November 13, 2015

Dear Alberta Loss Factor Stakeholders – Holders of Generation and PPAs

Re: **Generic Staking Orders for 2016 Loss Factors**

Please find the attached Generic Staking Orders for 2016 Loss Factors.

Yours truly,

Dan Shield
Director – Transmission Engineering and Performance

cc: John Kehler

Han Yu

Public

2500, 330-5th Avenue SW, Calgary, Alberta T2P 0L4 Phone: 403-539-2450 Fax: 403-539-2949
www.aeso.ca www.poweringalberta.com

Prepared For:

Alberta Electric System Operator

Generic Stacking Orders for 2016 Loss Factors

Prepared by:

Teshmont Consultants LP
1190 Waverley Street
Winnipeg, Manitoba, Canada R3T 0P4
www.teshmont.com

Teshmont

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TESHMONT CONSULTANTS LP
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The Association of Professional Engineers, Geologists and Geophysicists of Alberta

2015 November 12

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November 12, 2015

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1 Purpose

The purpose of this document is to describe the Generic Stacking Orders to be used to determine loss factors for 2016.

2 Introduction

The Generic Stacking Orders (GSOs) are a key component in the determination of loss factors under section 501.10 of the ISO rules, *Transmission Loss Factor Methodology and Requirements (note: at date requirement or state draft version)*. Generators are dispatched to meet system demand in the base cases according to the order and generation amount specified in the GSOs.

The loss factor GSOs contain two key pieces of information:

1) Generation supply levels at the measurement points for 12 seasonal base cases[1] (four seasons and three load levels as defined in Table 1) for all generators, and

Table 1 – Timeframes and Scenarios for Loss Factor Base Cases

Season	Timeframe	Scenario
Winter	December, 2015 – February, 2016	High
		Medium
		Low
Spring	March, 2016 – May, 2016	High
		Medium
		Low
Summer	June, 2016 – August, 2016	High
		Medium
		Low
Fall	September, 2016 – November, 2016	High
		Medium
		Low

2) Generation dispatch order.

The determination of the GSO generation supply levels is based on requirements in the AESO proposed Loss Factor rule submitted during Proceeding 790 as Exhibit 790-X0345. In summary, the generation supply levels are determined using historical data for existing generators (in service for more than a year). For generators that have been in service for less than one year, data is provided by the owner or the supply levels are estimated by the Incapability Factors (ICBF) or by a combination of actual data and ICBF. To determine the dispatch order, a statistical analysis is used to determine a relationship between the generator output and the actual historical hourly pool price. The process is explained in Section 4. The AESO has confirmed with the generation owners that the previous year's historical data is appropriate to use. Additional blocks are used where necessary to reflect generators' multiple offer strategies.

[1] Loss Factor base cases are relevant to NTG amount whereas operations and planning cases use more detailed modeling of the system including the behind the fence elements.

The transmission must-run (TMR) requirement supersedes all other operational criteria and hence TMR generators are dispatched first on the list when required to fulfill the reliability criteria.

3 Background

In 2015 during Proceeding 790, the AESO indicated it would apply the proposed loss factor rule submitted during the proceeding as a basis for the 2016 GSOs. The proposed loss factor rule has a section specific to the GSOs.

4 2016 GSOs Key Features

The highlights of the 2016 GSOs preparation process are:

1) Average historical net-to-grid (NTG) output of a generator is considered for each of the twelve seasonal cases.

2) The determination of TMR and the energy component is done using SCADA data. The historical TMR instruction amount as dispatched by the system controller is used as the TMR amount. The difference between the total SCADA amount and the TMR instruction amount is used as the energy component. For example, if TMR instruction is 25 MW and the actual amount is 45 MW then the TMR amount will be 25 MW and the energy component will be 20 MW.

3) Generator owners were provided an opportunity to comment on and suggest revisions to the GSO capacities[2] to correct calculation errors by the AESO on historical data or proposed operational characteristics on new generation.

4) The net of import and export (separately for BC, Saskatchewan, and Montana) is shown in the GSO only if the net is import. The net import (if any) is added at the end of the second block of Hydro. If the net is export the GSO shows zero for the scenario however, the net export flow will be represented in the loss factor base cases.

5) The DOS loads will be reflected in the loss factor base cases.

6) The numbers of hours (H values) used for averaging the historical generator output are taken from the AIES seasonal load duration curve analysis.

7) No maintenance or outage data is used in the 2016 GSOs as average historical net-to-grid output of a generator inherently contains this information.

8) 12 seasonal net-to-grid generations are assigned to each measurement point at which a system access service requires a loss factor.

9) The generator order, except for units such as wind, import, and hydro generation, is determined by the actual price responsiveness of the generators in each group.

10) Future generators expected to be connected in the forecast year that have Alberta Utilities Commission (AUC) approval through their filing are included in the GSOs.

11) Generators who have filed decommissioning plans with the AESO are removed accordingly.

[2] www.aeso.ca/downloads/2016_LF_GSO_DRAFT_AESO_heading_letter.pdf

12) Teshmont typically relies on an operating profile submitted to the AESO by the generator owner of a new generator. In the event this information has not been provided, Teshmont will rely on the Canadian Electricity Association's (CEA's) latest annual report on Generation Equipment Status utilizing the incapability factors to calculate the power available to the AIES. (1 - ICBF) has been considered as equivalent to Available Capacity Factors (ACF).

13) As any given loss factor is a function of the amount of generation at the measurement point, the 2016 GSOs represent the generation at that measurement point. In most cases, the generation at the measurement point is based on a single generator. During the Proceeding, the AESO filed a list of Measurement Point Exceptions for Loss Factor Calculations where multiple generators are connected behind a single measurement point. For example, Horseshoe is an exception which has 4 generators with a single measurement point identified as MPID HSH. The 4 generators are connected to Bus 172 (12 kV). They are represented as a single unit at Bus 171 (138 kV) because the AESO billing database contains NTG data for all of these four units (related to MPID HSH) at Bus 171. The same approach is applied to the Industrial System Designations (ISDs).

14) A stacking order is created for all generation units based on lowest operating cost for units of the same fuel type. If multiple units have the same operating costs the unit's previous year's loss factors are used to determine stacking order. Each generator's hourly offer prices and associated generation MW changes are combined and sorted as a multi-block stacking order for that generation unit for the 12 month period (June 1, 2014 - May 31, 2015). The generation unit is then divided into two blocks. Two blocks are chosen to avoid additional complexity for limited modeling improvement. A first block price is determined by calculating the average offer price per MW dispatched as a first block in the 12 month period. The first block size is defined as the percentage of first block MW dispatched divided by total MW dispatched multiplied by the GSO value for that seasonal scenario. Generation volumes above the first block size belong to the second block. The second block price is determined by calculating the average offer price per MW dispatched for every block above the first block for the same 12 month period. The second block size is calculated as the percentage of MW dispatched outside of the first block divided by the total MW dispatched then multiplied by the GSO value for that seasonal scenario. However, not all generators have a second block. The statistical analysis shows that some generators have an insignificant amount of generation in the second block which indicates their price insensitivity. A weighted average of generator output of 12 seasonal outputs is calculated based on the H values or durations of the scenarios. A second block for a generator is considered, in general, if the annual weighted average is 5 MW or greater. In some cases a second block is not assigned to a generator even though the weighted average is more than 5 MW such as for small power research and development (SPR&D) and wind generators.

The 2016 GSOs are similar to the previous year's GSOs in the following aspects:

1) The wind and hydro units are ranked according to their relative loss factors.

2) No bid price, specific TMR, maintenance schedules, or heat rate information is revealed.

3) Multiple blocks are used to represent the historical response of the generators to pool price.

4) The GSOs are separated into two blocks (where necessary) and into similar generation technologies (i.e., wind, co-gen, coal, etc.).

5 2016 Generic Stacking Orders

The following describes the application of the GSOs to the loss factor base cases:

1) **Transmission Must-Run Generators** – the generators represent the expected TMR dispatch (of gas, combined cycle, or other units) beyond area generation energy market participation. TMR is required in specific areas of the AIES to meet reliability criteria. The total NTG amount assigned to the TMR generators in the 2016 GSOs is obtained from the following two sources:

    a) The average historical TMR total (SCADA) is calculated for 12 seasonal cases in the past twelve months (June 1, 2014 to May 31, 2015). The AIES seasonal load duration curve analysis is used to obtain the average TMR total amount of each generator.

    b) The average TMR instruction amount (as dispatched by the System Controller) is calculated for 12 seasonal cases in the past twelve months (June 1, 2014 to May 31, 2015). The AIES seasonal load duration curve analysis is used to obtain the average TMR instruction amount for each generator.

    According to the ISO rules when the area criteria requirement is not met by the generation from local generators through energy market dispatches, TMR dispatches will be issued to TMR-contracted generators to make up the shortfall. TMR-contracted generators will be dispatched according to the TMR dispatch orders. The actual TMR dispatch order is confidential.

2) **Data** – Most of the data used in the 2016 GSOs such as Alberta system load, and generation amount at each POS are historical and taken from the most recent 12 months' data in the AESO's billing system. The data extraction period is June 1, 2014 to May 31, 2015.

3) **Dispatch Generator** – In general, the stacking orders are formed to more closely reflect actual operational perspectives. The generators may bid multiple blocks but the typical block size beyond the second block is very small.

4) **Wind Generation** – Wind generation does not have a relationship to pool price.

5) **Small Power Research & Development** – SPR&D generators are exempt by law from paying for losses.

6) **Distribution Connected Generation** – consists of distribution connected generators with STS contracts that occasionally results in supply of power to the AIES. Several prime movers may exist at a distribution generation location. The placement of the distribution generation in the GSOs is determined mainly by the predominant source of generation at the STS location and ranked by historical hourly pool price.

7) **Future Generation** – generators expected to be connected in the forecast year that have AUC approval per their filing will be included in the GSOs and placed with the same fuel type group.

8) **Import Levels** – as per the 2007 Transmission Regulation, inter-tie levels are included in the loss factor calculation power flows. Imports are added in the GSOs following the second block of hydro generation. The location reflects the relative level of availability of import resources for Alberta. The GSOs provide a list of generation or equivalent entity (imports or industrial system designations) along with their predicted seasonal output capacity. Exports are not added in the GSOs as they are not a supply component of the system.

Appendix 1: 2016 Generic Stacking Order

New GSO Number	Name	MPID	Gen with 2nd Block	Generation Type	Winter Peak Capacity (MW)	Winter Med Capacity (MW)	Winter Low Capacity (MW)	Spring Peak Capacity (MW)	Spring Med Capacity (MW)	Spring Low Capacity (MW)	Summer Peak Capacity (MW)	Summer Med Capacity (MW)	Summer Low Capacity (MW)	Fall Peak Capacity (MW)	Fall Med Capacity (MW)	Fall low Capacity (MW)
1	POPLAR HILL	PH1	1	Gas	10.4	10.5	4.9	23.8	4.7	1.3	0.7	2.1	0.3	9.0	6.6	4.1
2	TRANSCANADA BEAR CREEK GENERATOR	BCRK	1	Co-Cycle	0.0	0.2	0.0	41.0	5.1	1.3	0.0	0.0	0.0	0.0	0.0	0.0
3	VALLEYVIEW	VVW1	1	Gas	0.0	0.6	0.0	11.9	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	TABER WIND	TAB1		Wind	27.7	32.3	41.5	35.7	25.7	25.2	5.2	16.6	19.4	22.0	26.2	26.9
5	FT MACLEOD	0000001511		Wind, DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	GLENWOOD	0000022911		Wind, DG	0.0	0.0	0.1	0.0	0.1	0.2	0.0	0.2	0.4	0.0	0.1	0.2
7	SUNCOR HILLRIDGE WIND FARM	SCR3		Wind	11.5	13.1	18.9	15.4	10.7	7.6	2.1	6.8	7.7	9.8	11.2	11.1
8	SUNCOR MAGRATH	SCR2		Wind	10.5	12.1	16.2	14.5	9.9	6.6	3.2	7.1	7.3	9.2	10.5	10.4
9	CASTLE RIVER	CR1		Wind	10.7	15.3	21.8	18.1	11.4	3.6	5.4	5.8	3.8	8.2	12.1	9.7
10	PINCHER CREEK	0000039611		Wind, DG	0.7	1.6	3.6	1.9	1.1	0.4	0.1	0.5	0.3	1.1	1.7	1.8
11	MCBRIDE	AKE1		Wind	21.6	31.3	43.8	33.3	20.5	9.9	6.5	13.1	8.9	18.4	27.0	23.8
12	ENEL ALBERTA CASTLE ROCK WIND FARM	CRR1		Wind	28.3	33.9	44.8	37.8	23.9	9.3	9.7	12.8	9.7	25.0	27.9	23.6
13	KETTLES HILL WIND ENERGY PHASE 2	KHW1		Wind	22.3	27.4	38.6	33.4	21.5	8.1	8.8	12.4	9.8	19.1	25.3	22.4
14	SUMMERVIEW 2	IEW2		Wind	18.0	24.6	31.9	32.2	19.0	7.4	7.3	9.9	5.7	18.5	21.9	16.8
15	SUMMERVIEW 1	IEW1		Wind	20.9	29.1	39.9	37.7	22.1	9.9	8.8	11.3	7.9	20.0	25.2	20.3
16	BLACKSPRING RIDGE I WIND PROJECT	BSR1		Wind	83.2	113.8	157.1	160.3	119.4	97.5	49.6	76.0	84.1	85.0	115.9	114.2
17	SODERGLEN	GWW1		Wind	20.6	28.0	40.1	33.4	24.0	12.9	8.3	15.9	15.1	15.9	26.5	23.5
18	BLUE TRAIL WIND FARM	BTR1		Wind	16.8	26.7	35.1	34.4	20.6	10.2	5.3	10.2	8.3	18.1	22.8	20.6
19	ALBERTA WIND ENERGY OLD MAN RIVER WIND FARM	OWF1		Wind	15.0	21.7	29.6	25.5	17.3	7.7	1.4	1.8	0.3	13.7	20.0	16.8
20	GHOST PINE WIND FARM	NEP1		Wind	24.7	24.2	32.0	34.8	24.6	25.3	7.2	17.7	15.4	24.4	23.7	23.2
21	TRANSALTA ARDENVILLE WIND FARM	ARD1		Wind	20.9	28.5	40.6	33.7	21.9	12.0	5.6	13.4	11.3	21.1	25.5	24.5
22	COWLEY NORTH	CRE3		Wind	5.7	6.1	8.0	5.6	4.0	1.7	2.7	2.6	1.4	5.9	6.0	4.6
23	COWLEY RIDGE WIND POWER PHASE1	PKNE		Wind	1.1	1.6	2.4	2.9	1.9	0.6	0.7	0.7	0.4	1.3	1.3	0.9
24	COWLEY RIDGE WIND POWER PHASE2	CRWD		Wind	1.5	1.8	2.2	2.7	1.9	0.7	0.8	0.8	0.4	1.4	1.8	1.3
25	CAPITAL POWER HALKIRK WIND PROJECT	HAL1		Wind	65.6	64.0	73.3	91.2	55.7	79.2	13.9	40.8	31.4	55.1	59.0	63.7
26	SUNCOR WINTERING HILLS WIND ENERGY PROJECT	SCR4		Wind	35.2	36.6	46.0	50.0	33.9	40.5	8.3	26.5	24.3	35.4	35.0	35.2
27	FORTIS BULL CREEK PHASE 2 GENERATORS INCREASE	Project1608_1_GN		Wind	7.2	7.2	7.2	5.5	5.5	5.5	4.1	4.1	4.1	6.1	6.1	6.1
28	FORTIS BULL CREEK PHASE 1 GENERATORS INCREASE	Project1607_1_GN		Wind	6.1	6.1	6.1	4.6	4.6	4.6	3.5	3.5	3.5	5.1	5.1	5.1
29	BLUEARTH HAND HILLS WIND PROJECT	Project678_1_GN		Wind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.5	30.5	30.5
30	WESGEN	WST1		Bio-mass	11.8	12.4	12.3	13.2	11.5	10.7	8.3	10.2	12.4	9.5	12.9	13.5
31	GRANDE PRAIRIE ECOPOWER CENTRE	GPEC		Co-gen	7.6	8.3	10.7	3.4	7.8	8.4	5.9	7.6	8.1	6.9	7.1	8.6
32	P&G WEYERHAUSER	WEY1		Co-gen	0.8	1.2	1.1	1.4	1.5	0.8	1.0	0.8	0.1	1.7	1.1	0.7
33	BEAR CREEK G2	BCR2		Co-Cycle	16.9	16.0	15.5	17.2	15.6	15.1	22.4	18.2	16.4	16.7	14.2	12.9
34	PENGROWTH LINDBERGH CO-GEN	372S025N		Co-gen	0.0	0.0	0.1	0.1	0.5	1.1	0.0	0.0	0.0	0.0	0.0	0.0

New GSO Number	Name	MPID	Gen with 2nd Block	Generation Type	Winter Peak Capacity (MW)	Winter Med Capacity (MW)	Winter Low Capacity (MW)	Spring Peak Capacity (MW)	Spring Med Capacity (MW)	Spring Low Capacity (MW)	Summer Peak Capacity (MW)	Summer Med Capacity (MW)	Summer Low Capacity (MW)	Fall Peak Capacity (MW)	Fall Med Capacity (MW)	Fall low Capacity (MW)
35	DIASHOWA	DAI1	1	Co-gen	11.4	9.5	9.2	8.6	8.3	7.3	15.0	9.8	5.1	10.3	9.4	9.1
36	SHELL CAROLINE	SHCG		Co-gen	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
37	FORTISALBERTA AL-PAC PULP MILL	AFG1TX	1	Gas	7.2	2.9	1.7	3.8	4.9	4.8	18.5	11.2	9.0	6.2	4.1	4.1
38	MAHKESES COLD LAKE	IOR1		Co-gen	128.2	158.8	179.5	137.3	145.1	128.4	115.1	131.5	154.2	126.7	128.5	130.3
39	ALTAGAS PARKLAND	0000034911		Gas, DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40	PRIMROSE	PR1		Co-gen	0.0	0.1	0.0	0.0	0.2	1.2	10.5	8.4	7.8	0.1	2.1	2.5
41	ENMAX CALGARY ENERGY CENTRE CTG	CES1	1	Co-Cycle	80.9	46.7	20.0	47.0	50.8	45.5	84.9	31.5	11.4	63.7	25.9	9.4
42	ENMAX CALGARY ENERGY CENTRE STG	CES2	1	Co-Cycle	44.5	26.6	12.7	24.5	29.3	27.8	60.4	20.2	7.6	35.7	15.8	5.8
43	MEG ENERGY	MEG1		Co-gen	145.4	142.4	139.8	144.2	125.4	113.8	106.6	105.5	83.5	139.5	131.1	133.3
44	BALZAC	NX01	1	Co-Cycle	41.3	25.8	10.3	9.2	16.2	9.0	43.8	18.2	5.9	33.8	10.0	3.7
45	FOSTER CREEK G1	EC04		Co-gen	21.5	20.2	18.5	20.9	13.8	12.1	4.9	9.6	16.4	18.4	19.1	19.7
46	ENMAX SHEPARD ENERGY CENTRE	EGC1	1	Co-Cycle	46.8	83.8	62.3	154.6	426.3	321.7	648.6	162.1	0.0	0.1	12.5	1.4
47	HARMATTAN GAS PLANT DG	0000025611		Gas	1.6	3.1	3.6	1.3	3.5	2.8	3.4	2.6	3.5	2.4	3.4	4.3
48	NOVA JOFFRE	NOVAGEN15M	1	Co-gen	127.5	88.1	57.1	87.7	76.4	65.5	114.7	79.0	54.6	75.5	41.5	32.7
49	CARSELAND	TC01		Co-gen	60.8	58.5	61.2	63.1	61.4	53.1	60.2	60.5	47.6	65.4	65.9	64.0
50	NEXEN OPTI	NX02		Co-gen	24.5	31.8	28.4	32.4	18.0	18.8	9.4	21.2	27.0	26.8	22.3	24.0
51	REDWATER	TC02		Co-gen	9.2	9.2	9.4	9.3	8.5	8.8	3.3	6.1	6.0	10.4	9.1	9.2
52	CITY OF MEDICINE HAT	CMH1	1	Gas	18.3	7.4	2.1	4.9	6.4	4.5	26.9	10.4	4.0	16.4	7.9	4.5
53	CNRL HORIZON	CNR5		Co-gen	0.1	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	2.3	2.8
54	SHELL SCOTFORD	SCTG		Co-gen	0.0	0.1	0.0	0.0	1.4	1.5	1.0	0.1	0.0	0.3	0.0	0.0
55	DOW GTG	DOWGEN15M	1	Co-gen	65.9	37.2	7.9	25.2	17.8	4.8	53.0	22.7	5.5	48.2	28.6	9.0
56	CAVAILIER	EC01	1	Co-Cycle	40.7	22.2	2.4	22.1	23.9	15.1	50.6	21.8	3.1	43.9	25.9	10.3
57	BUCK LAKE	0000045411		Co-gen, DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	IMPERIAL KEARL OIL GENERATOR ADDITION BTF	IOR3		Co-gen	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	MUSKEG	MKR1		Co-gen	47.6	33.0	24.6	35.9	13.2	9.2	15.6	19.0	31.2	59.0	29.7	24.9
60	MCKAY RIVER	MKRC		Co-gen	180.8	178.9	176.8	175.6	131.6	165.5	129.7	135.3	117.5	179.9	148.9	151.7
61	WHITE COURT	EAGL		Bio-mass	24.0	22.4	21.5	18.8	19.9	19.8	24.3	23.0	21.9	23.5	21.0	20.7
62	SUNCOR MILLENIUM	SCR1		Co-gen	405.0	416.7	407.9	420.1	387.5	348.2	275.5	297.2	327.9	321.9	333.8	319.5
63	SYNCRUDE	SCL1		Co-gen	7.6	12.4	16.2	6.6	19.5	39.2	27.1	35.4	36.6	10.9	15.2	16.3
64	CASCADE	CAS		Hydro	20.0	11.6	1.8	18.6	7.7	0.8	4.4	1.7	0.1	9.5	4.0	0.7
65	KANANASKIS	KAN		Hydro	7.0	6.1	6.1	7.5	9.4	10.3	16.8	16.5	17.2	7.5	9.7	8.8
66	BEARSPAW	BPW		Hydro	5.4	6.2	6.6	6.7	7.9	10.1	12.1	12.9	13.7	5.8	7.8	8.4
67	HORSESHOE	HSH		Hydro	5.1	6.3	7.8	7.7	8.7	9.8	14.4	13.8	11.4	4.4	5.4	4.4
68	GHOST	GHO		Hydro	28.6	13.8	6.5	18.0	16.8	14.6	39.9	35.1	40.8	18.9	20.2	11.8
69	THREE SISTERS	THS		Hydro	1.0	0.8	0.5	0.4	0.0	0.0	0.1	0.0	0.0	0.7	0.3	0.2
70	SPRAY	SPR		Hydro	38.1	35.5	26.8	36.4	31.1	21.6	41.1	35.3	19.1	25.7	21.1	10.4
71	RUNDLE	RUN		Hydro	11.5	10.3	7.6	10.4	8.7	5.7	10.6	8.9	4.7	7.1	5.4	1.7

New GSO Number	Name	MPID	Gen with 2nd Block	Generation Type	Winter Peak Capacity (MW)	Winter Med Capacity (MW)	Winter Low Capacity (MW)	Spring Peak Capacity (MW)	Spring Med Capacity (MW)	Spring Low Capacity (MW)	Summer Peak Capacity (MW)	Summer Med Capacity (MW)	Summer Low Capacity (MW)	Fall Peak Capacity (MW)	Fall Med Capacity (MW)	Fall low Capacity (MW)
72	POCATERRA	POC		Hydro	1.4	1.0	0.3	0.0	2.7	1.1	6.9	2.2	0.3	4.3	3.0	0.7
73	INTERLAKES	INT		Hydro	2.6	0.7	0.0	2.7	0.9	0.0	2.9	0.8	0.0	1.6	1.2	0.1
74	SPRING COULEE	0000038511		Hydro, DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	BARRIER	BAR		Hydro	2.6	1.7	0.1	8.7	6.0	3.8	9.6	5.2	8.6	4.8	4.9	0.6
76	BRAZEAU	BRA	1	Hydro	53.1	26.9	5.5	27.6	22.9	3.6	76.3	52.6	57.6	41.7	28.4	5.2
77	STIRLING	0000006711		Hydro, DG	0.0	0.0	0.0	0.0	0.1	1.0	0.0	0.3	1.1	0.0	0.0	0.3
78	CHIN CHUTE	CHIN		Hydro	0.0	0.0	0.0	0.0	2.9	7.6	2.6	5.6	8.9	0.0	3.5	4.4
79	OLDMAN	OMRH		Hydro	13.6	11.3	10.9	10.1	22.8	26.3	25.6	25.9	29.0	12.2	15.2	16.5
80	TAYLOR HYDRO	TAY1		Hydro	0.0	0.0	0.0	0.0	3.3	8.7	12.1	11.3	11.4	0.0	1.5	1.6
81	BIGHORN	BIG		Hydro	51.2	46.8	35.9	62.1	52.0	53.0	64.0	43.8	34.8	64.7	51.1	39.3
82	RAYMOND RESERVOIR	RYMD		Hydro	0.0	0.0	0.0	0.0	4.0	10.6	14.3	12.9	12.7	0.0	5.4	6.4
83	HR MILNER	HRM	1	Coal	89.7	57.9	50.7	13.8	13.9	15.7	78.3	69.2	77.2	81.5	61.8	57.2
84	SHEERNESS #1	SH1	1	Coal	151.8	106.5	56.6	172.9	160.0	122.6	186.4	170.9	110.2	209.7	203.8	176.8
85	SHEERNESS #2	SH2	1	Coal	162.5	170.7	114.1	171.1	138.5	106.9	177.5	161.6	106.0	205.0	186.0	160.0
86	KEEPHILLS #3	KH3	1	Coal	226.5	212.3	222.7	228.6	221.9	223.6	207.5	211.4	195.4	207.7	227.2	229.6
87	GENESEE 1	GN1	1	Coal	212.7	211.0	205.9	206.1	160.1	73.8	217.5	208.7	207.8	213.5	212.2	209.1
88	GENESEE 2	GN2	1	Coal	214.6	215.0	207.2	217.5	211.9	208.4	215.0	203.4	170.3	212.3	212.5	210.5
89	GENESEE 3	GN3	1	Coal	223.0	224.2	220.6	224.2	219.4	219.4	219.0	214.8	208.8	223.8	143.4	143.2
90	BATTLE RIVER #5	BR5	1	Coal	214.6	185.3	120.4	131.6	67.9	66.0	210.3	173.2	108.2	204.3	176.6	144.8
91	KEEPHILLS #1	KH1	1	Coal	322.5	321.0	314.7	338.6	65.2	80.9	311.4	305.1	316.5	330.1	315.6	304.0
92	KEEPHILLS #2	KH2	1	Coal	292.5	275.4	227.4	276.7	243.2	214.9	247.3	255.1	239.6	284.1	275.8	263.1
93	BATTLE RIVER #3	BR3	1	Coal	47.0	37.5	38.0	31.6	9.2	3.2	75.8	57.5	40.6	53.2	55.2	46.4
94	BATTLE RIVER #4	BR4	1	Coal	67.6	52.7	33.7	42.3	63.0	73.7	69.7	54.1	31.4	68.3	63.6	45.9
95	SUNDANCE #1	SD1	1	Coal	179.2	185.9	156.1	188.4	144.2	107.1	164.9	161.6	153.1	204.1	199.2	174.8
96	SUNDANCE #2	SD2	1	Coal	156.6	157.6	129.9	163.0	148.5	111.1	155.2	157.2	131.9	193.9	172.0	160.9
97	SUNDANCE #3	SD3	1	Coal	211.8	198.5	197.4	200.5	51.2	61.7	177.8	150.7	95.3	195.3	176.6	153.8
98	SUNDANCE #4	SD4	1	Coal	153.7	123.7	65.1	96.0	170.0	152.5	166.1	144.8	90.1	199.5	191.0	171.3
99	SUNDANCE #5	SD5	1	Coal	241.9	227.3	198.8	244.4	192.9	156.3	184.8	214.2	185.0	247.7	250.7	222.6
100	SUNDANCE #6	SD6	1	Coal	184.1	179.7	142.8	198.9	169.2	181.6	118.5	78.4	24.0	155.1	192.1	175.8
101	KEEPHILLS #3	KH3	2	Coal	195.6	183.3	192.3	197.4	191.6	193.1	179.2	182.5	168.8	179.4	196.2	198.3
102	GENESEE 3	GN3	2	Coal	232.0	233.3	229.5	233.3	228.3	228.3	227.8	223.5	217.2	232.8	149.2	149.0
103	GENESEE 2	GN2	2	Coal	174.8	175.1	168.8	177.2	172.6	169.7	175.1	165.7	138.7	172.9	173.1	171.4
104	GENESEE 1	GN1	2	Coal	173.3	172.0	167.8	167.9	130.5	60.2	177.3	170.1	169.4	174.0	173.0	170.5
105	SUNDANCE #6	SD6	2	Coal	156.8	153.1	121.7	169.4	144.1	154.7	101.0	66.8	20.4	132.1	163.7	149.8
106	SUNDANCE #5	SD5	2	Coal	117.1	110.1	96.2	118.3	93.4	75.7	89.5	103.7	89.6	119.9	121.4	107.8
107	KEEPHILLS #2	KH2	2	Coal	100.0	94.2	77.8	94.6	83.2	73.5	84.6	87.3	82.0	97.2	94.3	90.0
108	KEEPHILLS #1	KH1	2	Coal	30.8	30.7	30.1	32.4	6.2	7.7	29.8	29.2	30.3	31.6	30.2	29.1

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109	BATTLE RIVER #5	BR5	2	Coal	136.2	117.7	76.4	83.6	43.1	41.9	133.5	109.9	68.7	129.7	112.1	92.0
110	SUNDANCE #1	SD1	2	Coal	45.3	47.0	39.4	47.6	36.4	27.1	41.7	40.8	38.7	51.6	50.3	44.2
111	SUNDANCE #3	SD3	2	Coal	117.4	110.0	109.4	111.2	28.4	34.2	98.6	83.5	52.9	108.2	97.9	85.3
112	SUNDANCE #4	SD4	2	Coal	107.4	86.4	45.5	67.1	118.8	106.5	116.0	101.2	62.9	139.4	133.4	119.7
113	SUNDANCE #2	SD2	2	Coal	54.6	54.9	45.3	56.8	51.7	38.7	54.1	54.8	45.9	67.6	59.9	56.1
114	SHEERNESS #2	SH2	2	Coal	114.8	120.6	80.6	120.9	97.8	75.5	125.4	114.2	74.9	144.8	131.4	113.0
115	SHEERNESS #1	SH1	2	Coal	96.7	67.8	36.1	110.2	102.0	78.1	118.8	108.9	70.2	133.6	129.9	112.7
116	BATTLE RIVER #4	BR4	2	Coal	54.5	42.5	27.2	34.2	50.9	59.5	56.3	43.7	25.3	55.1	51.3	37.1
117	HR MILNER	HRM	2	Coal	7.2	4.7	4.1	1.1	1.1	1.3	6.3	5.6	6.2	6.6	5.0	4.6
118	BATTLE RIVER #3	BR3	2	Coal	16.5	13.2	13.3	11.1	3.2	1.1	26.6	20.2	14.2	18.6	19.4	16.3
119	BRAZEAU	BRA	2	Hydro	3.9	2.0	0.4	2.0	1.7	0.3	5.6	3.8	4.2	3.0	2.1	0.4
120	BC IMPORT	BCHIMP		Import	399.7	112.3	0.0	136.6	68.7	0.0	403.7	140.7	105.5	198.8	56.9	0.0
121	SASKATCHEWAN IMPORT	SPCIMP		Import	2.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122	MONTANA TIE LINE	MATLIMP		Import	151.2	61.6	25.2	40.3	34.7	8.0	120.4	68.9	86.5	82.6	36.9	26.7
123	NORTHERN PRAIRIE POWER PROJECT	NPP1	1	Gas	37.8	8.7	4.1	11.3	9.0	4.1	41.5	10.7	4.1	21.0	14.0	8.0
124	NORTHSTONE ELMWORTH	NPC1		Gas	4.4	4.7	4.4	0.2	1.3	0.0	4.6	4.4	4.4	4.6	4.4	4.4
125	RAINBOW 1	RB1		Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
126	RAINBOW 2	RB2		Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
127	RAINBOW 5	RB5		Gas	20.4	6.4	0.0	0.5	5.9	0.9	16.3	2.5	0.0	8.3	5.0	0.9
128	RAINBOW 3	RB3		Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
129	RAINBOW 4	RL1		Co-gen Gas	37.2	39.3	40.8	42.5	35.0	28.8	30.2	26.0	12.3	40.4	35.1	35.0
130	FORT NELSON	FNG1		Gas	11.1	1.4	0.0	0.7	3.4	3.4	21.9	6.3	2.4	8.3	2.3	1.8
131	STURGEON 1	ST1		Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
132	STURGEON 2	ST2		Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
133	ATCO VALLEY VIEW 2	VVW2		Gas	0.0	0.0	0.0	0.1	1.0	0.2	3.4	0.1	0.0	1.4	0.1	0.0
134	FORTIS GENALTA CARSON CREEK GENERATOR	0000065911		Gas	0.8	0.1	0.0	0.0	0.5	0.0	1.9	0.2	0.0	0.2	0.0	0.0
135	DRYWOOD 1	DRW1		Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
136	ENMAX CROSSFIELD ENERGY CENTER	CRS3		Gas	17.6	2.8	0.0	2.1	6.0	1.0	26.2	4.1	0.0	10.8	4.5	0.2
137	ENMAX CROSSFIELD ENERGY CENTER	CRS1		Gas	15.5	3.1	0.0	10.9	6.4	0.7	25.5	3.6	0.0	8.9	3.4	0.1
138	ENMAX CROSSFIELD ENERGY CENTER	CRS2		Gas	15.7	2.6	0.0	11.1	6.6	0.9	23.1	3.4	0.0	9.3	3.3	0.1
139	NRGREEN WINDFALL POWER GENERATING STATION	NRG3		Gas	3.2	4.0	6.4	0.0	0.0	0.0	0.0	0.0	0.1	2.8	1.7	1.6
140	FORTIS ANC (ALBERTA NEWSPRINT COMPANY) - GEN	ANC1		Gas	7.5	0.3	0.0	0.5	0.5	0.0	10.9	0.5	0.0	2.3	0.4	0.0
141	CLOVER BAR 1	ENC1		Gas	24.7	4.5	0.0	0.0	2.0	0.0	23.3	3.3	0.0	8.1	4.6	0.6
142	CLOVER BAR 2	ENC2	1	Gas	33.6	11.5	0.0	2.3	9.9	0.0	46.9	11.9	0.0	16.5	7.2	1.1
143	CLOVER BAR 3	ENC3	1	Gas	63.5	14.4	0.0	0.0	10.2	0.2	54.6	10.5	0.0	6.2	7.5	1.1
144	TRANSCANADA BEAR CREEK GENERATOR	BCRK	2	Co-Cycle	3.8	3.4	10.3	0.1	2.0	0.0	24.3	9.0	0.8	6.2	5.9	2.2
145	ENMAX SHEPARD ENERGY CENTRE	EGC1	2	Co-Cycle	10.9	19.6	14.5	36.1	99.5	75.1	151.4	37.9	0.0	0.0	2.9	0.3

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146	CAVAILIER	EC01	2	Co-Cycle	36.1	19.7	2.1	19.7	21.2	13.4	44.9	19.3	2.7	38.9	23.0	9.2
147	CITY OF MEDICINE HAT	CMH1	2	Gas	6.6	2.7	0.8	1.8	2.3	1.6	9.7	3.8	1.4	6.0	2.9	1.6
148	BALZAC	NX01	2	Co-Cycle	43.4	27.1	10.9	9.6	17.0	9.4	46.0	19.2	6.2	35.5	10.5	3.9
149	DOW GTG	DOWGEN15M	2	Co-gen	13.8	7.8	1.7	5.3	3.7	1.0	11.1	4.7	1.2	10.1	6.0	1.9
150	ENMAX CALGARY ENERGY CENTRE CTG	CES1	2	Co-Cycle	68.4	39.5	16.9	39.8	43.0	38.4	71.8	26.6	9.6	53.9	21.9	8.0
151	ENMAX CALGARY ENERGY CENTRE STG	CES2	2	Co-Cycle	37.6	22.5	10.8	20.7	24.7	23.5	51.1	17.1	6.4	30.2	13.3	4.9
152	DIASHOWA	DAI1	2	Co-gen	1.0	0.8	0.8	0.7	0.7	0.6	1.3	0.8	0.4	0.9	0.8	0.8
153	FORTISALBERTA AL-PAC PULP MILL	AFG1TX	2	Gas	2.4	1.0	0.5	1.3	1.6	1.6	6.1	3.7	3.0	2.0	1.3	1.3
154	NOVA JOFFRE	NOVAGEN15M	2	Co-gen	26.4	18.3	11.8	18.2	15.8	13.6	23.8	16.4	11.3	15.7	8.6	6.8
155	MUSTUS ENERGY BIOMASS GENERATOR	Project803_1_SUP		Biomass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.5	41.5	41.5
156	CLOVER BAR 2	ENC2	2	Gas	13.6	4.6	0.0	1.0	4.0	0.0	19.0	4.8	0.0	6.7	2.9	0.5
157	CLOVER BAR 3	ENC3	2	Gas	8.3	1.9	0.0	0.0	1.3	0.0	7.2	1.4	0.0	0.8	1.0	0.1
158	NORTHERN PRAIRIE POWER PROJECT	NPP1	2	Gas	20.0	4.6	2.2	6.0	4.8	2.2	22.0	5.7	2.2	11.1	7.4	4.3
159	POPLAR HILL	PH1	2	Gas	1.2	0.4	0.2	0.2	3.8	1.1	6.0	0.7	0.3	0.4	0.2	0.3
160	VALLEYVIEW	VVW1	2	Gas	0.0	0.0	0.0	0.1	3.1	0.3	8.2	0.5	0.0	0.5	0.4	0.1
161	ATCO GENALTA CADOTTE GENERATOR INCREASE	321S009N		Gas	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
162	FORTIS STS INCREASE NEPL RALSTON DG	0000089511		Gas	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
163	FORTIS GENALTA BELLSHILL DG	0000013711		Gas	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
164	FORTIS BLUE EARTH INC./JBS D.G.	Project1550_1_GN		Gas	0.0	0.0	0.0	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
165	CENOVUS SUNDAY CREEK BTF	Project1245_1_GN		Gas	0.0	0.0	0.0	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7