up the hill to supply new load for the Stockton mine. This would require resource consent.

Option 4

Extend Option 3 to connect into the Transpower system at Denniston.

9. OTHER ISSUES

9.1 New electricity systems being considered under the Resource Management Act always attract the issues around Electro Magnetic Fields and I comment on this in regard to the HDL scheme.

9.2 Using the current Buller assets the power flow is south to north and if generation is injected at Granity the power flows will reverse from north to south so any EMF effects will not change. At any time now, or in the future, 10MW can flow along each circuit so the net effect is zero

9.3 There have been many international studies around the effects of EMF and transmission lines and to date no study has found the effects to be harmful to human life.

9.4 New Zealand's own Ministry of Health has not identified EMF as harmful, although guidelines are produced and all line companies, including Buller Electricity Limited, abide with these guidelines.

9.5 EMF diminishes quickly over distance and codes of practice define safe working clearances for various line voltages. The 33kV circuits to be used by HDL already comply with these requirements.

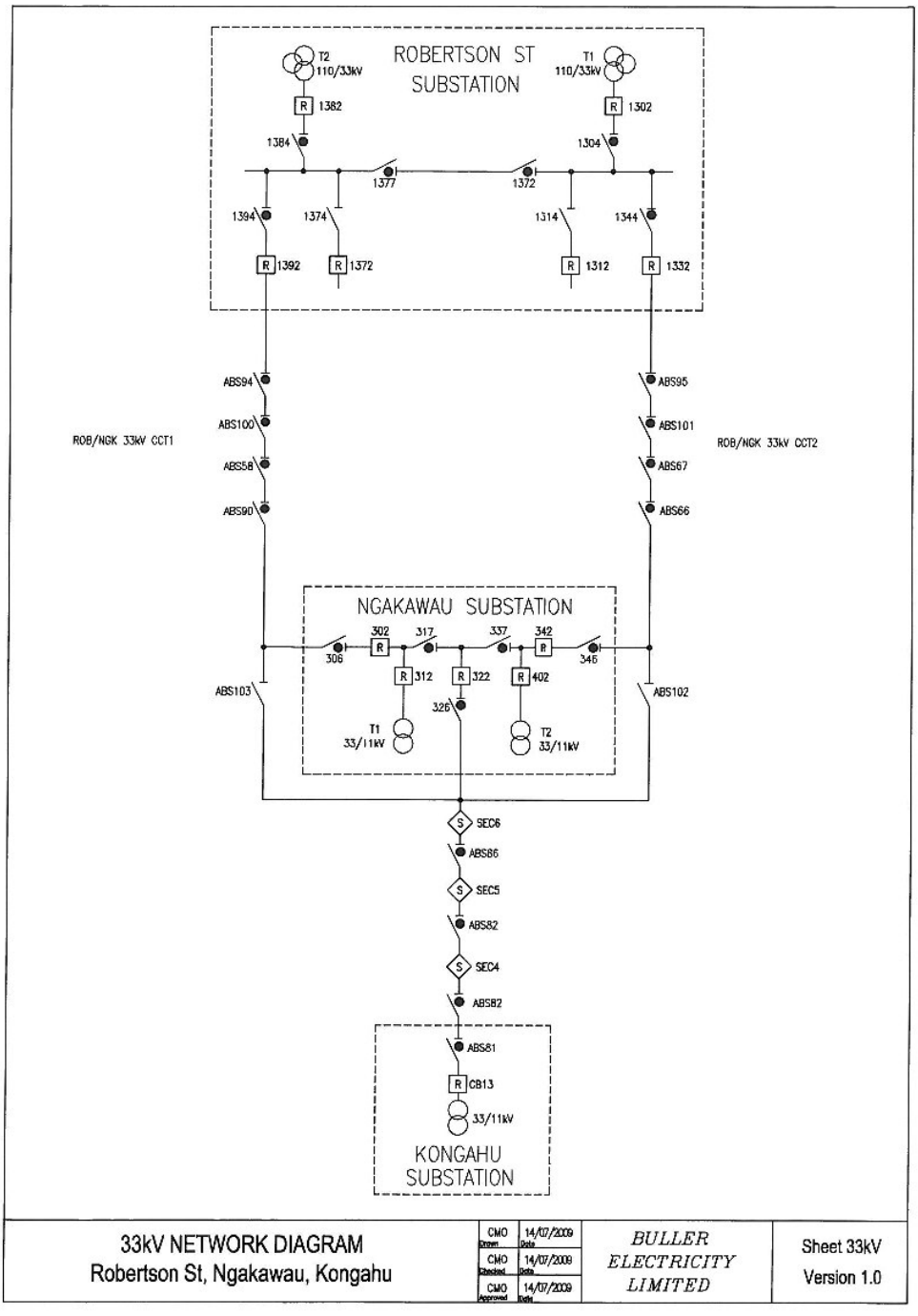
10. CONCLUSIONS

The proposal to inject 30MW into the Buller Electricity Limited 33kV sub transmission system is possible without major works requiring resource consents, assuming the connection from the generator to the existing over head lines will be under ground.

There are several options requiring further investigations should HDL require injection beyond 30MW.

The Transpower transmission system has sufficient capacity for the HDL scheme and all other proposed generation schemes as at today's date.

Other issues such as EMF are accounted for and are not a new issue to be considered in this case, other than compliance with current guidelines.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