A REPORT TO

THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

QUARTERLY REPORT

ON

PERFORMANCE OF GENERATING UNITS

FOR THE QUARTER ENDED DECEMBER 31, 2016

NEWFOUNDLAND AND LABRADOR HYDRO

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1.0 INTRODUCTION

In this report, Newfoundland and Labrador Hydro (Hydro) provides data on forced outage rates of its generating facilities. This data is provided in relation to historical forced outage rates and as well as in relation to assumptions used in Loss of Load Hours (LOLH) calculations for system planning purposes.

The forced outage rates are provided for individual generating units at hydraulic facilities; the three units at the Holyrood Thermal Generating Station (HTGS) and Hydro's gas turbines for the current 12-month reporting period of January 1, 2016 to December 31, 2016. The report also provides, for comparison purposes, the individual generating unit data on forced outage rates for the previous period January 1, 2015 to December 31, 2015. Further, total asset class data is presented on an annual basis for years the 2005-2014. This report provides data on outage rates for forced outages, not planned outages.

The forced outage rates of Hydro's generating units are presented using two measures: Derated Adjusted Forced Outage Rate (DAFOR) for the hydraulic and thermal units and Utilization Forced Outage Probability (UFOP) for the gas turbines.

Derated Adjusted Forced Outage Rate (DAFOR) is a metric that measures the percentage of the time that a unit or group of units is unable to generate at its maximum continuous rating (MCR) due to forced outages. The DAFOR for each unit is weighted to reflect differences in generating unit sizes in order to provide a company total and reflect the relative impact a unit's performance has on overall generating performance. This measure is applied to hydraulic and thermal units. However, this measure is not applicable to gas turbines because of their nature as a standby unit and relatively low operating hours.

Utilization Forced Outage Probability (UFOP) is a metric that measures the percentage of time that a unit or group of units will encounter a forced outage and not be available when required. This metric is used for the gas turbines.

Included in the forced outage rates are outages that remove the unit from service completely, as well as instances when units are de-rated. If a unit's output is reduced by more than 2%, the unit is considered de-rated by Canadian Electricity Association (CEA) guidelines. Per CEA guidelines, to take into account the de-rated levels of a generating unit, the operating time at the de-rated level is converted into an equivalent outage time.

In addition to forced outage rates, this report provides outage details for those outages that contributed materially to forced outage rates exceeding those used in Hydro's generation planning analysis.

2.0 PERIOD ENDING DECEMBER 31, 2016 OVERVIEW

Class of Units	January 1, 2015 to December 31, 2015 (%)	January 1, 2016 to December 31, 2016 (%)	Base Planning Assumption (%)
Hydraulic (DAFOR)	2.66	5.51	0.90
Thermal (DAFOR)	5.04	19.42	9.64
Gas Turbine (Combined) (UFOP)	12.94	9.35	10.62
Gas Turbine (Holyrood) (UFOP)	3.06[1]	1.65	5.00

The combined[2] gas turbine UFOP performance (in table above) shows improvement for the current period, the 12-month period ending December 2016 compared to the previous period, the 12-month period ending December 2015. There was a decline in Hydraulic and Thermal DAFOR performance for the current period compared to the previous period.

In the 10 year period prior to 2014, the hydraulic units show a somewhat consistent DAFOR. The DAFOR of the current 12-month period compared to the previous 10 years is higher, primarily due to penstock issues experienced on Units 1 and 2 at Bay d'Espoir.

The thermal units, in the 10 year period prior to 2014, exhibit more variability in DAFOR than the hydraulic units, but in many years were close to a consistent rate of approximately 10%. The forced outage rate of the current period ending December 2016 is 19.42% which is above the base planning assumption of 9.64%, and the sensitivity of 11.64%. This is primarily caused by an airflow derating on Unit 1 and boiler tube failures on Units 1 and 2.

[1] Only includes data from March 1, 2015 to December 31, 2015

[2] Combined Gas Turbines include the Hardwoods, Happy Valley, and Stephenville units. The performance of the Holyrood CT was not included in the combined base planning or sensitivity numbers as these numbers were set prior to the Holyrood CT's in service date.

Hydro's combined gas turbines' UFOP in the 10 year period prior to 2014 was generally consistent at approximately 10% until the year 2012 when the rate exceeded 50%. Since 2012, the UFOP has been improving each year. For the current 12-month period ending December 31, 2016, performance was mainly affected by forced outages to the Stephenville unit. Performance data for the Holyrood CT for the 12-month period ending December 2015 includes nine months of data where the 12-month period ending December 2016 includes a full year of data.

Note that the data in the charts for 2005 to 2014 are annual numbers (January 1 to December 31), and the data for December 2015 and December 2016 are 12-month rolling (January 1 to December 31 for this period).

3.0 GENERATION PLANNING ASSUMPTIONS

The DAFOR and UFOP indicators used in Hydro's generation planning model is representative of a historic average of the actual performance of these units. These numbers are noted in the table below under the column "Base Planning Assumption"[3].

Hydro also provides a sensitivity number for DAFOR and UFOP as part of its generation planning analysis. This number takes into account a higher level of unavailability, should it occur, to assess the impact of higher unavailability of these units on overall generation requirements. During the 12-month period ending December 31, 2016, the gas turbine units performed well within this sensitivity range for UFOP, while both the hydraulic and thermal classes performed outside of the sensitivity range for DAFOR. As part of the ongoing risk review considering energy supply up to Lower Churchill interconnection, Hydro is considering several years of data of DAFOR and UFOP and the resulting implication for meeting reliability criteria.

The new gas turbine (Holyrood CT) has a lower expected rate of unavailability than the original gas turbines, of 5% compared to 10.62% respectively, due to the fact that the unit is new and can be expected to have better availability than the older units.[4]

Hydro's generation planning assumptions for DAFOR and UFOP for the year 2016 are:

	DAFOR (%)		UFOP (%)	
	Base Planning Assumption	**Sensitivity**	**Base Planning Assumption**	**Sensitivity**
Hydraulic Units	0.90	0.90		
Thermal Units	9.64	11.64		
Gas Turbines - Existing			10.62	20.62
Gas Turbines - New			5.0	10.0[5]

[3] Hydro has completed a risk assessment on thermal generation supply for the period up to interconnection with Labrador and Nova Scotia. As part of this risk assessment, Hydro reviewed the recent availability results, no final decision has been made on new base planning assumption for various generation sources.

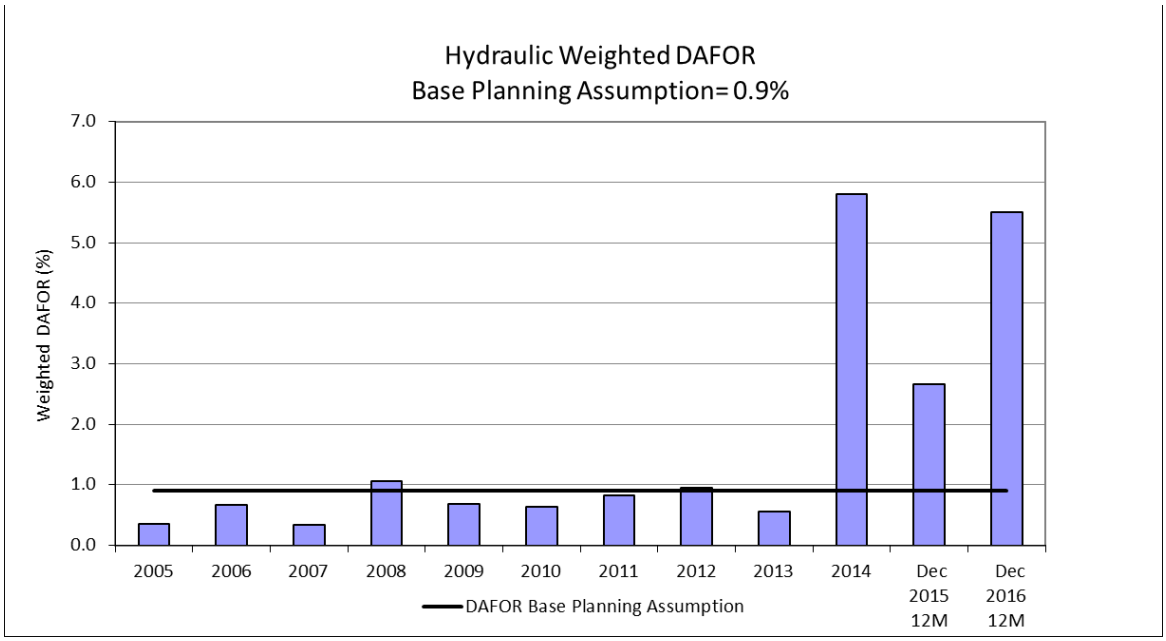
[4] Hydro selected a 5% UFOP for the new Holyrood CT following commentary on forced outage rates contained in the *Independent Supply Decision Review – Navigant (September 14, 2011)*

[5] In previous reports this sensitivity value was reported as 5.0%. The generation planning sensitivity for the Holyrood CT was updated to 10 % in the September 2015 Q3 report for system planning purposes.

4.0 HYDRAULIC UNIT FORCED OUTAGE RATE PERFORMANCE

The hydraulic unit forced outage rates are measured using the CEA metric, DAFOR. Detailed results for the 12-month period ending December 31, 2016 are presented as well as the data for the 12-month period ending December 31, 2015. These are compared to Hydro's generation planning assumption for the forced outage rate.

Generating Unit	Maximum Continuous Unit Rating (MW)	12 months ending December 2015 (%)	12 months ending December 2016 (%)	Hydro Generation Base Planning Assumption (%)
All Hydraulic Units - weighted	954.4	2.66	5.51	0.90
Hydraulic Units				
Bay D'Espoir 1	76.5	25.35	30.87	0.90
Bay D'Espoir 2	76.5	0.06	33.90	0.90
Bay D'Espoir 3	76.5	0.00	0.00	0.90
Bay D'Espoir 4	76.5	0.28	0.93	0.90
Bay D'Espoir 5	76.5	2.54	0.56	0.90
Bay D'Espoir 6	76.5	0.00	0.18	0.90
Bay D'Espoir 7	154.4	0.00	0.00	0.90
Hinds Lake	75	0.16	0.24	0.90
Upper Salmon	84	0.00	0.06	0.90
Granite Canal	40	1.88	1.36	0.90
Cat Arm 1	67	0.01	1.02	0.90
Cat Arm 2	67	1.41	0.00	0.90
Paradise River	8	0.24	7.08	0.90



Considering the individual units performance, the assumed Hydro generation base planning DAFOR was materially exceeded for Bay d'Espoir Unit 1 and Bay d'Espoir Unit 2. Also, there were exceedances compared to base planning assumption for Granite Canal, Cat Arm Unit 1 and Paradise River for the current period.

The Bay d'Espoir Unit 1 DAFOR of 30.87% and Unit 2 DAFOR of 33.90%, compared to the base planning assumption of 0.9% were impacted by the units being removed from service on two separate occasions as a result of a leak in Penstock 1, which provides water to both Units 1 and 2. The first event occurred on May 21, 2016. A consultant was engaged to conduct an investigation into the issue, which contributed the leak to a localized issue caused by, what was suspected to be, a defect at the weld. A repair procedure was provided on June 2, 2016, with repairs carried out and completed on June 3, 2016. Unit 1 was returned to service on June 3, 2016, at 1938 hours and Unit 2 returned to service a short time later at 2014 hours.

The second leak in Penstock 1 occurred on September 14, 2016. Considering this leak was similar to the first and located in the same area, a consultant was engaged to conduct a thorough investigation of the welds throughout the penstock, which included cutting sample sections from the penstock wall, for testing. This investigation is ongoing, but action was taken to refurbish the welds along the

upper section of the penstock between the Intake and Surge Tank. Both units were returned to service on November 30, 2016.

The Granite Canal Unit DAFOR of 1.36% compared to the base planning assumption of 0.9% was the result of the unit being unavailable from July 19, 2016 to July 22, 2016, due to water in the generator bearing oil. An investigation revealed that the generator bearing oil cooler experienced a leak, which resulted in water getting into the bearing oil. The damaged cooler was replaced with a new cooler and the unit returned to service.

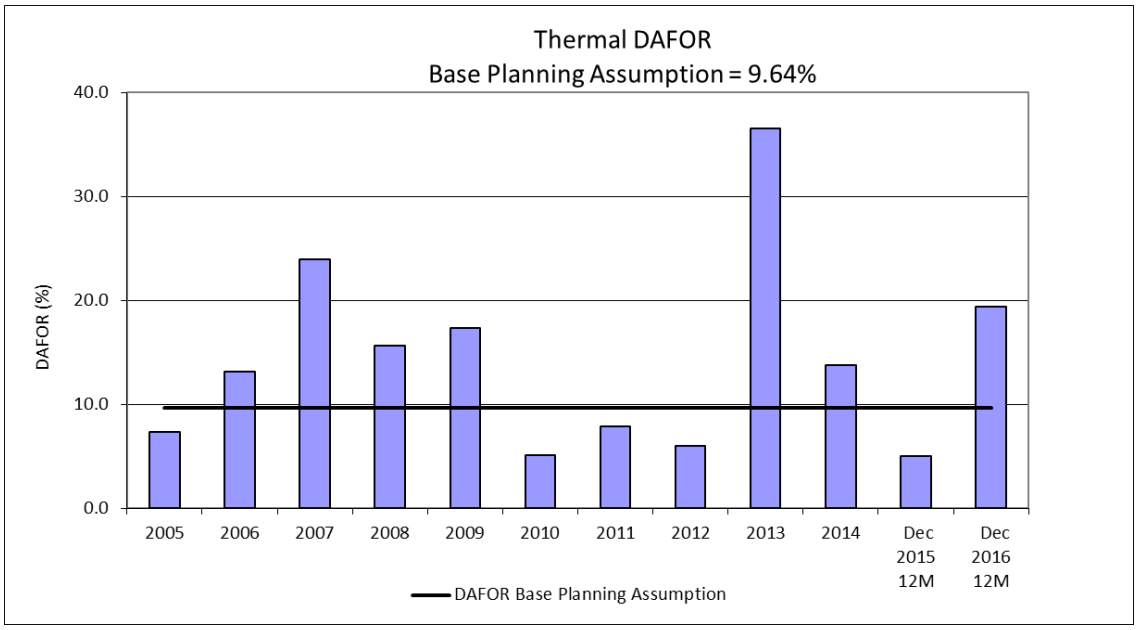
The Cat Arm Unit 1 DAFOR of 1.02% compared to the base planning assumption of 0.9% was the result of the unit being unavailable from November 23, 2016 to November 25, 2016, due to a governor oil pump trip. An investigation into the issue revealed that the internal seals in the pump had failed, preventing the pump from maintaining the governor oil pressure. The oil system was completely cleaned, flushed and replaced with new oil. A new oil pump was installed and the unit returned to service.

The Paradise River unit DAFOR of 7.08% compared to the base planning assumption of 0.9% was the result of a forced outage. A forced outage was experienced on September 23 from 0031 hrs to September 30 at 1805 hrs, which related to a governor low oil level alarm. This alarm was caused when a seal broke on one of the Governor servos, releasing oil from the governor oil sump into the powerhouse sump system. A new seal was installed and oil added to the governor system. There was another trip due to governor low pressure on October 23, 2016 to October 27, 2016. There have been repeated trips of this plant over the past number of months that had no obvious cause. Hydro investigated these trips and determined that it was most likely not a plant related issue, and likely due to distribution system disturbances. In consultation with Newfoundland Power regarding their equipment at the nearby Monkstown Substation, they agreed to replace the recloser with one having the capability to capture system information and assist in troubleshooting distribution issues. Since the recloser has been replaced there have been no associated cause-undetermined trips.

5.0 THERMAL UNIT FORCED OUTAGE RATE PERFORMANCE

The thermal unit forced outage rates are measured using the CEA metric, DAFOR. Detailed results for the 12-month period ending December 31, 2016 are presented as well as the data for the 12-month period ending December 31, 2015. These are compared to Hydro's generation base planning assumption for the forced outage rate.

Generating Unit	Maximum Continuous Unit Rating (MW)	12 months ending December 2015 (%)	12 months ending December 2016 (%)	Hydro Generation Base Planning Assumption (%)
All Thermal Units - weighted	490	5.04	19.42	9.64
Thermal Units				
Holyrood 1	170	4.94	24.55	9.64
Holyrood 2	170	1.89	26.69	9.64
Holyrood 3	150	9.37	2.41	9.64



For the 12-month period ending December 31, 2016, the weighted DAFOR for all thermal units, of 19.42% is above the assumed Hydro generation base planning DAFOR value of 9.64%, and also exceeded the previous 12-month period rate of 5.04%. Unit 1 DAFOR was 24.55% and Unit 2 DAFOR was 26.69%, and the performance for both units was above the base planning assumption of 9.64%. Unit 3 DAFOR was 2.41%, which is better than the base planning assumption of 9.64%. It is estimated that approximately half of the 19.42% DAFOR for the plant in 2016 is due to deratings and complications from the boiler tubes.

The DAFOR performance for Holyrood Unit 1 (170 MW) was affected by several events in the current 12 MTD period.

From November 27, 2015 to February 3, 2016, the unit was derated to 155 MW due to airflow limitations. This was a continuation of the problems experienced prior to the 2015 annual maintenance outage. During the 2015 annual outage the boiler components were internally inspected in an attempt to diagnose and resolve the airflow limitations. Significant air heater fouling was discovered and corrected during that outage. It was thought that the problem had been resolved, however airflow limitations continued once the unit was put back on line after the annual outage. Boiler tuning would have been the next step in resolving this issue. Tuning requires the unit to be operated through a range of high and low loads while control parameters are manipulated. The reheater tube failures in February 2013 and subsequent unit derating (see below) occurred before the tuning could be completed, removing the opportunity.

On February 3, 2016, the east forced draft fan variable frequency drive failed and caused the unit to trip. Investigation by Siemens (the manufacturer of the drives) and plant engineering was conducted. Under a Siemens recommendation, a control card on the drive unit was replaced and the unit was returned to service on February 5, 2016. When the unit was returned to service the load was limited to 140 MW to make the unit more reliable in consideration of the boiler reheater tube failures experienced in Unit 2. Hydro engaged Siemens to review the VFD reliability. Siemens completed a review and provided a set of recommendations which have been implemented by Hydro.

On February 8, 2016, the unit experienced a tube failure in the reheater section of the boiler. The unit was operated with a deration to 50 MW until an opportune time to shut it down for planned tube replacements on February 16, 2016. Hydro considered the risk of additional tube failures and the favorable weather forecast at the time and proceeded with the replacement of the lowest wall thickness tubes only during this maintenance outage. Sixteen lower reheater tubes were replaced at that time. The unit was returned to service on February 26, 2016 with a derating to 120 MW to maintain the reliability of the reheater until the remaining lower reheater tubes can be replaced during the upcoming scheduled annual maintenance outage.

On July 15, 2016, the unit was removed from service to repair a feedwater isolator gland failure, and to perform a wash of the air heaters and to repair cracks in the FD fan ductwork. The unit was returned to service after approximately 35 hours of outage time.

On August 27, 2016, the unit was taken off line in preparation for the annual maintenance outage. The work scope included replacement of the lower reheater tubes. The boiler gas path work scope included internal visual inspection and repairs, replacement of degraded steam coil air heaters, and ash removal from the economizer, air heaters, and stack breaching, as well as verifying proper function of the forced draft fans and their variable frequency drives.

During return to service from annual maintenance on October 29, 2016, a Mark V governor control card failed, causing a forced outage. The failed card was replaced and the unit was synchronized on November 2, 2016.

When the unit was first returned to service it remained derated due to air flow issues. As planned, combustion tuning was completed during the week of November 14, 2016 to diagnose the air flow issues on this unit. Tuning was completed by an expert from Foxboro (supplier of the distributed control system) with assistance from a boiler field expert from B&W. They determined that the air flow issues that Hydro is experiencing are due to fouling through various stages of the boiler, and air heater leakage. After an air heater wash, 160 MW was achieved. Further improvements require an outage to fully correct and this is being

planned for TH 2017 annual maintenance outage. Work will include boiler cleaning and air heater upgrades. Full load capability is expected upon completion of this work.

The DAFOR performance for Holyrood Unit 2 (170 MW) was primarily affected by several events.

On January 6, 2016, the unit experienced a tube failure in the reheater section of the boiler. Upon discovery of the failure the unit was taken offline in a controlled shutdown and allowed to cool for internal inspection. Four failed tubes in the lower section of the reheater were identified and replaced. The unit was returned to service on January 15, 2016. As is common practice when returning the unit to service, a stepped approach to loading the unit was employed. Between January 15, 2016 and January 19, 2016 the unit was gradually loaded in steps between 70 MW and 140 MW. On January 19, 2016, when operating at 140 MW, the unit experienced another failure in the lower reheater section of the boiler. Again the unit was taken offline in a controlled shutdown. Hydro considered the risk of additional tube failures and the favorable weather forecast at the time and proceeded with the replacement of the lowest wall thickness tubes during this outage. Over the period since the unit first went out of service January 6, 2016, 27 lower and three upper reheat tubes were replaced prior to the unit going back in service February 3, 2016. The unit was returned to service with a derating to 120 MW to improve the reliability of the reheater until the remaining lower reheater tubes were replaced during the scheduled annual maintenance outage.

On May 26, 2016, the west FD fan variable frequency drive failed and caused the unit to trip. Siemens (the manufacturer of the drives) was contacted immediately and a technician was dispatched to travel to site. In parallel, the plant Electrical Engineer (in consultation with Siemens), Electricians, and Operations conducted an internal investigation and determined that there were no current faults with the fan and it could be safely started. It was decided to put the unit back on line later in the day on May 26, 2016 while waiting for the Siemens technician. Because the reason for the trip had not been determined, the unit load was restricted to 50 MW (below UFLS).

The Siemens technician performed on-line diagnostics on May 27, 2016 and May 28, 2016.

Overnight on May 28, 2016, the unit was taken offline for a full internal inspection of the drive under direction of the Siemens technician. A control card on the drive unit was replaced and the unit was returned to service the next morning on May 29, 2016. Hydro engaged Siemens to review the VFD reliability. Siemens completed a review and provided a set of recommendations which have been implemented by Hydro.

The unit was returned to service on September 15, 2016, after its annual maintenance. The unit was derated to 130 MW until September 20, 2016 and to 150 MW until September 29, 2016 until on-line testing of the safety valves could be completed.

On November 6, 2016, the main steam inlet flange to the upper control valves was found leaking and the unit was derated to 70 MW until it was removed from service for gasket replacement on November 8, 2016. The unit was returned to service on November 10, 2016 but had to be taken off-line for another failure of the same gasket on November 16, 2016. This time the gasket was changed and a contractor was hired to provide a supplementary seal of the gasket. The unit was returned to service on November 21, 2016. This problematic joint is expected to be reliable for the remainder of the season and will be replaced during the planned outage in 2017.

On November 18, 2016, when attempting to go back on line after repair of the November 16 inlet flange leak, there was an issue discovered with turbine speed indication. After trouble shooting, it was determined that the speed probes had to be repositioned. The unit was returned to service on November 21, 2016.

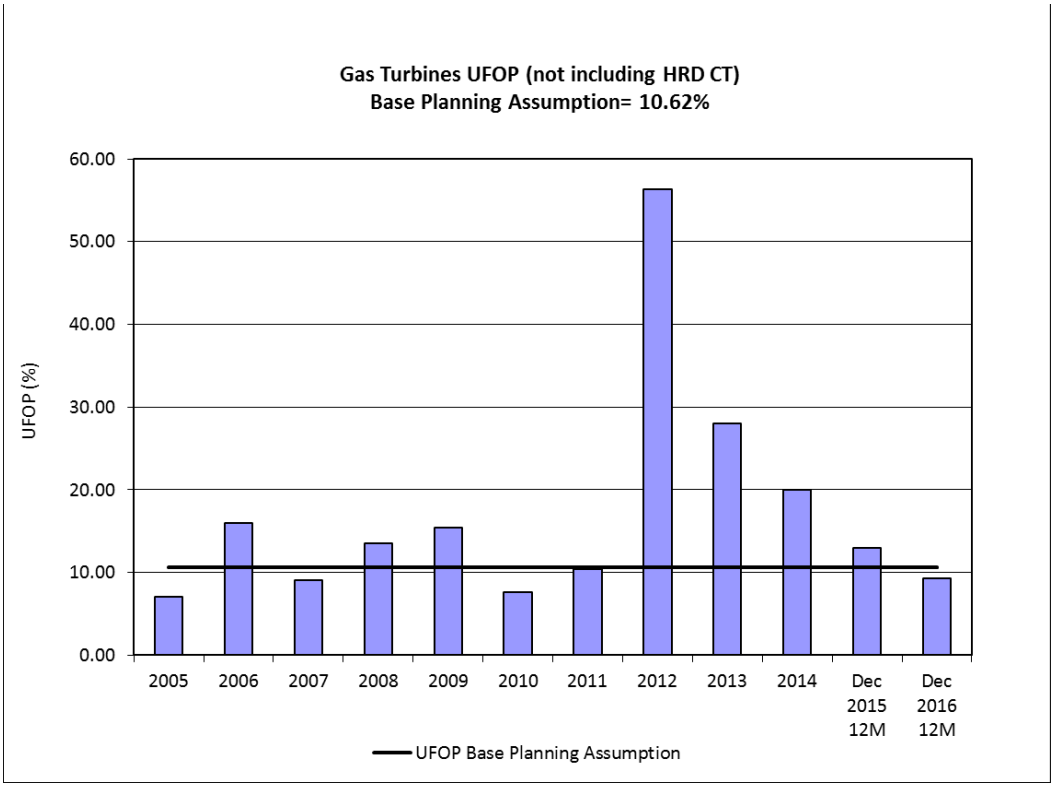
6.0 GAS TURBINE UFOP PERFORMANCE

The combined UFOP for the Hardwoods, Happy Valley and Stephenville gas turbines was 9.35% for the 12-month period ending December 31, 2016. This is better than the base planning assumption of 10.62%. The current period UFOP improved from the previous period UFOP of 12.94%. The Hardwoods UFOP for the current period is 7.83%, which is better than the base planning assumption of 10.62%. The Stephenville unit's current period UFOP is 15.40% compared to that of the previous period of 15.71%. Happy Valley's UFOP is 5.03% for the current period compared to 14.45% in the previous period.

Gas Turbine Units	Maximum Continuous Unit Rating (MW)	12 months ending December 2015 (%)	12 months ending December 2016 (%)	Hydro Generation Base Planning Assumption (%)
Combined Gas Turbines	125	12.94	9.35	10.62
Stephenville	50	15.71	15.40	10.62
Hardwoods	50	6.39	7.83	10.62
Happy Valley	25	14.45	5.03	10.62

The Holyrood (HRD) CT UFOP of 1.65% for the current period is better than the base planning assumption of 5.00%.

Combustion Turbine Units	Maximum Continuous Unit Rating (MW)	12 months ending December 2015 (%)	12 months ending December 2016 (%)	Hydro Generation Base Planning Assumption (%)
Holyrood CT	123.5	3.06	1.65	5.00



The Stephenville unit UFOP was primarily affected by the following events in the reporting period.

The UFOP for the Stephenville gas turbine was impacted by a forced outage from August 2, 2016 to August 5, 2016 due to a lube oil leak in the alternator module. The source of the leak was determined and the repair completed. The area was cleaned of oil and the unit returned to service.

There was another forced outage in August, from August 9 to August 19, 2016. This outage was due to the presence of debris on the metallic chip detectors during a routine inspection. A review of unit operation was completed in consultation with the overhaul facility, and the unit was returned to service with continued monitoring. No further issues have been found to date. The debris was analyzed and found to be minor in nature as very fine particles and not a cause of concern. The lubricating oil was analyzed and found to be in satisfactory condition for continued operation.