

1 Q. [T09-Turbines] - Please provide all basis and corresponding support why a 50-year
2 ASL is appropriate for Account T09 – Turbines rather than a 55- or 60-year ASL.
3 Further, provide the investment level and number of hours of operation for each of
4 the units. Finally, identify any physical or operating problems with each turbine and
5 how each specifically impacts life expectations.
6
7

8 A. Please see CA-NLH-274 Attachment 1 for the number of hours of operation for each
9 of the units. Physical condition problems are listed as follows.
10

11 Bay d'Espoir Units 1 to 6: The turbine runners are experiencing cavitation wear. The
12 wicket gate linkages are showing signs of wear - primarily in the bushings. Servo
13 motors seals have leaked and require seal replacement periodically. There has been
14 some concrete wear on the draft tube concrete structure that is typically repaired
15 with grout to reduce further damage.
16

17 Bay d'Espoir Unit 7: The turbine runner is experiencing cavitation wear (mild steel
18 runner with a stainless steel overlay - difficult to repair). Servo motors seals have
19 leaked and require seal replacement periodically. There has been some concrete
20 wear on the draft tube concrete structure that is typically repaired with grout to
21 reduce further damage. Currently the draft tube steel bull-nose requires
22 replacement.
23

24 Hinds Lake: The turbine runner is experiencing cavitation wear. The runner requires
25 crack repairs on average every four years. This runner is in the worst condition of
26 the major hydraulic units. Servo motors seals have leaked and require seal

1 replacement periodically. There has been some concrete wear on the draft tube
2 concrete structure that is typically repaired with grout to reduce further damage.

3
4 Paradise River: The turbine runner is experiencing cavitation wear, and has been
5 weld repaired. Servo motors seals have leaked and require seal replacement
6 periodically. There has been some concrete wear on the draft tube concrete
7 structure that is typically repaired with grout to reduce further damage.

8
9 Upper Salmon: The turbine runner is experiencing cavitation wear. There are
10 alignment issues with this unit due to concrete growth. Servo motors seals have
11 leaked and require seal replacement periodically. There has been some concrete
12 wear on the draft tube concrete structure that is typically repaired with grout to
13 reduce further damage.

14
15 Cat Arm: The turbine runners are experiencing some frosting (early signs of
16 cavitation wear). Needle leakage due to shaft and seal wear is a regular problem.
17 The deflector servo is experiencing leakage due to wear.

18
19 Granite Canal: This unit is less than 10 years old, so there are few physical condition
20 problems. The turbine runner is experiencing some frosting (early signs of cavitation
21 wear). The turbine shaft seal has been replaced due to excessive leakage.

22
23 Each of the above indications provides evidence of significant levels of interim
24 retirement activity, and which provide the company's operations and management
25 staff to believe that life extensions beyond the life estimates proposed in the
26 Gannett Fleming report are not reasonable.

Detailed Description of assets in Account T09 - Turbines

CA-NLH-274 Attachment 1, Page 1 of 2
Depreciation Methodology and Asset Service Lives

Asset Number	Description	Depreciation Start Date	Net Depreciable Cost (\$)	Further Description	Hours of Operation ¹
58773	Turbine No. 1-BDE	1/1/1967	280,641	75MW Francis Turbine - Bay D'Espoir Unit 1	138,337
58879	Draft Tube-Turbine #1-BDE	1/1/1967	8,066	75MW Francis Turbine - Bay D'Espoir Unit 1	138,337
58891	Autogreaser-Turbine #1-BDE	1/1/1967	2,275	75MW Francis Turbine - Bay D'Espoir Unit 2	76,930
58949	Turbine No. 2-BDE	1/1/1967	280,641	75MW Francis Turbine - Bay D'Espoir Unit 2	76,930
59077	Draft Tube-Turbine #2-BDE	1/1/1967	8,066	75MW Francis Turbine - Bay D'Espoir Unit 2	76,930
59086	Autogreaser-Turbine #2-BDE	1/1/1967	2,275	75MW Francis Turbine - Bay D'Espoir Unit 3	168,255
59151	Turbine No. 3-BDE	1/1/1967	280,641	75MW Francis Turbine - Bay D'Espoir Unit 3	168,255
59282	Draft Tube-Turbine #3-BDE	1/1/1967	8,066	75MW Francis Turbine - Bay D'Espoir Unit 3	168,255
59291	Autogreaser-Turbine #3-BDE	1/1/1967	2,275	75MW Francis Turbine - Bay D'Espoir Unit 3	168,255
59365	Turbine No. 4-BDE	1/1/1967	280,641	75MW Francis Turbine - Bay D'Espoir Unit 4	72,921
59488	Draft Tube-Turbine #4-BDE	1/1/1967	8,066	75MW Francis Turbine - Bay D'Espoir Unit 4	72,921
59496	Autogreaser-Turbine #4-BDE	1/1/1967	2,275	75MW Francis Turbine - Bay D'Espoir Unit 4	72,921
59556	Turbine No. 5-BDE	1/1/1970	833,337	75MW Francis Turbine - Bay D'Espoir Unit 5	98,952
59679	Draft Tube-Turbine #5-BDE	1/1/1970	12,500	75MW Francis Turbine - Bay D'Espoir Unit 5	98,952
59688	Autogreaser-Turbine #5-BDE	1/1/1970	5,339	75MW Francis Turbine - Bay D'Espoir Unit 5	98,952
59790	Turbine No. 6-BDE	1/1/1970	833,337	75MW Francis Turbine - Bay D'Espoir Unit 6	97,457
59909	Draft Tube-Turbine #6-BDE	1/1/1970	12,500	75MW Francis Turbine - Bay D'Espoir Unit 6	97,457
59918	Autogreaser-Turbine #6-BDE	1/1/1970	5,339	75MW Francis Turbine - Bay D'Espoir Unit 6	97,457
60096	Draft Tube-Turbine #7-BDE	1/1/1978	220,107	150MW Francis Turbine - Bay D'Espoir Unit 7	178,496
60104	Autogreaser-Turbine #7-BDE	1/1/1967	20,579	150MW Francis Turbine - Bay D'Espoir Unit 7	178,496
60732	Governor System - PRV Unit	3/9/1989	270,376	8MW Francis Turbine - Paradise River Unit 1	82,400
61677	Turbine - USL	1/21/1983	7,091,357	84MW Francis Turbine - Upper Salmon Unit 1	165,549
62135	Turbine No. 1 - Cat	8/2/1985	5,463,508	67MW Pelton Turbine - Cat Arm Unit 1	168,806
62318	Turbine No. 2 - Cat	8/2/1985	5,463,508	67MW Pelton Turbine - Cat Arm Unit 2	174,495
62985	Turbine - PRV Unit	3/9/1989	1,301,815	8MW Francis Turbine - Paradise River Unit 1	82,400
63097	Draft tube/Maintenance Gates	3/9/1989	72,469	40MW Kaplan Turbine - Granite Canal Unit 1	62,456
300232	Spiral Case	7/1/2003	119,687	40MW Kaplan Turbine - Granite Canal Unit 1	62,456
300233	Draft Tube	7/1/2003	98,935	40MW Kaplan Turbine - Granite Canal Unit 1	62,456
300234	Turbine (Instrumentation)	7/1/2003	262,605	40MW Kaplan Turbine - Granite Canal Unit 1	62,456
306447	Runner	7/1/2003	1,665,949	40MW Kaplan Turbine - Granite Canal Unit 1	62,456
306448	Head cover Assembly	7/1/2003	1,000,000	40MW Kaplan Turbine - Granite Canal Unit 1	62,456
306449	Guide Bearing Assembly	7/1/2003	200,000	40MW Kaplan Turbine - Granite Canal Unit 1	62,456
306450	Shaft Shield System	7/1/2003	75,000	40MW Kaplan Turbine - Granite Canal Unit 1	62,456
306451	Draft tube Gates	7/1/2003	250,000	40MW Kaplan Turbine - Granite Canal Unit 1	62,456

¹Data available for Bay d'Espoir Units 1 to 7, Upper Salmon Unit, Cat Arm Units 1 & 2, Hind Lake Unit - from January 1, 1990 to December 31, 2011

Data available for Granite Canal Unit is from July 30, 2003 to December 31, 2011

Data available for Paradise River Unit is from January 1, 1994 to December 31, 2011

Detailed Description of assets in Account T09 - Turbines

CA-NLH-274 Attachment 1, Page 2 of 2
Depreciation Methodology and Asset Service Lives

Asset Number	Description	Depreciation Start Date	Net Depreciable Cost (\$)	Further Description	Hours of Operation ¹
306452	Drainage Pumps	7/1/2003	100,000	40MW Kaplin Turbine - Granite Canal Unit 1	62,456
306453	Draft tube Monorail Hoist	7/1/2003	200,000	40MW Kaplin Turbine - Granite Canal Unit 1	62,456
333506	Turbine Bearing Oil Level Sys	10/30/2009	33,585	67MW Pelton Turbine - Cat Arm Unit 1	168,806
333507	Turbine Bearing Oil Level Sys	10/30/2009	33,585	67MW Pelton Turbine - Cat Arm Unit 2	174,495
99003850	Capital Spare - G.V. Ringfedders For Turbine	3/9/1989	258	8MW Francis Turbine - Paradise River Unit 1	82,400
99003851	Capital Spare - Bearing Pads For Turbine	3/9/1989	14,726	8MW Francis Turbine - Paradise River Unit 1	82,400
99003894	Provide & Install Index Testing Of Turbine Units At Cat Arm	12/23/1988	4,360	67MW Pelton Turbine - Cat Arm Unit 2	174,495
99004205	Capital Spares - Draft Tube Gate - Upper Salmon	1/21/1983	746	84MW Francis Turbine - Upper Salmon Unit 1	165,549
99004206	Capital Spares - Turbine - Upper Salmon	1/21/1983	46,030	84MW Francis Turbine - Upper Salmon Unit 1	165,549
99004300	Turbine & Governors - Draft Turbine	12/12/1980	62,550	80MW Francis Turbine - Hinds Lake Unit 1	121,328
99004302	Turbines & Governors - Turbine	12/12/1980	1,973,900	80MW Francis Turbine - Hinds Lake Unit 1	121,328
99004456	Misc - Capital Spares -(Turbine)	12/12/1980	59,000	80MW Francis Turbine - Hinds Lake Unit 1	121,328
99005630	Monitor Vibration On Turbine Shafts At BDE - Units 1-6	4/1/1987	8,893	75MW Francis Turbines - Bay D'Espoir Units 1-6	652,851
99005649	Turbines At BDE - Stage 3	1/1/1978	4,112,712	150MW Francis Turbine - Bay D'Espoir Unit 7	178,496
99006086	Drafttube Gates Ph #2-BDE	1/1/1978	95,459	150MW Francis Turbine - Bay D'Espoir Unit 7	178,496
99006150	Capital Spares - Turbine Unit	1/1/1978	34,500	150MW Francis Turbine - Bay D'Espoir Unit 7	178,496
99032152	Turbine(Hydraulic Equipment)-Unit1	1/1/1980	34,823	80MW Francis Turbine - Hinds Lake Unit 1	121,328
99041940	Turbine	7/1/2003	7,957,421	40MW Kaplin Turbine - Granite Canal Unit 1	62,456
99043356	Provide & Install Index Teg Of Turbine Units At Cat Arm	12/23/1988	4,360	67MW Pelton Turbine - Cat Arm Unit 2	174,495
99043365	Turbines & Governors - Tur By Bofors/Nohab, 77300kw	12/12/1980	657,967	80MW Francis Turbine - Hinds Lake Unit 1	121,328
93064	Turbine	1/1/1982	0	450Kw (0.45 MW) Generator	
6804	#1 Turb. Lube Oil Purification	4/23/1993	29,291	Lube,Oil and Filter System (Bowser System)	N/A
7715	#2 Turb Lube Oil Purification	4/23/1993	29,291	Lube,Oil and Filter System (Bowser System)	N/A
303295	Anti Fouling System U3	6/14/2007	305,590	Copper Ion Injection Systems (Retard Mussel Growth)	N/A
303300	Anti Fouling System-Unit 1	6/14/2007	305,590	Copper Ion Injection Systems (Retard Mussel Growth)	N/A
303301	Anti Fouling System Unit 2	6/14/2007	<u>305,590</u>	Copper Ion Injection Systems (Retard Mussel Growth)	N/A
Total			42,852,399		