

1 Q. Please compile, for the Stephenville Gas Turbine, the same 2008 to 2014 reliability  
2 and performance criteria as was provided for the Hardwoods Gas Turbine in  
3 response to Undertaking 81 in the Amended 2013 General Rate Application, and  
4 additionally including the same criteria to the extent available for 2015 and 2016.

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7 A. The following table provides the information originally filed in response to  
8 Undertaking 81 updated to include 2015 and 2016 year to date. The definitions  
9 used in the table are noted below:

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11 • **Failure Rate** is defined as the rate at which the generating unit encounters a  
12 forced outage. It is calculated by dividing the number of transitions from an  
13 Operating state to a forced outage by the total operating time. It can be  
14 greatly influenced by operating time of standby units such as gas turbines.

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16 • **Capability Factor** is defined as unit available time. It is the ratio of the unit's  
17 available time to the total number of unit hours.

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19 • **UFOP** is defined as the Utilization Forced Outage Probability. It is the  
20 probability that a generation unit will not be available when required. It is  
21 used to measure performance of standby units with low operating time such  
22 as gas turbines.

Year	Failure Rate		Capability Factor (%)		UFOP (%)	
	Stephenville GT	CEA <sup>1</sup>	Stephenville GT	CEA <sup>1</sup>	Stephenville GT	CEA <sup>1</sup>
2008	0 <sup>2</sup>	22.88	48.28	85.68	9.77	40.94
2009	915.68	83.04	43.91	88.12	12.70	36.17
2010	0 <sup>2</sup>	74.10	50.37	89.92	5.83	12.80
2011	0 <sup>2</sup>	39.81	45.24	80.18	16.41	20.19
2012	0 <sup>2</sup>	51.13	0 <sup>3</sup>	86.55	0 <sup>3</sup>	20.87
2013	266.94	78.09	45.72	87.13	50.00 <sup>*</sup>	18.22
2014	207.05	85.43	63.54	72.95	13.73	12.98
2015	37.1	n/a	57.55	n/a	15.71	n/a
2016 YTD <sup>4</sup>	0 <sup>2</sup>	n/a	84.04	n/a	0.56	n/a

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In 2009, the high failure rate was the result of low operating hours (9.5 hours) and one forced outage. The forced outage occurred during a monthly test and was caused by a lube oil leak.

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The unit experienced low Capability Factors from 2008 to 2011 due to very low operating hours compared to forced and maintenance outage hours.

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In 2013, the Capability Factor and UFOP were affected by two forced outages. Both of these outages occurred during testing to return the unit back to service after work on the unit's stator. The unit experienced a stator ground fault in December 2011 and was released for service in June 2013.

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<sup>1</sup> CEA Data for 0-10% Operating Factor Classification - All Canada Combustion Turbine Units (GTs).

<sup>2</sup> In 2008, 2010, 2011, and 2016 YTD, there were no instances when a forced outage occurred when generating. The unit would have times when it was not available due to a forced outage if, for example, the forced outage occurred as a result of an issue discovered when it was not operating.

<sup>3</sup> In 2012, Unit was on a forced outage for the entire year. This resulted in a zero percent Capability Factor and undefined UFOP.

<sup>4</sup> 2016 YTD includes data up to April 30, 2016.

1 In 2014, the Capability factor was affected by nine forced outages. These outages  
2 were as follows:

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4 1. January 4, caused by vibration alarms after the unit was started.

5 2. January 4, caused by vibration alarms after the unit was started.

6 3. January 4, caused by vibration alarms after the unit was started.

7 4. January 6, caused by a fuel supply problem.

8 5. January 6, caused by a fuel supply problem.

9 6. January 7, caused by a fuel supply problem.

10 7. February 11, caused by a broken alternator belt.

11 8. March 6, caused by a fuel supply problem (fuel tank transfer failure).

12 9. December 8, caused by a fuel supply problem (fuel line broken to End A).

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14 In 2015, the Capability factor and UFOP was affected by a forced outage from May 1  
15 to May 27, caused by an alternator bearing problem. The bearing was inspected,  
16 repaired and returned to service.

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18 In 2016, the UFOP was affected by a forced outage on January 11, due a problem  
19 with the vibration probe. The probe was replaced and the unit was returned to  
20 service.

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22 On March 26, 2016, Stephenville End A engine experienced an outage due to a  
23 suspected bearing failure. The failed engine has been taken out of service until  
24 approval can be acquired to refurbish and reinstall the failed engine.