1　Q.　Please provide the following information relating to Information Technology:

2　　　a.　2018 and 2019 Budgets, and 2018 Actual for Capital and O&M

3　　　b.　Resources (internal and external) by major categories for the most recent

4　　　　year available, noting any significant planned future changes

5　　　c.　Describe the major systems, platforms, services used by each of the

6　　　　different "clients"

7　　　d.　Please gauge (billings or allocations by category will work, for example) how

8　　　　you measure each Nalcor Energy/ Newfoundland Hydro client entity's share

9　　　　of usage from IT's work

10　　　e.　Budgets and forecasts of costs by major category

11　　　f.　Descriptions of organizations, resources, methods to integrate Information

12　　　　Technology/Operations Technology ("IT/OT") threat identification,

13　　　　mitigation, response and remediation

14

15

16　A.　a.　Capital and O& M budgets have been provided below. Table 1.0 represents

17　　　　Capital Budgets by line of business with supporting detail in Tables 1.1 to

18　　　　1.6. Table 2.0 provides the O&M Budgets by line of business with

19　　　　supporting detail in Tables 2.1 to 2.7.

Table 1.0 - Capital Projects By Line of Business

Total IT Capital Projects by Line of Business	Budget 2018	Actual 2018	Budget 2019
Nalcor Capital Projects - Business Systems Transformation	8,007,538	6,041,018	8,177,106
Nalcor Capital Projects - Common IT Services	2,069,355	1,782,051	3,526,245
Hydro Network Services	2,638,900	2,394,613	4,399,541
Hydro IT/OT Capital Projects	1,971,500	1,806,100	1,595,200
Churchill Falls IT/OT Capital Projects	729,800	782,267	1,098,200
Energy Marketing IT Capital Projects			47,300
Total Capital Expenditures	**15,417,093**	**12,806,049**	**18,843,592**

Table 1.1 - Nalcor Capital Projects – Business Systems Transformation

Nalcor Capital Projects - Business Systems Transformation	Budget 2018	Actual 2018	Budget 2019
ERP - JD Edwards EnterpriseOne including Utiligy360 Module (includes Finance, Human Resources/Payroll, Supply Chain Management, Customer Service, and Capital Asset Management)	3,938,394	3,691,360	2,918,612
Financial Management (Planning, Budgeting and Forecasting) - Cognos TM1	3,689,144	2,298,769	2,497,224
Information Management - HP Content Management rollouts	380,000	50,889	449,111
Management Reserve - to be reallocated as required to projects			2,312,159
Total Capital Expenditures	**8,007,538**	**6,041,018**	**8,177,106**

The Business Transformation Program is a multi-year program that is cost shared through a dedicated admin fee as described in the reposnse to RFI 055-d.

Capital expenditures in 2018 were lower than budget primarily due a change in schedule on the Cognos TM1 implementation project. The Information Management HP content Management rollouts were also deferred due to demands of the Muskrat Falls Inquiry on resources.

A management reserve outside of the project estimates has been budgeted as a contingency as requirements are further defined on later phases of the Projects.

Table 1.2 - Nalcor Capital Projects – Common IT Services

Nalcor Capital Projects - Common IT Services	Budget 2018	Actual 2018	Budget 2019
Desktop Transformation (carryover to 2019)	824,471	546,926	277,545
Minor Enhancements	339,300	340,069	531,100
Recovery System infrastructure	352,184	353,117	
Core IT Infrastructure	253,800	244,342	362,400
PC Replacement Program	26,500	25,664	214,100
Peripheral Replacement	273,100	271,933	267,500
Cyber Security			287,600
Collaboration Tools Enhancements			293,300
Database Service Enhancements and Consolidation			535,000
Microsoft Enterprise Agreement Renewal 3YR - 2019-2022			757,700
Total Capital Expenditures	**2,069,355**	**1,782,051**	**3,526,245**

Microsoft Enterprise Agreement Renewal was included in the Hydro capital budgets for previous three year period.
It has been moved to Nalcor based on organizational changes.

Table 1.3 - Hydro Network Services Capital Projects

Hydro Network Services Capital Projects	Budget 2018	Actual 2018	Budget 2019
Replace Battery Banks and Chargers - Various Sites (2017-2018)	561,900	555,096	
Upgrade Telecontrol Facilities - Mary March Hill and Blue Grass Hill	633,800	499,998	
Replace PBX Telephone Systems	91,700	134,914	1,107,386
Replace MDR6000 Microwave Radios	64,000	81,479	1,119,521
Replace Teleprotection TL261	57,600	60,147	457,253
Replace Network Communications Equipment	199,500	239,053	189,500
Upgrade Site Facilities	49,000	46,827	49,400
Replace Radomes	360,300	331,114	263,500
Purchase Test Equipment	46,000	30,681	45,600
Upgrade Remote Terminal Units	118,300	108,516	167,700
Buchans Air Conditioning	74,700	75,469	
Replace Battery Banks and Chargers (2018)	382,100	231,319	706,581
Replace Battery Banks and Chargers (2019)			96,300
Replace Teleprotection TL202/206			196,800
Total Capital Expenditures	**2,638,900**	**2,394,613**	**4,399,541**

Table 1.4 - Hydro IT/OT Capital Projects

Hydro IT/OT Capital Projects	Budget 2018	Actual 2018	Budget 2019
Microsoft Enterprise Agreement Renewal 3YR - 2016-2019	957,300	822,325	
Minor Enhancements	49,400	43,313	45,100
Cyber Security Program	62,200	63,238	90,700
Upgrade Software Applications	114,700	68,900	110,400
Core IT Infrastructure	430,900	453,773	359,500
PC Replacement Program	98,600	94,458	496,000
Peripheral Replacement	258,400	260,092	221,800
Upgrade Energy Management Systems			271,700
Total Capital Expenditures	**1,971,500**	**1,806,100**	**1,595,200**

Table 1.5 - Churchill Falls IT/OT Capital Projects

Churchill Falls IT/OT Capital Projects	Budget 2018	Actual 2018	Budget 2019
PC Replacement	63,600	58,813	237,000
Peripheral Replacement	177,000	173,253	87,600
Core IT	195,100	190,586	311,500
LAN Infrastructure Improvements - Town	294,100	359,615	249,700
Energy Management System Upgrade (IT/OT)			212,400
Total Capital Expenditures	**729,800**	**782,267**	**1,098,200**

Table 1.6 - Energy Marketing IT Capital Projects

Energy Marketing IT Capital Projects	Budget 2018	Actual 2018	Budget 2019
PC Replacement			47,300
Total Capital Expenditures	**-**	**-**	**47,300**

Table 2.0 - Operating Costs (O & M) Budgets by Line of Business

Total Operating Costs IT/OT by Line of Business	Budget 2018	Actual 2018	Budget 2019
Business Systems Transformation	2,695,473	2,904,725	565,626
Nalcor Common IT Services	6,526,024	6,280,999	8,423,480
Energy Marketing IT	839,593	851,221	862,638
Hydro OT	1,791,405	1,944,534	1,819,375
Hydro IT	527,964	506,419	527,129
Hydro Network Services	5,071,928	5,089,786	5,062,044
Churchill Falls IT/OT	528,893	Unavailable	554,309
Total Gross Operating Costs	**17,981,280**	**17,577,684**	**17,814,600**
Labour In	1,094,620	1,050,485	1,009,958
Labour (Out)	(1,791,619)	(2,691,937)	(1,812,359)
Total Operating Costs	**17,284,281**	**15,936,232**	**17,012,200**

Table 2.1 – Business Systems Transformation Operating Costs

Business Systems Transformation Operating Costs	Budget 2018	Actual 2018	Budget 2019
Salaries and Benefits	909,417	935,751	-
Memberships, subscriptions and dues (including software maintenance - see schedule A)	350,883	125,087	-
System Equipment Maintenance	5,000	156	-
Office Supplies, Memberships and Miscellaneous	30,600	31,358	-
Professional Services (including post go live vendor support for ERP)	1,125,527	1,754,953	365,626
Equipment Rentals	1,000	-	-
Utilities	5,880	4,045	-
Travel	6,607	33,421	-
Training (Development of Training Materials was grouped with Consulting)	260,559	19,726	200,000
Building Rental & Maintenance	-	228	-
Total Gross Operating Costs	**2,695,473**	**2,904,725**	**565,626**
Labour In	259,333	180,762	192,497
Labour (Out)	(86,278)	(215,648)	-
Total Operating Costs	**2,868,528**	**2,869,839**	**758,123**

Table 2.2 – Common IT Services Operating Costs

Nalcor Common IT Services Operating Costs	Budget 2018	Actual 2018	Budget 2019
Salaries and Benefits	4,303,289	4,216,145	5,138,797
Memberships, subscriptions and dues	1,667,178	1,552,663	2,080,439
System Equipment Maintenance	245,208	216,159	365,822
Office Supplies, Memberships and Miscellaneous	10,992	16,502	6,732
Professional Services	28,325	64,036	693,000
Equipment Rentals	92,000	17,206	19,254
Utilities	167,832	165,268	108,240
Travel	10,000	6,156	9,996
Transportation	-	9,555	-
Training	-	16,633	-
Building Rental & Maintenance	1,200	675	1,200
Total Gross Operating Costs	**6,526,024**	**6,280,999**	**8,423,480**
Labour In	-	168,311	-
Labour (Out)	(263,163)	(748,989)	(387,225)
Total Operating Costs	**6,262,862**	**5,700,322**	**8,036,255**

Table 2.3 – Energy Marketing Operating Costs

Energy Marketing IT Operating Costs	Budget 2018	Actual 2018	Budget 2019
Salaries and Benefits	247,645	250,611	246,261
Memberships, subscriptions and dues	574,981	574,631	597,673
System Equipment Maintenance	4,000	6,967	4,000
Equipment Rentals	11,086	13,072	12,485
Utilities	1,880	2,374	1,800
Travel	-	879	-
Training	-	2,686	420
Total Gross Operating Costs	**839,593**	**851,221**	**862,638**
Labour In	17,826	-	-
Labour (Out)	(17,045)	-	-
Total Operating Costs	**840,374**	**851,221**	**862,638**

Table 2.4 – Hydro OT Operating Costs

Hydro OT Operating Costs	Budget 2018	Actual 2018	Budget 2019
Salaries and Benefits	884,313	887,900	889,187
Memberships, subscriptions and dues	809,400	1,002,898	832,544
System Equipment Maintenance	79,656	41,181	79,656
Office Supplies, Memberships and Miscellaneous	1,674	1,108	1,626
Equipment Rentals	1,500	2,044	1,500
Utilities	5,880	3,830	5,880
Travel	8,582	5,370	8,582
Building Rental & Maintenance	400	201	400
Total Gross Operating Costs	**1,791,405**	**1,944,534**	**1,819,375**
Labour In	-	3,768	-
Labour (Out)	(282,639)	(310,972)	(282,639)
Total Operating Costs	**1,508,766**	**1,637,330**	**1,536,736**

Table 2.5 – Hydro IT Operating Costs

Hydro IT Operating Costs	Budget 2018	Actual 2018	Budget 2019
Salaries and Benefits	182,966	289,878	184,591
Memberships, subscriptions and dues	265,928	209,441	263,503
System Equipment Maintenance	6,500	3,672	6,500
Office Supplies, Memberships and Miscellaneous	1,674	500	1,626
Professional Services	61,800	457	61,800
Equipment Rentals	1,500	-	1,500
Utilities	2,520	1,291	2,520
Travel	4,665	1,180	4,665
Building Rental & Maintenance	412	-	424
Total Gross Operating Costs	**527,964**	**506,419**	**527,129**
Labour In	-	160	-
Labour (Out)	-	(7,953)	-
Total Operating Costs	**527,964**	**498,625**	**527,129**

Table 2.6 – Hydro Network Services Operating Costs

Hydro Network Services Operating Costs	Budget 2018	Actual 2018	Budget 2019
Salaries and Benefits	2,422,108	2,557,507	2,412,308
Memberships, subscriptions and dues	-	9,809	-
System Equipment Maintenance	712,545	573,253	712,545
Office Supplies, Memberships and Miscellaneous	3,539	4,958	3,455
Professional Services	10,972	25,167	10,972
Equipment Rentals	1,576,704	1,625,581	1,576,704
Utilities	229,734	221,515	229,734
Travel	92,256	52,854	92,256
Building Rental & Maintenance	24,071	19,143	24,071
Total Gross Operating Costs	**5,071,928**	**5,089,786**	**5,062,044**
Labour In	817,462	697,484	817,461
Labour (Out)	(1,142,495)	(1,408,376)	(1,142,495)
Total Operating Costs	**4,746,895**	**4,378,894**	**4,737,011**

Table 2.7 – Churchill Falls IT/OT Operating Costs

Churchill Falls IT/OT Operating Costs	Budget 2018	Actual 2018	Budget 2019
Salaries and Benefits	248,258	Unavailable	236,777
Memberships, subscriptions and dues	280,635	Unavailable	317,532
Total Gross Operating Costs	**528,893**	**Unavailable**	**554,309**
Total Operating Costs	**528,893**	**Unavailable**	**554,309**

1   • Churchill Falls IT/OT is embedded within a larger business unit so the
2   IT/OT Operating Costs presented for Churchill Falls are an estimate at
3   this time.

1   • IT/OT capital projects are budgeted and managed by Corporate IT with

2   the exception of projects for Hydro Network Services. Operating

3   budgets are completed by individual lines of business.

4   • The operating costs have been presented prior to the application of the

5   intercompany admin fee.

6   • Memberships, Subscriptions and Dues in Tables 2.1 to 2.7 above also

7   include costs associated with Software Licenses and Maintenance.

8

9   b.   Please see Table 3.0 for a summary of IT/OT positions by Line of

10   Business. Table 3.0 to Table 3.6 provides a breakdown of resources by Line

11   of Business and major category.

Table 3.0

IT/OT Positions by Line of Business	Number of Resources
Nalcor Common IT Services	44
Business Systems Transformation IT	4
Energy Marketing IT	2
Churchill Falls IT	2
Hydro IT/OT	29
Lower Churchill Project IT	5
Total:	86

Table 3.1

Nalcor Common IT Services Position Categories	Number of Resources
Administration	1
Corporate Management	3
Corporate Systems	10
Enterprise Architecture	3
Information Management	3
Infrastructure	5
Project Delivery	5
Service Management	10
Security	4
Total:	44

Table 3.2

Business Systems Transformation IT Position Categories	Number of Resources
Corporate Systems	2
Information Management	1
Project Delivery	1
Total:	4

Table 3.3

Energy Marketing IT Position Categories	Number of Resources
Line of Business Application Support	2
Total:	2

Table 3.4

Churchill Falls IT Position Categories	Number of Resources
Line of Business Service Management	2
Total:	2

Table 3.5

Hydro IT/OT Position Categories	Number of Resources
Hydro Management	1
Operating Technology	7
Information Management	1
Network Services	20
Total:	29

Table 3.6

Lower Churchill Project IT Position Categories	Number of Resources
Lower Churchill Project Management	1
Line of Business Application Support	2
Line of Business Service Management	2
Total:	5

1 ***Notes:**

2 Tables 3.0-3.6 - Executive level positions are not included in the above

3 tables.

4 Table 3.2 – Business Systems Transformation IT positions are term positions

5 to support the implementation of the program. These positions will no

6 longer exist once the program is complete.

7 Table 3.4 – Churchill Falls IT positions do not include Communications,

8 Engineering and Protection and Control positions.

9 Table 3.5 – Hydro IT/OT positions does not include Engineering and

10 Protection and Control positions within Hydro.

11 Table 3.6 – Lower Churchill Project positions are mainly contract positions to

12 support the Lower Churchill Project. Please see below for future position

13 requirements.

1   c.   Please refer to PUB-Nalcor-176, Attachment 1 for details on major systems,

2   platforms and services.

3

4   d.   The majority of the Nalcor IT services are provided to all lines of business.

5   Costs related to these services are charged to the appropriate lines of

6   business via the administration fees, which utilize the methodologies

7   described below. If services are provided for a specific line of business,

8   these are direct billed and excluded from the administration fees.

9

10   **Capital and Operational Administration (Admin) Fees**

11   The process for calculating the Capital and Operational Admin Fees is:

12   • Operating costs are accumulated in a business unit and are allocated

13   based on a percentage of average system users;

14   • The average system user percentage is based on an average of the

15   following ratios:

16   o Number of Full Time Equivalents (FTE) plus external contractors

17   assigned to each line of business;

18   o Number of JDE users in each line of business;

19   o Number of Lotus Notes email accounts assigned to employees

20   and external contractors for each line of business; and

21   o Number of active computers in each line of business;

22   • The Operational Admin fee is recalculated on a quarterly basis and the

23   Admin fee is "trued up" at that time; and

24   • Capital project costs are recovered by applying the average system user

25   percentage (as noted above) to the depreciation costs expensed during

26   the year over the service life of the asset(s).

1   For the cost allocation, the ratio utilized at December 31, 2018 was as

2   follows:

Table 4: Allocation of Average System Users for Nalcor IS Admin Fee

Line of Business	FTE's and Contractors		Lotus Notes Email Accounts		Active PC's		JDE Users		Average System Users	
Churchill Falls	305.7	16.2%	378.5	15.1%	260.1	14.4%	290.4	18.7%	308.7	15.9%
Hydro	866.8	45.9%	1,146.1	45.6%	865.4	48.0%	903.8	58.3%	945.5	48.8%
Exploits	43.8	2.3%	50.5	2.0%	14.8	0.8%	51.6	3.3%	40.2	2.1%
Oil and Gas	24.1	1.3%	34.6	1.4%	39.3	2.2%	21.8	1.4%	29.9	1.5%
Energy Marketing	22.3	1.2%	22.6	0.9%	24.5	1.4%	16.8	1.1%	21.5	1.1%
Menihek	9.7	0.5%	9.1	0.4%	2.6	0.1%	3.1	0.2%	6.1	0.3%
Bull Arm Fabrication	4.6	0.2%	4.1	0.2%	3.8	0.2%	3.4	0.2%	4.0	0.2%
Lower Churchill	372.5	19.7%	499.0	19.8%	430.4	23.9%	43.5	2.8%	336.3	17.3%
Transition to Operations	49.3	2.6%	48.5	1.9%	35.4	2.0%	40.8	2.6%	43.5	2.2%
Nalcor Energy (Excluding Lower Churchill Project)	190.3	10.1%	320.8	12.8%	127.6	7.1%	175.6	11.3%	203.6	10.5%
Total	**1,889.0**	**100.0%**	**2,513.9**	**100.0%**	**1,803.8**	**100.0%**	**1,550.6**	**100.0%**	**1,939.3**	**100.0%**

3   **Hydro Administration (Admin) Fee**

4   The Hydro Admin fee includes recovery of costs related to networking,

5   phone and mobile phone management charges and is calculated using a per

6   unit charge based on usage by each line of business.

7

8   The per unit charge is calculated as follows:

9   • Network costs are calculated by dividing the total costs by the number of

10   network drops in use to determine the cost per drop and then multiplied

11   by the number in use per line of business;

12   • Costs related to telephones are calculated by dividing the total costs by

13   the number of active phones, faxes and modems in use to determine the

14   cost per device and then multiplied by the number in use per line of

15   business; and

1   •   Mobile phone management charges include an estimate of time spent

2   by support staff on the service divided by the number of active devices

3

4   **Business Systems Transformation Administration (Admin) Fee**

5   *Capital Costs*

6   Business System Transformation (BST) Program costs meeting capitalization

7   criteria, including internal labour, professional services, and hardware and

8   software costs are recorded in separately identifiable capital project

9   accounts in Nalcor's financial records. Under the BST Program, Nalcor incurs

10   all costs for the capital projects associated with the Program while projects

11   are in progress. When implementation is complete, Nalcor creates new

12   asset accounts and transfers the program costs to these assets. With the

13   assets in service, the full cost of each asset is depreciated over the course of

14   its useful life. On a monthly basis, a fee is charged to other lines of business

15   for their share of the depreciation costs related to the assets on a pro rata

16   basis through the inter-company admin fee.

17

18   The Business System Admin Fee charged to each line of business each year

19   represents the average of two ratios:

20   •   The line of business share of overall JD Edwards users; and

21   •   The line of business share of overall FTEs and contractors in relation to

22   Nalcor and its subsidiaries.

23

24   The only exception to the pro rata process is when a capital cost is incurred

25   for the benefit of a specific line of business. In these instances, 100% of the

26   depreciation cost is allocated to the specific line of business. For example,

27   the implementation of the customer service module, Utiligy360, as part of

1   the EnterpriseOne project is for Hydro's use only and is therefore charged

2   solely to Hydro.

3

4   ***Non-Capital Costs***

5   Project costs ineligible for capitalization but not related to ongoing

6   operations (i.e., project training), software support and maintenance, etc.

7   are allocated to each line of business based on the same methodology as

8   that used for the allocation of capital costs.

9

10   ***Program Management Costs***

11   Costs related to the overall management, oversight and administration of

12   the BST Program are recovered from the lines of business in the year in

13   which they are incurred, using the following methodology:

14   • Approximately 50% of these costs are related to specific systems and will

15   be charged to the other lines of business utilizing the same methodology

16   as the capital and non-capital costs discussed above;

17   • The remaining 50% of the costs are not directly related to specific

18   systems and are charged evenly across all of Nalcor's lines of business. In

19   addition to its core lines of business, Nalcor has legal entities such as

20   holding companies and limited partnerships that are each charged a

21   nominal fee of $10,000 annually. This represents approximately $50,000

22   annually. This nominal fee represents costs incurred for maintenance of

23   general ledgers and limited charts of accounts on behalf of these

24   entities. The formula for allocation of these fees is:

1   <u>(Total Program Management Costs x 50%) - $50,000</u>

2   10 companies

3

4   For the pro-rata cost allocation, the ratio utilized at December 31, 2018 was

5   as follows:

Table 5: Allocation of Average System Users for Business Systems Transformation

Line of Business	FTE's and Contractors	%	JDE Users	%	Average	%
Churchill Falls	305.7	16.2%	290.4	18.7%	298.1	17.3%
Hydro	866.8	45.9%	903.8	58.3%	885.3	51.5%
Exploits	43.8	2.3%	51.6	3.3%	47.7	2.8%
Oil and Gas	24.1	1.3%	21.8	1.4%	22.9	1.3%
Energy Marketing	22.3	1.2%	16.8	1.1%	19.5	1.1%
Menihek	9.7	0.5%	3.1	0.2%	6.4	0.4%
Bull Arm Fabrication	4.6	0.2%	3.4	0.2%	4.0	0.2%
Lower Churchill	372.5	19.7%	43.5	2.8%	208.0	12.1%
Transition to Operations	49.3	2.6%	40.8	2.6%	45.0	2.6%
Nalcor Energy (Excluding Lower Churchill Project)	190.3	10.1%	175.6	11.3%	183.0	10.6%
Total	**1,889.0**	**100.0%**	**1,550.6**	**100.0%**	**1,719.8**	**100.0%**

6   e.   Tables 6.0 below reflects a summary of the 2019 budget and forecasts of

7   costs by major category. The details by line of business have been provided

8   in Tables 6.1 to 6.7.

Table 6.0 – Summary of 2019 Operating Budgets and Forecasts by Category

Summary - Operating Costs by Category	Gross Operating Costs Total	Labour In (Out)	Net Operating Costs Total
Administration	$163,739		$163,739
Other*	$57,215		$57,215
Corporate Management	$586,387		$586,387
Corporate Systems	$3,336,769	$124,997	$3,461,766
Enterprise Architecture	$418,168		$418,168
Information Management	$539,220	$67,500	$606,720
Infrastructure	$1,407,306		$1,407,306
Project Delivery	$529,467	($387,225)	$142,242
Service Management	$953,571		$953,571
Security	$997,263		$997,263
Line of Business Application Support	$1,441,953		$1,441,953
Operating Technology	$2,136,907	($282,639)	$1,854,268
Hydro Management	$184,591		$184,591
Network Services	$5,062,044	($325,033)	$4,737,011
Total Budget - 2019	**$17,814,600**	**($802,400)**	**$17,012,200**
Forecasted Position - Capitalized Project Delivery	$90,666	($90,666)	
Forecasted Position - Operating Technology	$125,466		$125,466
Forecasted Position - Information Management Hydro	$94,961		$94,961
Total Forecast - 2019	**$18,125,693**	**($893,066)**	**$17,232,627**
*Other includes Books and Subscriptions for the business			

Table 6.1 – Nalcor Common IT Services 2019 Budget and Forecast by Category

Nalcor Common IT Services Operating Costs by Category	Gross Operating Costs Total	Labour In (Out)	Net Operating Costs Total
Administration	$163,739		$163,739
Other*	$57,215		$57,215
Corporate Management	$586,387		$586,387
Corporate Systems	$2,821,143		$2,821,143
Enterprise Architecture	$418,168		$418,168
Information Management	$489,220		$489,220
Infrastructure	$1,407,306		$1,407,306
Project Delivery	$529,467	($387,225)	$142,242
Service Management	$953,571		$953,571
Security	$997,263		$997,263
Total Budget - 2019	**$8,423,480**	**($387,225)**	**$8,036,255**
Forecasted Position - Capitalized Project Delivery	$90,666	($90,666)	
Total Forecast - 2019	**$8,514,146**	**($477,891)**	**$8,036,255**
*Other includes Books and Subscriptions for the business			

Table 6.2 – Business Systems Transformation 2019 Budget and Forecast by Category

Business System Transformation Operating Costs by Category	Gross Operating Costs Total	Labour In (Out)	Net Operating Costs Total
Corporate Systems	$515,626	$124,997	$640,623
Information Management	$50,000	$67,500	$117,500
Total Budget - 2019	**$565,626**	**$192,497**	**$758,123**
Total Forecast - 2019	**$565,626**	**$192,497**	**$758,123**

Table 6.3 – Energy Marketing 2019 Operating Budget and Forecast by Category

Energy Marketing Operating Costs by Category	Gross Operating Costs Total	Labour In (Out)	Net Operating Costs Total
Line of Business Application Support	$862,638		$862,638
Total Budget - 2019	**$862,638**		**$862,638**
Total Forecast - 2019	**$862,638**		**$862,638**

Table 6.4 – Hydro OT 2019 Operating Budget and Forecast by Category

Hydro OT Operating Costs by Category	Gross Operating Costs Total	Labour In (Out)	Net Operating Costs Total
Operating Technology	$1,819,375	($282,639)	$1,536,736
Total Budget - 2019	**$1,819,375**	**($282,639)**	**$1,536,736**
Forecasted Position - Operating Technology	$125,466		$125,466
Total Forecast - 2019	**$1,944,840**	**($282,639)**	**$1,662,201**

Table 6.5 – Hydro IT 2019 Operating Budget and Forecast by Category

Hydro IT Operating Costs by Category	Gross Operating Costs Total	Labour In (Out)	Net Operating Costs Total
Hydro Management	$184,591		$184,591
Line of Business Application Support	$342,538		$342,538
Total Budget - 2019	**$527,129**		**$527,129**
Forecasted Position - Information Management Hydro	$94,961		$94,961
Total Forecast - 2019	**$622,090**		**$622,090**

Table 6.6 – Hydro Network Services 2019 Operating Budget and Forecast by Category

Hydro Network Services Operating Costs by Category	Gross Operating Costs Total	Labour In (Out)	Net Operating Costs Total
Network Services	$5,062,044	($325,033)	$4,737,011
Total Budget - 2019	**$5,062,044**	**($325,033)**	**$4,737,011**
Total Forecast - 2019	**$5,062,044**	**($325,033)**	**$4,737,011**

Table 6.7 – Churchill Falls IT/OT 2019 Operating Budget and Forecast by Category

Churchill Falls IT/OT Operating Costs by Category	Gross Operating Costs Total	Labour In (Out)	Net Operating Costs Total
Line of Business Application Support	$236,777		$236,777
Operating Technology	$317,532		$317,532
Total Budget - 2019	**$554,309**		**$554,309**
Total Forecast - 2019	**$554,309**		**$554,309**

1   f.   Please refer to PUB-Nalcor-176, Attachment 2 for a description of
2   organizations, resources, methods to integrate Information
3   Technology/Operations Technology ("IT/OT") threat identification,
4   mitigation, response and remediation.

Information Technology Services Provided by Nalcor

Services Category	Description	Specific Services
Business Application Support	Provide IT support for corporate applications used across multiple lines of business For a list of supported applications see the Applications and Lotus Notes Apps Tabs	Role based access to business systems
		Backup and recovery of business systems and databases
		Maintenance and support of application functionality and availability
Collaboration	Provide and support tools/applications that allow users from all lines of business to interact with other employees and external stakeholders	Access and support for the enterprise email system
		Access and support for shared folders on the network drive
		Access and support to the collaboration platform
		Access and support for instant messaging services
End User Services	Provide direct support and services to IT users	Resolve issues and provide support via the Service Desk
		In-person support for individual business users
		Install and support standardized desktop software
		Allow employees to print, scan, or copy via shared and personal printers
		Supply and support desktop and laptop hardware for all employees
		Access and support for web, audio and video conferencing
		Manage and support company provided mobile devices
		Training on accessing corporate network and other IS services
		IT 24/7 System Oncall

Services Category	Description	Specific Services
Infrastructure Services	Provide support for IT infrastructure	Store documents and files in a dedicated and secured location
		Manage server and storage requirements
		Support and manage firewall services
Information Management	Provide services for the collection, organization, storage, and disposal of information	Program management, advisory services, education and awareness, and policy development
		Manage subscription and library services
		Manage record storage, retention and disposal of paper records stored with external vendor
Project Management and Planning Services	Assist in identifying and assessing IT requirements and provide oversight and guidance during solution acquisition and implementation	Stakeholder consultation and requirements gathering
		Project management, analysis and design for capital and operating projects
		Asset planning for all IS services
		IS policy and standard development
		Solution implementation
		Request for Proposal (RFP) composition and evaluation
Security	Provide services to prevent the unauthorized access, use, or modification of corporate data	Virus protection and elimination
		Program management, advisory services, education and awareness, and policy and procedure development
		Monitoring and updating of all servers and hardware
		Disaster Recovery
		Corporate governance and standards development
		Risk management
		IT Incident Response
		Threat Risk Assessments
		Evaluation of all system changes

Operating Technology Services Provided by Hydro

Services Category	Description	Specific Services
OT Application Support	Provide IT support for OT applications deployed in the industrial control environment Primary support for Energy Management System (EMS) and Water Management. Please refer to OT tab below for a list of OT applications	Provide system access to OT applications
		Backup and recovery of OT systems and databases
		Maintenance and support of OT application functionality and availability
OT Application Development	Develop IT solutions deployed in the industrial control environment	Complete analysis and requirements for new OT systems
		Deliver custom developed IT solutions in an OT environment
OT Infrastructure Services	Provide support for infrastructure in an OT environment	Manage OT server and storage requirements
		Support and manage OT firewall services
		OT 24/7 System Oncall
OT Cyber Security	Provide services to prevent the unauthorized access, use, or modification of the Operating Environment	Virus protection and elimination on OT systems
		Monitoring and updating of all OT servers and hardware
		OT Disaster Recovery
		OT Standards Development
		OT Risk management
		Evaluation of all OT system changes

Services Provided by Hydro Network Services

Category	Description	Specific Services
Network Services	Provide remote supervisory control, and local and wide area networks	Support and maintain the Local Area Network
		Give employees access to the internet either through Ethernet or Corporate wireless connection
		24/7 Networking Oncall Services
Communication Services	Provide employees with access to communication tools	Provides employees access to voice communications including telephone, voice mail and long distance. Includes moving employees to a new office, adding new employees or changing services
		Manage company provided mobile phones with training, setup and maintenance
		Allows users to interact via webcam with people both within and outside the organization
Technical Field Service Support	Support communications from Hydro sites	Manages/maintains all communications equipment at more than 150 Hydro owned sites province wide that provide remote supervisory and control services to the NLSO Energy Control Center.
Network Management Center	Monitoring of network infrastructure and traffic	Provide network management support by monitoring the performance, capacity and health of the voice and data networks

Nalcor Common IT Platforms, Applications and Systems

Product Name	Users	Description	System Type
Accellion	All LOB	Secure File Transfer	Application
AMR	Hydro	Automatic Meter Reading Software	Application
Beyond Trust	All LOB	Workstation Administrative Rights Control	Application
Blanco - Secure Wipe	IT	Secure Workstation Removal	Application
Board Books	All LOB	Board meeting documents and access	Application
Cisco AMP	All LOB	Workstation Advanced Malware Protection	Application
Cisco Webex	All LOB	Corporate Audio/Web Conferencing Solution	Application
Cognos Disclosure Management	All LOB	Financial Reporting Software	Application
Content Metrix	IT	Capacity Management for SharePoint	Application
Disability Management System	All LOB	Disability Management System	Application
Fetch Pursuit	IT	Email Search and Disclosure Tool	Application
Fetch Retriever - Email Recovery	IT	Email Recall Tool	Application
Footprints	IT	Helpdesk Ticket Tracking	Application
Kapish for Lotus Notes	All LOB	HP Content Management IBM Notes Plugin	Application
Mail Attender	All LOB	Corporate Mail Archiving Tool	Application
MV90Xi	Hydro	Industrial Billing and Meter Reading Software	Application
MyNLHydro	Hydro	Customer Care System	Application
Online Tenders	Hydro	Hydro Supply Chain Online Tendering System	Application
Payroll Tax updates - Vertex	All LOB	ERP Payroll Tax Tables	Application
Pistol Star	All LOB	Single Signon	Application
Powertech	IT	AS400 Security Software	Application
Qsoftware	IT	ERP Security and SOD Manager	Application
Rapid Redact	All LOB	Removes confidential information before document disclosure	Application
Robot Scheduler	IT	AS400 Job Scheduler	Application
SANS	All LOB	Security Awareness Software	Application
Solarwinds - IPAM, VM Management	IT	System Monitoring and Management	Application
Solarwinds - Log and Event Manager	IT	System Monitoring	Application
Solidworks	All LOB	3D CAD Design Software	Application
UPK	All LOB	ERP Training Program	Application
VitalSigns	IT	System Monitoring - IBM Notes	Application
Wyse Device Manager	IT	Thin Client Device Management Software	Application
Blackberry Enterprise Server	LCP	Blackberry Device Management	Platform
Citrix	All LOB	Corporate Application Delivery System	Platform
Clarity/TM1	All LOB	Corporate Budgeting and Forecasting Tool	Platform
Create Form	All LOB	Corporate Form Conversion Tool	Platform
Fortinet - Fortimail	All LOB	Corporate Email Filtering Software	Platform
HP Content Management	All LOB	Corporate Document Management System	Platform

IBM Iseries	All LOB	Corporate Enterprise Midrange Computer System	Platform
IBM MAAS360 & Lotus Traveler	All LOB	iOS Device Management and Email Gateway	Platform
IBM Notes	All LOB	Email and Application Delivery System - See Custom Lotus Apps TAB for more detail	Platform
IBM Spectrum Protect	All LOB	Corporate Data Backup and Recovery Software	Platform
JDEdwards Enterprise One	All LOB	Corporate ERP System - See JDE-E1-Module TAB for more detail	Platform
Medgate	All LOB	Environmental, Health, Safety and Quality (EHSQ) software	Platform
Microsoft Office Systems	All LOB	Microsoft Word, Excel, Project, PowerPoint	Platform
Microsoft System Management Server	All LOB	Corporate Patch and Application Deployment System	Platform
Paloalto	All LOB	Corporate Firewall and URL Filter	Platform
Primavera	All LOB	Corporate Project Planning, Control, Monitoring and Reporting tool	Platform
Rightfax	All LOB	Corporate Electronic Faxing Tool	Platform
RSA	All LOB	Corporate Remote Authentication Service	Platform
SAN - Storage Area Network	All LOB	Corporate Enterprise Storage System	Platform
SharePoint	All LOB	Corporate Workflow Applications and Document Management	Platform
Showcase	All LOB	Corporate Reporting Tool	Platform
Spreadsheet Server	All LOB	Corporate Financial Reporting Tool	Platform
SQL	All LOB	Corporate Enterprise Database Service	Platform
Symantec	All LOB	Corporate Antivirus and AntiMalware System	Platform
VMware	All LOB	Corporate Virtualization Software	Platform
Windows Operating Systems	All LOB	Corporate Desktop and Server Operating System	Platform
Winmagic	All LOB	Corporate Encryption Service	Platform
Xerox Printing	All LOB	Corporate Enterprise Printing Solution	Platform
Xerox ShareScan	All LOB	Corporate Enterprise Scanning Solution	Platform
Cisco Video Conferencing	All LOB	Corporate Video Conferencing Solution	System
Hyperion Web Analysis	All LOB	Data analysis, presentation, and reporting system	System
IBM Tape Drives	IT	Corporate Backup and Recovery System	System
KIP Plotter	All LOB	Large Scale Printer	System
Oracle Essbase Plus	All LOB	Multidimensional Database Management System	System
Secureworks IPS	IT	Intrusion Prevention System	System
Visix - Nalcor TV	All LOB	Corporate Media Presentation	System
Warm Standby Disaster Recovery Site	All LOB	Fully functional secondary recovery site	System

JDEdwards Enterprise One ERP Modules		
Module Name	**Users**	**Description**
Capital Asset Management (CAM)	All LOB	Work Order Management, Equipment Master, Capital Asset Management, Condition Based Management, Equipment Cost Analysis, Resource Assignments
Customer Service	NL Hydro	Utiligy360 - Utility Billing and Customer Services (CIS), Address Book for Customers, Accounts Receivable, Case Management, BI Publisher, OneView, UX/1
Finance	All LOB	General Ledger, Accounts Payable/Accounts Receivable, Company and Business Units, Structure
Human Capital Management including Payroll (HCM)	All LOB	Canadian Payroll, Human Resources Benefits, Self-Service, Address Book for Employees
Project Management	All LOB	Fixed Assets, Job Cost
Supply Chain Management (SCM)	All LOB	Sales Order, Pricing, Procurement, Address Book for Suppliers, Inventory

Lotus Notes Applications		
Application Name	Users	Description
2012 Rate Hearing	Finance	Documentation related to the 2012 rate hearing
Application for Service	Customer Service	This database is used by the customer services department to process a customer's applicaton for service.
Apprenticeship Program Intranet	Human Resources	Apprentice Program Intranet (GRID)
Archive Customer Assistance	Customer Service	The Customer Assistance database is used to track requests for customer assistance. Archived requests.
Archived CFLCO EMS Environmental Aspects	CF Environment	The purpose of this database is to track Environmental Aspects for Churchill Falls. Individuals are able to request changes to any Environmental Aspect as the entire change process has been automated. (Archived)
Archived Revised CLFCO EMS Environmental Aspects	CF Environment	The purpose of this database is to track Environmental Aspects for Churchill Falls. Individuals are able to request changes to any Environmental Aspect as the entire change process has been automated. (Archived - modified)
Asset Management Intranet	Corporate	Asset Management Intranet (GRID)
Audit Management	Financial, Safety, & Environmental Audit Team members	The Newfoundland and Labrador Hydro Audit Management Application.
Audit Management Archive	Financial, Safety, & Environmental Audit Team members	The Newfoundland and Labrador Hydro Audit Management Application.
Audit Review	Financial, Safety, & Environmental Audit Team members	Review and discussion of Audit Management audit issues that require further clarification.
Audit Review Archive	Financial, Safety, & Environmental Audit Team members	Review and discussion of Audit Management audit issues that require further clarification. (Archived audits)
Backup of HTGS Procedures Nov 5 2012	Mike Manual/Beverly Kennedy	Backup of HTGS - Mike stills uses database
Bishop's Falls Aircraft Requests	Corporate	Allows individuals to book aircrafts, view flight schedule by date, departure location or aircraft
Bulletin Board	Corporate Communications	This database is meant to be a virtual bulletin board where employees can place notifications on any topic that they feel it would be beneficial for other Hydro employees to be made aware of.
Bulletin Board Archive	Corporate Communications	Archived Bulletins
Central Condition Reports	TRO Central	The purpose of this Database is to store condition reports for the TRO Central region. It is intended to be one source of information to ensure the message is relayed to all individuals consistently.
CFLCO Environmental Aspects	CF Environment	The purpose of this database is to track Significant Aspects for the Environmental Management System. Individuals are able to request changes to any Significant Aspect, the entire change process has been automated.
CF(L)Co Water Management Document Database	Water Mgmt. Team	Discussion Database for water management
CF Operations Handbook	CF Staff	Linked from CF Intranet (GRID)

CF Manuals Database	CF Staff	Linked from CF Intranet (GRID)
CFLCO Intranet	CF Staff	Main CF Intranet
Churchill Falls Unit Modernization	Limited access to modernization team	Discussion Database for CF Modernization
Churchill Falls Helicopters	Churchill Falls Air Services	Allows individuals to book aircrafts, view flight schedule by date, departure location or aircraft
CIAC	Customer Services/Field	The CIAC application is a Lotus Notes based work flow application designed to improve the response time for the necessary approval procedure. It consists of a CIAC form that gathers information for documentation and calculation purposes. Each document presents options in the Action Bar according to the information entered. A response document or customer letter can be generated for the CIAC document
CIAC Attachments	Customer Services/Field	Store attachments associated with CIACs
CIS Emergency Calls	Customer Services	Allows a place for entry and keeps track of phone calls made to the 1-800 number for Power Outages and Emergencies
CIS Emergency Calls Archive	Customer Services	Archive database for CIS Emergency Calls
Common Library	Information Systems	Intranet common library (possibly used with Contact Directory)
Configuration Database	Corporate	Common tables used for lookups and common design elements
Contractor Safety Statistics	Safety/Projects	Used to store and analyze safety statistics for contractors working on projects
Corporate Communications	Corporate	Corporate Communications Intranet (GRID)
Corporate Contract Selection Guidelines	Corporate?	The database is used to store Corporate Contract Selection Guidelines.
Corporate Documents	Corporate	The database is used to store Corporate Documents.
Corporate Documents Archive	Corporate	Archived Corporate Documents
Corporate EMS Manual	Corporate	A Document Library application is an electronic filing cabinet that stores reference documents for access by a workgroup. The database might contain anything from environmental impact statements for a group of engineers to financial statements for a group of loan officers.
Corporate Fall Protection program	Corporate	Corporate Fall Protection Intranet (GRID)
Corporate Intranet (GRID)	Corporate	Corporate Intranet Main Site (GRID)
Corporate Photo Bank	Corporate	Corporate Photo Repository (GRID)
Corporate Policies & Procedures	Corporate	The purpose of this Database is to make the Hydro Group Policy and Procedure Manual of the Hydro Group of Companies available to each Employee. Each Policy will be categorized under a specific area and can be read at anytime by an Employee who has Lotus Notes access.
Customer Assistance	Customer Services	Used to track requests for customer assistance
Customer Services Intranet	Corporate	Customer Services Intranet (GRID)

Damage Claims	Customer Services	The Damage Claim System is a Lotus Notes based application used to record any damage claims made against Newfoundland and Labrador Hydro. These claims are made by customers or by other persons where damage may have resulted from Hydro's power system or as a result of negligence by Hydro personnel. The database is a workflow based system intended to incorporate/notify all the involved individuals in resolving a claim, including letters and forms which will be sent to the Claimant. The database will also include two PUB reports and a monthly status report.
Distribution Standards	Corporate	Inventory standards
Employee Engagement Survey Intranet	Corporate	Employee Engagement Survey Intranet (GRID)
Employee Orientation	HR (Used for historical purposes for Mark Thorne)	The Employee Orientation database is used to set up an orientation plan for new employees or for employees who have been promoted to a supervisory role.
Employee Recognition	Corporate	Our Corporate Recognition Program serves to highlight the excellence that exists in all areas and job functions across the organization. It covers a wide range of practices that collectively express and reinforce workplace values and priorities. Recognition can be informal, such as saying thank you, or formal, such as awards or special events.
Employee Termination	Human Resources	The Employee Termination database is used to allow supervisors to submit employee termination requests on-line.
Energy Efficiency	Corporate	Energy Efficiency Intranet (GRID)
Energy Marketing	Energy Marketing	Energy Marketing Intranet (GRID)
Engineering Services Intranet	Corporate	Engineering Services Intranet (GRID)
Environment Intranet	Corporate	Environment Intranet (GRID)
Environment Week Intranet	Corporate	Environment week photo contest (GRID)
Environmental Compliance Directory	Corporate	The database is used to store environmental documents
Environmental Management Targets	Corporate	This database tracks environmental targets & milestones
Exit Interview	Human Resources	This database holds the exit interview questions
Experience Based Development System	Human Resources	WEB ONLY - This database will trap employee information, probation information, skills lists, register hours with industrial training, block training, rotation information, performance reviews similar to the performance review system and total hours accumulated.
Explore Nalcor	Corporate	Explore Nalcor Intranet (GRID)
Finance	Corporate	Finance Intranet (GRID)
Forms	Corporate	This database is a repository of forms used at the Hydro Group of companies.
Grievance Management	Human Resources	This database is only accessible for HR to hold grievances

Hardware Requests	Corporate	The purpose of this database is to provide a method for staff to request hardware. All requests for hardware should be initiated using this database. The workflows associated with this database ensure that the request is routed to the appropriate person(s) for approval, review, and/or installation.
Heath and Wellness	Corporate	Health & Wellness Intranet (GRID)
HTGS EMS Environmental Aspects	Holyrood Environmental Services	The purpose of this database is to track Significant Aspects for the Environmental Management System. Individuals are able to request changes to any Significant Aspect, the entire change process has been automated.
HTGS Procedures	Holyrood	The purpose of this database is to capture and access procedures. Individuals are able to request changes to any procedure, the entire change process has been automated.
Human Resources Intranet	Corporate	Human Resources Intranet (GRID)
Hydro Asset Management	Corporate	This database is a Lotus Notes workflow enabled application that will manage the flow of asset data throughout Newfoundland and Labrador Hydro. This database will provide the ability for field users to enter asset requests for Addition, Modification, Transfer, Single Retirement and Bulk Retirement.
Hydro Asset Management Archive	Corporate	This database is a Lotus Notes workflow enabled application that will manage the flow of asset data throughout Newfoundland and Labrador Hydro. (Archived documents) This database will provide the ability for field users to enter asset requests for Addition, Modification, Transfer, Single Retirement and Bulk Retirement.
Hydro Common Library	Corporate	Maybe used by the Contact Directory (GRID)
Hydro Generation Intranet	Corporate	Hydro Generation Intranet (GRID)
Hydro Intranet Contact Directory	Corporate	Repository of Phone information on the Corporate Intranet (GRID)
Hydro Intranet Design Element Library	Corporate	Required for design elements for Contact Directory (GRID)
Hydro Place Condition Reports	Hydro Place	The purpose of this Database is to contain condition reports related to Hydro Place. It is intended to be one source of information to ensure the message is relayed to all individuals consistently.
NLHydro Website	External	
Hydrowise Redirect	External	
Information Systems	Corporate	IS Intranet (GRID)
Information Systems PPS&G	IST	Store Information Systems related Policies, Procedures, Guidelines and documents
Integrated Outage Action Plan	Corporate	The purpose of this database is to track targets and their associated milestones associated with the Outage Plan
Internal Audit	Corporate	Internal Audit Intranet (GRID)

Intranet Site Map	Corporate	This is the site map for the corporate intranet
IS&T EMS Configuration Changes	EMS	
IS&T ITIL Policies and Procedures	IST	Store Information Systems ITIL related Policies, Procedures, Guidelines and documents
IS&T Policies and Procedures	IST	Store Information Systems related Policies, Procedures, Guidelines and documents
JDE Procedures	Corporate	This database allows you to capture and access corporate standards related to J.D. Edwards.
Job Application	External/Corporate	This database contains applications for both general and competition job postings.
Job Descriptions	Corporate	This database is used to store Job Descriptions and generate Job Postings.
King Air Schedule	Churchill Falls Air Services	Allows individuals to book aircrafts, view flight schedule by date, departure location or aircraft
King Air Schedule Archive	Churchill Falls Air Services	Allows individuals to book aircrafts, view flight schedule by date, departure location or aircraft
Labor Relations Intranet	Corporate	Labor Relations Intranet (GRID)
Labrador Issues and Actions	TRO Labrador	Contains all major projects and issues for TRO Labrador
Lower Churchill Project Intranet	Corporate	LCP Intranet (GRID)
LCP Consultation Database	LCP	
LCP Q&A (Blog)	Corporate	LCP Q & A Discussion database
LCP Suggestion Box	Corporate	
Learning Management	Supervisors/Training Administrators/HR	Track employee training and profiles
Leave Request System	Corporate	Tracks employee leave requests
Lotus Notes Address Book	Corporate	IBM Domino Directory
Mail Signature	Corporate	Part of mail template for email signatures
Materials Classification	Corporate	Used to store the materials classifications
Metering Services	Corporate	Metering Services Intranet (GRID)
Mobile Device management Self-service	Corporate	Mobile Device Intranet (GRID)
Nalcor Energy Audit Forms	Corporate	Mobile Safety Audits
Nalcor Work Methods	Corporate	The Nalcor Work Methods database will be a database that will hold Task Inventory, Work Methods and Task Based Risked Assessments for the corporation.
Network Services	Network Services	This database is used to provide a common area for Network Services documentation.
Network Services Contracts	Network Services	This database has been designed to allow for easier management of software license information.
Network Services Intranet	Corporate	Network Service Intranet (GRID)
NLHydro Website	External	Newfoundland & Labrador Hydro Internet
Online Pay Stubs	Corporate	Repository of Employee Pay Stubs
Online Pay Stubs Archive	Corporate	Repository of Employee Pay Stubs (Archived)
Online Orientation	Corporate	Online Orientation for new hires and new supervisors
Operating Instructions	System Operations	This database stores the system operating instructions,

Organizational Effectiveness	Corporate	Organizational Effectiveness Intranet (GRID)
Outage Remedial Action Tracking	Corporate	Used to track remedial actions following an outage
Talent Management	Corporate	Talent Management Intranet (GRID)
Performance Review	Corporate	Database stores employee DPR documents
Personnel Requisition	Corporate	Used by supervisor to enter requisitions for positions
Planned System Equipment Outage Help	Field/ECC	Planned System Equipment Outage Help
Planned System Equipment Outages	Field/ECC	Scheduling outages for the Energy System
Policies Intranet	Corporate	Policies Intranet (old??)
Procedure Management	Safety	This database is used to create safety procedures (procedure approval)
Project Management Manual	PETS	The purpose of this Database is to make the Project Management Manual of the Hydro Group of Companies available to each Employee.
RACI	Corporate	RACI Intranet
Rate Hearing Committee Issues	Rate Hearing Committee	Documentation related to the ???? rate hearing
Reading Room	Corporate	This database is meant to be a resource for sharing books and articles of interest, where employees can place entries that they feel it would be beneficial for other Hydro employees.
Rebate Program	Customer Services	Customer Rebate applications
Recruitment	Corporate	Recruitment Intranet
Registration	External	Register for job posting notifications
Registration Error Notices	External	Register for job posting notifications Error messages
Remote Access Requests	Corporate	This database will allow individuals to request dial up access.
Request for Cellular Service	Corporate	This application is used to request cellular service
Safety	Corporate	Safety Intranet
Safety & Health Program	Corporate	Used to support the Loss Control program
Safety AIs	Corporate	Used to store accident/incidents, major safety announcements, and motor vehicle accident reports
SC7 & Enterprise Reporting	Showcase 7 project team	Store Documentation related to the Showcase 7 upgrade
Security Policies and Procedures	Corporate	The purpose of this Database is to make the Security Policies and Procedures Manual of the Hydro Group of Companies
Services EMS Environmental Aspects	Corporate	The purpose of this database is to track Environmental Aspects for the Environmental Services and Properties.
Services EMS Manual	Corporate	The purpose of this database is to capture and access EMS procedures
Software Contracts	IST	This database has been designed to allow for easier management of software license information.
Software Requests	Corporate	Provides a method for staff to request software
Succession Planning	Human Resources/Supervisors	Used for supervisors to map out succession plans.
Supply Chain and Administration	Corporate	Supply Chain and Admin Intranet (GRID)
Supply Chain Management Procedures	Corporate	The purpose of this Database is to make the Materials Management and Administration Procedures Manual of the Hydro Group of Companies

SWOP (Safe Workplace Observation Program)	Corporate	The Hydro Group has a goal of becoming a safety leader. One of the key components in achieving "best in class" safety performance is a well developed system for the reporting, review, and analysis of sub standard conditions and practices (acts) as well as loss and "near miss" incidents. The Safe Workplace Observation Program database is designed to record and track safety related Announcements, Observations, Commendations, Conditions and Incidents and their associated Actions.
System Planning Data Books	Corporate	This database stores the System Planning databooks
TeamStudio Unplugged	Information Systems	Administration of Unplugged Software
TeamStudio Unplugged Log	Information Systems	Administration of Unplugged Software
TEC / PPC	Corporate	Tracks Tools, Equipment & Consumables/Personal Protective Clothing
Timesheet	Corporate	Automates the time sheet workflow
Timesheet Archive	Human Resources	Archival database of the time sheet database
Total Compensation	Corporate	Compensation Intranet (GRID)
Transportation Intranet	Corporate	Transportation Intranet (GRID)
TRO Distribution Services Intranet	Corporate	TRO Distribution Services Intranet (GRID)
TRO EMS Environmental Aspects	Corporate	Stores TRO EMS Significant Aspects
TRO EMS Manual	Corporate	Stores TRO EMS Manuals
TRO - HP Safety & Health Program	TRO - Engineering	TRO-HP Safety & Health (2001/2002 documents??)
Work Protection Code		Work Protection Code Intranet (GRID)

Hydro OT Platforms		
Product Name	**Description**	**System Type**
Activu	System to control the display wall in the Energy Control Room	Platform
ASE Test Set	Communications Protocol testing	Application
Aspen Oneliner	Protection relay coordination and studies	Application
Aspen Relay	Manage relay configuration settings	Application
AutoCAD	CAD Application	Application
Bomgar	Secure remote access	Application
Creditron	Software to support Hydro Treasury	Application
Cyberx	Behaviour Anomoly Detection (BAD) system used on ECC, WAV, BDE	Application
Cyme Dist and CYME Online Mapping	System Planning Software	Application
EMSVIEW	Custom Intranet to manage reporting for NLSO	Platform
Environmental Database	Custom data management system for Vista and Nostradamus inputs	System
ESMII	Work Protection Code System	Platform
ESRI GIS	GIS System	Platform
Falls and LTS	Lightning Tracking and analysis software	Application
GE Perception	Configure and manage GE transfix for dissolved gas analysis in transformers.	Application
IBM Spectrum Protect	EMS Data Backup and Recovery Software	System
Ion Enterprise	Diesel Plant Power Management	Platform
Microsoft System Management Server	EMS Patch and Application Deployment System	Platform
Monarch	Energy Management System	Platform
NGINX	Servers used to obtain weather data from Environment Canada for display wall in ECC	Application
Nostradamus	Forecasting electrical demand	Platform
Oneliner	Advanced Systems for Power Engineering	Application
PI - OSISoft	Operational Database Reporting Tool	Platform
PlexOS	Generation modeling software	Application
PLS-CADD	CAD Application	Application
PSSE	Load flow analysis	Application
Redhat	EMS Core Operating System	Platform
SAN - Storage Area Network	EMS Enterprise Storage System	Platform
SpecOps	Operating system password management	Application
SQL	EMS Database Service	Platform
Strategist (ProScreen)	Generation Planning Software	Application
Symantec	EMS Antivirus and AntiMalware System	Platform
Tap Root	Cloud service for Root cause analysis	Application

Trihedrial	Scada system in diesel plants	Application
Tripwire	System Monitoring	System
TSM	Manage data backups	Application
Vista	LT, ST, Inflow includes Cplex – for water management	Platform
VMware	EMS Virtualization Software	Platform
WebOASIS	Cloud service used by NLSO to manage transmission tags	Application
WebTag	Cloud service used by NLSO to manage transmission tags	Application
WebTrans	Cloud service used by NLSO to manage transmission tags	Application
Windows Operating Systems	EMS Desktop and Server Operating System	Platform

Network Services Platforms, Applications and Systems		
Product Name	**Description**	**System Type**
Cisco PBX	Corporate Telephone System	System
Cisco Video Conferencing	Corporate Video Conferencing System	System
Cisco Wireless	Corporate Wireless System	System
Cisco Works	Network Monitoring System	System
Microware	Corporate Microware Communication System	System
Nortel PBX	Corporate Telephone System	System
VHF	Corporate VHF Radio System	System

Nalcor Information Systems and Hydro Information and Operating Technology

Boundless Energy

March 26, 2019

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Agenda

- Background

- Overview of Nalcor Information Systems (IS)

- Overview of Hydro Information and Operating Technology (IT/OT)

- Cybersecurity

Background

BACKGROUND

Structural Changes

- In 2000, IS, OT, and Network Services were brought together into one group

- In 2007, Network Services was moved out to Transmission and Rural Operations (TRO)

- In 2015, an Information Management Capacity Assessment Tool was completed identifying a low maturity level in most areas of the company. An IM corporate group and program was later established under Nalcor

- In 2016, there was a reorganization that split IS and OT and OT was merged with Network Services

Information Systems (IS)

- This group is responsible for providing Information Technology (IT) and Information Management (IM) services to Nalcor and its subsidiaries, including: NL Hydro, Churchill Falls, Lower Churchill, Oil and Gas, Bull Arm Fabrication and Energy Marketing

Information and Operating Technology (IT/OT)

- This group is responsible for information and operating technology support for Hydro specific business applications, communications equipment and infrastructure used for Hydro's generation, transmission and distribution functions

Overview of Nalcor IS

IS Organizational Chart
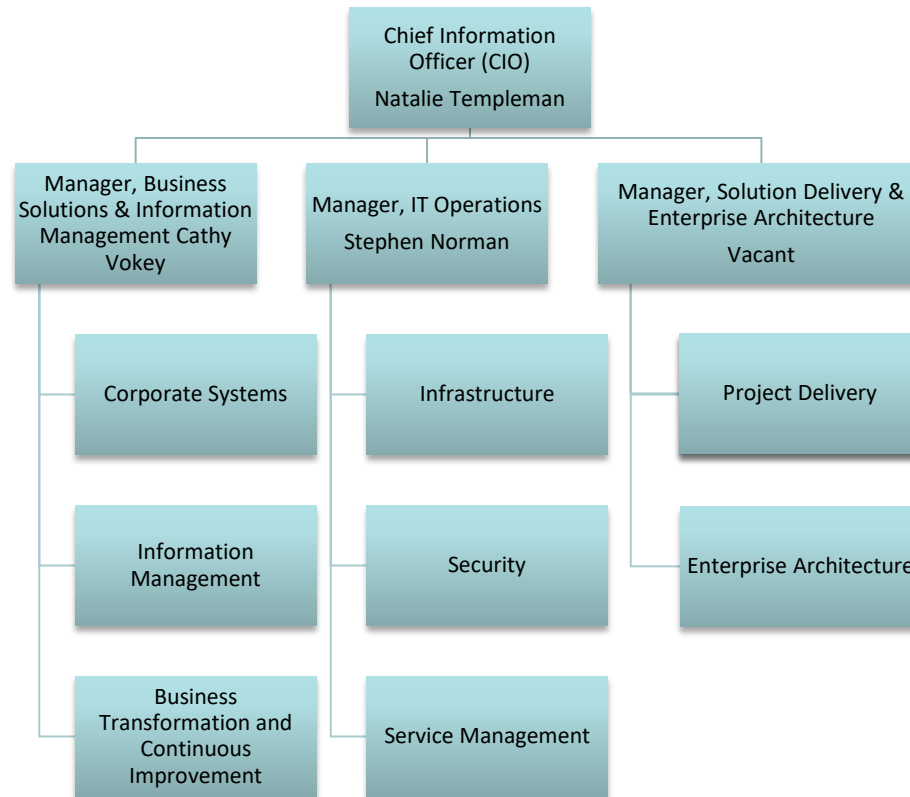
(Refer to Response to PUB-NALCOR-176-b)

IS Resources

- IS has 44 staff as listed below:

Nalcor Common IT Services Position Categories	Number of Resources
Administration	1
Corporate Management	3
Corporate Systems	10
Enterprise Architecture	3
Information Management	3
Infrastructure	5
Project Delivery	5
Service Management	10
Security	4
Total:	44

- There are some IT staff embedded in lines of business, including: Churchill Falls (2), Energy Marketing (2) and LCP (5)
- As a result of the LCP transition, it is expected that the IS group will increase by two staff between 2020-2022
- IMCAT recommended a distributed IM program model made up of a central IM team (with a Manager and 6 IM professionals)
- Security includes three dedicated Cybersecurity resources and one resource dedicated to Application Access
- Gap in the following resources: Database Analyst, Business Analyst, Security and Application Development

IS Services

Corporate Business Systems

- Design, development, implementation, configuration, and management of applications, databases, and computer systems used by all lines of business

- Supports the corporate applications used by all lines of business and applications for specific lines of business, manages access controls, software acquisition and management, and performs minor enhancements (Refer to Response to PUB-NALCOR-176-c)

Information Management

- Establishes and executes IM strategy, planning and policy

- Manages the IM program

- Delivers IM services (education, awareness & training, advisory services, IM tools & technologies, off-site record storage and record disposals)

Security

- Provides services to prevent the unauthorized access, use, or modification of corporate data

- Provides security program management, advisory services, education and awareness, and policy and procedure development

- Performs intrusion and threat detection

Infrastructure Support

- Manages operating systems, servers and storage, and peripherals

- Supports and manages the email system and Citrix environment

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IS Services

Service Management

- Manages the service and support of end-user service requests and IT issues for all Nalcor staff
- Manages the IS Helpdesk
- Provides Tier 1 support, including: software installations and desktop deployments

Enterprise Architecture

- Assists in identifying and assessing IT requirements and provides oversight and guidance during solution acquisition and implementation
- Asset planning for all IS services
- Researches technologies and IT trends
- Develops capital IT budgets

Solution Delivery

- Delivers IT projects
- Performs Project Management

(Refer to Response to PUB-NALCOR-176-c)

Overview of Hydro IT/OT

IT/OT Organizational Chart
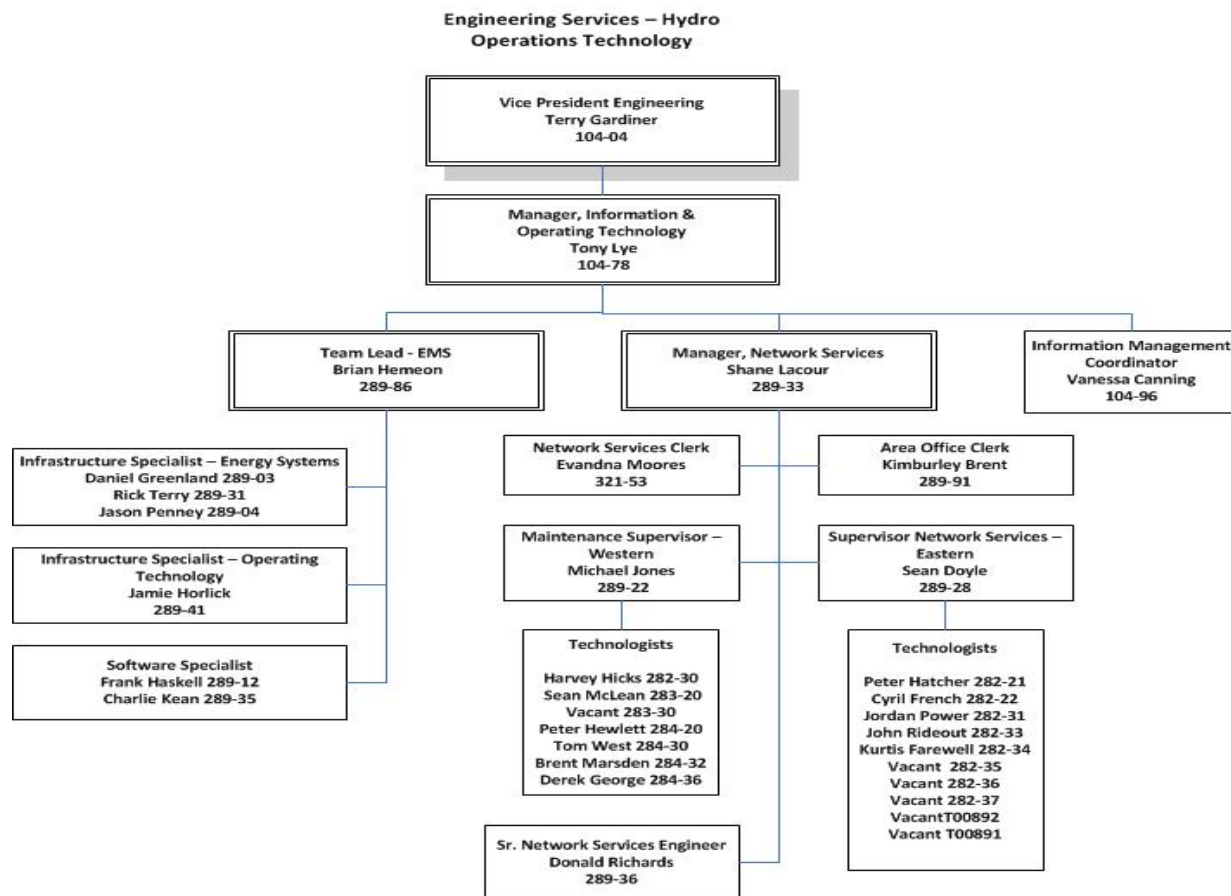
(Refer to Response to PUB-NALCOR-176-b)

IT/OT Resources

Hydro IT/OT Position Categories	Number of Resources
Hydro Management	1
Operating Technology	7
Information Management	1
Network Services	20
Total:	29

- The transition of LCP to Power Supply is being evaluated to determine the impact to resources
- Additional resources will be required in the security area

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IT/OT Services

OT

- Design, development, implementation, configuration, and management of applications, databases, and computer system used by various NLH departments to control, monitor, and manage the interconnected and isolated electric system in Newfoundland and Labrador

- Application Support and enhancement for OT applications for NL Hydro and Power Supply (CF)

- Primary application and infrastructure support responsibility for the Energy Management System

- Application Development focused on OT environment

Network Services

- Supports and maintains the Local Area Network

- Provides network management support by monitoring the performance, capacity and health of the voice and data networks

- Provides employees with access to voice communications including telephone, voice mail and long distance

- Manages/maintains all communications equipment at more than 150 Hydro owned sites province wide that provide remote supervisory and control services to the NLSO Energy Control Center

IT/OT Services

Information Management

- Executes the IM Program to ensure compliance with the Management of Information Act within Hydro Departments and aligns Hydro IM Activities with the Nalcor Corporate IM Program

- Delivers IM services (education, awareness & training, advisory services, preparation for off-site record storage and record disposals)

Cost Recovery for IS and IT/OT

Cost Recovery

- IS shared services costs are recovered through an Administration Fee. Operating costs are allocated to the lines of business on an average system user basis. Costs incurred solely for a particular line of business are charged to that line of business (Refer to Response to PUB-NALCOR-176-d)

- Business Systems Transformation Program cost recovery will be done through a Administration Fee. Costs are allocated to the lines of business based on the average number of JDE users and number of FTEs and Contractors (Refer to Response to PUB-NALCOR-176-d)

- OT services and Network Services provided to other lines of business are funded through a charge back model Administration Fee. Costs are allocated to the lines of business based on the number of network ports, telephone lines, and devices (Refer to Response to PUB-NALCOR-176-d)

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Cybersecurity

Background

- Cybersecurity is about Protecting IT, Industrial Control Systems (ICS) assets and processes from modern cyber threats and attacks, while maintaining the safety and reliability of operations

- Cybersecurity Risk Management spans both IT and Operating Technology (OT) and these two groups report into two different lines of business (IT Nalcor IS and OT Hydro IT/OT)

- Nalcor IS group has three positions dedicated to Cybersecurity and Hydro OT has one person with security responsibilities. This is an area where additional resources will be required

- Historically more tactical than strategic approach

- There is 24 hour support by both groups

- Roles and responsibilities around OT are currently being reviewed

- These groups work collaboratively together

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Background

- IS team is currently focused on:
  - Leading IT Threat Analysis and involved in OT threat analysis
  - Proactively responds to threats and works with the various teams (IT and OT)
  - Education and Awareness for the organization
  - Leading Incident Management for IT
  - Engaged in Incident management for OT
  - Monitoring of Security Events in a Security Information and Event Management (SIEM) system and escalates to the various groups

- OT team is currently focused on:
  - OT Threat Analysis and collaborates with Nalcor Security
  - Proactively responds to cybersecurity threats and works with the various teams
  - Engages with the following groups that have cybersecurity responsibilities for OT
    - Control Systems Engineers
    - Protection and Control Technologists
    - Communication Engineers
    - Communication Technologist
  - Cybersecurity Incident management for OT is led by the OT Team Lead with engagement and collaboration of Nalcor's Cybersecurity Officer

Cybersecurity Organizational Structure
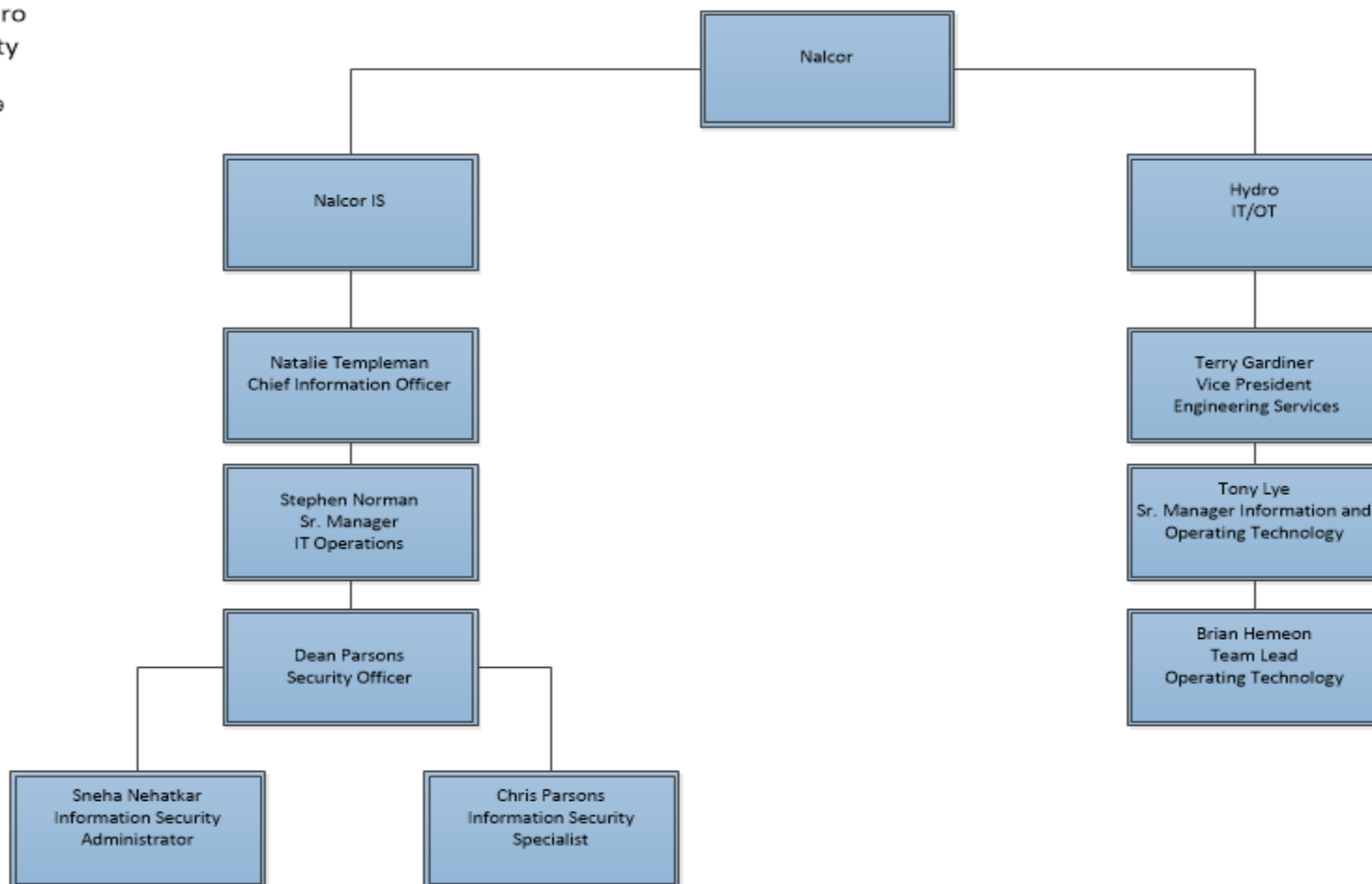
Cybersecurity Program – Threat INTEL

Cybersecurity Team (both IT and OT) use the followings sources for threat intelligence

Methods to Integrate IT/OT Cybersecurity

- Established Cybersecurity Council

- Assessments and Action Plans
  - Nalcor IS security group completed a C2M2 assessment for IT
  - Hydro's OT group completed a C2M2 assessment on the Energy Control Center
  - North American Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) Gap Analysis has been completed for:
    - Energy Control Center (ECC), and the Churchill Falls (CF) SCADA system
  - NERC CIP policies have been documented and reviewed by Hydro OT and Nalcor's Security Team and next steps is to decide which requirements will be implemented
  - Churchill Falls Internal Audit completed and action plans being drafted

- Developing a RASCI (Responsible, Accountable, Supported, Consulted and Informed) based on the National Institute of Standards and Technology (NIST) Critical Infrastructure Framework for OT

- Documenting the Cybersecurity Program and Risk Management Strategy is a part of this year's work plan

- Developing plans from the Assessments and Audits are on-going

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Methods to Integrate IT/OT Cybersecurity

- Threat Identification
  - Nalcor IS Security is Monitoring the SIEM
  - Events are identified and reported by anyone throughout the company
  - Determination of a Cyber Threat is handled by Nalcor Security in consultation with Hydro OT

- Threat Mitigation
  - Security Patching is done by both IT and OT groups
    - There is a Patch Vulnerability Group to educate on emerging security threats including both OT and IT – function of the committee under review
  - Education and Awareness is provided to all employees by Nalcor's IS Security Team
    - This training is generic and covers both OT and IT
    - Next step is to determine which group will do targeted security training based on functional role
  - Commercial Off the Shelf Technology to monitor and protect in both environments
  - Nalcor's IS and Hydro's OT teams proactively work together in cybersecurity defense

- Threat Response
  - Nalcor Leads IT cybersecurity incident response
  - Hydro leads OT cybersecurity incident response with collaboration from Nalcor* - confirming through RASCI

- Threat Remediation
  - Led by Nalcor's cybersecurity team * - confirming through RASCI
  - Infrastructure and Software Specialists in OT and Infrastructure Specialists in Nalcor IS work on threat remediation activities