



## ***West Royalty Substation Fire Post Mortem***

May 12, 2009

On April 27, 2009 at 9:16 a.m. three 13.8 kV circuit breakers tripped at the West Royalty Substation control building that protect the distribution circuits supplying the West Royalty and Charlottetown North areas. The trip alarms were received at the Energy Control Centre (ECC) and Maritime Electric line employees were immediately dispatched to the Substation. They arrived on site at approximately 9:25 a.m. along with a volunteer firefighter. The Charlottetown Fire Department trucks arrived on the scene at approximately 9:40 a.m.

From 9:30 a.m. – 10:00 a.m. the local media was contacted and advised that a fire had been reported at the West Royalty Substation and that the Charlottetown Fire Department was on site. Media and customers were advised that approximately 25,000 customers were without power. This number increased to 55,000 customers at 9:52 a.m. when the 138 kV supply to the West Royalty Substation was tripped at the request of the firefighters to remove all electricity in the building.



At 10:43 a.m. GT3, the 50 MW combustion turbine located at the Charlottetown Plant, was successfully black-started by the ECC Operator and at 10:46 a.m. began picking up load from the Charlottetown Substation. With the root cause and extent of the outage unknown at that time, Management made the decision to start GT3 and take Charlottetown Thermal Generator # 9 out of layup as it would be more economical to operate than GT3 for any lengthy duration. It was expected to take in excess of 12 hours before Generator # 9 would be available for service.

The Charlottetown Fire Department subsequently entered the control building that houses the breakers/switchgear and used CO2 to extinguish the fire found in the Mount Edward circuit switchgear. The Fire Department requested, for the safety of the firefighters, to keep all electricity off in the building until the fire was deemed to be out.

With the fire safely extinguished the ECC operator restored power to the Milton Brackley and Bonshaw 25 kV feeders at 11:32 a.m. At 11:33 a.m. the ECC operator picked up Hunter River and Rattenbury feeders. At 11:44 a.m., the Company reported to the media that Maritime Electric technicians had been given the clearance to enter the control building to review the status and damage of the electrical supply equipment.

At 12:01 p.m. the 69 kV transmission lines (from the West Royalty Substation) to Charlottetown Substation were energized and at 12:02 p.m. all customers east of Charlottetown had their power restored. By then there were approximately 15,000 customers in the Charlottetown North area still without power. Customers in the Charlottetown area were picked up during the day as generation and distribution capacity allowed and as line crews reconfigured the distribution feeders in the City to transfer customer load from the West Royalty Substation to the Charlottetown Substation feeders. At 2:09 p.m. the University Avenue feeder was restored and at 4:37 p.m. approximately 7,600 customers remained without power in parts of Charlottetown, Parkdale, and Sherwood. The Company advised the media and customers that it hoped to have all power restored in the evening and that crews were working at sites across the City. Throughout the remainder of the day, there were 8 crews working in the Charlottetown area transferring customers to other circuits. Throughout the day the media was updated as progress was made in restoring power to customers.

At 9:49 p.m. Charlottetown Thermal Generator # 9 was synchronized to the system and began picking up load, aiding the restoration process. The last remaining four customers in the Sherwood area had their power restored around midnight. The Call Centre received approximately 3,500 calls during the outage and remained open to service customers until midnight.

The next day (April 28th), it was determined that the fault inside the Mount Edward breaker was initiated by a squirrel; however it was a failure of the breaker to operate properly that resulted in the more widespread outage. Normally, the initial fault, caused by a squirrel in this case, would have resulted in an outage to just one circuit with little or no equipment damage. Unfortunately, the Mount Edward breaker was damaged beyond repair.

Clean-up and equipment refurbishment and replacement continues at the West Royalty control building. The investigation by Company personnel and AIG, Maritime Electric's Insurer, is

ongoing and the current estimate of the damage is \$200,000, which is approximately the insurance deductible amount.

The following action items are the conclusions of Management at this point in the investigation:

1. Investigate ways to improve pest control for substation control buildings.
2. Investigate the feasibility of a CO2 fire suppression system and expedite the planned smoke/fire alarm system for the West Royalty Substation and other Company control buildings.
3. Construct a new 13.8 kV circuit from Charlottetown Substation that could interconnect with the West Royalty Substation 13.8 kV circuits.
4. Add a tie point between the Queens Arms and Euston Street circuits by reconductoring approximately 1.8 km from Belvedere Avenue to Euston Street.
5. Formalize a switchgear maintenance program that will include regular thermal scans.
6. Establish a maintenance program for the 13.8 kV switches used in the Charlottetown City Circuits.

### **Conclusion**

Although this outage resulted in hardship for some of our customers and equipment damage at the West Royalty Substation, it also provided many positive highlights:

- The GT3 Black Start process was successful.
- #9 Boiler/Generator was taken out of layup mode and placed into service in less than 10 hours. Through the Energy Purchase Agreement 7 days have been allowed for bringing the Plant up to full output.
- A thermo scan, during the restoration process, found equipment “hot spots” that have been repaired and/or slated for future replacement as certain feeders were loaded up to their maximum level.
- Staff have gained valuable experience and as a result have come up with action items that are intended to improve restoration time and future reliability
- A deeper appreciation of our employees’ abilities and determination during stressful and demanding events.