B20

YUKON ENERGY

YUKON UTILITIES BOARD		
EXHIBIT B-20		
DAY	ENTERED BY YEC	DATE Nov 14/12

YUKON ENERGY CORPORATION

OVERVIEW OF 20-YEAR RESOURCE PLAN: 2011-2030

UPDATED APPENDIX A

November 2012

APPENDIX A: UPDATED NEAR-TERM GRID LOAD SCENARIOS

The 2011 Resource Plan grid load scenarios are updated on an ongoing basis. As at November 2012, four load scenarios are currently applicable for Yukon Energy grid generation and capacity planning (see Table A-1):

1. Load scenarios without connection of major new mines:

    a. **Base Case:**[1]

        i. GRA non-industrial forecast loads for 2012 and 2013[2];
        ii. Non-industrial growth at 2.26%/year[3] for 2014 and 2015, at 2.45%/year[4] for 2016-2020 inclusive, at 2.82%/year for 2021-2025 inclusive, at 3.13%/year for 2026 and thereafter;
        iii. DSM/SSE assumed at 32% of annual load growth based on Yukon Electricity Conservation and Demand Management Potential Review (CPR) report prepared by ICF Marbek (January 2012);
        iv. Minto generation load (includes grid losses) at 32.3 GW.h/2012, 28.3 GW.h/2013, 38.0 GW.h/2014 and at 39.1 GW.h/year for 2015-2022 (no load thereafter)[5];
        v. Alexco generation load (includes grid losses) for 2012 and 2013 are at the same level as in 2012/13 GRA (14.2 GW.h/2012 and 15.8 GW.h/2013)[6], at 20.9 GW.h/2014 and step-by-step increasing to approximately 33 GW.h in 2016, and decreasing to approximately 22 GW.h/year level by 2020 (no load thereafter); and
        vi. Whitehorse Copper Tailings (WHCT) generation load (includes grid losses) at 9.3 GW.h/yr 2014-2018 (as compared to 5.2 GW.h/yr in 2013, as per 2012/13 GRA) and 4.1 GW.h in 2019 (no load thereafter).

[1] The Base Case loads have been updated from the June 2012 Update for years after 2013 to reflect current information on industrial loads and non-industrial load growth rates and DSM/SSE projections based on the ICF Marbeck January 2012 CPR report. GRA forecasts for 2012 and 2013 are retained for this update, except for adjustments to reflect the major reductions in forecast Minto mine loads.

[2] YEC's current 2012 BP forecasts indicate loads in 2012 (9 month actual) and 2013 that exceed GRA forecasts (including losses, the 2012 BP is 7.0 GWh higher than GRA forecast and the 2013 BP is 8.0 GW.h higher than GRA forecast [includes impact from delay in Fish Lake hydro plant in-service]). Non-industrial Resource Plan forecasts have not been adjusted at this time to reflect the current 2012 BP adjustments.

[3] 2011 Resource Plan forecast annual growth rate for non-industrial load.

[4] The annual growth rates for 2016-2020, 2021-2025 and 2026-2030 are from Marbek's final CPR report.

[5] Minto generation load reflects major reductions as provided by Minto in fall 2012 that materially changed forecasts previously provided in fall 2011.

[6] Alexco generation load after 2013 reflects updated forecasts as recently provided by Alexco. (The 2012 and 2013 GRA forecasts are retained - Alexco's recent updates suggest a small generation load reduction in 2012 (0.6 GWh) and a small generation load increase in 2013 (1.3 GW.h).

b. **Base Case with Brewery Creek:** Base Case with the added connection, starting July 2014, of Brewery Creek mine with generation load (including grid losses) assumed of 9.6 GW.h/yr in 2014, 19.0 GW.h/yr for years 2015-2017, and 29.0 GW.h/yr thereafter until the end of 2023[7].

2. Load scenarios with connection of major new mines:

   a. **Scenario A:** Base Case with Brewery Creek and Victoria Gold mine, starting April 2015 with generation load (including grid losses) of 124.7 GW.h/yr for 2015-2018 (2015 at 103.4 GW.h, assuming April start of operations), 143.3 GW.h/yr for 2019-2020, 145.1 GW.h/yr for 2021 and 152.3 GW.h/yr for 2022-2024 (no load thereafter)[8].

   b. **Scenario B:** Base Case with Brewery Creek, Victoria Gold and Carmacks Copper mine, starting January 1, 2016 with generation load (including grid losses) of 54.4 GW.h/yr that continues until the end of 2022 and 27.2 GW.h/yr for 2023 (no load thereafter)[9].

[7] Negotiation of a PPA with Brewery Creek has not yet commenced.

[8] PPA negotiations are ongoing with Victoria Gold (an earlier LOI set out principles for connection to the grid). It is assumed that Victoria Gold will pay all costs required for grid connection, plus upgrade of the Mayo-Keno line. The timing for connection of this mine remains uncertain (but will not be earlier than the Q2 2015 assumed in Scenario A).

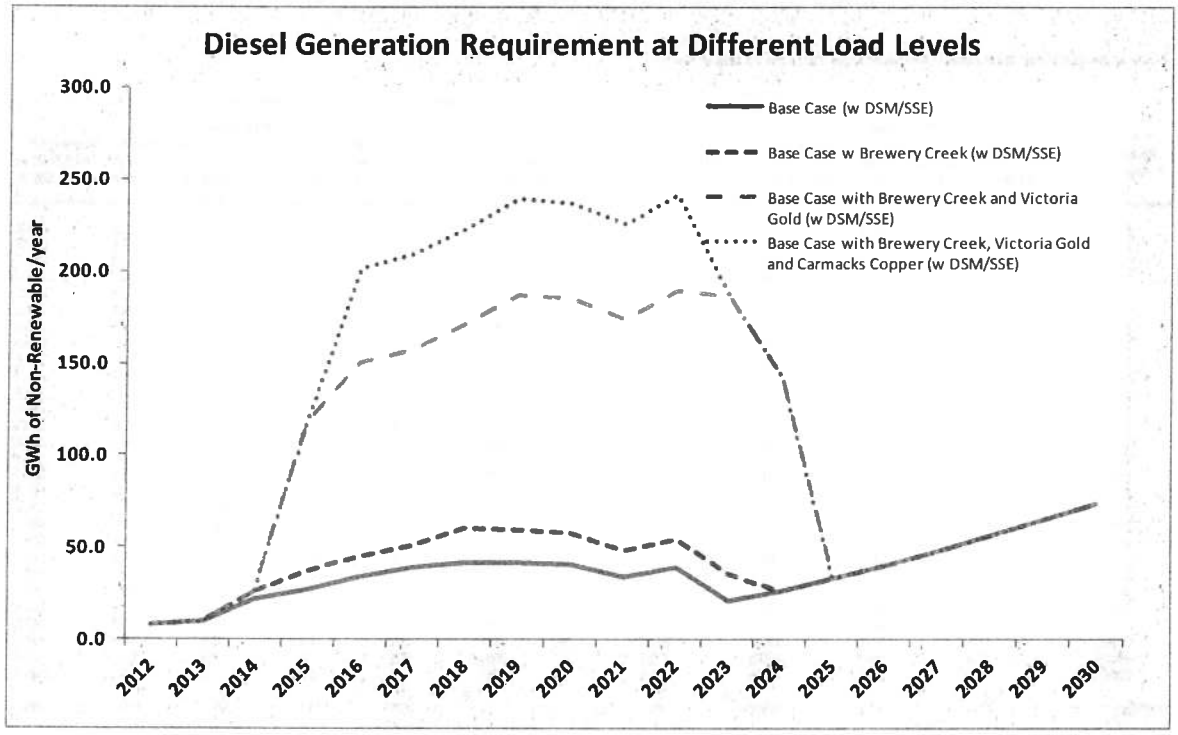
[9] Carmacks Copper has recently re-started its regulatory review processes, with an announced filing of a revised application planned this year with YESAB, followed shortly thereafter with revised filing with the YWB. PPA discussions occurred in the past – Carmacks Copper will be required to pay all costs required for grid connection plus a contribution to CSTP capital costs. The timing for connection of this mine remains uncertain, but could potentially occur by Q1 2016.

Table A-1: Updated Grid Load Scenarios

Forecast Years	Base Case (w DSM/SSE)			Base Case w Brewery Creek (w DSM/SSE)			Base Case with Brewery Creek and Victoria Gold (w DSM/SSE)			Base Case with Brewery Creek, Victoria Gold and Carmacks Copper (w DSM/SSE)		
	Non-industrial Load (GW.h)	Industrial Load (GW.h)	Total Generation (GW.h)	Non-industrial Load (GW.h)	Industrial Load (GW.h)	Total Generation (GW.h)	Non-industrial Load (GW.h)	Industrial Load (GW.h)	Total Generation (GW.h)	Non-industrial Load (GW.h)	Industrial Load (GW.h)	Total Generation (GW.h)
2012	359.0	46.5	405.5	359.0	46.5	405.5	359.0	46.5	405.5	359.0	46.5	405.5
2013	362.6	49.3	411.9	362.6	49.3	411.9	362.6	49.3	411.9	362.6	49.3	411.9
2014	368.3	68.3	436.6	368.3	77.9	446.2	368.3	77.9	446.2	368.3	77.9	446.2
2015	374.1	74.5	448.6	374.1	93.5	467.7	374.1	196.9	571.0	374.1	196.9	571.0
2016	380.6	80.4	461.0	380.6	99.4	480.0	380.6	224.2	604.7	380.6	278.5	659.1
2017	387.2	81.5	468.8	387.2	100.6	487.8	387.2	225.3	612.5	387.2	279.6	666.9
2018	394.0	79.5	473.6	394.0	108.6	502.6	394.0	233.3	627.3	394.0	287.6	681.7
2019	401.0	70.2	471.1	401.0	99.2	500.2	401.0	242.6	643.6	401.0	297.0	697.9
2020	408.1	60.9	469.0	408.1	89.9	498.0	408.1	233.3	641.4	408.1	287.7	695.8
2021	416.5	39.1	455.6	416.5	68.2	484.7	416.5	213.3	629.8	416.5	267.6	684.1
2022	425.2	39.1	464.3	425.2	68.2	493.3	425.2	220.5	645.6	425.2	274.8	700.0
2023	434.1		434.1	434.1	29.0	463.1	434.1	181.3	615.4	434.1	208.5	642.6
2024	443.2		443.2	443.2		443.2	443.2	152.3	595.5	443.2	152.3	595.5
2025	452.6		452.6	452.6		452.6	452.6		452.6	452.6		452.6
2026	463.4		463.4	463.4		463.4	463.4		463.4	463.4		463.4
2027	474.5		474.5	474.5		474.5	474.5		474.5	474.5		474.5
2028	485.9		485.9	485.9		485.9	485.9		485.9	485.9		485.9
2029	497.7		497.7	497.7		497.7	497.7		497.7	497.7		497.7
2030	509.8		509.8	509.8		509.8	509.8		509.8	509.8		509.8

Note: The 2012/2013 forecasts for this update retain the 2012/2013 GRA forecasts, except for the updated reduction to the Minto mine load. YEC 2012 BP updates indicate higher non-industrial generation loads (including grid losses) in 2012 (+7.0 GW.h) and in 2013 (+8.0 GW.h) compared to the 2012/2013 GRA forecasts.

Figure A-1: Diesel Generation Requirements at Different Forecast Loads: 2012-2030



Diesel Energy Requirement (GWh)	2012	2015	2020	2025	2030
Base Case	8.1	26.6	40.8	32.8	74.0
Base Case with Brewery Creek	8.1	37.3	57.8	32.8	74.0
Base Case with Brewery Creek and Victoria Gold	8.1	117.6	184.8	32.8	74.0
Base Case with Brewery Creek, Victoria Gold and Carmacks Copper	8.1	117.6	236.9	32.8	74.0

Figure A-1 and table provide the forecast diesel generation requirement during the 20-year planning period for each of the load scenarios.

1. The numbers are based on updated load for 2012-2030.
2. Diesel requirement numbers are long-term average diesel.
3. Model run with Aishihik 10-year rolling average rule, Mayo Lake assumed in-service by 2015.

Diesel generation forecasts for each load scenario reflect long-term average hydro generation, i.e., the average hydro generation over 28 recorded water year conditions at the assumed load, as estimated by the power benefits model used by YEC for grid generation planning. Table A-2 and the Figure A-2 below it provide a detailed review of potential diesel generation variability for the year 2015 under each load scenario for each of the 28 water years (the figure shows the annual load duration curve for diesel for each load scenario).

Table A-2: Forecast Diesel Generation Variability (GW.h) Depending on Water Year Conditions - Load Scenarios for 2016 and 28 Water Years of Record

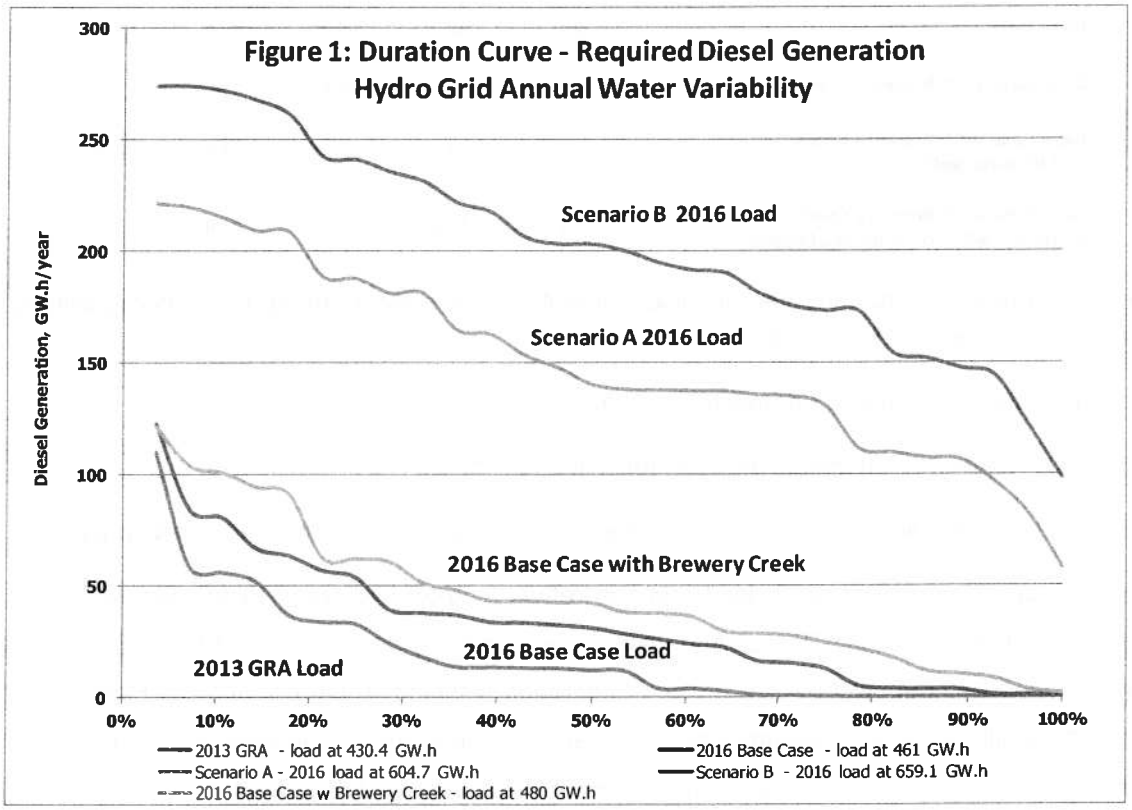
Average Annual Diesel Generation (Averaged Load Years for 28 Water Years)

Water Year	2016 Base Case - load at 461 GW.h	2016 Base Case w Brewery Creek - load at 480 GW.h	Average diesel generation required (GW.h) Scenario A - 2016 load at 604.7 GW.h	Scenario B - 2016 load at 659.1 GW.h
1981	3.9	10.3	137.8	203.1
1982	26.2	48.0	147.7	194.7
1983	28.5	38.2	135.0	191.5
1984	37.9	62.1	188.5	242.1
1985	33.5	43.3	162.7	217.4
1986	37.0	43.2	135.7	181.3
1987	12.9	24.6	137.5	199.9
1988	15.3	27.6	111.7	147.6
1989	3.6	8.4	109.7	175.5
1990	5.2	17.8	138.1	190.1
1991	3.4	11.7	107.4	144.2
1992	1.0	1.9	58.2	98.5
1993	1.2	3.6	96.6	154.4
1994	0.9	21.8	209.1	267.4
1995	56.9	94.1	219.5	273.8
1996	80.5	103.6	221.3	271.7
1997	84.3	100.5	181.1	231.2
1998	63.4	90.8	214.9	273.8
1999	122.5	121.1	208.4	260.7
2000	66.9	62.6	137.3	173.1
2001	33.8	28.6	82.3	121.8
2002	39.6	36.1	140.2	203.2
2003	31.1	51.3	187.6	240.9
2004	53.8	60.7	181.2	235.5
2005	23.9	42.2	153.4	206.3
2006	22.4	37.7	164.7	221.7
2007	32.4	42.5	130.8	173.3
2008	16.3	29.5	106.6	151.9
Average	33.5	45.1	150.2	201.7

Distribution of Annual Water Year Loads (Figure 1)

	% of Years not less than	2013 GRA - load at 430.4 GW.h	2016 Base Case - load at 461 GW.h	2016 Base Case w Brewery Creek - load at 480 GW.h	Scenario A - 2016 load at 604.7 GW.h	Scenario B - 2016 load at 659.1 GW.h
1	4%	109.9	122.5	121.1	221.3	273.8
2	7%	58.5	84.3	103.6	219.5	273.8
3	11%	55.9	80.5	100.5	214.9	271.7
4	14%	51.8	66.9	94.1	209.1	267.4
5	18%	36.8	63.4	90.8	208.4	260.7
6	21%	33.6	56.9	62.6	188.5	242.1
7	25%	32.8	53.8	62.1	187.6	240.9
8	29%	24.3	39.6	60.7	181.2	235.5
9	32%	18.0	37.9	51.3	181.1	231.2
10	36%	13.5	37.0	48.0	164.7	221.7
11	39%	13.3	33.8	43.3	162.7	217.4
12	43%	12.9	33.5	43.2	153.4	206.3
13	46%	12.8	32.4	42.5	147.7	203.2
14	50%	12.0	31.1	42.2	140.2	203.1
15	54%	11.6	28.5	38.2	138.1	199.9
16	57%	3.8	26.2	37.7	137.8	194.7
17	61%	3.7	23.9	36.1	137.5	191.5
18	64%	2.6	22.4	29.5	137.3	190.1
19	68%	0.9	16.3	28.6	135.7	181.3
20	71%	0.6	15.3	27.6	135.0	175.5
21	75%	0.3	12.9	24.6	130.8	173.3
22	79%	0.1	5.2	21.8	111.7	173.1
23	82%	0.1	3.9	17.8	109.7	154.4
24	86%	0.0	3.6	11.7	107.4	151.9
25	89%	0.0	3.4	10.3	106.6	147.6
26	93%	0.0	1.2	8.4	96.6	144.2
27	96%	0.0	1.0	3.6	82.3	121.8
28	100%	0.0	0.9	1.9	58.2	98.5
		18.2	33.5	45.1	150.2	201.7

Figure A-2: Duration Curve – Required Diesel Generation Hydro Grid Annual Water Variability



Projected annual grid capacity MW surplus (shortfall) under each load scenario is provided in Table A-3, assuming existing plant and planned diesel unit retirements and applying YEC's approved N-1 and LOLE capacity planning criteria. These shortfalls assume that L172 is re-enforced (with by twinning or by provision for the 35 kV system to be able to by-pass this line between Takhini and McIntyre substations).

The following are noted regarding assumed diesel unit retirements, using projected shortfalls under the Base Case to demonstrate the impact of assumed retirements:

- 2015 Base Case shortfall of 3.8 MW: reflects following 8 MW of diesel unit retirements:
    - Mirrlees WD#1 and WD#2 retired in 2014/2015 (2011 Resource Plan rating of 3.50 and 4.5 MW=8 MW total).
    - Replacing one of these units with at least the same capacity would totally resolve the 2015 shortfall.
- 2020 Base Case shortfall of 16.9 MW: reflects following 13.11 MW of diesel unit retirements:
    - The above Mirrlees retirements (8 MW) plus.
    - Dawson retirement of 3 units (total 2.56 MW retired in 2017, 2018 and 2020).
    - Mayo retirement of 2 units (total 1.7 MW in 2019).
    - Faro retirement of 1 unit (0.85 MW in 2019).
- 2025 Base Case shortfall of 41.2 MW: reflects following 28.61 MW of diesel unit retirements:
    - The above 13.11 MW retired by 2020 plus.
    - Whitehorse retirement of 4 units (total 11.5 MW - last Mirrlees (4.5 MW) and 3 EMDs).
    - Faro Mirrlees unit (4.0 MW in 2021).
- 2030 Base Case shortfall of 58.4 MW: reflects following 34.41 MW of diesel unit retirements:
    - The above 28.61 MW retired by 2025 plus.
    - Whitehorse CAT (3.0 MW in 2026).
    - Faro CAT (2.8 MW in 2027).

Table A-3: Grid Capacity Planning - Forecast MW Surplus (Shortfall) by Load Scenario: 2012-2030

Forecast Years	Base Case (w DSM/SSE)			Base Case w Brewery Creek (w DSM/SSE)			Base Case with Brewery Creek and Victoria Gold (w DSM/SSE)			Base Case with Brewery Creek, Victoria Gold and Carmacks Copper (w DSM/SSE)		
	Peak MW	N-1 Surplus (shortfall) (MW)	LOLE Surplus (shortfall) (MW)	Peak MW	N-1 Surplus (shortfall) (MW)	LOLE Surplus (shortfall) (MW)	Peak MW	N-1 Surplus (shortfall) (MW)	LOLE Surplus (shortfall) (MW)	Peak MW	N-1 Surplus (shortfall) (MW)	LOLE Surplus (shortfall) (MW)
2012	77.8	7.2	7.2	77.8	7.2	7.2	77.8	7.2	7.2	77.8	7.2	7.2
2013	78.6	6.5	6.5	78.6	6.5	6.5	78.6	6.5	6.5	78.6	6.5	6.5
2014	81.9	1.8	1.8	84.4	1.8	1.8	84.4	1.8	1.8	84.4	1.8	1.8
2015	84.2	-3.8	-3.8	86.7	-3.8	-3.8	95.1	-3.8	-11.6	95.1	-3.8	-11.6
2016	87.9	-5.1	-5.1	90.4	-5.1	-6.9	98.8	-5.1	-15.3	106.1	-5.1	-22.6
2017	89.2	-7.3	-7.3	91.7	-7.3	-9.1	100.1	-7.3	-17.5	107.4	-7.3	-24.8
2018	90.0	-9.4	-9.4	92.5	-9.4	-10.6	100.9	-9.4	-19.0	108.2	-9.4	-26.3
2019	90.6	-13.4	-13.4	93.1	-13.4	-13.8	101.5	-13.4	-22.2	108.7	-13.4	-29.5
2020	92.0	-16.9	-16.9	94.5	-16.9	-17.3	102.9	-16.9	-25.7	110.2	-16.9	-33.0
2021	88.4	-27.0	-27.0	90.9	-27.0	-27.0	99.3	-27.0	-30.6	106.5	-27.0	-37.8
2022	90.1	-28.8	-28.8	92.6	-28.8	-28.8	101.0	-28.8	-32.3	108.3	-28.8	-39.6
2023	86.2	-30.5	-30.5	88.7	-30.5	-30.5	97.1	-30.5	-30.5	104.4	-30.5	-35.7
2024	88.0	-32.3	-32.3	88.0	-32.3	-32.3	96.4	-32.3	-32.3	96.4	-32.3	-32.3
2025	89.9	-41.2	-41.2	89.9	-41.2	-41.2	89.9	-41.2	-41.2	89.9	-41.2	-41.2
2026	92.0	-46.3	-46.3	92.0	-46.3	-46.3	92.0	-46.3	-46.3	92.0	-46.3	-46.3
2027	94.2	-51.3	-51.3	94.2	-51.3	-51.3	94.2	-51.3	-51.3	94.2	-51.3	-51.3
2028	96.5	-53.6	-53.6	96.5	-53.6	-53.6	96.5	-53.6	-53.6	96.5	-53.6	-53.6
2029	98.8	-56.0	-56.0	98.8	-56.0	-56.0	98.8	-56.0	-56.0	98.8	-56.0	-56.0
2030	101.3	-58.4	-58.4	101.3	-58.4	-58.4	101.3	-58.4	-58.4	101.3	-58.4	-58.4