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MSA REPORT

Events of July 24, 2006

9 August, 2006

MARKET SURVEILLANCE
ADMINISTRATOR

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1 INTRODUCTION

On July 24, 2006, the Alberta market experienced a record high daily average Pool price of \$526. That fact, in and of itself, would pique the MSA's interest. In addition and perhaps of greater interest to the public was the fact that the Alberta Electric System Operator (AESO) was forced to shed load for a brief period. Hence, the events of that day are of significant interest to both the MSA and the AESO and there has been a high degree of cooperation between these two agencies in assessing the facts.

The MSA has undertaken this review of the circumstances and the behaviours of market participants. This report sets forth some of the background leading to the events of July 24, and tries to answer some of the questions that naturally suggest themselves:

- What role, if any, did weather play?
- Was the amount of generation out of service at the time abnormal?
- Were electricity prices on July 24 reasonable given the circumstances of the market?
- Did market participants comply with the applicable rules and the Electric Utilities Act, and did their conduct contribute to the issue or to its remediation?
- Are the events of July 24 indicative of a generation adequacy problem?
- What role, if any, did market structure play in this event?

The shedding of firm load, meaning forcing some customers off the grid, is the final step in a detailed process developed with stakeholders over many years by the AESO. This process, called OPP801 is described on the AESO's web site and it is used when all available energy offered into the market has been dispatched. A significant portion of July 24 was spent with the system in OPP801 and the AESO proceeding as necessary through the various steps. At such times, the market is replaced by emergency procedures and the MSA's role of monitoring normal market behaviour is replaced by the compliance of participants to AESO directives and requests to keep the system stable and to avoid the shedding of load.

2 MSA ROLE

Under the *Electric Utilities Act*, the MSA has a mandate of monitoring and surveillance to ensure a fair, efficient, and openly competitive electricity market. After the July 24 event occurred, the MSA worked closely with the AESO, who has primary responsibility for safe and reliable operation of Alberta's electricity grid, to fully understand the facts and chronology of what happened. The description of physical events that caused the July 24 load curtailment was developed and published by the AESO (Appendix A).

The MSA reviewed the market situation up to and including July 24. This included all the key drivers that ultimately interact to produce the market price, and all were assessed in order to identify what caused high prices (and, in this rare circumstance, load shedding) from a market perspective.

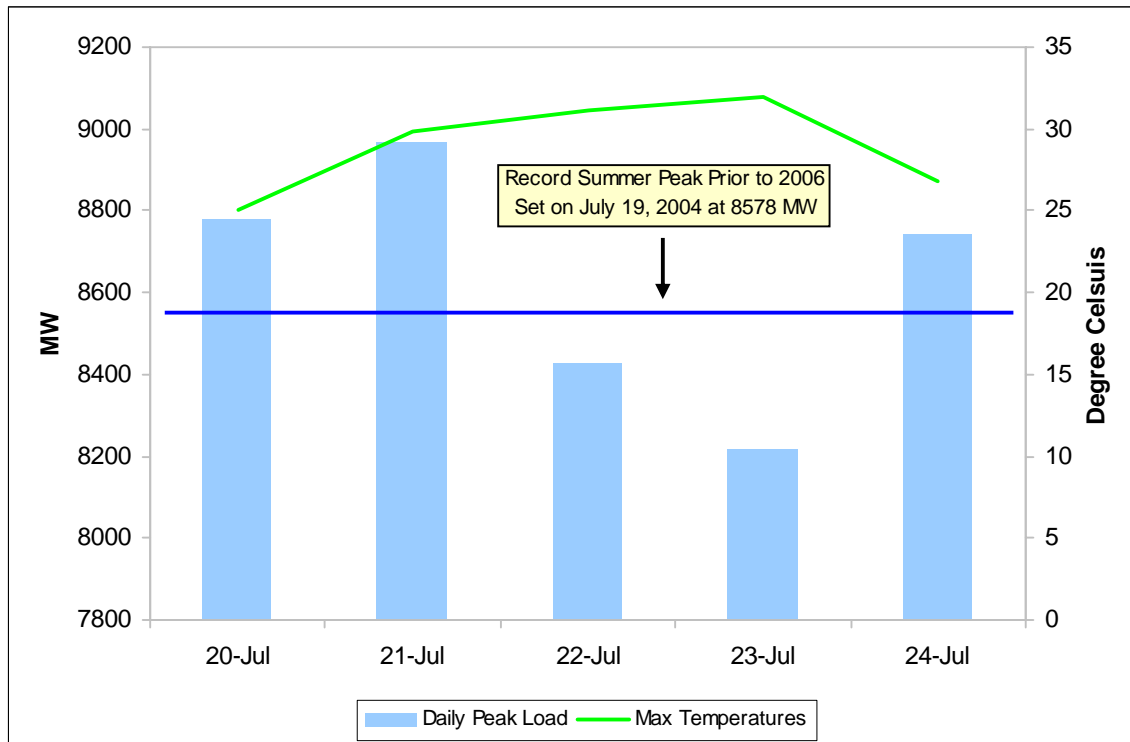
3 CONDITIONS PRIOR TO JULY 24

Temperature

July 2006 was a hot month in Alberta and was particularly hot during the days leading up to July 24. Figure 1 shows the general rise in temperatures in that period. High temperatures, particularly when prolonged for several days, affect the electricity demand and supply in several ways:

- Air conditioning load increases
- Gas-fired generating stations have reduced cooling and therefore generating capacity
- The cooling ponds at several of Alberta's coal-fired stations have environmental limitations that reduce the generating capacity in hot weather
- Available wind energy is often low on hot days

Figure 1 - Temperatures and Load



Load

As a result of the hot weather, demand in the province increased substantially and we had several occasions where the record peak demand of prior summers was

broken. On Friday July 21, we experienced the highest of these new records at 8966 MW, about 400 MW greater than in previous years. Figure 1 shows the peak load on the days leading up to July 24. The lower load over the weekend is quite normal.

Coming into July 24, the AESO was expecting a continuation of high load with a forecasted peak of 8900 MW.

Planned Maintenance

The Alberta system experiences its highest demands in winter. The record winter peak demand is about 9600 MW and was set in December 2005. Typically, there is very little planned maintenance in winter and it is then spread out through the balance of the year. Planned maintenance is critical to preserving the life of these generating assets. Experience around the world has indicated that cutting back on planned maintenance increases unplanned maintenance and is not prudent. As noted above, some of the coal-fired plants suffer cooling pond derates in the summer and operators take advantage of that knowledge to do some of their planned maintenance at that time.

The units on planned maintenance in late July were:

- Sundance #1 (280 MW)
- Sundance #5 (353 MW)
- Wabamun #4 (279 MW)

Sundance #5 was expected to come back on-line by Monday July 24 from its planned maintenance. The Wabamun #4 outage started originally on July 8 as an unplanned outage that later became extended to August 9 as the problem revealed itself to be a water wall failure.

Recognizing the total amount of coal capacity in the system, typical planned maintenance time requirements, availability of skilled labour to execute the maintenance and the desire to avoid winter, results in one to three units being on planned maintenance most of the time. Unit owners schedule their own outages partially guided by an AESO-facilitated process that reveals to the market a forward-looking view of the total planned maintenance over an extended period of time.

Thus, having two coal units scheduled off-line for planned maintenance during the week was not an unusual situation.

Unplanned Outages and Derates

The system also experienced a number of unplanned (forced) outages and derates (partial outages) over the period of interest.

Over the weekend, Sundance #2 was forced out due to a tube leak and ultimately came back to service late in the day on July 24.

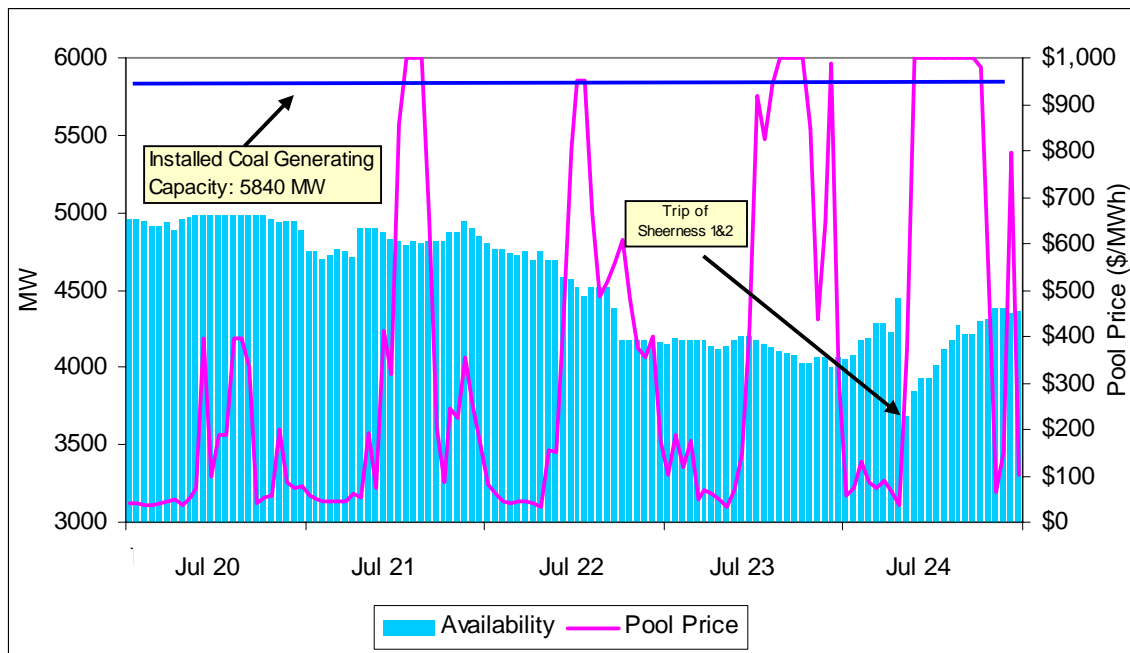
Over the weekend of July 22-23, Battle River station was backed down to its minimum stable generating level to meet its environmental requirements (cooling

pond). Sundance #3, #4 and #6 were all derated, at least partially due to cooling pond issues.

The total amount of coal-fired generation off-line due to unplanned maintenance or thermal derates was above normal. All the gas units in the province were derated to some extent by the hot weather. The amount of derate varies from plant to plant but is roughly in the range of 5 - 25%.

For the coal fleet, the overall effect can be shown in terms of resulting coal plant availability - see Figure 2. In the figure, the availability is simply the total MW of the coal fleet reduced by the various outages and derates. It is clear that there is a strong relationship with Pool price. Market watchers are well aware of the relationship between Pool price and availability of coal-fired generation.

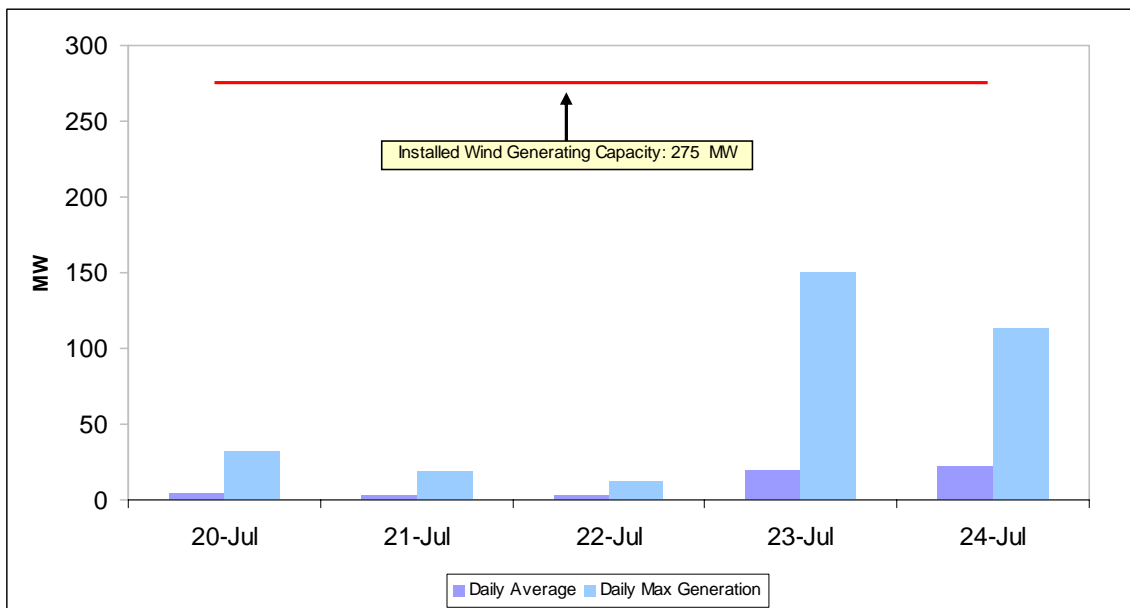
Figure 2 - Availability of Coal-Fired Generation and Pool Price



Wind Energy

The contribution of wind energy over the period of interest is depicted in Figure 3. The wind generation was 23 MW on July 24 and averaged about 11 MW over the five days, compared with an installed wind capacity of about 275 MW. It remains an open question as to how much wind the system planners can expect in periods when the system is tight. In any event, wind energy was low in this period.

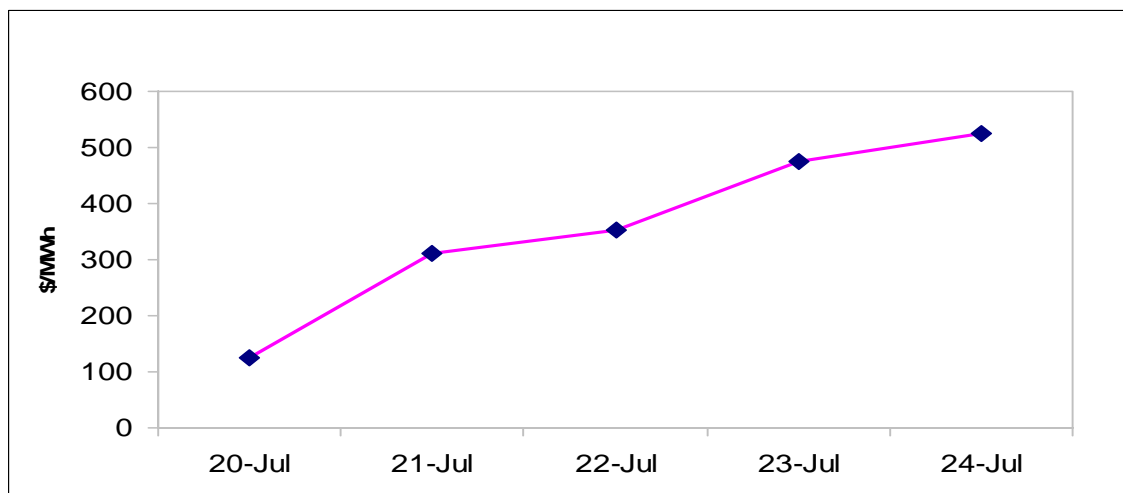
Figure 3 - Wind Generation



Pool Prices

Average daily Pool prices are shown in Figure 4. Even though the load on Sunday July 23 peaked at 8216 MW, lower than the workdays just before and after, the average price was \$475. That daily average price was the highest since 2000 – a record lasting only one day as it turned out. During July 23, the AESO went into OPP801 indicating how tight the market was that day.

Figure 4 - Pool Prices



Elevated demand, pre-existing generation derates and outages, along with low wind generation created the general tight supply situation at the start of Monday, July 24.

4 MARKET SITUATION AND EVENTS OF JULY 24

In the early morning, the AESO, the MSA and market participants were anticipating a challenging day for the AESO system controllers and an expectation of continued high Pool prices as occurred on the previous day:

- AESO forecasted the system peak demand to remain high at 8900 MW
- Outages at Wabamun #4, Sundance #1 and Sundance #2 effectively reduced available supply by 839 MW. Sundance #5 appeared to be struggling to come back up after weekend maintenance and ultimately generated very little until late in the day
- In the meantime, the three Battle River units looked to remain derated. Weather conditions at the plant improved throughout the day and this allowed some recovery of the generating capacity lost to derates.
- High temperatures caused all gas-fired plants in the province to be derated
- Wind generation continued to be low
- Anecdotal information on the financial electricity market indicated very wide same-day bid-ask spreads of \$250-\$350. Such a spread indicates great uncertainty on the part of both buyers and sellers.
- Prices in neighbouring markets to the West and East were all very high indicating regional market tightness. In fact, on July 24 California set a new record peak demand and was dispatching down interruptible customers as it too was in emergency conditions.

Although the outlook was for a tight market, there was no expectation of involuntary service disruption to customers. Several days per year will start in somewhat similar circumstances. AESO market rules and operating procedures contemplate coping with such eventualities.

Pool prices in the morning reflected the prevailing circumstances and averaged \$76/MWh from midnight to 8:00, somewhat higher than the usual overnight prices which tend to range from \$10/MWh to \$50/MWh.

As noted in the AESO's preliminary report into the events of July 24, the two main drivers ultimately leading to the temporary shedding of firm load were both failures of elements of the transmission system.

4.1 Critical Event No. 1: Transmission Line Fault Caused Sheerness Units #2 And #2 to Trip

At 8:51, Sheerness #1 and #2 tripped (were forced off-line) because of a transmission line fault. It may never be possible to determine with certainty what

caused the trip, but physical evidence at this point suggests the fault may have been caused by a lightning strike. Just prior, the two Sheerness units were generating a combined energy of about 780 MW. Following a hard (sudden and total) trip it is not uncommon for units to take a while to get back on-line. Sheerness #2 began to ramp up at 13:45 but tripped again at 16:02; not unusual given the circumstances. The unit came on-line again much later in the day. Sheerness #1 did not come on-line again until early on July 25; its restart being delayed at the AESO's request for operational reasons (to allow for the line to be repaired).

4.2 Critical Event No. 2: AB-BC Intertie Trip

At 16:28, the AB-BC intertie tripped due to a lightning strike. The intertie trip separated Alberta from BC and the rest of WECC region.

The resulting abrupt drop in frequency resulted in about 250 MW of automatic frequency-responsive load shedding. This is a normal response designed to protect the overall system and prevent cascading events. The tie line was sending approximately 470 MW to Alberta prior to the trip.

The trip prompted AESO to issue Energy Emergency Alert 3 and to direct interruption of about 400 MW of firm load. The firm load curtailment directives were sent to the various load serving entities (AltaLink, ATCO Electric, EPCOR, ENMAX, Red Deer and Lethbridge), who complied with the directives and curtailed the load.

The intertie was successfully re-synchronized at 16:42 and, within an hour of the original trip, the system was stable and sufficiently supplied to resume service to all customers.

Although it is unfortunate to have to shed firm load at any time, the characterization of this event as 'rolling blackouts' across Alberta is somewhat sensational. The amount of load shedding was relatively small, directed and controlled by the AESO with restoration of service to all load within an hour.

The system controllers at the AESO, who manage the minute to minute operation of the Alberta electrical system, did their job in an expeditious and professional manner following well established and public procedures.

5 ANALYSIS

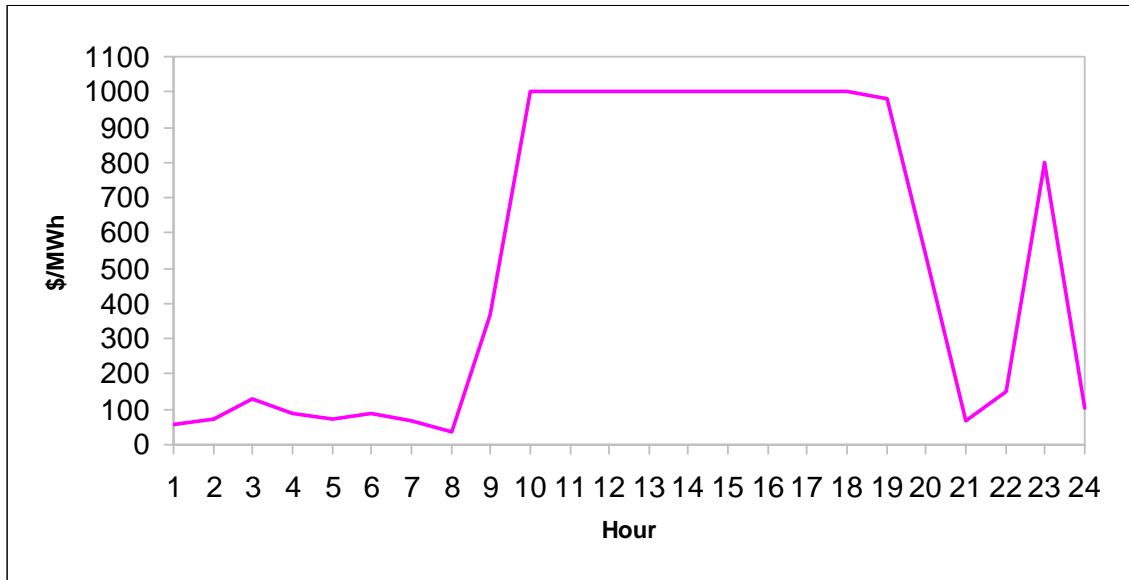
Market Prices

During the period approximately 09:00 through 19:00, the system was very short of energy and the AESO made requests for assistance from consumers, generators in Alberta and in neighbouring control areas (BC and Saskatchewan). At this time the AESO was doing everything within its control to 'keep the lights on'. From a market perspective, it is appropriate to see that the Pool price was at the price cap throughout this critical period. The message to generators is, 'get fired up and producing energy if you can'. To load, the message is also equally clear, 'get off the system if you can'. The market price is the signal to both load and supply. In that sense, the \$1,000/MWh price signal throughout this period was as

strong as it could be – and, more importantly, was fully aligned with and contributed to the AESO’s reliability mandate.

It seems clear that some price-responsive load moved off the system once it was clear that market prices were high and going to stay that way for a while. Equally well, it seems that generators were responding to the price signal by bringing much needed energy to the market at the same time.

Figure 5 - Hourly Pool Prices on July 24



Generator Response

Appendix II contains a table showing the generation by unit over July 24 together with comments where the generation was abnormally low. The MSA has already been able to establish acceptable reasons for most of the cases where there was a shortfall with just a few smaller cases still remaining to query.

In some cases, there was clear evidence of extraordinary efforts by plant operators to squeeze out a few extra MWs to help out – a commendable response. The MSA has not uncovered any evidence of a generator electing not to generate electricity during the critical period when it was able to do so.

Reliability of the System

The electricity system in Alberta is designed to provide a high level of reliability to consumers, commensurate with its importance to society. For most of us, to successfully deliver electricity to our homes, we need to have generation, transmission and then distribution all work as planned. Analysis of historical service interruptions has shown that the greatest number is due to distribution, next is transmission and finally, the least likely, generation. In fact, most of us are used to and accepting of several brief interruptions per year - mostly due to distribution problems.

The transmission events of July 24 are unusual in that the combined probability is very low. Whether this is an indication that the transmission system in these areas needs to be bolstered is for the AESO to establish. It is factually correct to say that some load was forced off the system (briefly) due to the lack of generation. However, the key events were transmission related and, in their absence, the system would not have been short of generation resources.

How did Alberta's restructured electricity market and its design/rules function in these circumstances? The two primary drivers appear to have been transmission related (at least one of the faults was due to weather) and transmission is a regulated service. Transmission systems are unavoidably exposed to meteorological risks - as witnessed by the major storm-related outages last week in both Ontario and Quebec. The transmission system in Alberta is planned, designed and operated in a regulated environment. Absent the transmission problems, there was no anticipated shortage of generation resources on July 24. There is no basis for concluding that a different mechanism for providing generation supply to Albertans would have performed more reliably or economically. The high price environment throughout the critical period encouraged market responsive increases in supply and reductions in load, likely reducing the size of the problem that the AESO had to manage.

6 CONCLUSIONS

A sequence of events induced high market prices and ultimately led to the brief period of load shedding in the late afternoon of July 24.

Assessment of all generators in the system virtually complete, and the MSA has not found any market participant whose generation status is not reasonably accounted for.

Detailed compliance monitoring and enforcement of AESO rules is undertaken by the AESO itself and the MSA normally seeks only to be satisfied that the AESO rules are appropriate, that the monitoring and enforcement are effective and even handed. The MSA is satisfied that the AESO compliance monitoring team is 'on the job' and that it will inform the MSA of any concerns over participant compliance on July 24 that should more appropriately be investigated by us.

The AESO's preliminary findings concerning the electrical engineering aspects of the event, and to which the MSA fully defers, are:

- Transmission fault that isolated Sheerness from the grid (in reliability terms, a double contingency);
- Transmission fault due to lightning that isolated a significant amount of imports from the grid; and,
- Brief interruption of service of 400 MW firm load (about 5% of load on the system) for a period of about one hour.

The MSA's findings are:

- Hot weather caused high Alberta load and significant reductions in supply;
- Similar conditions were occurring in nearby markets;
- Alberta market prices appropriately reflected the extreme tightness of the system;
- There was no evidence of generation that was electing not to generate during the critical period when it was able to do so; and,
- Insufficiency of generation was not a root cause of the event. Generation became stranded from the load by transmission problems that ultimately meant load could not be fully met.

The market was stressed by the coincidence of high levels of forced outages and temperature-induced derates, record summer demands and two major transmission faults, at least one of which was caused by weather. The AESO was managing an already tight system, coordinating as required with other areas outside Alberta who themselves were under stress. The market structure that allows prices to rise to \$1,000/MWh provided the signal to get all available generation on-line and to get discretionary load off-line. The AESO's, procedures developed over a number of years, assisted the system controllers to minimize the impact of these events on customers. There was some shedding of firm load but the system was protected from a cascading failure. Throughout the Alberta-wide system, 95% of firm load was continued to be served in this challenging time. Furthermore, all load was reconnected within an hour.

The MSA believes that the events of July 24 were well managed. Market participants assisted the AESO to manage a difficult situation by following rules, complying with the procedures of OPP801 and acting cooperatively and expeditiously.



Appendix A

August 9, 2006

TO: Stakeholders and interested parties

Re: Power System Disturbance – July 24, 2006

On July 24, 2006, there was a unique set of circumstances on the Alberta Interconnected Electric System that required conservation efforts and temporary interruptions in power service. These circumstances included a combination of high summer temperatures and near record demand for power, a number of large generators off-line for maintenance, a transmission line fault that forced two large generators off line, and a lightning strike that forced a brief automatic outage to the Alberta-B.C. 500 kV transmission intertie. While any one of these events is manageable, having all of these events occur within the course of one day is challenging.

As these events were occurring on July 24, 2006, the AESO was able to successfully maintain the safe and reliable operation of the Alberta Interconnected Electric System. The AESO's system controllers managed the events through use of reserve generating capacity and established procedures and practices. The AESO had downgraded the situation to an Energy Emergency Alert 1 after a reduction in demand was realized due to the efforts of consumers who reduced their power use after the AESO's appeal for conservation was issued in the morning, and efforts by generators who were coming back online.

The AESO was also importing electricity through the transmission interties with B.C. and Saskatchewan to assist in keeping the supply and demand for power in balance. At 4:28 in the afternoon, lightning struck the Alberta-B.C. transmission intertie and it was automatically shut off to isolate the fault thereby minimizing the potential impact. However, this also meant that some power supply was immediately unavailable to Alberta. At this point, there was a reduction of load through automatic procedures, in order to preserve the integrity of the electric system. The AESO issued instructions for further load reduction and service was temporarily interrupted to some consumers in order to rebalance the system quickly. Under these procedures, each of the province's power control centres decides in advance how this type of power reduction is managed in their particular service area. This temporary interruption lasted about half an hour and all power service was restored to all customers within the hour.

The AESO would like to express its appreciation to consumers for their efforts to reduce power consumption on a voluntary basis when requested. In addition, the AESO would also like to acknowledge the prompt and professional support provided by generators and transmission and distribution facility operators in Alberta, as well as operators at the British Columbia Transmission Corporation (BCTC) and SaskPower for their assistance during these circumstances.

The AESO is undertaking a comprehensive review of the events of July 24, 2006 with all parties involved to ensure that all practices, procedures and rules were appropriate and to identify and initiate any necessary improvements. In addition to this letter, we've provided a [Preliminary Disturbance Summary](#) of the events of July 24, 2006 which is based on information collected by the AESO. The AESO is also cooperating with Alberta's Market Surveillance Administrator in their investigation of the sequence of events.

The AESO recognizes that any interruption in power service causes inconvenience. Our operating policies and procedures are designed to minimize system disturbances so that any managed power interruption is a last resort and so that service can be restored safely and in an expedient manner. The AESO policies and procedures to manage Alberta's power grid are well documented and available to the public. In fact, some of the AESO's operating policies and procedures have recently been recognized as industry best practice in North America.

I can assure you that we take our role very seriously in providing for the safe, reliable and efficient operation of Alberta's power grid.

Sincerely,
Original signed by,

Warren Frost, P. Eng.
Vice-President, Operations and Reliability



PRELIMINARY DISTURBANCE SUMMARY - July 24, 2006

PRE-DISTURBANCE CONDITIONS

High system demand forecast (8,900 MW), two large coal units off line for scheduled maintenance (Wabamun # 4 and Sundance # 1) and one large coal unit (Sundance # 2) off line due to a forced outage (~ 840 MW total) and various derates to other generating units.

- 08:51 Sheerness # 1 and # 2 trip at full load (~ 780 MW) due to a transmission line fault. All reserves were directed up to cover loss of Sheerness units and the remaining energy market merit order was dispatched.
- 08:53 AESO initiated Supply Shortfall Procedures (OPP 801).
- 09:16 – 09:18 Demand Opportunity Service loads were curtailed.
- 09:19 Energy Emergency Alert 1 issued¹. The AIES was maintaining sufficient operating reserves.
- 09:19 – 09:22 Short Term Adequacy Category I generation directed up (~ 65 MW).
- 09:50 Request for Emergency Energy issued to BCTC and SaskPower.
- 10:30 AESO issued public appeal to consumers to voluntarily reduce electricity consumption.
- 11:10 Energy Emergency Alert 2 issued. Service was maintained to all firm load customers.
- 13:45 Sheerness # 2 on line.
- 14:39 BCTC 5L92 line (Cranbrook to Selkirk) trip and auto-reclose due to lightning. Severe lightning activity noted in BC intertie corridor and southwest region of Alberta.
- 15:15 Energy Emergency Alert downgraded from level 2 to level 1 due to increasing output from Sheerness # 2 and voluntary load reductions (~ 150 MW). The AIES was maintaining sufficient operating reserves.
- 15:15 Emergency Energy no longer required from BCTC or SaskPower.
- 16:02 Sheerness # 2 tripped off line (~ 165 MW). Reserves were directed up to recover from the generation contingency.
- 16:06 Sundance # 2 on line (minimal MW's).
- 16:15 Energy Emergency Alert 2 issued. Service was maintained to all firm load customers. Imports on BC intertie were limited due to severe lightning activity in the BC intertie corridor.

¹ <http://ets.aeso.ca/Market/Reports/HelpTextServlet?service=EnergyAlertsInfo>

DISTURBANCE CONDITIONS

- 16:28 BC intertie trip due to lightning caused Alberta to separate from BC and WECC. Alberta frequency reduced to 59.1358 resulting in automatic underfrequency load shedding (~ 250 MW).
- 16:32 – 16:36 Energy Emergency Alert 3 issued for Alberta control area. AESO directed interruption of about 400 MW of firm load and further adjustments to generators in Alberta to recover frequency and allow Alberta to re-synchronize with BC.
- 16:42 BC intertie closed synchronizing Alberta with BC and WECC.
- 16:52 – 17:05 AESO directed restoration of all firm load in Alberta.
- 17:10 AESO received confirmation from Transmission Facility Owners that all load has been restored.
- 17:25 Energy Emergency Alert downgraded from level 3 to level 2. Service was maintained to all firm load customers.
- 17:28 Short Term Adequacy Category I directives terminated.
- 17:35 Energy Emergency Alert downgraded from level 2 to level 0. Energy emergency alerts cancelled and energy supply sufficient to meet AIES load and reserve requirements.
- 18:00 Public appeal for voluntary load reduction expired.
- 18:54 – 18:56 Service restored to Demand Opportunity Service loads.
- 18:54 AIES restored to normal operating conditions.

Appendix B Plant Generation on July 24 Based on 15 Minute Data

Unit	MCR	July 24, 2006 All Day			July 24, 2006 9:00 - 18:00			Plant Owner	Marketer/PPA Buyer (If applicable)	Comments
		Avg Gen	Min Gen	Max Gen	Avg Gen	Min Gen	Max Gen			
Coal										
Battle River #3	148	105	61	153	121	62	153	ATCO	ENMAX/EPCOR	Derated - cooling issues
Battle River #4	148	115	59	159	145	62	159	ATCO	ENMAX/EPCOR	Derated - cooling issues
Battle River #5	368	295	141	371	364	338	371	ATCO	ENMAX/EPCOR	Derated - cooling issues
Genesee #1	384	354	268	378	357	353	362	EPCOR	Balancing Pool	Derated - vacuum pressure problems due to high ambient temperatures
Genesee #2	384	386	379	394	390	379	394	EPCOR	Balancing Pool	Generating above rated capacity
Genesee #3	450	451	449	454	451	449	454	TransAlta / EPCOR	TransAlta / EPCOR	Generating above rated capacity
H.R. Milner	143	129	94	135	132	130	135	Maxim Power		
Keephills #1	381	388	375	409	400	380	409	TransAlta	ENMAX	Generating above rated capacity
Keephills #2	381	390	370	405	400	386	405	TransAlta	ENMAX	Generating above rated capacity
Sheerness #1	378	142	0	390	0	0	0	TransAlta / ATCO	TransCanada	Tripped offline due to fault on 9L99
Sheerness #2	378	151	0	394	14	0	144	TransAlta / ATCO	TransCanada	Tripped offline due to fault on 9L100, re-synchronized and retripped
Sundance #1	280	0	0	0	0	0	0	TransAlta	TransCanada	Scheduled maintenance outage
Sundance #2	280	52	-10	277	11	-10	108	TransAlta	TransCanada	Ramping back from forced outage
Sundance #3	353	330	295	348	335	324	348	TransAlta	Altagas / TransCanada	Derated - external pump temperature issues
Sundance #4	353	337	298	350	344	327	350	TransAlta	Altagas / TransCanada	Derated - external pump temperature issues
Sundance #5	353	188	20	281	227	152	281	TransAlta	EPCOR	Derated - ramping back from maintenance outage
Sundance #6	399	343	306	369	346	340	364	TransAlta	EPCOR	Derated - condenser back pressure issues
Wabamun #4	279	0	0	0	0	0	0	TransAlta		Maintenance outage
Hydro										
Bighorn	120	65	10	115	94	71	115	TransAlta		Plant provided operating reserves
Bow River	319	144	47	256	222	148	256	TransAlta		Plant provided operating reserves
Brazeau	350	105	6	318	227	24	318	TransAlta		Plant provided operating reserves
CUPC Oldman River	32	25	7	28	26	25	28	ATCO		
Chin Chute	11	10	10	11	10	10	11	Irrican Power		
Irrican Hydro	7	6	0	6	6	6	6	Irrican Power		
Raymond Reservoir	18	18	0	19	19	19	19	Irrican Power		
Taylor Hydro	12	13	0	14	12	0	14	Canadian Hydro Developers		

Unit	MCR	July 24, 2006 All Day			July 24, 2006 9:00 - 18:00			Plant Owner	Marketer/PPA Buyer (If applicable)	Comments
		Avg Gen	Min Gen	Max Gen	Avg Gen	Min Gen	Max Gen			
Gas										
ATCO Scotford Upgrader	184	125	115	140	133	124	140	ATCO		
Air Liquide Scotford #1	80	68	41	71	67	67	69	Air Liquide		Plant provided operating reserves
Bear Creek	80	30	19	64	39	25	64	TransCanada		
Buck Lake	6	3	3	3	3	3	3	Penn West		
Calpine Energy Centre	250	265	164	276	271	268	272	Calpine Income Fund L.P.	TransAlta	Generating using duct firing to increase output
Carseland Cogen	80	76	64	84	78	76	82	TransCanada		Generating above rated capacity
Celanese	20	5	3	6	6	3	6	Calanese Canada Inc.		
Dow Hydrocarbon	310	228	170	246	242	238	246	Dow Chemical Canada Inc		
Drywood	6	0	0	0	0	0	0	Canadian Hydro Developers		
Elmworth - Northstone	12	10	0	12	11	10	12	Northstone Power		
EnCana #1	120	90	47	106	98	93	106	Encana		Plant provided operating reserves
EnCana Foster Creek	80	65	62	68	64	62	67	Encana		
Fort Nelson	47	41	34	43	41	41	42	Powerex		
Gold Creek Facility	7	4	3	4	4	4	4	Maxim Power		
Joffre #1	474	282	221	392	325	222	392	ATCO /EPCOR/ Nova	ATCO	Plant provided operating reserves
MacKay River	165	151	148	154	150	148	154	TransCanada		
Mahkeses	180	137	133	140	136	133	140	Imperial Oil Resources		
Maxim #2	8	6	0	8	8	7	8	Maxim Power		
Maxim #3	7	4	0	7	7	7	7	Maxim Power		
Maxim #4	6	3	0	6	5	0	6	Maxim Power		
Medicine Hat #1	205	164	127	185	181	170	184	City of Medicine Hat		
Muskeg River	200	138	119	157	153	150	157	ATCO/SaskPower International	ATCO	
Nexen #1	120	74	21	105	102	100	105	Nexen		
Poplar Hill #1	47	12	-1	36	29	4	36	ATCO		Plant provided operating reserves
Primrose #1	85	74	71	76	73	71	75	ATCO/CNRL	ATCO	
Rainbow #1	26	0	0	0	0	0	0	ATCO		Unit failed to start - old unit
Rainbow #2	40	13	0	27	24	0	27	ATCO		
Rainbow #3	21	0	0	0	0	0	0	ATCO		Unavailable as unit is inoperable
Rainbow #5	47	40	30	44	41	40	43	ATCO		
Rainbow Lake #1	47	26	10	37	34	32	37	ATCO		
Redwater Cogen	40	31	0	36	34	30	35	TransCanada		
Rossdale #10	71	0	0	0	0	0	0	EPCOR		Not generally available to the system - slow start unit
Rossdale #8	67	0	0	0	0	0	0	EPCOR		Not generally available to the system - slow start unit
Rossdale #9	71	-1	-1	-1	-1	-1	-1	EPCOR		Not generally available to the system - slow start unit
Sait	6	0	0	0	0	0	0	Sait		
Sturgeon #1	10	2	0	5	4	0	5	ATCO		
Sturgeon #2	8	0	0	0	0	0	0	ATCO		Unit failed to start - old unit
Suncor #1	445	358	347	375	369	350	375	TransAlta		
Syncrude #1	430	273	273	273	273	273	273	Syncrude		
Talisman Edson	11	8	7	9	9	8	9	Talisman		
University of Alberta	39	21	16	24	22	21	24	U of A		
Valleyview 1	45	16	-1	44	37	7	44	ATCO		Plant provided operating reserves
Weldwood	50	42	33	46	41	33	45	Weldwood of Canada Ltd		