NOTICE TO MARKET PARTICIPANTS AND STAKEHOLDERS

Date: November 2, 2012

Re: July 9 2012, Load Shed Event

This Notice reports on the Market Surveillance Administrator's findings with respect to the load shed event that occurred in parts of Alberta on July 9, 2012.

The MSA's responsibility in a matter of this nature is to review whether any rules, reliability standards or provisions of the *Electric Utilities Act* were violated by market participants or the Alberta Electric System Operator (AESO) leading up to or during the event.

In brief, we find no evidence of wrongdoing by any of the parties, neither regarding compliance with the market rules and reliability standards, nor with respect to allegations of manipulation of the market or collusion among participants. The circumstances that led to the controlled action initiated by the AESO were a combination of peak summer demand for electricity and generator equipment issues caused by high temperatures.

There are always lessons to be learned from critical events such as occurred on July 9, 2012. While the MSA offers some suggestions in this Notice, these are matters squarely under the purview and that engage the professional expertise of the system operator, the AESO.

The body of this Notice summarizes our findings. An Attachment summarizes the conditions before July 9 and provides a chronology of events on the day leading to the controlled load shed and the restoration. Also attached to the Notice is a glossary and brief description of the operation of electric systems and the roles of the relevant agencies: the Alberta Electric System Operator, Market Surveillance Administrator, Alberta Utilities Commission, and the Western Electricity Coordinating Council. The Overview and Glossary in Attachment B is meant to assist those who don't have a close familiarity with the electricity sector; it is by no means comprehensive.

Our Approach

The Market Surveillance Administrator (MSA) is an independent enforcement agency that protects and promotes the fair, efficient and openly competitive operation of Alberta's wholesale electricity markets and its retail electricity and natural gas markets. The MSA also works to ensure that market participants and the Alberta Electric System Operator (AESO) comply with the Alberta Reliability Standards and the Independent System Operator Rules (ISO rules).

The MSA reviewed both the conduct of the market participants and the AESO on July 9, 2012 when 200 megawatts (MW) of Alberta load was shed as a result of insufficient generation.

While July 9, 2012 was expected to be a hot day, the AESO forecast that there was sufficient generation and imports to meet the anticipated load. At the beginning of the day the AESO anticipated there would only be one generator out of service on a planned outage and there was sufficient generation to meet both energy and operating reserve requirements. Over the course of the day the available supply to meet the load deteriorated as a result of up to 10 generators being forced from service at various times. By the afternoon, after all supply and operating reserve were exhausted the AESO found it necessary to request 200 MW of load shedding.

The AESO has a legislated mandate to operate the system in the Alberta control area within its design limits and with respect to its Operating Limits and Procedures. During periods of stress such as when there is insufficient generation to meet load, the use of these procedures is critical to ensure the continued safe and reliable operation of the system. Well understood procedures ultimately protect the electrical grid when the operator is facing significant system challenges.

What We Looked At

In the course of our review, we examined confidential generator reports as to what had occurred to force them from service, their actions in restarting their generation to return to service and the generators' review of maintenance and calibration procedures.

We have also reviewed the AESO's operating procedures, the AESO's actions and the various tools available to them to ensure reliability.

What We Found

We are satisfied that the July 9, 2012 event resulted from a confluence of peak summer load and coincidental generator forced outages due to high ambient temperature conditions. We have not uncovered any breaches of the ISO rules, Alberta Reliability Standards or anticompetitive conduct in violation of the *Electric Utilities Act.*

There is no evidence of market manipulation by generators and, to the contrary, in the course of our review we found that generators had made substantial efforts to return to service. We have found no correlation between the design of the electricity market and the load shedding event.

Over the course of July 9, 2012 ten generating units operated by six different market participants and accounting for over 1400 MW of energy were forced from service for periods of time. From our review of the confidential generators' reports we conclude that the coincident loss of so many generators was as a result of many unrelated factors, including:

- Hot weather - up to that point the hottest day of the summer - stressing the units;
- Maintenance / calibration procedures on several generators that appear to have been improperly applied.

We understand that event investigation by the AESO has already led to the submission and approval of a number of corrective action plans by generators to mitigate similar operational issues from arising in the future.

Next Steps / Recommendations

We have asked the AESO to review one of its look ahead short term forecasting tools to determine if the most appropriate inputs are being used. One can consider this tool as an early warning to potential troubles ahead. In our view, this did not contribute to the July 9, 2012 event but a more robust tool might have been able to provide more advanced warning of the potential supply adequacy issues.

Similarly, it is a known phenomenon that the actual output of generators is impeded by ambient temperature conditions and we have suggested to the AESO that a better understanding of the implications may allow modeling this capacity into its tools.

The present ISO rules and Alberta Reliability Standards derived from NERC Reliability Standards do not appear to place an onus on generators to follow their documented maintenance procedures. We recommend that the AESO take the lead with the participants to determine whether to develop some form of accountability for generators

to ensure their documented procedures – notably maintenance and calibration - are followed.

The AESO continues to review and assess its internal processes and procedures and will share its findings with MSA in due course. We look forward to further discussion of these issues.

July 9, 2012 was a serious event. The MSA is confident that the AESO and market participants are committed to learn from the experience to be in a better position to respond to similar challenges that may arise in the future.

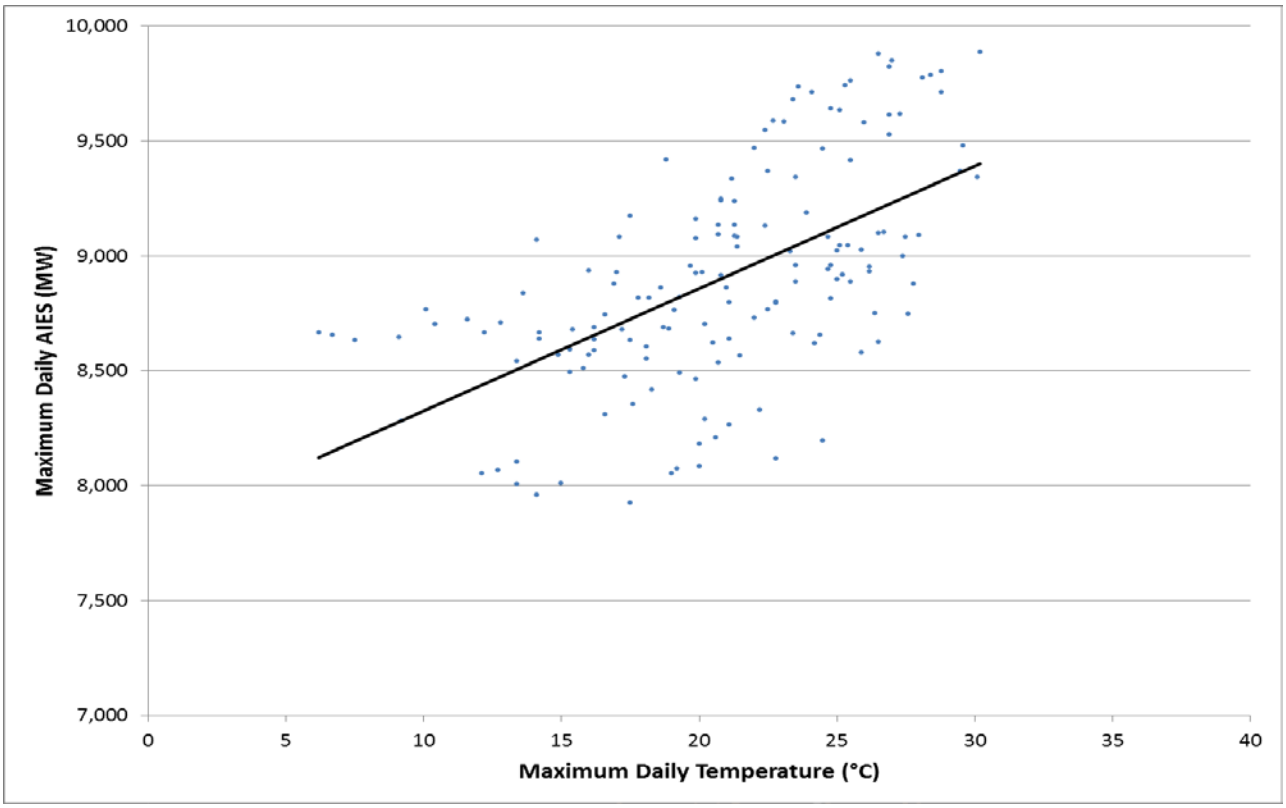
Attachment A - Chronology of Events

July 9, 2012 was a notable day as AESO faced a shortage of available generation and was forced to curtail load for several hours to keep the system secure. The following description focuses on the outlook prior to the day and the events of the day, from a market perspective.

Outlook Prior to July 9

During the week prior to Monday July 9, there were indications that it would be tight day for the market. The weather forecast was for a hot day. This tends to increase the load on the system; a rule of thumb is 50 MW per 1 degree Celsius rise. This is supported by the data of Figure 1 that shows maximum daily loads versus the corresponding daily maximum temperature for May through September, 2012.

Figure 1: Maximum Daily Load and Maximum Daily Temperature



Further to that, Monday is generally the highest load day of the week due to the startup of many businesses that were closed over the weekend. July 8 yielded the highest ever

summer peak demand for a Sunday and, with no break in the weather expected, set up Monday July 9 as a very high demand day.

Over the weekend, only one unit was on maintenance and no major outages were scheduled for Monday. However, hot weather causes many thermal units to be derated from their normal maximum capability. Also, hot days frequently produce little wind generation.

Forward trading for Monday July 9 was relatively brisk as companies sought to manage their exposure to pool price. Around 40 MW traded at prices in the range $200 – 225/MWh. Given that most traders would expect the off-peak prices to be quite low, such prices for the whole 24 hours of the day imply an expectation of on-peak prices in the $500 – 800/MWh range. For comparison, at that time, the 30-day rolling average pool price was $36.93/MWh.

Events on July 9

By the morning of July 9 some things became more certain. The expectation was that the temperature would reach 30 degrees Celsius and a record high summer demand was a prospect. In the event, a new record of 9885 MW was set in HE14.

At 7 am the only unit of significant size offline was the one that went on outage over the weekend and its return to service was delayed. There were no strong signals that a generation adequacy issue was in the offing. In fact, AESO's Supply Adequacy report showed more than 400 MW of energy in the merit order above that needed for the load for all hours of the day. Over the next 7 hours or so, however, over 1400 MW of capacity across 10 generating units (operated by six different market participants) was forced out of service for various periods of time, ultimately leading to some shedding of load. A summary is provided in Table 1.

Table 1: Significant Events on July 9, 2012

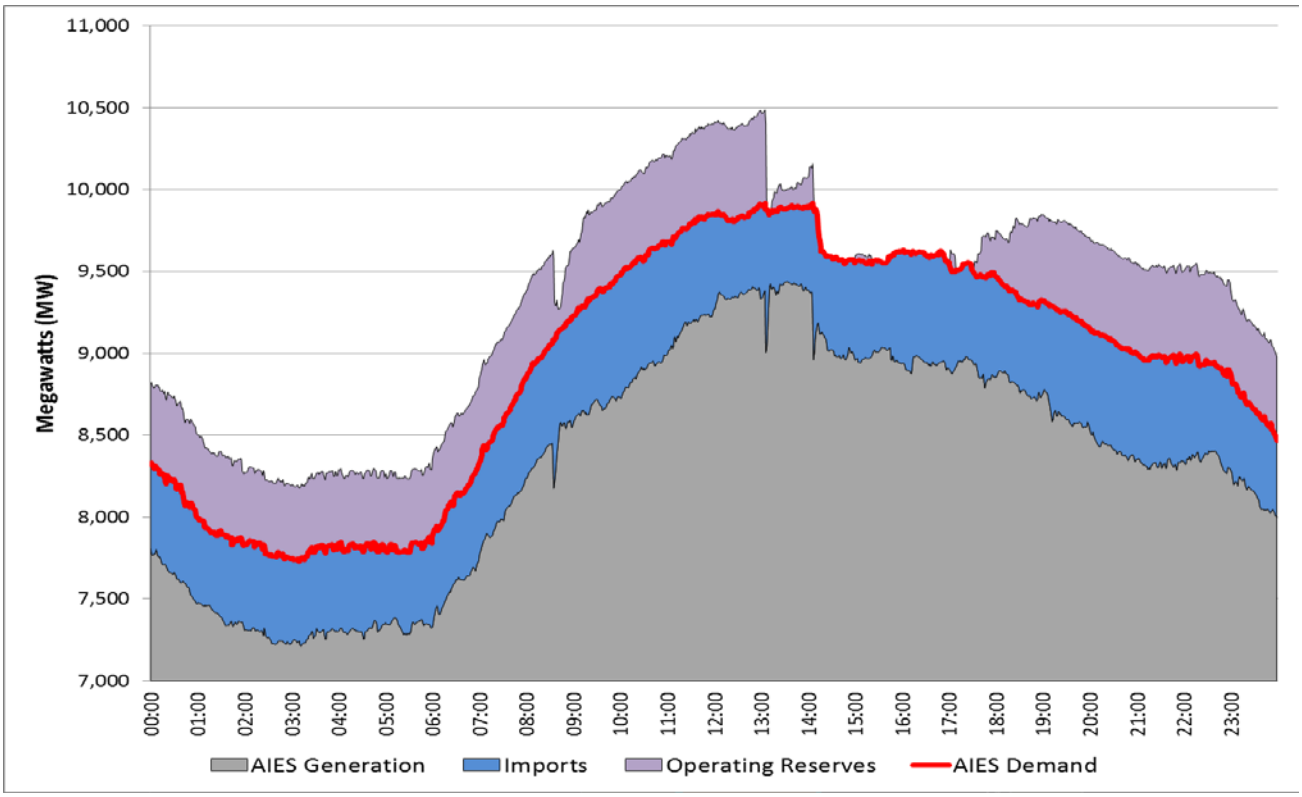
Time	Event	Fuel Type	MW*	Starts Return
08:34	Battle River 5 - forced	Coal	(324)	July 14
12:58	Balzac GS - forced	Gas	(78)	13:35
13:05	Keephills G1 - forced	Coal	(393)	18:16
13:18	Poplar Hill G1 - forced	Gas	(33)	17:34
13:34	EEA1 declared	n/a	n/a	n/a
14:04	AESO asks BC Hydro to cancel transmission outage	n/a		15:48
14:06	Genesee G2 - forced	Coal	(400)	17:12
14:08	EEA2 / EEA3 declared	n/a	n/a	n/a
14:08	Rotating blackout implemented	n/a	200	n/a
14:15	Mahkeses GT91 forced	Gas	(71)	14:45
14:21	Saskatchewan provides emergency energy	n/a	60	n/a
14:58	Sundance #3 – return from planned outage	Coal	362	14:58
15:00	Saskatchewan provides emergency energy	n/a	100	n/a
15:39	Rotating blackout	n/a	100	n/a
15:46	Joffre CT201 - forced	Gas	(205)	17:00
15:48	BC Hydro Transmission outage ended	n/a		n/a
15:48	BC Hydro Import ATC increased from 495 to 575	n/a	80	n/a
17:10	Rotating blackout ended	n/a	n/a	n/a
17:15	Crossfield G2 - forced	Gas	(41)	18:48

*Brackets in this column indicate loss of MW.

Source: AESO, "AIES Event Log"

At 13:34 the AESO declared Energy Emergency Alert 1, meaning that the normal energy merit order was exhausted. Soon after, Emergency Alerts 2 and 3 were declared leading to the curtailment of load of 200 MW at 14:08. The AESO was able to eliminate all load shedding by 17:10 and system normal conditions resumed at 18:48 (Energy Emergency Alert 0) and the system controller returned to dispatching the merit order. A useful diagram to show how the merit order was exhausted and how the reserves were then converted to energy is presented in Figure 2.

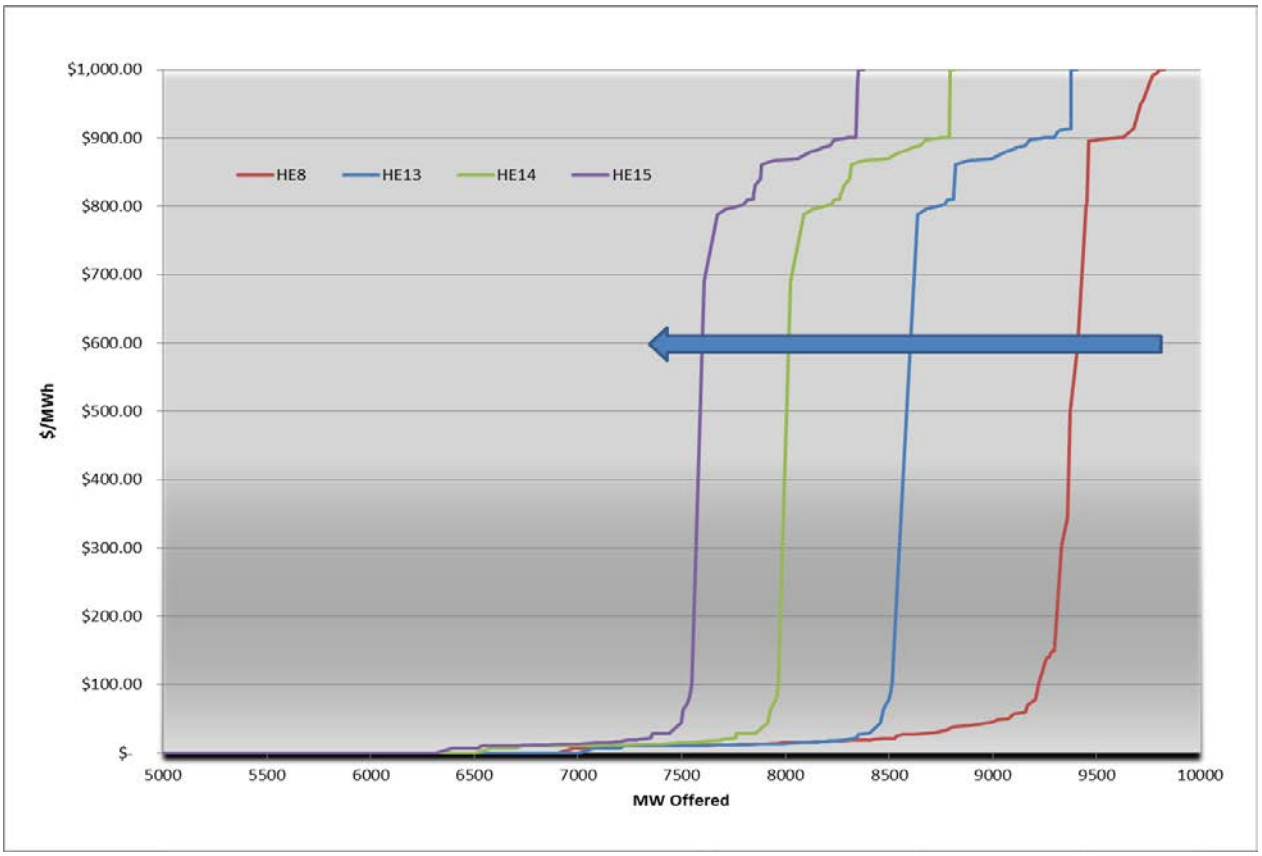
Figure 2: Supply, Demand and Operating Reserves, July 9, 2012



The average pool price for the day was $411.43 (On-Peak $611.20/MWh, Off-Peak $11.90/MWh). This average price is ten times the 30-day rolling average price leading up to July 9. Market conditions remained tight over the next 3 days averaging almost $360/MWh. By that time the 30-day rolling average had more than doubled to $83.88/MWh.

When there is an expectation of a certain amount of market tightness, some generators will withhold in an effort to drive the price higher and run the associated dispatch risk. If the expectation is for a really tight day then there is little need for strategic offers since pure scarcity alone will drive the price. July 9 turned out to be one of the latter. Figure 3 shows the merit orders for several hours in the day and it is apparent that the only significant changes to the shape of the curve through the day is due to the loss of generation as units went on forced outage. There was very little strategic offering that occurred on July 9, 2012.

Figure 3: Offer Curve Development on July 9, 2012



Attachment B - Backgrounder:

Overview of Alberta Electric Operations

Electricity is a commodity, but unlike almost any other commodity it must be produced when it is required, effectively there is no storage. This means that the electricity system must be coordinated to ensure supply and consumption (or demand, usually called 'load' in the electricity business) are matched at all times. That responsibility falls to the Alberta Electric System Operator (AESO). As the name implies, the AESO manages the electric grid in Alberta, directing the operations of market participants within the framework of established rules, procedures and reliability standards. In formal terms, the AESO is responsible for the safe, reliable and economic planning and operation of the Alberta Interconnected Electric System.

The suppliers (generators of electricity in Alberta and importers of electricity generated outside the province) offer their energy into the Alberta electricity marketplace. As the Alberta load rises the AESO will direct generators to produce power to meet that demand. As demand increases the AESO calls upon suppliers who have offered at higher prices. The AESO also contracts for operating reserves to help manage the system and act as a safety net if there is an unplanned loss of generation.

Generation can be lost either to problems at a specific generating plant or where there are problems on the transmission system. Enough reserves are held to deal with the single largest event that could impact the system – the exact criteria are set out in Alberta Reliability Standards which have been developed to ensure a high and consistent standard of reliability (in simple terms, the uninterrupted supply of electricity) across North America. In practice, operating reserves are only one part of how the AESO manages a reliable system. For example: generation and transmission operators must in turn comply with a number of rules and Alberta Reliability Standards. The AESO monitors compliance with these rules and standards and the Market Surveillance Administrator conducts enforcement action in the case of breaches. Adjudication is the function of the Alberta Utilities Commission, a quasi-judicial tribunal.

In practice the contracted reserves and other procedures that the AESO follows are almost always sufficient to deal with the issues that arise from time to time in the electric system. Larger problems occurring over a shorter space of time are obviously more challenging to address. When the AESO anticipates that demand will outstrip supply it follows a 30 step procedure to manage the situation, the last of which is to direct electric distribution companies (the local suppliers of electricity to homes and businesses) to engage in a controlled procedure known as load shedding. This is sometimes also referred to as a 'rolling blackout': the electric distribution companies' stop delivering

electricity to some customers for a short period of time before restoring their service and moving to stop delivery at a different set of customers. The AESO directs how much each distribution company needs to stop delivering and the distribution companies in turn determine which customers are selected at any point in time.

If the AESO exhausts all other procedures and load is not shed in a controlled manner, the likely consequence would be a blackout. Lack of control may cause the blackout to cascade forcing other generators and even more load offline and possible affecting neighbouring jurisdictions as happened to Ontario in 2003. Simply put, a controlled load shed is far more preferable to the alternative.

Load shed events do not occur often. Prior to July 9, 2012 the last load shed event in Alberta was July 24, 2006 (398 MW load shed). However, it is important to ensure that market participants and the AESO adhered to the rules and reliability standards designed to protect against such occurrences. The AESO has the responsibility for operating a safe and reliable electric system and therefore has an obvious interest in assessing the circumstances that led to the event with a view to identifying possible improvements in procedures. In the event of breaches in the rules and reliability standards the MSA would consider enforcement action. Even if there are no breaches it is important to check whether lessons can be learned from what are unusual events.

Glossary

Alberta Reliability Standards

The AESO currently operates to North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) reliability standards in accordance with the Transmission Regulation. NERC standards are adapted for use in Alberta where appropriate through a consultation process led by the AESO, and are subject to approval by the Alberta Utilities Commission as Alberta Reliability Standards.

Alberta Electric System Operator

The Alberta Electric System Operator, abbreviated AESO, as an independent system operator is a not-for-profit entity responsible for the safe, reliable and economic planning and operation of the Alberta Interconnected Electric System. The AESO also facilitates Alberta's fair, efficient and openly competitive wholesale electricity market.

Independent System Operator Rules

All market participants are obligated to comply with the *Electric Utilities Act* of Alberta and the ISO rules. Each participant is bound by the rules, which are defined as including the rules, practices, policies and procedures that regulate the operation of the market.

Market Participant
Includes any person or entity that supplies, generates, transmits, distributes, trades, exchanges, purchases or sells electricity, electric energy, electricity services or ancillary services.

Alberta Load
The amount of electricity delivered or required within the Alberta Interconnected Electric System at a point in time.

Control Area
Electric power system in which operators such as the AESO match loads to resources within the system, maintain scheduled interchange between control areas, maintain electric frequency within reasonable limits, and provide sufficient generation capacity to maintain operating reserve. The AESO is the Balancing Authority within the Alberta control area.

Design Limits
The operational limit of a product beyond which it not required to function properly.

Operating Limits and Procedures
The technical standards and operating policies and procedures allowing the safe, reliable and economic operation of the Alberta Interconnected Electric System (AIES).

Energy Emergency Alert One
EEA1
This alert is declared after all available resources in the energy market have been used to meet AIES firm load. Sufficient operating reserves are intact - which means we still have about 500 MW in reserves available. Energy is imported through the interconnections with BC and Saskatchewan as per schedules. At this point the AESO would also ask customers who have Demand Opportunity Service (DOS) contracts to lower their demand on the system. These are generally customers who have flexible operations to respond to changes in their demand or supply quickly.

Energy Emergency Alert Two
EEA2
All steps under Alert 1 have been taken. Operating reserves are being used to supply energy requirements. Power service is maintained for all firm load customers. Load management procedures have been implemented, which may include the voluntary load curtailment program (VLCP), voltage reduction and reduction in non-essential loads. Customers who are part of the VLCP have agreed to comply with directives to reduce or stop their power consumption during this type of energy shortfall situation.

A public communication may have been issued to request customers to voluntarily reduce demand. Ancillary service directives have been issued to supplemental and spinning reserves to increase energy supply and firm load is now relied upon for reserve. Emergency energy has been requested of neighbouring control areas. Regulating reserve is maintained.

Energy Emergency Alert Three
EEA3

All steps under Alerts 1 and 2 have been taken. Some firm load is curtailed, which means that power service to some customers is temporarily interrupted to maintain the minimum required regulating reserve and the integrity of the overall system. After receiving directives from the AESO system controller, the distribution facility owners decide which customers are to be temporarily without power at this point in the process.

Load Shedding

The act or process of disconnecting the electric current on certain lines when the demand becomes greater than the supply.

Generator Outage

A temporary suspension or reduction of an electrical generator's output. Outages can be either 'planned', for maintenance, or 'forced' due to unforeseen operational or system problems.

NERC Reliability Standards

North American Electric Reliability Corporation (NERC) reliability standards define the reliability requirements for planning and operating the North American bulk power system, and are developed using a results-based approach that focuses on performance, risk management, and entity capabilities.

Western Electricity Coordinating Council

The Western Electricity Coordinating Council or WECC as it is commonly referred to, is a Regional Entity with delegated authority from NERC responsible for coordinating and promoting bulk electric system reliability in the Western Interconnect that includes Alberta. Pursuant to an agreement with the MSA, WECC monitors the AESO for compliance with the Alberta Reliability Standards.

Operating Reserve

Operating Reserve is output available from a generator that can be dispatched, or load that can be reduced, to maintain system reliability in the event of an imbalance between supply and demand on the electricity system. Most power systems are designed so that, under normal conditions, the operating reserve is always at least the capacity of the largest generator plus a fraction of the peak load.