2009 Generic Stacking Order Loss Factors

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1.0 Purpose

The purpose of this document is to describe the 2009 Generic Stacking Order as the order applies to the loss factor calculation.

2.0 Introduction

The Generic Stacking Order (GSO) is a key component in the loss factor calculation, operational forecasts, planning studies, and General Tariff Application process. Generators are dispatched to meet system demand in the base cases according to the order and generation amount specified in the GSO.

The 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, 2008 – February, 2009	High
		Medium
		Low
Spring	March, 2009 – May, 2009	High
		Medium
		Low
Summer	June, 2009 – August, 2009	High
		Medium
		Low
Fall	September, 2009 – November, 2009	High
		Medium
		Low

2. Generation dispatch order.

Starting in 2006, the Rule governing the determination of the GSO generation supply levels can be located at **www.aeso.ca** > Rules & Procedures > ISO Rules > Current Rules. The AESO has clarified details where necessary to

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

reflect changes in process as outlined in the 2007 Transmission Regulation. These changes will be effective as of January 1 2009. 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, the supply levels are estimated by the Incapability Factors. To determine 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 generators' multiple bidding strategies.

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

3.0 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 new methodology reflects the requirements of the Alberta Department of Energy (DOE) 2004 Transmission Regulation. The regulation (and subsequent 2007 Transmission Regulation) indicates loss factors must be calculated from the average impact of generators on the Alberta Interconnected Electric System (AIES). The regulation directed the AESO to implement a new methodology to meet these requirements. The AESO has consulted with stakeholders on both Regulations in the development of the loss factor methodology including the development of new rules for the preparation of the GSO.

Previous GSO's, up to 2005, used generators STS contract levels as capacity

amounts. Moving to a one year historical generation basis as was done in 2006 has several advantages, including;

- Amounts of actual generator energy market dispatch representative for the previous year
- Addresses the issue of confidentiality of maintenance data by including actual maintenance and forced outages from the previous period
- Treats all facilities on the same basis
- Reduces necessity for the AESO to forecast generator / pool price relationships

4.0 2009 GSO Key Features

The highlights of the 2009 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 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 are provided an opportunity to comment on and suggest revisions to the GSO capacities to correct calculation errors by the AESO on historical data or proposed operational characteristics on new generation.
4. The net of historical level of import and export (separately for BC, Montana, 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-A of AESO Loss Factor Rules).

6. No maintenance or outage data is used in the 2008 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 order except for units such as wind, import, and hydro generation is determined by the actual price responses of the generators in each group.

9. New generators expected to be connected in the forecast year will be included in the GSO. These are generators with signed contracts to connect or who have made significant financial commitments to connect. Generators who have filed decommissioning plans with the AESO will be removed accordingly.

   AESO relies on the Canadian Electricity Association (CEA) information in the event of new generators or in the case of a lack of updated information from the generators on their availability. The incapability Factors (ICBF) is used to calculate the power available to the AIES. (1- ICBF) has been considered as equivalent to Available Capacity Factors (ACF). The ICBFs are obtained from CEA's latest annual report on Generation Equipment Status. ICBF is used only in the absence of operating profile submitted by the generator owner.

10. The 2009 GSO considers the NTG amount at the point of supply (POS). Since any given loss factor is primarily the function of net to grid amount of generation, the 2009 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.

11. An energy stacking order is created for all generation units based on 12 months of historical data. The generation energy market behavior analysis is updated with the latest historical data from the period June 1 2007 to May 31 2008. 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 months period. The generation unit is then divided into two blocks. Two blocks are chosen to avoid additional complexity for limited modeling improvement. A statistical analysis is applied to define the first and second blocks from its multi-block stacking order. A low end price with the highest occurring percentage in the 12 months period is selected as the first block. Its block size is defined as the average size based on occurrence. Generation volumes above the first bock size belong to the second block. This block price is defined by using weighted average of all the prices above the first block. The weighted factor is generation MW changes at each price and its percentage in history. The second block size is calculated by averaging of all blocks above the first block. 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 weighted average is equal to or more than 5 MW. In some cases the second block is not assigned to a generator even though the weighted average is more than 5 MW such as for SPR&D or Wind generators.

The price response analysis used to construct the GSO is consistent with the losses forecast as filed with the AESO's General Tariff Application.

The 2008 GSO is similar to its predecessors 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 (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)

5.0 2009 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 OPPs 501, 510 and 521. TMR is required in specific areas of the AIES to meet reliability criteria The total net-to-grid (NTG) amount assigned to the TMR generators in the 2008 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 2007 to May 31 2008). 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 2007 to May 31 2008). 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) Most of the data used in 2009 GSO such as Alberta system load, hourly pool price and generation amount at each POS are historical and taken from the most recent 12 months' data found in the AESO's billing system. The data extraction period is June 1 2007 to May 31 2008.

3) 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 2008 GSO. SPR&D generators are exempt by law from paying for losses.

6) **Distribution Connected Generation** – consists of distribution connected generators with STS contracts who occasionally supplies 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 and ranked by historical hourly pool price.

7) **Preliminary Generation** – consists of the generators with preliminary status 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.

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New GSO Number	Name	MP_ID	Gen with 2nd Block	PSS/E Bus	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	1035	Co-gen	35.4	42.6	43.2	44.7	37.7	38.7	25.9	34.2	34.2	41.5	36.4	36.7
2	RAINBOW 5	RB5	1	1037	Gas	17.8	19.6	11.6	20.8	21.6	14.5	18.7	16.4	10.8	21.8	23.1	18.2
3	FORT NELSON	FNG1	1	1016	Gas	19.1	33.2	37.9	36.1	30.9	37.5	18.6	33.7	38.5	31.3	33.6	35.5
4	POPLAR HILL	PH1	1	1118	Gas	4.9	2.1	0.0	15.2	4.9	0.6	3.4	1.5	0.4	10.4	8.0	0.9
5	BEAR CREEK G1	BCRK	1	10142	Co-Cycle	10.4	5.7	0.0	0.0	2.2	3.2	1.3	0.6	0.0	10.7	2.9	0.7
6	VALLEYVIEW	VVW1	1	1171	Gas	10.2	1.0	0.0	8.9	1.0	0.0	0.1	0.0	0.0	2.0	0.0	0.0
7	BEAR CREEK G2	BCR2	1	10142	Co-Cycle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	RAINBOW 1	RB1	1	1031	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
9	RAINBOW 3	RB3	1	1033	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
10	RAINBOW 2	RB2	1	1032	Gas	11.0	1.9	0.1	2.6	2.7	0.9	1.9	0.4	0.5	3.7	2.7	1.7
11	GRANDE PRAIRIE ECOPOWER CENTRE	GPEC	1	1101	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
12	NORTHSTONE ELMWORTH	NPC1	1	19134	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
13	TABER WIND	TAB1		343	Wind	17.6	30.9	42.4	26.0	22.0	24.1	6.8	13.0	13.0	22.9	29.5	38.0
14	SUNCOR HILLRIDGE WIND FARM	SCR3		389	Wind	10.6	14.8	18.7	11.9	11.1	13.2	4.8	8.7	7.1	11.0	13.4	15.8
15	FT MACLEOD	0000001511		4237	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
16	SUNCOR MAGRATH	SCR2		251	Wind	12.2	14.4	18.7	13.2	11.7	12.2	4.8	7.2	5.7	9.3	13.2	13.2
17	GLENWOOD	0000022911		4245	Wind, DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.0	0.2	0.4
18	McBRIDE	AKE1		901	Wind	26.3	35.3	46.3	30.5	29.3	24.3	17.5	18.9	10.0	20.3	34.1	32.6
19	TAYLOR WIND PLANT	TAY2		670	Wind	0.9	1.0	1.3	1.2	0.8	0.7	0.3	0.4	0.2	0.5	1.0	0.7
20	SODERGLEN	GWW1		358	Wind	27.8	37.5	48.2	33.0	33.0	27.3	18.3	20.7	12.9	22.5	34.2	32.3
21	CASTLE RIVER	CR1		234	Wind	12.6	18.0	19.9	15.5	14.5	8.8	9.3	8.0	4.4	13.0	16.8	13.6
22	KETTLES HILL WIND ENERGY PHASE 2	KHW1		402	Wind	25.4	31.5	38.5	27.5	27.8	20.7	14.8	9.9	5.2	19.9	28.1	24.4
23	PINCHER CREEK	0000039611		4224	Wind, DG	0.2	1.2	2.1	0.5	1.0	1.2	0.2	0.7	0.6	0.3	1.4	1.4
24	SUMMERVIEW 1	IEW1		336	Wind	24.8	31.9	37.0	22.7	26.9	23.5	16.8	17.9	7.0	19.1	31.1	25.7
25	COWLEY EXPANSION 1	CRE1		264	Wind	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.3	0.2
26	COWLEY EXPANSION 2	CRE2		264	Wind	0.4	0.5	0.6	0.4	0.4	0.2	0.3	0.2	0.1	0.3	0.4	0.4
27	COWLEY NORTH	CRE3		264	Wind	7.5	8.9	10.4	5.7	6.1	4.2	4.6	4.1	2.1	5.5	7.7	6.7
28	COWLEY RIDGE WIND POWER PHASE1	PKNE		264	Wind	4.1	4.7	5.4	3.6	3.7	2.5	2.8	2.2	0.6	2.8	4.2	3.7
29	COWLEY RIDGE WIND POWER PHASE2	CRWD		264	Wind	3.7	4.1	4.6	3.1	3.3	2.2	2.5	2.1	1.0	2.5	3.7	3.2
30	WESGEN	WST1		14	Bio-mass	7.2	8.1	8.9	14.1	12.5	11.7	8.2	9.0	5.7	1.4	8.3	8.2
31	WHITE COURT	EAGL		410	Bio-mass	24.3	23.2	20.3	24.2	18.6	11.3	22.9	22.4	23.5	24.5	21.8	21.6
32	BRIDGE CREEK	GOC1		19145	Gas-decomp	2.8	3.5	3.6	3.7	3.4	3.4	2.1	2.6	3.0	3.5	3.2	3.4
33	DRAYTON VALLEY PL IPP	DV1		4332	Bio-mass	7.2	6.2	4.3	8.6	7.7	7.7	8.7	7.7	8.4	10.2	8.7	8.7
34	BELLY RIVER IPP	BLYR		447	Hydro	0.0	0.0	0.0	0.0	0.0	0.0	2.7	2.8	2.8	0.0	1.1	1.3
35	CHIN CHUTE	CHIN		406	Hydro	0.0	0.0	0.0	0.0	2.2	6.2	9.9	9.7	9.6	0.0	3.8	4.7
36	DICKSON DAM 1	DKSN		4006	Hydro	4.8	4.8	4.8	4.4	6.2	9.4	14.0	12.2	11.0	4.0	4.9	5.5
37	WATER IPP	WTRN		3449	Hydro	0.5	0.5	0.5	0.6	0.7	1.1	1.1	1.4	1.5	0.6	1.0	0.9
38	ST MARY IPP	STMY		3448	Hydro	0.9	1.0	1.0	1.0	1.0	1.1	1.8	1.9	1.9	0.9	1.0	1.0
39	RAYMOND RESERVOIR	RYMD		413	Hydro	0.0	0.0	0.0	0.0	2.3	6.4	19.4	18.3	18.3	0.0	5.6	7.0
40	DIASHOWA	DAI1		1088	Co-gen	1.7	2.3	2.2	2.4	1.9	1.4	3.4	2.6	1.6	1.3	1.2	0.8
41	P&G WEYERHAUSER	WEY1		1141	Co-gen	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	BALZAC	NX01	1	290	Co-Cycle	30.2	16.0	3.0	14.5	26.1	16.7	36.1	19.2	14.6	33.7	11.1	5.1
43	CARSELAND	TC01	1	5251	Co-gen	50.5	45.4	45.1	45.1	47.0	45.1	45.4	45.5	45.4	47.0	44.3	44.5
44	ENMAX CALGARY ENERGY CENTRE CTG	CES1	1	187	Co-Cycle	58.1	23.5	2.2	37.7	41.5	9.5	79.6	35.1	12.8	23.0	23.1	4.3
45	ENMAX CALGARY ENERGY CENTRE STG	CES2	1	187	Co-Cycle	32.9	13.7	1.1	21.6	25.8	4.6	54.5	22.9	8.0	14.6	14.9	2.1

46	CITY OF MEDICINE HAT	CMH1	1	680	Gas	2.5	2.0	0.6	4.7	2.5	0.2	3.7	2.8	3.2	1.2	1.8	0.5
47	PLAMONDON	0000035311		4304	Co-gen, DG	1.2	0.8	0.5	0.2	0.7	0.4	0.6	0.6	0.8	0.1	0.3	0.3
48	CAVAILIER	EC01	1	247	Co-Cycle	31.6	17.6	3.5	26.3	26.2	9.1	37.7	19.5	6.2	37.1	27.8	8.5
49	NOVA JOFFRE	NOVAGEN15M	1	383	Co-gen	73.3	61.8	42.0	34.8	56.7	50.5	96.3	66.5	38.8	78.9	68.9	57.4
50	REDWATER	TC02	1	50	Co-gen	14.1	12.4	12.4	14.5	13.4	13.3	9.8	11.3	11.7	12.5	11.6	11.5
51	DOW GTG	DOWGEN15M	1	61	Co-gen	42.5	23.4	7.9	28.9	29.2	14.5	49.9	32.3	14.9	50.6	29.6	9.7
52	SHELL SCOTFORD	SCTG		43	Co-gen	13.2	5.9	0.6	6.7	2.0	0.1	0.0	0.0	0.0	28.8	4.0	1.3
53	NEXEN OPTI	NX02		1241	ISD	43.7	43.7	43.7	24.8	47.4	60.7	43.7	43.7	43.7	43.7	43.7	43.7
54	PRIMROSE	PR1	1	1302	Co-gen	21.4	21.5	19.8	13.7	12.4	14.8	16.3	20.4	23.2	23.3	20.4	20.9
55	SUNCOR MILLENIUM	SCR1	1	1208	Co-gen	186.3	174.9	146.6	172.1	122.4	128.5	157.7	119.5	61.6	176.8	148.8	123.9
56	McKAY RIVER	MKRC	1	1274	Co-gen	140.7	130.0	112.1	153.9	119.5	69.7	103.6	96.5	110.2	79.1	80.7	73.6
57	SYNCRUDE	SCL1		1205	Co-gen	32.2	36.9	44.7	39.1	41.8	44.5	18.7	18.3	20.5	51.9	38.6	36.6
58	MUSKEG	MKR1	1	1236	Co-gen	69.5	65.9	58.0	80.0	67.8	52.8	52.5	50.6	47.6	85.3	63.0	51.8
59	FOSTER CREEK G1	EC04	1	1301	Co-gen	42.5	53.8	57.5	35.9	39.2	35.8	36.1	43.2	44.2	56.4	49.8	48.5
60	MAHKESES COLD LAKE	IOR1		1310	Co-gen	48.1	45.8	44.6	27.8	13.1	8.6	30.3	41.4	45.2	52.1	44.6	44.9
61	BUCK LAKE	0000045411		80	Co-gen, DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0
62	CASCADE	CAS	1	175	Hydro	17.7	8.2	0.0	10.5	4.9	0.1	8.5	2.3	0.0	14.9	6.6	0.1
63	POCATERRA	POC		214	Hydro	13.8	5.4	0.0	10.3	3.1	0.0	7.4	1.9	0.0	10.2	4.0	0.2
64	SPRAY	SPR	1	310	Hydro	33.0	22.4	6.8	30.5	20.0	1.2	43.6	27.3	10.5	27.5	18.3	2.7
65	RUNDLE	RUN	1	197	Hydro	12.0	8.4	2.8	12.6	7.5	0.5	16.4	10.2	4.1	10.1	6.8	1.0
66	BARRIER	BAR		216	Hydro	10.1	5.0	0.0	6.5	4.5	2.7	10.6	6.0	3.2	6.8	5.1	0.4
67	HORSESHOE	HSH	1	171	Hydro	9.0	7.3	7.5	6.8	7.0	8.0	12.3	11.9	11.1	7.9	7.7	7.3
68	KANANASKIS	KAN	1	193	Hydro	8.8	7.3	7.3	6.9	7.4	8.8	15.9	14.3	12.5	7.5	7.5	7.1
69	GHOST	GHO	1	180	Hydro	22.7	9.9	1.1	12.9	8.8	9.9	32.8	24.9	14.8	17.0	14.7	3.0
70	THREE SISTERS	THS		379	Hydro	1.0	0.6	0.2	0.2	0.1	0.0	1.5	0.7	0.2	1.0	0.7	0.1
71	BEARSPAW	BPW	1	183	Hydro	5.0	5.1	5.4	5.0	5.4	6.9	11.8	10.7	10.0	5.0	5.8	6.1
72	INTERLAKES	INT		376	Hydro	2.8	1.4	0.1	1.0	0.5	0.0	3.0	0.7	0.0	3.3	1.6	0.0
73	STIRLING	0000006711		4280	Hydro, DG	0.0	0.0	0.0	0.0	0.1	0.7	0.0	0.6	1.9	0.0	0.1	0.4
74	SPRING COULEE	0000038511		4246	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	TAYLOR HYDRO	TAY1		670	Hydro	0.0	0.0	0.0	0.0	2.1	5.7	12.6	12.7	12.9	0.0	4.4	5.6
76	OLDMAN	OMRH		230	Hydro	1.8	1.8	1.8	2.9	8.0	16.3	29.7	25.5	22.9	3.2	8.1	9.1
77	BIGHORN	BIG	1	103	Hydro	44.8	31.5	22.2	35.3	32.5	20.7	70.5	48.5	32.5	43.5	35.5	23.7
78	BRAZEAU	BRA	1	153,33	Hydro	7.9	3.1	0.0	4.3	3.8	0.6	12.8	6.4	1.8	5.7	3.4	0.4
79	SHEERNESS #1	SH1	1	1484	Coal	261.1	251.6	218.5	275.2	258.2	226.4	263.9	229.4	224.6	253.5	234.5	222.9
80	SHEERNESS #2	SH2	1	1484	Coal	249.4	240.1	229.0	243.8	240.0	237.4	248.0	236.2	203.5	241.8	229.7	206.5
81	WABAMUN #4	WB4	1	133	Coal	243.8	246.0	236.7	261.5	231.3	248.6	195.8	162.2	127.3	224.7	215.6	209.3
82	SUNDANCE #2	SD2	1	135	Coal	208.7	196.4	183.6	233.7	202.1	158.5	206.7	186.9	185.0	224.7	191.5	191.4
83	SUNDANCE #3	SD3	1	135	Coal	280.5	275.0	256.4	304.8	266.4	234.5	275.5	258.1	213.8	288.4	249.0	232.1
84	SUNDANCE #4	SD4	1	135	Coal	286.3	266.1	246.4	314.4	277.2	277.2	106.4	123.5	111.0	310.1	214.2	178.1
85	SUNDANCE #6	SD6	1	135	Coal	267.7	234.9	202.0	270.0	239.3	207.9	263.5	252.3	222.9	276.3	262.1	241.4
86	KEEPHILLS #1	KH1	1	420	Coal	293.4	280.2	239.8	303.6	275.1	258.8	280.7	278.0	266.8	299.1	282.9	281.2
87	KEEPHILLS #2	KH2	1	420	Coal	270.4	265.4	270.9	262.9	235.6	218.1	294.6	285.0	273.1	288.6	289.5	286.8
88	GENESEE 1	GN1	1	524	Coal	194.4	189.3	196.0	172.0	121.2	157.4	193.9	193.4	181.5	198.6	171.7	169.3
89	GENESEE 2	GN2	1	524	Coal	197.6	195.2	194.4	119.1	132.7	138.5	193.0	185.5	183.6	195.1	190.7	189.1
90	GENESEE 3	GN3	1	524	Coal	222.9	224.7	226.2	213.0	169.5	117.6	190.2	212.2	198.6	231.6	198.9	188.2
91	SUNDANCE #1	SD1	1	135	Coal	237.3	221.1	225.3	248.2	220.0	196.5	155.0	123.7	147.0	196.6	216.1	214.4
92	SUNDANCE #5	SD5	1	135	Coal	280.0	266.1	253.9	284.8	242.0	233.4	235.3	179.0	127.3	256.5	269.1	251.4
93	BATTLE RIVER #3	BR3	1	1491	Coal	67.2	66.7	63.8	70.3	68.1	61.0	55.5	37.2	37.5	65.9	63.3	58.7
94	BATTLE RIVER #4	BR4	1	1491	Coal	114.9	90.7	100.1	54.9	104.1	137.6	139.1	142.9	143.9	145.5	87.7	85.6
95	BATTLE RIVER #5	BR5	1	1469	Coal	155.7	144.7	110.9	157.0	116.3	50.9	116.4	120.8	118.8	138.4	146.0	132.4
96	HR MILNER	HRM	1	1147	Coal	82.1	88.4	82.1	67.9	34.2	12.9	106.8	99.6	91.8	89.1	96.6	90.8
97	GENESEE 3	GN3	2	524	Coal	206.7	208.3	209.7	197.5	157.1	109.0	176.4	196.8	184.1	214.7	184.4	174.5

98	SUNDANCE #6	SD6	2	135	Coal	107.8	94.5	81.3	108.7	96.3	83.7	106.1	101.5	89.7	111.2	105.5	97.2
99	SUNDANCE #4	SD4	2	135	Coal	79.7	74.1	68.6	87.5	77.1	77.1	71.0	75.7	72.2	86.3	59.6	49.6
100	SUNDANCE #5	SD5	2	135	Coal	65.0	61.7	58.9	66.1	56.1	54.1	54.6	41.5	29.5	59.5	62.4	58.3
101	SHEERNESS #1	SH1	2	1484	Coal	103.7	100.0	86.8	109.4	102.6	89.9	104.8	91.2	89.2	100.7	93.2	88.6
102	SHEERNESS #2	SH2	2	1484	Coal	117.9	113.5	108.3	115.3	113.5	112.2	117.3	111.6	96.2	114.3	108.6	97.6
103	BATTLE RIVER #5	BR5	2	1469	Coal	214.5	199.3	152.7	216.2	160.2	70.1	160.3	166.4	163.7	190.6	201.1	182.4
104	SUNDANCE #2	SD2	2	135	Coal	39.2	36.9	34.5	43.9	38.0	29.8	38.8	35.1	34.8	42.2	36.0	36.0
105	GENESEE 1	GN1	2	524	Coal	178.7	174.0	180.2	158.1	111.5	144.7	178.3	177.8	166.8	182.5	157.8	155.6
106	SUNDANCE #3	SD3	2	135	Coal	42.7	41.8	39.0	46.4	40.5	35.7	41.9	39.3	32.5	43.9	37.9	35.3
107	SUNDANCE #1	SD1	2	135	Coal	24.0	22.4	22.8	25.1	22.3	19.9	15.7	12.5	14.9	19.9	21.9	21.7
108	BATTLE RIVER #3	BR3	2	1491	Coal	76.2	75.6	72.4	79.7	77.2	69.1	63.0	42.2	42.5	74.7	71.8	66.5
109	GENESEE 2	GN2	2	524	Coal	184.9	182.6	181.9	111.5	124.1	129.6	180.6	173.6	171.8	182.6	178.5	177.0
110	KEEPHILLS #1	KH1	2	420	Coal	73.7	70.4	60.3	76.3	69.1	65.0	70.6	69.9	67.1	75.2	71.1	70.7
111	KEEPHILLS #2	KH2	2	420	Coal	73.1	71.7	73.2	71.1	63.7	59.0	79.6	77.0	73.8	78.0	78.2	77.5
112	HR MILNER	HRM	2	1147	Coal	16.2	17.4	16.2	13.4	6.7	2.5	21.1	19.7	18.1	17.6	19.1	17.9
113	BATTLE RIVER #4	BR4	2	1491	Coal	2.5	2.0	2.2	1.2	2.2	3.0	3.0	3.1	3.1	3.1	1.9	1.8
114	WABAMUN #4	WB4	2	133	Coal	7.7	7.8	7.5	8.3	7.3	7.9	6.2	5.2	4.0	7.1	6.9	6.7
115	SUNDANCE 5 UPGRADE	SD5		135	Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.4	41.4	41.4
116	CASCADE	CAS	2	175	Hydro	6.0	2.8	0.0	3.5	1.6	0.0	2.8	0.8	0.0	5.0	2.2	0.0
117	SPRAY	SPR	2	310	Hydro	10.6	7.2	2.2	9.8	6.4	0.4	13.9	8.7	3.4	8.8	5.8	0.9
118	RUNDLE	RUN	2	197	Hydro	2.4	1.7	0.6	2.5	1.5	0.1	3.3	2.0	0.8	2.0	1.3	0.2
119	HORSESHOE	HSH	2	171	Hydro	1.4	1.1	1.2	1.1	1.1	1.3	1.9	1.9	1.7	1.2	1.2	1.1
120	KANANASKIS	KAN	2	193	Hydro	1.6	1.4	1.4	1.3	1.4	1.6	3.0	2.7	2.3	1.4	1.4	1.3
121	GHOST	GHO	2	180	Hydro	11.4	5.0	0.5	6.5	4.4	5.0	16.5	12.5	7.4	8.5	7.4	1.5
122	BEARSPAW	BPW	2	183	Hydro	1.3	1.3	1.4	1.3	1.4	1.8	3.0	2.8	2.6	1.3	1.5	1.6
123	BIGHORN	BIG	2	103	Hydro	18.7	13.1	9.2	14.7	13.5	8.6	29.4	20.2	13.5	18.1	14.8	9.9
124	BRAZEAU	BRA	2	153,33	Hydro	71.2	27.6	0.3	38.7	34.4	5.4	115.4	57.8	16.6	51.3	30.4	4.0
125	BC IMPORT	BCHIMP		158	Import	456.4	38.5	0.0	258.3	114.0	0.0	397.7	71.9	0.0	146.3	53.5	0.0
126	SASKATCHEWAN IMPORT	SPCIMP		1473	Import	83.4	51.1	23.5	16.4	77.7	72.2	93.5	96.5	102.5	44.1	67.9	47.7
127	MATL IMPORT	MATLIMP		451	Import	0.0	0.0	0.0	25.0	25.0	0.0	25.0	25.0	0.0	25.0	25.0	0.0
128	CARSELAND	TC01	2	5251	Co-gen	17.9	16.1	16.0	16.0	16.7	16.0	16.1	16.1	16.1	16.7	15.7	15.8
129	CAVAILIER	EC01	2	247	Co-Cycle	39.9	22.2	4.4	33.1	33.0	11.5	47.5	24.6	7.8	46.8	35.0	10.7
130	REDWATER	TC02	2	50	Co-gen	4.8	4.2	4.2	4.9	4.5	4.5	3.3	3.8	3.9	4.2	3.9	3.9
131	PRIMROSE	PR1	2	1302	Co-gen	2.4	2.4	2.2	1.5	1.4	1.7	1.8	2.3	2.6	2.6	2.3	2.4
132	SUNCOR MILLENIUM	SCR1	2	1208	Co-gen	21.4	20.1	16.9	19.8	14.1	14.8	18.2	13.8	7.1	20.4	17.1	14.3
133	MUSKEG	MKR1	2	1236	Co-gen	18.2	17.3	15.2	21.0	17.8	13.8	13.7	13.2	12.5	22.3	16.5	13.6
134	FOSTER CREEK G1	EC04	2	1301	Co-gen	3.8	4.8	5.1	3.2	3.5	3.2	3.2	3.8	3.9	5.0	4.4	4.3
135	ENMAX CALGARY ENERGY CENTRE CTG	CES1	2	187	Co-Cycle	31.2	12.6	1.2	20.2	22.3	5.1	42.7	18.8	6.9	12.4	12.4	2.3
136	ENMAX CALGARY ENERGY CENTRE STG	CES2	2	187	Co-Cycle	17.0	7.0	0.5	11.1	13.3	2.3	28.0	11.8	4.1	7.5	7.7	1.1
137	McKAY RIVER	MKRC	2	1274	Co-gen	11.1	10.3	8.8	12.1	9.4	5.5	8.2	7.6	8.7	6.2	6.4	5.8
138	NOVA JOFFRE	NOVAGEN15M	2	383	Co-gen	41.2	34.8	23.6	19.6	31.9	28.4	54.2	37.4	21.9	44.4	38.8	32.3
139	CITY OF MEDICINE HAT	CMH1	2	680	Gas	6.6	5.2	1.6	12.4	6.5	0.6	9.7	7.3	8.4	3.3	4.8	1.4
140	BALZAC	NX01	2	290	Co-Cycle	33.2	17.6	3.3	16.0	28.8	18.4	39.7	21.2	16.1	37.1	12.3	5.6
141	DOW GTG	DOWGEN15M	2	61	Co-gen	34.2	18.8	6.4	23.3	23.5	11.7	40.2	26.0	12.0	40.8	23.8	7.8
142	RAINBOW 4	RL1	2	1035	Gas	1.7	0.5	0.4	0.0	1.6	1.1	7.2	3.2	4.6	0.8	0.9	1.2
143	RAINBOW 5	RB5	2	1037	Gas	0.8	0.5	0.4	0.2	1.1	0.4	6.2	1.9	0.6	0.6	0.6	0.5
144	FORT NELSON	FNG1	2	1016	Gas	21.6	4.8	1.7	4.3	7.6	0.9	21.1	6.2	1.5	9.9	3.9	2.1
145	POPLAR HILL	PH1	2	1118	Gas	2.2	0.2	0.0	0.3	0.3	0.1	1.3	0.3	0.0	0.4	1.2	0.1
146	BEAR CREEK G1	BCRK	2	10142	Co-Cycle	25.2	27.4	16.3	26.5	20.5	5.4	37.3	14.1	1.2	19.9	8.6	3.9
147	VALLEYVIEW	VVW1	2	1171	Gas	0.1	0.1	0.0	0.3	0.2	0.0	0.9	0.7	0.0	0.0	0.0	0.0
148	NORTHSTONE ELMWORTH	NPC1	2	19134	Co-gen	2.9	0.4	0.0	0.4	1.3	0.2	4.1	2.0	3.0	0.9	0.3	0.0
149	BEAR CREEK G2	BCR2	2	10142	Co-Cycle	18.2	18.7	15.6	14.9	16.3	15.5	28.2	18.5	16.9	18.5	15.9	14.4

150	RAINBOW 1	RB1	2	1031	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
151	RAINBOW 3	RB3	2	1033	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
152	GRANDE PRAIRIE ECOPOWER CENTRE	GPEC	2	1101	Co-gen	14.1	14.4	16.3	13.8	17.1	18.1	15.6	17.1	16.8	18.1	17.9	18.7
153	RAINBOW 2	RB2	2	1032	Gas	0.4	0.1	0.0	0.1	0.5	0.1	3.3	0.5	0.1	0.1	0.2	0.1
154	STURGEON 1	ST1		1166	Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.4	0.0	0.0	0.0
155	STURGEON 2	ST2		1166	Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
156	DRYWOOD 1	DRW1		4226.0	Gas	2.0	0.3	0.0	0.4	0.5	0.0	0.0	0.0	0.0	0.8	0.0	0.0
157	ROSSDALE 8	RG8		507.0	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
158	ROSSDALE 9	RG9		507.0	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
159	ROSSDALE 10	RG10		507	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
160	CLOVER BAR 1	ENC1		516	Gas	7.9	7.9	7.9	0.0	3.5	0.9	7.9	7.9	7.9	7.9	7.9	7.9
161	SHELL CAROLINE	SHCG		3370	Co-gen	3.9	3.9	3.9	2.9	2.6	3.1	3.9	3.9	3.9	3.9	3.9	3.9
162	ATCO VALLEY VIEW 2	VVW2		1172	Gas	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
163	CLOVER BAR 2	ENC2		516	Gas	0.0	0.0	0.0	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2
164	DOW UPGRADE PHASE 1	DOWGEN15M		61	Co-gen	4.9	2.1	0.0	2.9	3.0	0.9	5.9	3.4	1.0	6.0	3.0	0.2
165	NORTHERN PRAIRIE POWER PROJECT	Project672_1_SUP		1120	Gas	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
166	MEG ENERGY	ProjectISD762SUP		405	Co-gen	0.0	0.0	0.0	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3
167	ENMAX CROSSFIELD ENERGY CENTRE	Project730_1_SUP		503	Gas	0.0	0.0	0.0	0.0	0.0	0.0	114.0	114.0	114.0	114.0	114.0	114.0
168	DAPP POWER WESTLOCK EXPANSION	Project692_1_SUP		21	Gas	0	0	0	0	0	0	0	0	0	6.25	6.25	6.25
169	MAXIM POWER DEERLAND PEAKING STATION	Project703_1_SUP		432	Gas	0	0	0	0	0	0	0	0	0	28.5	28.5	28.5

* Capacity is determined as per AESO rules for the periods defined.