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ALBERTA ELECTRIC SYSTEM OPERATOR

2012 Loss Factors Generic Stacking Order

PROFESSIONAL ENGINEER
FRIEDRICH RITTER
ALBERTA
Sept. 16, 2011

SEPTEMBER 16, 2011

	Name	Signature	Date
Prepared by:	Ryan Fehr, EIT.		Sept 16 2011
Reviewed by:	Ashikur Bhuiya, P.Eng.		Sep 16/2011
Approved by:	Fred Ritter, P.Eng		Sept. 16, 2011

APEGGA Permit to Practice P-8200

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

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1 Purpose

The purpose of this document is to describe the 2012 Generic Stacking Order as the order applies to the loss factor calculation.

2 Introduction

The Generic Stacking Order (GSO) is a key component in the loss factor calculation. Generators are dispatched to meet system demand in the base cases according to the order and generation amount specified in the GSO.

The loss factor GSO contains two key pieces of information –

1. Generation supply levels on a net-to-grid basis (NTG) for 12 seasonal cases[1] (four seasons and three load levels as defined below) for all generators, and

Season	Timeframe	Scenario
Winter	December, 2011 – February, 2012	High
		Medium
		Low
Spring	March, 2012 – May, 2012	High
		Medium
		Low
Summer	June, 2012 – August, 2012	High
		Medium
		Low
Fall	September, 2012 – November, 2012	High
		Medium
		Low

2. Generation dispatch order.

   The Rule governing the determination of the GSO generation supply levels can be located at www.aeso.ca > Rules & Standards > ISO Rules > Current Rules. 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 or by a combination of actual data and the Incapability Factors. 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 4.0. The AESO will request annually from generation owners confirmation that the previous year's historical data is appropriate to use. Additional blocks are used where necessary to reflect a generator's multiple bidding strategy.

   The TMR requirement (please refer to www.aeso.ca > Rules and Standards >Current Operating Policies and Procedures > "Complete Set of OPPs") supersedes all other operational criteria and hence TMR generators are dispatched first on the list when required to fulfill the reliability criteria.

[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.

3 Background

In 2006, the AESO began utilizing a new methodology, 50% Area Load Corrected R-Matrix, for the determination of generator and opportunity service loss factors. The methodology reflects the requirements of the Transmission Regulation. More information on the methodology can be found in the Current ISO Rules (www.aeso.ca > Rules and Standards >Current ISO Rules> "Appendix 6 - Transmission loss Factor Methodology & Assumptions".

4 2012 GSO Key Features

The highlights of the 2012 GSO 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, and Saskatchewan) is shown in the GSO only if the net is import. If the net is export the GSO shows zero for the scenario. The net import (if any) is added at the end of the 2nd block of Hydro. If the net is export then it will be reflected in the loss factor base cases. The DOS loads will be reflected in the loss factor base cases.

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

6. No maintenance or outage data is used in the 2012 GSO as average historical net-to-grid output of a generator inherently contains this information.

7. 12 seasonal net-to-grid generations are assigned to each individual generator at the point of supply (POS).

8. 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.

9. Future generators expected to be connected in the forecast year that have Alberta Utilities Commission (AUC) approval will be included in the GSO.

10. Generators that have filed decommissioning plans with the AESO will be removed accordingly.

11. The AESO typically relies on an operating profile submitted by the generator owner of a new generator. In the event this information has not been provided, the AESO will rely on the Canadian Electricity Association's (CEA) latest annual report on Generation Equipment Status

[2] www.aeso.ca/downloads/Transmission_Loss__Factor_GSO_Data_Confirmation_Request.pdf

utilizing the incapability factors (ICBF) to calculate the power available to the AIES. (1- ICBF) has been considered as equivalent to Available Capacity Factors (ACF).

12. The 2012 GSO considers the NTG amount at the point of supply (POS). Since any given loss factor is primarily the function of the NTG amount of generation, the 2012 GSO represents an aggregate of generation at the point of supply. An equivalent generator is considered at the bus from which the NTG amount related to the Measurement Point Identification (MPID) is obtained. For example, Horseshoe has 4 generators with a single MPID which is 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 (ISD). All ISDs are represented by a single equivalent generator and load. The GSO contains a column with bus numbers for corresponding MPIDs.

13. An energy stacking order is created for all generation units based on lowest operating cost for units predominantly 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 dispatch order. Each generator's hourly bidding 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 (January 1st 2010 - December 31st 2010). 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 bid 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 bock size belong to the second block. The second block price is determined by calculating the average bid 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 2nd block. The statistical analysis shows that some generators have an insignificant amount of generation in the 2nd block which indicates their price insensitivity. A weighted average of generator output of 12 seasonal outputs is calculated based on the H values or duration 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 2012 GSO is similar to its predecessors in the following aspects:

1. Units with similar generation technology in cases where operating costs are identical are ranked according to their pervious year's loss factors.

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

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

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

4.1 2011 Important Generator Retirements

1. Sundance Units 1 and 2 have been out of service since December of 2010

5 2012 Generic Stacking Order

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

1. **Transmission Must Run (TMR) generators** – the generators represent the expected TMR dispatch (of gas, combined cycle, or other units) beyond area generation energy market participation. The TMR units are listed in the AESO OPP 501. TMR is required in specific areas of the AIES to meet reliability criteria The total NTG amount assigned to the TMR generators in the 2012 GSO 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 2010 to May 31 2011). 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 2010 to May 31 2011). The AIES seasonal load duration curve analysis is used to obtain the average TMR instruction amount for each generator.

    According to the OPPs 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 to the AESO.

2. **Data** – Most of the data used in the 2012 GSO 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, 2010 to May 31, 2011.

3. **Dispatch Generator** – In general, the energy stacking order is formed to more closely reflect an actual operational perspective. The generators may bid multiple blocks but the typical block size beyond the 2nd block is very small.

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

5. **Small Power Research & Development** – The relative order remains the same as the 2011 GSO. 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 stacking order is determined mainly by the predominant source of generation at the STS location.

7. **Future Generation** – generators expected to be connected in the forecast year that have AUC approval will be included in the GSO 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 GSO following the second block of hydro generation. The location reflects the relative level of availability of import resources for Alberta. The GSO provides a list of generation or equivalent entity (imports or industrial system designation) along with their predicted seasonal output capacity. Exports are not added in the GSO as they are not a supply component of the system.

Appendix 1: 2012 Generic Stacking Order

New GSO Number	Name	MP_ID	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	RAINBOW 4	RL1	1	Co-gen	41.5	40.7	42.2	31.8	29.4	24.9	30.7	27.9	26.6	42.1	35.9	32.7
2	RAINBOW 5	RB5	1	Gas	27.4	17.4	11.2	29.0	17.4	12.2	14.0	10.6	8.9	17.5	16.4	13.1
3	POPLAR HILL	PH1	1	Gas	0.9	0.6	0.2	1.2	2.2	0.0	0.0	0.3	0.0	0.7	0.5	0.0
4	VALLEYVIEW	VVW1	1	Gas	0.1	0.0	0.0	0.0	2.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
5	FORT NELSON	FNG1	1	Gas	12.4	29.6	36.0	31.1	34.2	35.9	20.7	34.0	36.0	27.8	32.1	32.1
6	BEAR CREEK G1	BCRK	1	Co-Cycle	6.4	7.9	4.3	12.8	5.0	0.2	0.1	3.8	1.4	13.6	6.8	4.4
7	RAINBOW 2	RB2	1	Gas	0.0	0.7	0.0	0.6	1.5	1.3	0.0	0.0	0.0	0.0	0.0	0.0
8	TABER WIND	TAB1		Wind	23.4	32.0	50.2	20.7	24.9	27.8	9.7	17.1	37.1	20.0	20.7	26.7
9	SUNCOR HILLRIDGE WIND FARM	SCR3		Wind	7.8	13.4	19.7	7.5	11.3	13.6	4.2	7.3	15.6	9.7	9.5	12.3
10	GLENWOOD	0000022911		Wind, DG	0.0	0.0	0.0	0.0	0.0	0.0	2.9	3.1	4.0	0.0	1.0	1.4
11	FT MACLEOD	0000001511		Wind, DG	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
12	CASTLE RIVER	CR1		Wind	11.4	13.8	21.2	8.0	10.9	7.3	7.5	7.2	10.4	13.9	11.5	9.6
13	SUNCOR MAGRATH	SCR2		Wind	6.7	12.3	19.5	8.4	10.7	11.0	4.6	8.0	14.0	10.3	9.8	9.5
14	PINCHER CREEK	0000039611		Wind, DG	0.6	1.2	3.0	0.5	1.4	1.4	0.4	0.9	2.3	1.1	1.7	1.9
15	MCBRIDE	AKE1		Wind	17.6	27.9	45.2	15.0	21.3	21.1	10.2	16.5	31.5	22.1	20.8	20.1
16	KETTLES HILL WIND ENERGY PHASE 2	KHW1		Wind	16.7	22.9	37.1	10.7	21.2	19.5	8.8	15.2	27.2	22.2	21.9	20.2
17	TAYLOR WIND PLANT	TAY2		Wind	0.5	0.9	1.4	0.7	0.8	0.7	0.4	0.4	0.7	0.6	0.6	0.4
18	BLUE TRAIL WIND FARM	BTR1		Wind	11.9	21.6	34.3	11.8	19.2	19.3	8.7	14.0	27.7	15.0	19.2	19.7
19	SUMMERVIEW 1	IEW1		Wind	19.2	22.9	35.5	12.3	21.1	18.1	10.5	14.2	32.0	18.2	20.8	19.3
20	SUMMERVIEW 2	IEW2		Wind	14.0	19.7	29.8	10.5	19.3	15.1	6.2	8.1	10.3	14.2	18.7	15.5
21	SODERGLEN	GWW1		Wind	18.0	27.0	42.9	16.1	24.6	26.6	11.4	19.7	35.7	29.4	23.5	23.8
22	TRANSALTA ARDENVILLE WIND FARM	ARD1		Wind	14.8	20.1	29.8	14.2	20.3	23.6	16.9	16.9	16.9	25.1	25.1	25.1
23	COWLEY EXPANSION 1	CRE1		Wind	0.2	0.2	0.3	0.2	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.2
24	COWLEY EXPANSION 2	CRE2		Wind	0.3	0.4	0.5	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3
25	COWLEY NORTH	CRE3		Wind	6.2	6.4	9.4	5.2	5.3	4.1	3.7	3.5	4.6	5.6	5.4	4.9
26	COWLEY RIDGE WIND POWER PHASE1	PKNE		Wind	3.0	3.3	4.7	2.7	3.1	2.2	2.4	2.0	2.5	2.7	2.8	2.6
27	COWLEY RIDGE WIND POWER PHASE2	CRWD		Wind	2.6	3.0	4.2	2.6	2.8	1.8	2.0	1.8	2.1	2.6	2.4	2.2
28	GHOST PINE WIND FARM	NEP1		Wind	1.9	11.9	17.6	18.5	20.6	32.7	19.2	19.2	19.2	28.6	28.6	28.6
29	SUNCOR WINTERING HILLS WIND ENERGY PROJECT	SCR4		Wind	39.6	39.6	39.6	30.3	30.3	30.3	22.5	22.5	22.5	33.5	33.5	33.5
30	ALBERTA WIND ENERGY OLD MAN RIVER WIND FARM	Project519_1_GEN		Wind	0.0	0.0	0.0	16.2	16.2	16.2	12.0	12.0	12.0	17.9	17.9	17.9
31	CAPITAL POWER HALKIRK WIND PROJECT	Project723_1_SUP		Wind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.2	57.2	57.2
32	WESGEN	WST1		Bio-mass	15.3	14.7	14.9	12.0	13.1	13.8	11.6	12.1	13.3	13.7	13.4	13.7
33	WHITE COURT	EAGL		Bio-mass	23.9	23.8	24.0	23.9	21.2	18.2	23.2	23.2	24.8	22.3	20.7	21.3
34	BRIDGE CREEK	GOC1		Gas-decomp	4.0	3.7	3.6	4.0	3.5	3.4	1.4	1.9	2.8	3.2	1.8	2.1
35	DRAYTON VALLEY PL IPP	DV1		Bio-mass	7.0	6.9	6.8	7.5	6.7	7.3	8.0	8.1	8.9	7.5	9.3	9.5
36	CHIN CHUTE	CHIN		Hydro	0.0	0.0	0.0	0.0	0.8	2.3	4.2	4.9	3.7	0.0	2.4	3.1
37	DICKSON DAM 1	DKSN		Hydro	4.9	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38	WATER IPP	WTRN		Hydro	1.6	1.3	1.3	0.8	2.0	2.5	2.5	2.6	2.7	0.0	0.0	0.0
39	ST MARY IPP	STMY		Hydro	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	0.0	0.0	0.0
40	RAYMOND RESERVOIR	RYMD		Hydro	0.0	0.0	0.0	0.0	0.7	2.2	7.2	6.7	1.8	0.0	3.5	4.6
41	NORTHSTONE ELMWORTH	NPC1		Co-gen	3.9	1.1	0.0	0.3	0.4	0.0	1.6	0.3	0.0	1.1	0.2	0.0
42	FORTISALBERTA AL-PAC PULP MILL	AFG1TX		Gas	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
43	GRANDE PRAIRIE ECOPOWER CENTRE	GPEC		Co-gen	10.6	10.9	11.0	6.0	10.8	9.5	8.8	11.5	15.4	11.6	9.7	10.7
44	WAUPISOO	0000040511		Co-gen, DG	4.9	4.8	4.8	5.3	3.9	1.5	4.8	5.3	5.5	6.5	6.1	6.6
45	P&G WEYERHAUSER	WEY1		Co-gen	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
46	BEAR CREEK G2	BCR2		Co-Cycle	16.5	15.1	12.6	15.6	10.6	9.1	22.1	14.6	11.4	13.4	11.8	11.9
47	HARMATTAN GAS PLANT DG	0000025611		Gas	5.1	7.2	7.6	5.6	8.4	9.5	1.5	1.5	1.5	1.5	1.5	1.5
48	SHELL CAROLINE	SHCG		Co-gen	0.2	0.5	0.4	3.5	5.7	5.5	0.0	0.3	0.8	0.0	0.8	1.2
49	DIASHOWA	DAI1		Co-gen	2.9	2.9	2.6	2.5	2.1	1.4	3.5	1.6	0.9	2.7	1.7	1.2
50	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
51	BALZAC	NX01	1	Co-Cycle	51.9	44.8	25.1	55.6	26.7	7.9	69.2	42.9	17.0	57.6	46.8	24.8
52	CARSELAND	TC01	1	Co-gen	65.9	64.8	61.7	60.1	59.2	60.8	60.0	60.3	61.7	62.4	53.5	52.8
53	CITY OF MEDICINE HAT	CMH1	1	Gas	32.3	19.2	2.1	22.9	8.1	1.5	36.4	17.0	8.1	12.2	10.8	4.3
54	CAVAILIER	EC01	1	Co-Cycle	23.3	16.4	7.3	22.9	9.8	1.6	24.8	14.6	4.1	19.9	15.7	8.5
55	NOVA JOFFRE	NOVAGEN15M	1	Co-gen	111.1	92.2	67.0	97.1	67.2	13.2	131.1	67.5	30.0	97.0	72.6	46.8
56	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
57	SHELL SCOTFORD	SCTG		Co-gen	0.9	0.1	0.0	0.1	2.3	0.5	0.0	0.0	0.0	0.0	0.7	0.2
58	REDWATER	TC02	1	Co-gen	25.6	24.7	23.7	24.0	23.2	23.3	18.9	18.4	16.6	22.0	23.2	23.6
59	DOW GTG	DOWGEN15M	1	Co-gen	54.9	34.9	21.8	36.5	37.8	26.3	52.8	39.1	16.2	53.7	48.5	26.0
60	PRIMROSE	PR1		Co-gen	5.7	7.5	5.3	0.0	3.5	5.8	1.9	5.6	5.3	3.1	6.8	8.1
61	CNRL HORIZON	CNR5		Co-gen	9.8	12.9	14.1	0.0	0.0	0.0	11.9	8.8	1.7	2.3	5.8	6.3
62	FOSTER CREEK G1	EC04		Co-gen	44.4	41.8	37.0	42.3	34.0	29.2	30.3	30.8	36.8	4.9	32.0	35.2
63	MCKAY RIVER	MKRC		Co-gen	161.4	157.1	154.0	161.9	149.0	133.4	140.2	144.5	148.3	161.9	129.8	128.0
64	SYNCRUDE	SCL1		Co-gen	39.8	34.1	30.3	26.7	20.9	19.7	16.6	24.0	17.4	40.6	41.7	44.8
65	MEG ENERGY	MEG1		Co-gen	78.7	77.3	76.0	80.9	71.4	69.7	60.7	65.9	69.7	81.3	53.6	49.9
66	MUSKEG	MKR1	1	Co-gen	59.9	39.1	22.2	53.8	33.4	16.8	62.3	47.7	36.3	61.8	45.6	32.1
67	SUNCOR MILLENIUM	SCR1	1	Co-gen	123.6	116.3	106.7	155.3	132.1	129.8	104.3	84.1	71.8	118.9	125.8	117.6
68	NEXEN OPTI	NX02		Co-gen	47.0	46.7	46.9	34.1	44.2	105.6	88.6	94.2	78.0	33.5	34.5	35.9
69	MAHKESES COLD LAKE	IOR1		Co-gen	46.9	44.2	39.4	41.5	35.6	41.1	37.0	41.6	47.6	50.0	47.9	49.1
70	ENMAX CALGARY ENERGY CENTRE CTG	CES1	1	Co-Cycle	13.9	8.7	2.7	14.1	7.0	0.8	7.4	2.9	0.5	11.9	7.2	3.0
71	ENMAX CALGARY ENERGY CENTRE STG	CES2	1	Co-Cycle	8.6	5.3	1.7	8.2	4.3	0.5	4.3	1.8	0.2	6.8	4.4	1.8
72	CASCADE	CAS	1	Hydro	20.7	10.7	0.1	20.1	8.4	0.3	1.7	0.4	0.0	15.3	6.5	0.2
73	GHOST	GHO	1	Hydro	25.1	15.4	3.1	15.7	18.1	12.6	38.6	25.9	18.0	20.1	20.8	8.6
74	SPRAY	SPR	1	Hydro	38.0	33.2	10.9	37.6	25.7	2.0	23.0	13.2	0.8	50.0	26.2	3.8
75	THREE SISTERS	THS		Hydro	0.8	0.8	0.4	0.4	0.0	0.0	0.7	0.2	0.0	1.5	0.9	0.2
76	HORSESHOE	HSH	1	Hydro	10.7	8.4	7.9	9.5	7.9	7.7	13.0	12.3	11.7	9.0	8.5	8.3
77	RUNDLE	RUN	1	Hydro	13.5	11.3	3.6	12.5	8.7	0.6	7.7	4.4	0.3	15.1	8.7	1.3
78	BARRIER	BAR		Hydro	9.1	5.4	0.0	8.8	4.6	0.8	9.0	3.8	0.6	4.8	4.8	0.6
79	KANANASKIS	KAN	1	Hydro	10.7	8.5	7.9	9.9	9.4	10.0	14.9	14.1	12.8	6.6	8.3	8.2
80	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
81	BEARSPAW	BPW	1	Hydro	6.4	6.4	6.6	6.3	7.8	9.8	11.3	11.3	11.9	5.8	5.8	5.7
82	POCATERRA	POC		Hydro	10.6	5.2	0.3	9.0	2.9	0.0	1.3	0.2	0.0	7.8	2.2	0.1
83	INTERLAKES	INT		Hydro	3.8	2.0	0.0	2.6	0.5	0.0	0.5	0.1	0.0	3.2	0.9	0.0
84	STIRLING	0000006711		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
85	BRAZEAU	BRA	1	Hydro	105.3	40.1	0.6	56.2	38.4	8.0	121.2	50.7	1.3	54.1	53.7	14.3
86	OLDMAN	OMRH		Hydro	3.6	3.6	3.7	4.1	16.9	25.2	18.3	22.9	29.6	9.3	4.7	4.3
87	TAYLOR HYDRO	TAY1		Hydro	0.0	0.0	0.0	0.0	0.7	2.1	5.9	6.2	1.5	0.0	3.0	3.8
88	BIGHORN	BIG	1	Hydro	58.1	41.5	27.0	49.8	41.1	25.5	37.7	33.1	23.6	64.2	40.0	28.2
89	HR MILNER	HRM	1	Coal	96.6	73.3	55.2	96.3	69.6	41.8	68.0	60.9	61.2	84.8	61.6	56.4
90	SHEERNESS #1	SH1	1	Coal	193.7	198.5	186.6	176.3	172.8	117.1	199.2	161.9	129.0	174.8	177.8	149.3
91	SHEERNESS #2	SH2	1	Coal	181.5	184.8	173.2	174.5	163.6	108.6	177.2	158.5	118.8	148.4	173.5	156.2
92	SUNDANCE #3	SD3	1	Coal	280.6	183.8	162.5	324.0	289.9	280.0	291.9	231.3	130.1	282.9	295.8	281.1
93	SUNDANCE #4	SD4	1	Coal	343.1	331.3	311.4	354.4	302.2	263.0	309.7	288.4	248.7	340.8	329.1	303.0
94	SUNDANCE #6	SD6	1	Coal	301.2	312.5	295.6	320.2	277.3	243.4	252.2	245.9	216.7	241.4	295.8	276.7
95	BATTLE RIVER #5	BR5	1	Coal	264.1	252.4	213.5	261.3	248.0	200.2	172.2	145.1	72.1	260.7	233.4	193.7
96	GENESEE 1	GN1	1	Coal	209.3	200.9	203.2	211.7	148.9	183.5	211.1	202.9	151.4	211.3	210.5	208.3
97	GENESEE 2	GN2	1	Coal	211.2	208.6	205.7	211.5	199.2	170.9	208.9	199.3	140.6	205.2	197.4	194.2
98	GENESEE 3	GN3	1	Coal	235.8	235.2	238.2	245.5	237.9	239.9	238.2	234.4	195.5	205.8	115.5	126.4
99	KEEPHILLS #1	KH1	1	Coal	311.9	314.1	295.1	327.3	287.7	259.9	320.6	304.6	264.0	325.0	309.8	295.9
100	KEEPHILLS #2	KH2	1	Coal	310.1	290.4	283.7	326.1	291.8	257.5	299.4	287.5	264.3	310.1	314.1	313.1
101	BATTLE RIVER #3	BR3	1	Coal	94.3	96.1	78.5	105.4	87.9	62.0	90.6	88.4	66.7	97.2	93.6	86.5
102	BATTLE RIVER #4	BR4	1	Coal	94.3	86.8	66.7	94.1	88.0	59.3	93.3	81.1	61.1	94.0	91.7	80.6
103	SUNDANCE #5	SD5	1	Coal	324.7	323.3	297.7	313.6	312.6	282.6	344.4	309.7	283.8	229.3	317.8	317.1
104	GENESEE 3	GN3	2	Coal	198.2	197.6	200.1	206.3	199.9	201.6	200.2	197.0	164.3	173.0	97.0	106.2
105	GENESEE 1	GN1	2	Coal	177.1	169.9	171.9	179.0	125.9	155.2	178.6	171.6	128.0	178.7	178.0	176.1
106	GENESEE 2	GN2	2	Coal	179.5	177.3	174.8	179.8	169.4	145.3	177.6	169.4	119.5	174.4	167.8	165.0
107	HR MILNER	HRM	2	Coal	23.4	17.8	13.4	23.4	16.9	10.1	16.5	14.8	14.8	20.5	14.9	13.7
108	SUNDANCE #6	SD6	2	Coal	54.0	56.0	53.0	57.4	49.7	43.6	45.2	44.1	38.8	43.3	53.0	49.6
109	KEEPHILLS #2	KH2	2	Coal	50.0	46.9	45.8	52.6	47.1	41.5	48.3	46.4	42.6	50.0	50.7	50.5
110	KEEPHILLS #1	KH1	2	Coal	49.1	49.4	46.4	51.5	45.3	40.9	50.4	47.9	41.5	51.1	48.8	46.6
111	SUNDANCE #5	SD5	2	Coal	46.2	46.0	42.3	44.6	44.4	40.2	49.0	44.0	40.3	32.6	45.2	45.1
112	BATTLE RIVER #5	BR5	2	Coal	108.0	103.2	87.4	106.9	101.4	81.9	70.4	59.3	29.5	106.6	95.5	79.2
113	BATTLE RIVER #3	BR3	2	Coal	37.1	37.8	30.9	41.4	34.6	24.4	35.6	34.8	26.2	38.2	36.8	34.0
114	BATTLE RIVER #4	BR4	2	Coal	56.8	52.3	40.2	56.7	53.1	35.7	56.2	48.8	36.8	56.6	55.2	48.6
115	SUNDANCE #4	SD4	2	Coal	44.5	43.0	40.4	46.0	39.2	34.1	40.2	37.4	32.3	44.2	42.7	39.3
116	SHEERNESS #1	SH1	2	Coal	146.2	149.8	140.8	133.0	130.4	88.3	150.3	122.2	97.3	131.9	134.1	112.6
117	SHEERNESS #2	SH2	2	Coal	158.2	161.1	151.0	152.1	142.6	94.6	154.4	138.1	103.5	129.3	151.2	136.1
118	SUNDANCE #3	SD3	2	Coal	9.9	6.5	5.8	11.5	10.3	9.9	10.3	8.2	4.6	10.0	10.5	10.0
119	KEEPHILLS #3	KH3	1	Coal	447.9	447.9	447.9	447.9	447.9	447.9	447.9	447.9	447.9	447.9	447.9	447.9
120	BIGHORN	BIG	2	Hydro	0.4	0.3	0.2	0.3	0.3	0.2	0.3	0.2	0.2	0.4	0.3	0.2
121	BRAZEAU	BRA	2	Hydro	3.9	1.5	0.0	2.1	1.4	0.3	4.5	1.9	0.0	2.0	2.0	0.5
122	CASCADE	CAS	2	Hydro	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
123	GHOST	GHO	2	Hydro	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
124	SPRAY	SPR	2	Hydro	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0
125	HORSESHOE	HSH	2	Hydro	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	RUNDLE	RUN	2	Hydro	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

New GSO Number	Name	MP_ID	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*
127	KANANASKIS	KAN	2	Hydro	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
128	BEARSPAW	BPW	2	Hydro	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	DICKSON DAM 1	DKSN		Hydro	0.0	0.0	0.0	4.4	6.8	11.1	10.9	11.1	10.4	4.9	7.2	7.9
130	WATER IPP	WTRN		Hydro	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	2.4	2.5
131	ST MARY IPP	STMY		Hydro	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	2.3	2.3
132	BC IMPORT	BCHIMP		Import	523.0	383.5	108.7	517.6	419.2	320.9	414.8	250.8	240.9	402.1	149.3	0.0
133	SASKATCHEWAN IMPORT	SPCIMP		Import	90.8	61.8	41.2	98.3	77.3	78.3	24.4	60.3	63.6	50.1	29.0	27.2
134	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
135	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
136	ATCO VALLEY VIEW 2	VVW2		Gas	0.8	0.3	0.0	0.0	0.2	0.0	0.5	0.0	0.0	0.0	0.0	0.0
137	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
138	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
139	CLOVER BAR 3	ENC3	1	Gas	33.5	11.9	2.4	0.0	0.0	0.0	21.1	5.3	0.0	22.6	10.5	3.1
140	CLOVER BAR 1	ENC1	1	Gas	11.3	7.6	0.9	7.9	1.4	0.0	2.0	0.8	0.0	4.8	1.0	0.3
141	CLOVER BAR 2	ENC2	1	Gas	14.6	9.6	1.5	12.3	2.3	0.0	0.0	0.0	0.0	8.0	2.1	0.3
142	ENMAX CROSSFIELD ENERGY CENTER	CRS3	1	Gas	2.0	0.6	0.1	2.2	0.6	0.0	2.3	0.7	0.0	1.9	0.4	0.1
143	ENMAX CROSSFIELD ENERGY CENTER	CRS1	1	Gas	1.4	0.6	0.0	2.1	0.7	0.0	2.3	0.6	0.0	1.7	0.3	0.1
144	ENMAX CROSSFIELD ENERGY CENTER	CRS2	1	Gas	1.8	0.6	0.1	2.4	0.7	0.0	2.6	0.8	0.0	1.6	0.4	0.1
145	NORTHERN PRAIRIE POWER PROJECT	NPP1	1	Gas	43.6	17.0	0.9	13.9	9.8	0.0	33.6	7.0	0.0	19.9	4.5	0.3
146	ENMAX CALGARY ENERGY CENTRE CTG	CES1	2	Co-Cycle	137.7	85.8	26.7	139.3	69.0	8.3	73.8	28.8	4.8	117.8	71.3	29.9
147	ENMAX CALGARY ENERGY CENTRE STG	CES2	2	Co-Cycle	85.0	52.4	16.5	81.5	42.3	4.8	42.4	17.5	2.3	67.4	43.5	17.9
148	SUNCOR MILLENIUM	SCR1	2	Co-gen	8.3	7.8	7.2	10.4	8.9	8.7	7.0	5.6	4.8	8.0	8.4	7.9
149	CAVAILIER	EC01	2	Co-Cycle	66.6	46.9	20.8	65.3	28.0	4.5	70.8	41.6	11.8	56.9	44.8	24.4
150	CITY OF MEDICINE HAT	CMH1	2	Gas	11.9	7.1	0.8	8.4	3.0	0.6	13.4	6.3	3.0	4.5	4.0	1.6
151	BALZAC	NX01	2	Co-Cycle	20.9	18.1	10.1	22.4	10.8	3.2	27.9	17.3	6.9	23.2	18.9	10.0
152	DOW GTG	DOWGEN15M	2	Co-gen	15.2	9.7	6.0	10.1	10.5	7.3	14.6	10.8	4.5	14.9	13.4	7.2
153	MUSKEG	MKR1	2	Co-gen	7.5	4.9	2.8	6.7	4.2	2.1	7.8	6.0	4.5	7.7	5.7	4.0
154	NOVA JOFFRE	NOVAGEN15M	2	Co-gen	19.8	16.5	12.0	17.3	12.0	2.4	23.4	12.1	5.3	17.3	13.0	8.3
155	REDWATER	TC02	2	Co-gen	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3
156	CARSELAND	TC01	2	Co-gen	0.9	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.8	0.8
157	CLOVER BAR 2	ENC2	2	Gas	82.1	53.7	8.4	69.0	12.8	0.0	0.0	0.0	0.0	45.0	11.5	1.5
158	CLOVER BAR 1	ENC1	2	Gas	28.7	19.2	2.4	19.9	3.5	0.0	5.0	2.0	0.0	12.0	2.6	0.6
159	CLOVER BAR 3	ENC3	2	Gas	41.1	14.6	2.9	0.0	0.0	0.0	25.8	6.5	0.0	27.7	12.9	3.8
160	ENMAX CROSSFIELD ENERGY CENTER	CRS2	2	Gas	23.3	8.4	0.7	31.7	9.0	0.0	34.4	10.0	0.0	21.0	5.1	1.0
161	ENMAX CROSSFIELD ENERGY CENTER	CRS3	2	Gas	28.8	9.0	0.7	31.7	8.6	0.1	33.5	9.6	0.4	27.1	5.8	0.8
162	ENMAX CROSSFIELD ENERGY CENTER	CRS1	2	Gas	20.6	8.5	0.7	30.8	9.6	0.1	33.1	9.4	0.0	24.7	4.7	1.4
163	NORTHERN PRAIRIE POWER PROJECT	NPP1	2	Gas	23.5	9.2	0.5	7.5	5.3	0.0	18.1	3.8	0.0	10.7	2.4	0.1
164	FORT NELSON	FNG1	2	Gas	29.8	10.4	4.2	7.1	5.5	2.0	19.3	5.4	1.9	12.1	3.1	2.4
165	RAINBOW 4	RL1	2	Gas	2.9	1.2	1.4	0.5	1.9	4.0	3.3	3.2	2.4	0.7	0.7	0.9
166	BEAR CREEK G1	BCRK	2	Co-Cycle	26.3	18.6	9.0	11.3	1.1	0.0	29.9	8.0	1.7	14.2	1.6	0.1
167	POPLAR HILL	PH1	2	Gas	3.6	0.7	0.0	0.5	0.6	0.0	5.4	1.6	0.0	0.1	1.0	0.0
168	RAINBOW 5	RB5	2	Gas	1.6	0.5	0.4	0.3	0.7	0.2	0.3	0.7	0.2	0.4	0.7	0.4
169	VALLEYVIEW	VVW1	2	Gas	1.2	0.4	0.2	0.1	0.2	0.1	0.4	0.2	0.0	0.0	0.1	0.1
170	RAINBOW 2	RB2	2	Gas	1.2	0.5	0.0	1.1	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0
171	DRYWOOD 1	DRW1		Gas	3.5	0.7	0.0	0.5	0.3	0.0	2.5	0.3	0.0	0.6	0.2	0.0
172	BC HYDRO FORT NELSON GENERATING STATION UPGRADES	FNG1	2	Gas	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2

* Capacity determined as per AESO Rules for the defined period