Q. Please provide any staffing studies or projections prepared by or for the staff involved in operating generating plants.

A. Hydro conducts staffing studies as required. Larger staffing reviews normally arise as a result of significant change anticipated to impact operations.

Over the last five years there has been one external staffing review to determine the workforce requirements within the Holyrood Thermal Generation Plant necessitated as a result of anticipated changes in power generation arising from Muskrat Falls. The study was completed by a third party consultant, AMEC, in April of 2012 and as an affirmation of an internal staffing plan for standby and post steam operations. The AMEC study is provided in PUB-NLH-229 Attachment 1.

Outside of that noted above, there has not been reason to conduct staffing reviews beyond those accomplished through regular annual workforce planning in areas impacting the Island Interconnected generation within the last five years. Hydro's annual review process involves analysis of the proposed work plan relative to approved positions, anticipated vacancies, retirement projections, and in consideration of improvement factors, where possible. Adjustments are made to ensure an alignment of resources to required work. Adjustments may include transfer of positions where appropriate as well as varying temporary or contract labour to supplement the regular workforce. There has been no significant change in staffing within Hydro's generation facilities within the last five years as a result of these regular reviews with the exception of a realignment of staff within Hydro's non-regulated generation facilities resulting from integration of Exploits Generation

and Star Lake operations to leverage synergies and bring operational performance to Hydro's standards.

A review of the emergency response at the Holyrood facility resulted in a decision to add four Emergency Response Technicians and one Emergency Response Coordinator in 2009 to the staffing compliment at the Holyrood Thermal Generation Plant in favour of extending a third party arrangement. In addition, Hydro later added three Operator Trainee positions for succession purposes as well as an Electrical Maintenance position, which offset reductions in earlier years as a result of its annual review process.

24 April 2012

Mr. Terry LeDrew, P. Eng.
Plant Manager, Holyrood Thermal Generating Station
NALCOR Energy
Holyrood Thermal Generating Station
P.O. Box 29
Holyrood, Newfoundland and Labrador, Canada AOA2R0

Dear Terry,

Holyrood Thermal Generating Station (Holyrood) – Third Party Assessment of Holyrood's Staff Plan

As per our Agreement, we have completed the Holyrood Thermal Generating Station Third Party Assessment of Holyrood's Staff Plan. I trust that the report satisfies your needs.

Thank you for the opportunity to work on this very interesting project.

Yours truly,

Blair Seckington
Director, Power Technology
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BRS/brs
c: C. Woodall
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Holyrood Thermal Generating Station

Third Party Assessment of Holyrood's Staff Plan

April 24, 2012

Ian Leach _____ April 24, 2012
Prepared by: Date

Blair Seckington _____ April 24, 2012
Checked by: Date

Blair Seckington _____ April 24, 2012
Approved by: Date

Rev.	Description	Prepared By:	Checked:	Approved	Date
A	Draft Report	Ian Leach	Blair Seckington	Blair Seckington	31 March 12
0	Final Report	Ian Leach	Blair Seckington	Blair Seckington	**24 April 12**

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HOLYROOD THERMAL GENERATING STATION
Third Party Assessment of Holyrood's Staff Plan

EXECUTIVE SUMMARY

AMEC was contracted to review the staff plan for NALCOR's Holyrood 3 Unit oil fired Thermal Generating Station (Holyrood) and provide a third party assessment as to the appropriate staff levels after the installation and commissioning of the new 900MW DC transmission line from Muskrat Falls in Labrador to the island of Newfoundland. The reason for the staff plan review is based on the "re-purposing" of the Holyrood facility. Once the new generation source has been established, Holyrood's role will transition from its present capability where units 1 & 2 operate only as electricity generators, while unit 3 can operate as either an electricity generating unit or as a synchronous condenser to its future role where all three units are operated only as Synchronous Condensers.

Benchmarking with similar changes at other utilities in North America was difficult. Although a small number of utilities had converted plants to Synchronous Condenser operation, they had typically either reverted back to being a generating facility or were shutdown completely and/or dismantled. Some insight was gained from three stations:

i. Dalhousie Generating Station - 2 heavy oil fired units (unit 1 is rated at 100MW's /Unit 2 rated at 215MW's) in Dalhousie New Brunswick.
ii. Burrard Generating Station – a 6 unit 900MW total capacity natural gas fuelled station in Port Moody B.C., with four units that are capable of synchronous condenser operation.
iii. Zion Nuclear facility - two 850 MW nuclear units located in Zion Illinois USA that converted to synchronous condenser operation in the 1990's and operated in that mode until 2009 when they were de-commissioned.

Holyrood's management staff developed staff plans internally for both the "Standby Mode" as well as the "Synchronous Condenser Mode". The plan was considered to be well thought through, particularly the maintenance staff requirements to keep Holyrood operational when the plant will be in the "Standby Mode" and beyond. The review did however recommend a number of changes.

Holyrood's existing staff level in 2012 is approximately 106 people with thirty-one management staff (29% of total) and seventy-five unionized staff (71% of total). The staffing assessment is based on these numbers.

The analysis looked at a range of alternatives. The number of personnel required in 2017 varied from a high of 72 to a low of 63. In 2020 and beyond, the number is as high as 46 to as low as 30. It is recommended that Holyrood adopt a "5 Crew Short Term Operating Scenario" in the Standby Mode 2017-2020 resulting in a staff level of 67 being required to keep the plant operational. Staffing in the Post Steam era from 2020 onward will depend on the timing and amount of de-commissioning required. Major de-commissioning activities shortly after 2020 will require a staff number of 46 using the "5 Operating Crew Scenario". Excluding major de-commissioning activities or after their completion, the required staff number using the "5 Operating Crew Pattern" would be reduced to 33. Details of the recommended organization and position rationale are provided in Section 6 of the report. Indicative organization charts are attached as Appendices 5, 6, & 7.

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Third Party Assessment of Holyrood's Staff Plan

1 Introduction

AMEC was contracted to review the staff plan for NALCOR's Holyrood 3 Unit oil fired Thermal Generating Station (Holyrood) and provide a third party assessment as to the appropriate staff levels after the installation and commissioning of the new 900MW DC transmission line from Muskrat Falls in Labrador to Newfoundland. The new DC transmission line (Appendix 1) will have the capability of supplying the island of Newfoundland, as well as some generation through an interconnected line under the Cabot Strait linking Newfoundland with Nova Scotia Power at Lingan and into the US Northeast interconnected grid. The link with Nova Scotia also provides for a reverse supply of power if for any reason a power supply interruption at Muskrat Falls occurred.

The reason for the staff plan review is based on the "re-purposing" of the Holyrood facility. Once the new generation source has been established, Holyrood's role will transition from its present capability where units 1 & 2 operate only as electricity generators, while unit 3 can operate as either an electricity generating unit or as a synchronous condenser to its future role where all three units are operated only as Synchronous Condensers. Although project approval has not yet been given to build the DC transmission line from Labrador, Holyrood is proactively preparing its plans for the eventual "re-purposing" of the facility recognizing that it will be phased out of service as a generating plant and become a source of voltage stabilization within the next 8 – 15 years. Exactly what the timing and the degree as to how many Holyrood units will be used as generators until the new transmission line and generating source is in service and proven is still unknown.

The study recognizes that the staffing required remains somewhat fluid. Without the certainty as to what Holyrood's role looks like especially during the transition and what commissioning / de-commissioning activities will take place during this time, there is some difficulty determining how many staff are required to operate and maintain the plant. With this in mind a number of scenarios were pre-determined and the study was based on those assumptions.

2 Assumptions - Holyrood Standby Generation and Re-Purposed Conditions

The report addresses only the Holyrood station and its existing equipment role change. It does not address any additional scope outside of Holyrood (i.e. such as the new Soldiers Pond Converter Station which includes the installation of 2 new Synchronous Condensers or the Hardwood Gas Turbine Facility near Mount Pearl Nfld.) where maintenance may be provided by Holyrood staff or staff located at Holyrood. The assumptions used for staffing in the analysis are:

- Staffing the plant in "standby mode" includes cases where:
  - 3 units are available to operate as generators for either extended or short term durations;
  - 2 units are operated as generators and one unit in synchronous condenser mode; and

- 1 unit is operated as a generator and 2 units in synchronous condense mode from the years 2017 -2020.

- Staffing the plant for the year 2020 and beyond with 3 units to be run as synchronous condensers only
- De-commissioning activities for the remaining plant facilities and site will take place after the year 2022
- Contract staff used for boiler and turbine maintenance outside of what Holyrood maintainers perform will not be covered in the staffing document
- Staffing will include operating coverage 24 hrs/day 365 days / yr
- Maintaining staff with specific skill sets and provincial certification required to perform those specific duties must be considered
- The physical layout of the plant Control Room and the controls themselves remain configured the way they are today. No changes are being planned to operate the Synchronous Condensers from either a remote location or from one central terminal within Holyrood
- Operating reliability was not considered as a factor when developing the models because of the unknown requirements the System Operator would have on Holyrood.

AMEC staff visited Holyrood on two occasions meeting with staff and the ELAC committee. The ELAC committee is formed from within the plant, made up of trades people, union leadership, management, from Holyrood, and Human Resources from NALCOR's Head Office in St. John's. Staff interviews were conducted with persons from across all of the disciplines within the plant. Approximately 25% of the present staff total of 106 provided their input into this study.

3 Benchmarking

Benchmarking this transition with similar changes at other utilities in North America was more difficult than expected. Although a small number of utilities had converted plants to Synchronous Condenser operation, they had either reverted back to being a generating facility or were shutdown completely and/or dismantled. Some insight was gained from three stations:

iv. Dalhousie Generating Station - 2 heavy oil fired steam units each with a total station output of 315MW's. Located in Dalhousie New Brunswick, the plant was visited by Ian Leach (AMEC), Terry LeDrew (Plant Manager, Holyrood), Jabez Lane (Holyrood), and Bob Clarke (Holyrood, IBEW) on February 9th 2012;

v. Burrard Generating Station – a 6 x 150 MW unit natural gas fuelled station located in Port Moody B.C. The plant has four units that are capable of synchronous condenser operation. It has on occasion operated up to 3 units as synchronous condensers. The station has in the past been reduced to two generating units with four synchronous condensing units. It was returned to a six unit generating operation however plans are being made to again place some units into a (dry lay-up) condition.

vi. Zion Nuclear facility - two 850 MW nuclear units located in Zion Illinois USA. The units were converted to synchronous condenser operation in the 1990's and operated in that mode until 2009 when they were de-commissioned.

Although benchmarking may provide some insights, each plant is somewhat unique, based on factors such as the weather, the grid that it is associated with, the layout of the plant, and the operating mode of the facility. Holyrood is very unique because it operates in an island mode, is the only thermal station on the grid, and weather requires significant amounts of auxiliary steam during the winter and shoulder months to keep the residual fuel oil heated in the storage tanks, for startup of the generating units, and for plant heating.

3.1 Dalhousie TGS (Dalhousie)

Dalhousie unlike Holyrood is slated to close completely once their fuel storage tanks are empty. The plant is scheduled for de-commissioning starting later in 2012. 100 MW Unit #1 was already declared to be out of service, however it has since been returned to a generating condition by the plant staff for short durations since that declaration. The 215MW Unit 2 is still operational and in fact was in service at the time of the site visit.

One similarity to Holyrood is that New Brunswick Power has a synchronous condenser plant at Eel River, approximately 15km west of the Dalhousie, which has been in service since the 1970's. Although Newfoundland does not yet have a synchronous condenser plant, one is being planned for at Soldiers Pond which is approximately 15 – 20km from Holyrood. The converter station is required to convert the DC power transmitted from Labrador to AC power for use on the island. In the case of Dalhousie, some of the staff displaced at Dalhousie found positions at the Eel River plant with some additional training and certification. Although this report doesn't deal with staffing for Soldiers Pond Converter Station, it would appear as if some of the staff from Holyrood could be utilized at this new facility.

A difference between Dalhousie and Holyrood is the only personnel classed as "Management" are in manager level jobs. All staff at Dalhousie from the supervisors to the people at the floor level is represented by the IBEW (International Brotherhood of Electrical Workers) union.

3.2 Burrard Generating Station (Burrard)

Burrard is located in Port Moody British Columbia. Burrard consists of six 150 MW natural gas fired units. All six units are being used as generators however, prior to 2008 3 units and sometimes 4 unit generators saw duty as synchronous condensers. Presently plans are being made to put equipment associated with the generation of electricity for three units back into long term cold standby.

A Burrard Staffing chart is included in Appendix 2. It shows staff levels and positions from fiscal years 2004 – 2011. During BC Hydro's fiscal years 2005 / 2006 /2007 when 3 units were being used as synchronous condensers the number of staff at Burrard ranged from a high of 84 to a low of 72. When Burrard ran only in synchronous condenser mode the number of operators

required to run the plant totaled 3, the minimum considered to be necessary to safely operate Burrard in synchronous condenser mode. The on shift compliment was allowed to drop to that number allowing the opportunity for operations staff to take vacations, perform regularly scheduled day shift starts on units capable of generation, working in other areas of the plant as well as providing relief for operators at BC Hydro's Fort Nelson combined cycle generating station.

Although Burrard is the best example of a benchmark for Holyrood especially in the "Standby" mode there remain distinct differences between B.C. Hydro's Burrard Station and NALCOR's Holyrood Plant. Burrard's physical location places it in a more moderate climate and because of this there isn't any need for auxiliary boilers. The fuel used at Burrard is natural gas so there are no storage tanks and no marine terminal that require staff when an oil tanker is being off loaded. Burrard does not have a combustion turbine for black start capability on site and some positions at Burrard are covered by personnel who are Head Office employees whereas Holyrood's personnel are station specific. Some of these positions at Burrard include the Senior Environmental Coordinator and the Environment Techs along with the Financial Analyst, Manager for Health and Safety, and some Clerical positions. Therefore the actual station staff number for Burrard does not entirely reflect the numbers required to operate the plant.

3.3 Zion Nuclear Plant (Zion)

The Zion Nuclear plant is located in Zion, Illinois, USA. It was a two unit (850 MW/unit) nuclear station. Both of the unit generators were converted to synchronous condenser operation in the late 1990's and remained operating in that mode until mid 2009. Zion Nuclear appeared to be a good comparator for the "Post Steam" era for Holyrood to benchmark against.

Unfortunately, at this time the generators have been completely dismantled with the plant de-commissioning beginning in 2009. The plant manager was not interested in hosting a visit, but provided some information over the phone. He indicated that during the synchronous condenser operation a full time staff of 40 remained at the plant (compared to its original staff total of over 600 before the conversion to synchronous condenser operation). Details on how many or what positions (i.e. maintenance and operator numbers during those 10+ years) were not provided.

The plant was dismantled primarily due to its ageing equipment. One generator stator rewind had already been done in 2004. The equipment was in a condition where a business case could not be made to reinvest in the facility to keep it open and functional. To compensate for the loss of this form of voltage control on the electrical system, static Var compensators were installed in another location nearer the O'Hare International Airport. Currently Zion is in the long arduous process of being fully dismantled.

3.4 Other Benchmarks

Other stations that were considered as possible benchmarks included the Ralph Garcia Plant in Key West Florida and the Contra Costa station in Contra Costa County California near San Francisco. The Garcia station converted gas turbine generators to synchronous condensing mode and the controls were moved to a central location operated by the system operator. It was decided this plant did not emulate Holyrood's situation. The Contra Costa plant had been sold, de-commissioned and dismantled and when inquiries were made no response was received.

4 Assessment Considerations

A considerable number of staffing models were run in order to determine the recommended staffing numbers and organization for Holyrood going forward from approximately the year 2017 for the scenarios requested. Several possible staffing numbers are provided with the positions, as well as a rationale and short outline as to the expectations of those positions. They are not job descriptions, but provide an overview of the positions likely required.

All of the recommended staff plans will make it necessary for contractual changes to be negotiated with the IBEW union prior to any implementation. The IBEW union contract comes due for renewal in 2014. Recognizing the uncertainty as to when the Labrador to Newfoundland DC transmission line will be built and operational, the agreement will have to satisfy the future needs, while maintaining existing staff levels required to ensure the station's generating reliability until after the change is made. Some of the staffing models that were examined included re-assigning some of Holyrood's personnel to NALCOR's Head Office in St John's (i.e. some managers and Asset Engineering staff) in a manner similar to what B.C. Hydro has done with Burrard and its head office functions.(This model could be used if the staffing levels at Holyrood are considered to be high and the work load no longer requires an FTE.)

The staff plan assessment for Holyrood took into account that the station is a registered facility within the province of Newfoundland and Labrador and that it is bound to follow the Boiler, Pressure Vessel and Compressed Gas Regulations under the Public Safety Act. The number of qualified staff when units are being operated as generating units is stipulated by the regulations (Appendix 3) for a 1st Class Power Engineering Facility.

During the Standby Mode in 2017-2020 where the plant may require all 3 Units in service as generators, some changes will be required to the Plant Registration and the numbers required to operate the plant. However there is no change to its requirement as a 1st Class Power Engineering Facility.

When Holyrood goes from "Standby to Synch Condenser Mode", the rating of the plant will need to be determined. Whether rotating synchronous condensers impact their regulatory rating needs to be determined. The generators will continue to be cooled using pressurized hydrogen. It has been difficult to determine whether or not these will impact the required plant registration. The plant registration will include the auxiliary boiler(s) that will have to be installed and in use; how many air compressors are in use; the new Hydrogen Generator; and possibly the presence of a black start capable gas turbine generator. In light of these uncertainties, the staff plan assessment for 2020 and beyond assumes that the plant remains as a 1st Class Facility. As such, those required to operate it will hold the same qualifications as those who are currently operating it. If the registration level requirement is reduced, the only significant change to the staffing arrangement would be the level of certification required by the Province. The staff numbers would remain the same, unless physical changes are made that would reduce staff requirements. The level and timing of de-commissioning in the post 2020 period has yet to be determined. Additional staff may be required therefore staff plans have been developed to include that scenario as well. Additional operator training will be required when the plant becomes a synchronous condenser facility especially in the areas of electrical safety and switching specifically.

Holyrood's management staff developed staff plans internally for both the "Standby Mode" as well as the "Synchronous Condenser Mode". In their plans, a number of contract staff jobs become available to Holyrood personnel. This is not considered as being viable in the area of plant security. Maintaining qualified staff to do the jobs that need to be done while keeping the numbers at reasonable levels is preferable to just filling positions. If economic measures are implemented later, one of the areas usually affected is in plant security. Reducing contract staff to reduce the overall station budget is easier than trying to re-deploy staff that have been displaced once already. Both of the stations assessed as benchmarks use contract staff for security with after-hours security provided by operations personnel who are on site 24/7. Ontario Power Generation's Lennox Generating Station (4 x 500 MW oil and natural gas fuelled GS) uses contract staff throughout the day Monday – Friday, but utilizes Operations on the back shifts and weekends to provide security along with additional security technology that is available.

The staff plan developed by Holyrood's management team is well thought through, particularly the maintenance staff requirements Appendix 4 to keep Holyrood operational when the plant will be in the "Standby Mode" and beyond. Some changes are recommended to the Holyrood plan in the Asset Management, Health, Safety, Environment, Support Services, and Operations Sections. Various scenarios were developed to assess how the staffing levels could be affected depending on the number of operating crews used and the operating pattern of the plant (operated for extended or short term durations). The recommended Operations Section staffing changes because of the requirement to staff the plant 24/7 in a variety of operating patterns which can be dictated by weather, reliability of other generation, or the implementation of new

equipment required to keep the plant operational either as a generating station or as voltage support.

The changes within the Operations group balances the mix of people required to operate the plant safely and reliably with the need to keep these highly skilled, certified staff doing meaningful work when the plant is not operating. Overtime, whether due to sickness, accidents, training, vacations, or extended running periods in the uncertain role Holyrood will play, is an important element in the analysis. The staffing numbers should be as accurate as possible to ensure enough qualified staff is available at all times to operate the plant without undue hardship on staff or their families. The changes include some changes to the reporting structure, especially after 2020.

5 Assessment of Holyrood's Staffing Requirements

Holyrood's existing staff level in 2012 is approximately 106 people with thirty-one management staff (29% of total) and seventy-five unionized staff (71% of total). The staffing assessment is based on these numbers.

The staffing models are intended to provide Holyrood management with a number of alternatives to consider for both the 2017 – 2020 "Standby Mode" period and the 2020 and beyond re-purposed "Post Steam" period (all three units in synchronous condenser operation only). The number of personnel required in 2017 varies from a high of 72 to a low of 63. In 2020 and beyond, the number is as high as 46 to as low as 30.

There are differences in the staff numbers in every section within the plant between the Holyrood management staffing plan and the models considered herein. These differences may not be in the positions required, but in the number of people needed to fill them. In the case of the 2020 and beyond period, the reporting structure also changes significantly from the current configuration. The current union agreement calls for the use of 5 operating crews, which provides for a supernumerary crew Monday's to Thursday on dayshift from 8:00AM – 4:00PM. One option is to use 4 operating crews. This affects staffing of the operating crews, but not in the Maintenance, Asset Management, Support Services, Safety, Health and Environment sections. The number in each of these sections is considered to be as low as reasonably possible. It is likely that the overall unit operating reliability numbers will drop at least partially because of the reduction in staff levels. Some overtime will be required, especially in 2017-2020, when the units are operating as electricity generators to both maintain and operate them.

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6 Recommended Staff Plan

A number of alternatives were assessed and the information included to provide Holyrood's management with some flexibility in initial decision-making and to change direction as the need arises. It is recommended that Holyrood adopt the "5 Crew Short Term Operating Scenario" in the Standby Mode 2017-2020. During this Standby period, a staff level of 67 would be required to keep the plant operational, possibly with a moderately lower reliability factor. Assuming the station runs for short periods (one to two weeks at a time), the amounts of overtime will be modest and generation reliability may not be affected. Longer operating periods of up to a month at a time will require significantly more overtime, but with the use of the supernumerary operating crews that would be workable. The smaller maintenance staff numbers may create some reliability issues during longer generation operating periods, however these typically occur in the winter period when fewer vacations are taken and the availability of staff for overtime increases. It is reasonable, given the uncertainty associated with the new Labrador to Newfoundland HVDC transmission line and its initial reliability, that Holyrood might be required to generate for longer periods but that need would diminish as the HVDC line becomes more reliable. Keeping any additional Holyrood staff doing meaningful work would become increasingly difficult.

Staffing in the Post Steam era from 2020 onward will initially depend on the amount of de-commissioning required. This makes providing a hard and fast staffing recommendation more difficult. Major de-commissioning activities will likely require a staff number of 46 using the "5 Operating Crew Scenario". The 4 crews on the shift rotation will be required to operate the 3 synchronous condensers, while the supernumerary crew would provide operations support to the de-commissioning process. Other staff positions would be maintained during the decommissioning period because of the technical and supervisory expertise needed to ensure that the work is done in a safe and effective manner. Excluding major de-commissioning activities or after their completion, the staff number using the "5 Operating Crew Pattern" would be reduced to 33. The number of technical and supervisory staff would be reduced by 13. No changes to the number of operators or maintenance personnel would be made. Until the generating portion of the plant is decommissioned, abandoned in place or dismantled for sale, the supernumerary operating crew would be utilized in maintaining the preservation program of the generating portion of the plant. They would ensure that pumps, fans and motors are rotated on a regular basis to prevent bearing and motor winding problems and would provide for overtime support during training, sickness or vacation periods. With the additional requirement for electrical switching and work protection, periodic training in that aspect of the operation will be required. It will become necessary for operators to carry out some of those activities with the reduction of staff in the electrical maintenance section.

The following tables provide an overview of what alternative staff plans with the 4 or 5 Operating Crews and the different operating patterns in the "Standby Mode" and the recommended 5 Operating Crew Staff Plan. The recommended plan included a listing of the positions that are suggested to be eliminated and the new positions created. The rationale as to why positions remain is also included. The recommended Organization Charts are included in Appendices 5, 6, & 7 for the "Standby 2017-2020" model and the two "Post Steam 2020" and beyond models for the De-Commissioning Mode and the Non De-Commissioning mode.

HOLYROOD STAFFING
2017 - 2020

	2012-2016	← 2017 - 2020 →					
	#'s of Employees						
Departmental Trade Classifications	Existing	← Standby →					
Crew Configuration	5- Operating Crews	5- Operating Crews	4 Operating Crews	5 Operating Crews	4 Operating Crews	5- Operating Crews	4 Operating Crews
Operating Scenarios	3 units available to generate or operate in Synch Cond. Mode	3 units available to generate or operate in Synch Cond. Mode Extended Generation Period	3 units available to generate or operate in Synch Cond. Mode Extended Generation Period	3 units available to generate for 1-2 week durations	3 units available to generate for 1-2 week durations	Units 1&2 in Synch Cond Mode and only Unit 3 available to generate	Units 1&2 in Synch Cond mode and only Unit 3 available to generate
Manager - Thermal Generation	1	1	1	1	1	1	1
Manager – Operations	1	1	1	1	1	1	1
Operations Specialist	1	1	1	1	1	1	1
Performance Specialist - Operations	1	0	0	0	0	0	0
Shift Supervisor	5	0	0	0	0	0	0
Lead Thermal Plant Operator	5	5	4	5	4	5	4
Thermal Plant Operator	20	20	16	15	12	15	12
Operations Totals	33	27	22	22	18	22	18

Maintenance							
Manager - Work Execution	1	1	1	1	1	1	1
Maintenance Engineer - Work Execution	1	1	1	1	1	1	1
Instrumentation Supervisor	1	0	0	0	0	0	0
Technologist - Instrumentation & Control	6	3	3	3	3	3	3
Planning Supervisor	1	0	0	0	0	0	0
Planner	2	1	1	1	1	1	1
Planning Clerk	1	1	1	1	1	1	1
Electrical Supervisor	1	1	1	1	1	1	1
Electrical Maintenance "A"	6	4	4	4	4	4	4
Mechanical Maintenance Supervisor	2	1	1	1	1	1	1
Mechanical Maintenance "A" - Millwright	6	4	4	4	4	4	4
Mechanical Maintenance "A" - Welder	3	1	1	1	1	1	1
Carpenter	1	1	1	1	1	1	1
General Maintenance "B"	7	3	3	3	3	3	3
General Maintenance "B" (Industrial Cleaner - Temp)	1	0	0	0	0	0	0
Industrial Cleaner (Temp)	2	2	2	2	2	2	2
Maintenance Totals	42	24	24	24	24	24	24

Support Services							
Team Lead - Support Services	1	1	1	1	1	1	1
Warehouse Supervisor	1	0	0	0	0	0	0
Office Clerk	3	2	2	2	2	2	2
Stores Worker	3	2	2	2	2	2	2
Utility Worker - Janitor	0	1	1	1	1	1	1
Security Guard	0	0	0	0	0	0	0
Support Services Totals	8	6	6	6	6	6	6
Safety /Health/Environment							
Manager - Safety, Health, & Environment	1	1	1	1	1	1	1
Plant Chemist	1	1	1	1	1	1	1
Emergency Response Coordinator	1	1	1	1	1	1	1
Safety Coordinator	1		0	0	0		
Technologist - Environment	4	2	2	2	2	2	2
Technologist - Chemical	3	2	2	2	2	2	2
Emergency Response Technician	4	1	1	1	1	1	1
Safety / Health/ Environment Totals	15	8	8	8	8	8	8
Long Term Asset Planning							

Manager - Long Term Asset Planning	1	1	1	1	1	1	1
Asset Specialist - Thermal	1	0	0	0	0	0	0
Asset Operations - Day Shift Supervisors	0	2	2	2	2	2	2
Plant Engineer - Electrical	1	1	1	1	1	1	1
Plant Engineer - Mechanical	1	0	0	0	0	0	0
Project & QA Engineer	1	1	1	1	1	1	1
Plant Engineer – Civil	1	1	1	1	1	1	1
Co-op Engineer	1	0	0	0	0	0	0
Long Term Asset Planning Totals	7	6	6	6	6	6	6
Station Totals	**106**	**72**	**67**	**67**	**63**	**67**	**63**

HOLYROOD STAFFING 2020-2025				
	# of Employees			
Departmental Trade Classifications	**Post Steam**	**Post Steam**	**Post-Steam**	**Post-Steam**
Crew Configuration	5- Operating Crews	4- Operating Crews	5 Operating Crews	4 Operating Crews
Operating Scenarios	3 Units in Synch Cond mode Major de-commissioning and reconfiguring of powerhouse and station site. Control Room layout remains the same	3 Units in Synch Cond mode Major de-commissioning and reconfiguring of powerhouse and station site. Control Room layout remains the same	3- Units in Synch Cond mode No de-commissioning activities	3- Units in Synch Cond mode No de-commissioning activities
Manager - Thermal Generation	0	0	0	0
Manager – Operations	1	1	1	1
Operations Specialist	1	1	0	0
Lead Thermal Plant Operator	5	4	5	4
Thermal Plant Operator	10	8	10	8
Plant Chemist	1	1	0	0
Technologist - Environment	1	1	0	0
Technologist - Chemical	2	2	1	1
Operations Totals	21	18	17	14

Maintenance				
Manager - Work Execution	1	1	1	1
Office Clerk	1	1	1	1
Maintenance Engineer - Work Execution	1	1	0	0
Project & QA Engineer	1	1	0	0
Plant Engineer - Civil	1	1	0	0
Planner	1	1	0	0
Stores Worker	2	2	2	2
Emergency Response Coordinator	1	1	0	0
Emergency Response Technician	1	1	0	0
Plant Engineer - Electrical	1	1	1	1
Electrical / Instrumentation Supervisor	1	1	0	0
Technologist - Instrumentation & Control	2	2	1	1
Electrical Maintenance "A"	2	2	2	2
Mechanical Maintenance Supervisor	1	1	0	0
Mechanical Maintenance "A" - Millwright	2	2	2	2
Mechanical Maintenance "A" - Welder	1	1	1	1
Carpenter	1	1	1	1
General Maintenance "B"	2	2	2	2
Industrial Cleaner (Temp)	1	1	1	1
Utility Worker - Janitor	1	1	1	1
Maintenance Totals	25	25	16	16
Station Total Staff	**46**	**43**	**33**	**30**

RECOMMENDED HOLYROOD STAFF PLAN
Standby Mode 2017-2020
Positions Eliminated and New Positions Created
Short Term Generation Using all 3 Units --- Maintaining 5 Operating Crews
(Positions identified in red font will either be downsized or have been excluded.)

Job Classifications	# of Employees in 2012	Positions Reduced in 2017	New Positions Created in 2017	# of Positions Remaining in 2017
Manager - Thermal Generation	1			1
Manager - Operations	1			1
Operations Specialist	1			1
Performance Specialist - Operations	1	1		0
Shift Supervisor	5	5		0
Lead Thermal Plant Operator	5			5
Thermal Plant Operator	20	5		15
Operations Totals	33	11		22
Maintenance				
Manager - Work Execution	1			1
Maintenance Engineer - Work Execution	1			1
Instrumentation Supervisor	1	1		0
Technologist - Instrumentation & Control	6	3		3
Planning Supervisor	1	1		0
Planner	2	1		1
Planning Clerk	1			1
Electrical Supervisor	1			1

Electrical Maintenance "A"	6	2		4
Mechanical Maintenance Supervisor	2	1		1
Mechanical Maintenance "A" - Millwright	6	2		4
Mechanical Maintenance "A" - Welder	3	2		1
Carpenter	1			1
General Maintenance "B"	7	4		3
General Maintenance "B" (Industrial Cleaner - Temp)	1	1		0
Industrial Cleaner (Temp)	2			2
Maintenance Totals	42	18		24
Support Services				
Team Lead - Support Services	1			1
Warehouse Supervisor	1	1		0
Office Clerk	3	1		2
Stores Worker	3	1		2
Utility Worker - Janitor	0		1	1
Security Guard	0			0
Support Services Totals	8	3	1	6
Safety /Health/Environment				
Manager - Safety, Health, & Environment	1			1
Plant Chemist	1			1
Emergency Response Coordinator	1			1
Safety Coordinator	1	1		0

Technologist - Environment	4	2		2
Technologist - Chemical	3	1		2
Emergency Response Technician	4	3		1
Safety / Health/ Environment Totals	15	7		8
Long Term Asset Planning				
Manager - Long Term Asset Planning	1			1
Asset Specialist - Thermal	1	1		0
Asset Operations - Day Shift Supervisors	0		2	2
Plant Engineer - Electrical	1			1
Plant Engineer - Mechanical	1	1		0
Project & QA Engineer	1			1
Plant Engineer - Civil	1			1
Co-op Engineer	1	1		0
Long Term Asset Planning Totals	7	3		6
Totals	**106**	**42**	**3**	**67**
Number of Staff Remaining				**67**

Rationale for Each Position Remaining at Holyrood during the Period Steam to Synchronous Condenser Operation 2017-2020

(Positions in italics are "Eliminated Completely")

Manager -Thermal Generation -There is no significant change being made to this position.

Labour Manager – Operations --The Operations Manager presently holds the position as Chief Engineer for the plant as recognized by the current Plant Registration issued by the government of Newfoundland and Labrador. Due to the standby generation requirements maintaining and monitoring the operating crews to ensure the plant is operated within the regulations which are in force and to ensure the operators are properly trained to carry out the Operations Manager or Chief Engineers position will be required.

Operations Specialist - The Operations Specialist position will be required until the plant is physically downsized. The individual will be required to assist the Manager Operations in fulfilling training, ensuring the plant is operated at the highest level of competency and ensures the day to day activities of the crews on shift are carried out in a timely and orderly fashion. The Ops Specialist will assume the duties of the Manager- Operations during absences.

Performance Specialist - Operations *- Due to the Standby Generation requirement this position is seen as being redundant. Some of the job duties of the Performance Specialist should now be handled by the Plant Chemist especially those with respect to the environment. Any other duties with regards to plant statistics are seen to be less important and could be handled by the Environment Technologists.*

Operations Shift Supervisors -These positions have been moved from Operations to Asset. The two Day Shift Supervisors will play an important function for both sections. Because of the ongoing requirement to commission new pieces of equipment installed at Holyrood in order for it to become a Synchronous Condenser Plant and the eventual de-commissioning of all unnecessary systems once the Muskrat Falls and Labrador-Newfoundland HVDC project is deemed totally reliable. These 2 individuals will be required to ensure these projects are handled safely, efficiently, and within specifications. Documented procedures will be required to ensure that as the new pieces of equipment are implemented operating instructions are prepared to assist the operators in dealing with these and as well decommissioning procedures will need to be prepared to ensure the safety of those dismantling the equipment. When the Operations - Manager or the Operations Specialist are absent the Operations Shift Supervisors will be required to provide relief in these positions as well.

Manager - Work Execution -Required to manage the Maintenance section which will still be one of the largest labour groups within the plant and no real change to the job will occur during this stage.

Maintenance Engineer - Work Execution - Both the Mechanical Maintenance Crew and the Electrical Maintenance Crew Supervisors will directly report to this position. This person will be responsible to ensure the day to day work plan is being carried out safely and efficiently making sure that the equipment is available to operate when needed. Maintenance Engineer - Work Execution will be required to administer any outside contracts.

Instrumentation Supervisor *- Not required as this position becomes a part of the Electrical Supervisors job duties*

Mechanical Maintenance Supervisor (1 required) - This position will be required to supervise all aspects of the Maintenance trades including millwrights, welders, carpenters, scaffold erection and other general maintenance activities for the total plant.

Planning Supervisor *- Not required as this position becomes a part of the Planner's position*

Planner - Day to day work activities for the stations maintenance sections and operations will be required to ensure the plant is available when required. The Planner will supervise the Planning Clerk to ensure that the work plans are developed and ensure the resources are available in order that the work can be carried out

Electrical Supervisor (1 required) - The Electrical supervisor will now be responsible for the Electrical Maintenance Crew and the Instrumentation Technologists ensuring that the day to day activities are being carried out safely and efficiently and the plants electrical and instrumentation devices are in good working order when the plant is either in a shutdown state or is required to operate.

Team Lead - Support Services - This position should be combined with the Warehouse Supervisors position. The Team Lead Support Services Manager will still be responsible for the handling of fuel deliveries during the standby mode of operation and will look after the Marine Terminal and the International Port Security. This position will also be responsible for the Plant Security Guard contract as it exists today. The recommendation is to keep the security service as it exists today until the plant becomes a Synchronous Condenser Operation. As is done today the TLSS will continue to manage the office staff and the stores personnel as well.

Warehouse Supervisor *- This position is being eliminated.*

Manager - Long Term Asset Planning - This position will still be required as the Long Term role of the station and as to what condition the assets will be maintained in is a necessity. Although the number of direct reports will be reduced maintaining the plant in a state that makes it ready to operate and the condition over the long term of the facility will be required.

Asset Specialist - Thermal *- This position is being eliminated. The roles and responsibilities will be handled in part by the 2 Asset Day Shift Supervisors.*

Plant Engineer – Electrical - Reports directly to The Manger Long Term Asset Planning and is required to ensure that as the plant transitions from a generating facility to a synchronous condenser operation that all aspects of the electrical systems are properly dealt with. This will include supervising and consulting with contractors hired to complete electrical projects with respect to Synchronous Condenser Operation or the Installation of new equipment and the de-commissioning of those systems not needed in the Post Steam mode.

Plant Engineer – Mechanical *- No longer required as duties of the Plant Engineer - Mechanical will now be handled by the Project QA Engineer.*

Project Mechanical / QA Engineer - Reports directly to The Manger Long Term Asset Planning and will be required to fill the Plant Engineer - Mechanical position as well to ensure that as the plant transitions from a generating facility to a synchronous condenser operation and that all aspects of the mechanical systems are properly dealt with. This will include new installations, developing procedures for maintaining the systems required for both the generating and synchronous condenser operation and the layup procedures for all mechanical devices not required for use while in the Standby Mode. This position will be required to provide direction to the Maintenance Section with regards to the application of the ASME Code to ensure the plant is being maintained within the guidelines of the applicable ASME Codes.

Plant Engineer – Civil - Reports directly to the Manager Long Term Asset Planning and provides direction, supervision, and consultation with respect to the physical and structural changes that may be made to either the main powerhouse or any outlying buildings or structures.

Asset Day Shift Supervisors - Because of the ongoing requirement to commission new pieces of equipment installed at Holyrood in order for it to become a Synchronous Condenser Plant and the eventual decommissioning and the possible layup of generating equipment for long periods of time 2 individuals are required to perform duties of a commissioning / de-commissioning team. The people filling these positions would prepare documents, procedures, and look at the viability of new systems being added to the plant and as well would prepare de-commissioning documentation in order that this process can be carried out after 2020. Supervising of supernumerary operators may be required to ensure new equipment is put into service as per OEM directions. These people would be expected to fill the role as Labour Manager Operations and the Operations Specialist when vacated by the incumbent.

Co-op Engineer *- This position is no longer required.*

Manager-Safety, Health, & Environment - This position will be required to provide direction to the Plant Chemist and the Emergency/ Safety Coordinator. Overall plant performance statistics will be required to be maintained by this section utilizing one or both of the environmental technologists in this role.

Plant Chemist - This position will maintain the same responsibilities as they exist today along with carrying out the duties of the Performance Specialist with respect to supervising the Environment Technologists and all station reporting including both the environment and the plant performance.

Emergency Response Coordinator - The Emergency Response Coordinators position will be combined with the Safety Coordinators position. Although the job function doesn't change and both the safety training and the overall emergency response work is required it should be on a smaller scale as the number of plant personnel has diminished and some of the work load should be transferred back to the operations sections.

Safety Coordinator *- This position is being combined with ERC*

Operations

Lead Thermal Plant Operator - one for each Operating Crew is recommended and this position will become "union supervisory" thus eliminating the need for the shift supervisor position. Because of the added supervisory functions now performed by the shift supervisor a job reclassification would be required. Because this is a union position hands on work would be still allowable.

Thermal Plant Operator - Depending on the number of units either generating power or providing voltage support as Synchronous Condensers and depending on the number of auxiliary boilers and air compressors in service would determine the number of TPO's required. 15 TPO's (3/Crew) will be required to staff the plant 24/7. TPO's will be required to take on some of the Emergency Response Technician's job duties.

Maintenance

Electrical Maintenance "A" - Four will be required to provide support for the safe efficient operation of the plant. Staff will be required to fill in as the electrical/ instrumentation supervisor when that person is not available.

Mechanical Maintenance "A" - Millwright - Four will be required to carry on the duties necessary to keep the plant operational during the standby mode of operation. Staff will be required to fill in as the Mechanical Supervisor when that person is not available.

Mechanical Maintenance "A" - Welder - One will be required to perform the welding tasks necessary.

Technologist - Instrumentation & Control - Three are required to ensure the control systems and the relaying is in good working order. Staff will be required to fill in as the Electrical / Instrumentation Supervisor when that person is not available.

Carpenter - One is required for odd jobs related to the maintenance and operation of the plant and would be assigned General Maintenance duties to provide meaningful work.

General Maintenance "B" - Three required ensuring that the proper scaffolding and safety systems are being built for use by the Maintenance Trades while performing work. Other duties that may be required to be done by this work group could include snow plowing and shovelling and those listed on their job document. May be required to fill in temporarily as a stores worker.

Planning Clerk - Develops day to day work plans including PM work that is required to be completed by maintenance and operations crews inputting deficiencies and reports as necessary.

General Maintenance "B" (Industrial Cleaner-Temp) *-This position should be eliminated.*

Industrial Cleaner (Temp) - Two required as is presently set up. Assisting the General Maintenance crew as needed.

Support Services

Office Clerk - Two required for documentation control and payroll inputting.

Stores Worker – Two required for ensuring parts and sundry goods are provided to staff on an as needed basis.

Utility Worker - Janitor - One required to clean office buildings etc. Use of Industrial Cleaner Temps would be required for fill in due to absences.

Security Guard - *Use of contracted service should be maintained.*

Technologist - Environment - Two Environmental Technologists would take on the roles of the Performance Specialist as well as carry out reduced ET monitoring and reporting.

Chemical Technologists - Two Chemical Technologists would continue to monitor water quality, operate the WTP, take lube oil samples, monitor generator hydrogen dewpoints and ensure the quality of stored systems.

Emergency Response Technician - One Emergency Response Technician is required to ensure that PM's are being carried out and will ensure that proper Safety Procedures are being followed. ERT reports to the "Emergency Response/ Safety Coordinator".

RECOMMENDED HOLYROOD STAFF PLAN
Units 1, 2, & 3 Synchronous Condenser Operation / De-Commissioning 2020 Onward
Maintaining 5 Operating Crews
(Positions identified in red font will either be downsized or have been excluded.)

	# of Employees Existing in 2019	Positions Eliminated in 2020	Positions Remaining in 2020
Manager - Thermal Generation	1	1	
Manager – Operations	1		1
Operations Specialist	1		1
Lead Thermal Plant Operator	5		5
Thermal Plant Operator	15	5	10
Operations Totals	22	5	17
Maintenance			
Manager - Work Execution	1		1
Maintenance Engineer - Work Execution	1		1
Technologist - Instrumentation & Control	3	1	2
Planner	1		1
Planning Clerk	1	1	
Electrical Supervisor	1		1
Electrical Maintenance "A"	4	2	2
Mechanical Maintenance Supervisor	1		1
Mechanical Maintenance "A" - Millwright	4	2	2
Mechanical Maintenance "A" - Welder	1		1
Carpenter	1		1
General Maintenance "B"	3	1	2
Industrial Cleaner (Temp)	2	1	1

Maintenance Totals	24	8	16
Support Services			
-			
Team Lead - Support Services	1	1	
Office Clerk	2	1	1
Stores Worker	2		2
Utility Worker - Janitor	1		1
Security Guard	0		
Support Services Totals	6	2	4
Safety /Health/Environment			
-			
Manager - Safety, Health, & Environment	1	1	
Plant Chemist	1		1
Emergency Response Coordinator	1		1
Technologist - Environment	2	1	1
Technologist - Chemical	2		2
Emergency Response Technician	1		1
Safety / Health/ Environment Totals	8	2	6
Long Term Asset Planning			
-			
Manager - Long Term Asset Planning	1	1	
Asset Operations - Day Shift Supervisors	2	2	
Plant Engineer - Electrical	1		1
Project & QA Engineer	1		1
Plant Engineer - Civil	1		1

Long Term Asset Planning Totals	6	3	3
Totals	**67**	**21**	**46**
Number of Staff Remaining			**46**

Rationale for Each Position Remaining at Holyrood during the Period
Post Steam Synchronous Condenser Operation - 2020 and Beyond with De-Commissioning

Positions Highlighted in italics "Eliminated Completely"

Manager - Thermal Generation *–This position is redundant and any duties required will be handled by the Manager Work Execution.*

Labour Manager – Operations --The Operations Manager presently holds the position as Chief Engineer for the plant as recognized by the Plant Registration issued by the government of Newfoundland and Labrador. Due to the Synchronous Condenser Operation the registration requirements will change but it is not known at this time as to what degree that will be. The Labour Manager-Operations will still be required to maintain and monitor the operating crews to ensure the plant is operated within the regulations which are in force and to ensure the operators are properly trained to carry out the Operations. The Pant Chemist and the Chemical Technicians will report directly to the Labour Manager Operations.

Operations Specialist -The Operations Specialist position will be required until the plant is physically downsized. The individual will be required to assist the Manager Operations in fulfilling training, ensuring the plant is operated at the highest level of competency and ensures the day to day activities of the crews on shift are carried out in a timely and orderly fashion. The Operations Specialist will ensure that the plant systems being de-commissioned are done so in a safe and timely manner. The Ops Specialist will assume the duties of the Manager- Operations during absences.

Manager - Work Execution - Required to oversee the total plant operation in co-ordination with NALCOR's Head Office while overseeing the station Maintenance section which will still be one of the largest labour groups within the plant along with the engineering staff, planning staff, stores workers, Emergency Response / Safety Co-ordinator and ERT- Technician. This function will be carried out with the assistance of the Maintenance Engineer- Work Execution.

Maintenance Engineer - Work Execution - Both the Mechanical Maintenance Crew and the Electrical Maintenance Crew Supervisors will directly report to this position. This person will be responsible to ensure the day to day work plan is being carried out safely and efficiently making sure that the equipment is available to operate when needed. Maintenance Engineer - Work Execution will be required to administer any outside contracts.

Mechanical Maintenance Supervisor (1 required) - This position will be required to supervise all aspects of the Maintenance trades including millwrights, welders, carpenters, scaffold erection and other general maintenance activities for the total plant.

Electrical Supervisor (1 required) - The Electrical supervisor is now responsible for the Electrical Maintenance Crew and the Instrumentation Technologists ensuring that the day to day activities are being carried out safely and efficiently and the plants electrical and instrumentation devices are in good working order when the plant is either in a shutdown state or is required to operate as Synchronous Condensers. The Electrical Supervisor will also be required to help in the de-commissioning of electrical systems as necessary.

Planner - Day to day work activities for the stations maintenance sections and operations will be required to ensure the plant is available when required. The Planner will supervise the Planning Clerk to ensure that the work plans are developed and ensure the resources are available in order that the work can be carried out.

Team Lead - Support Services *- This position will become redundant.*

Manager - Long Term Asset Planning *- This position becomes redundant as the Long Term Role of the plant will be set.*

Plant Engineer – Electrical - Reports directly to The Manger - Work Execution and is required to ensure that as the plant transitions from a generating facility to a synchronous condenser operation that all aspects of the electrical systems are properly dealt with. This will include supervising and consulting with contractors hired to complete electrical projects with respect to Synchronous Condenser Operation or the Installation of new equipment and the de-commissioning of those systems not needed in the Post Steam mode.

Project Mechanical / **QA Engineer** - Reports directly to The Manager - Work Execution and will be required to fill the Plant Engineer - Mechanical position as well to ensure that as the plant transitions from a generating facility to a synchronous condenser operation and that all aspects of the mechanical systems are properly dealt with. This will include new installations, developing procedures for maintaining the systems required for both the generating and synchronous condenser operation and the layup procedures for all mechanical devices not required for use while in the Standby Mode. This position will be required to provide direction to the Maintenance Section with regards to the application of the ASME Code to ensure the plant is being maintained within the guidelines of the applicable ASME Codes.

Plant Engineer – Civil - Reports directly to the Manager - Work Execution and provides direction, supervision, and consultation with respect to the physical and structural changes that may be made to either the main powerhouse or any outlying buildings or structures during the de-commissioning process.

Asset Day Shift Supervisors *– This position is redundant.*

Plant Chemist - This position will report to the Labour Manager - Operations and will be required during the de-commissioning process. Supervision of the Chemical Technicians and the Environment Technologists will remain as they exist today along with carrying out the duties of the Performance Specialist with respect to supervising the Environment Technologists and all station reporting including both the environment and the plant performance.

Emergency Response Coordinator - The Emergency Response Coordinators position will be combined with the Safety Coordinators position. Although the job function doesn't change and both the safety training and the overall emergency response work is required it should be on a smaller scale as the number of plant personnel has diminished and some of the work load should be transferred back to the operations sections.

Operations

Lead Thermal Plant Operator - One for each Operating Crew is recommended and this position will become "union supervisory" thus eliminating the need for the shift supervisor position. Because this is a union position hands on work would be still allowable. While working the Supernumerary schedule the LTPO would be required to supervise de-commissioning activities along with the Operations-Specialist.

Thermal Plant Operator - Depending on the number of units providing voltage support as Synchronous Condensers and depending on the number of auxiliary boilers and air compressors in service that would determine the number of TPO's required on shift at any given time. 10 TPO's (2/Crew) will be required to staff the plant 24/7. TPO's will be required to take on some of the Emergency Response Technicians job duties as well.

Maintenance

Electrical Maintenance "A" - Two will be required to provide support for the safe efficient operation of the plant. Staff will be required to fill in as the electrical/ instrumentation supervisor when that person is not available.

Mechanical Maintenance "A" - Millwright - Two will be required to carry on the duties necessary to keep the plant operational during the post steam mode of operation. Staff will be required to fill in as the Mechanical Supervisor when that person is not available.

Mechanical Maintenance "A" - Welder - One will be required to perform the welding tasks necessary.

Technologist-Instrumentation & Control - Two are required to ensure the control systems and the relaying is in good working order. Staff will be required to fill in as the Electrical / Instrumentation Supervisor when that person is not available.

Carpenter - One is required for odd jobs related to the maintenance and operation of the plant and would be assigned General Maintenance duties to provide meaningful work.

General Maintenance "B" - Two required to ensure that the proper scaffolding and safety systems are being built for use by the Maintenance Trades while performing work. Other duties that may be required to be done by this work group could include snow plowing and shovelling and those listed on their job document. Required to fill in as a stores worker when the need arises.

Planning Clerk *– Position becomes redundant as planning work will be developed by the Planner.*

Industrial Cleaner (Temp) - One required to assist the General Maintenance crew as needed and to fill in as the Utility Worker Janitor.

Office Clerk – One required for documentation control and payroll inputting reporting directly to the Manager –Work Execution.

Stores Worker – Two required for ensuring parts and sundry goods are provided to staff on an as needed basis.

Utility Worker – Janitor - One required to clean office buildings etc. Use of Industrial Cleaner Temps would be required for fill in due to absences.

Security Guard - *Use of contracted service should be maintained.*

Technologist- Environment - One Environmental Technologist would take on the roles of the Performance Specialist as well as carry out the reduced ET monitoring and reporting.

Chemical Technologists - Two Chemical Technologists would continue to monitor water quality, operate the WTP, take lube oil samples, monitor generator hydrogen dewpoints and ensure the quality of stored systems.

Emergency Response Technician - One Emergency Response Technician is required to ensure that PM's are being carried out and will ensure that proper Safety Procedures are being followed. Reports to the Emergency Response/ Safety Coordinator.

RECOMMENDED HOLYROOD STAFF PLAN
Units 1, 2, & 3 Synchronous Condenser Operation / NO De-Commissioning 2020 Onward
Maintaining 5 Operating Crews
(Positions identified in red font will either be downsized or have been excluded.)

Job Classifications	# of Employees Existing in 2019	Positions Eliminated in 2020	Positions Remaining in 2020
Manager - Thermal Generation	1	1	
Manager - Operations	1		1
Operations Specialist	1	1	
Lead Thermal Plant Operator	5		5
Thermal Plant Operator	15	5	10
Operations Totals	22	6	16
Maintenance			
Manager - Work Execution	1		1
Maintenance Engineer - Work Execution	1	1	
Technologist - Instrumentation & Control	3	1	2
Planner	1	1	
Planning Clerk	1	1	
Electrical Supervisor	1	1	
Electrical Maintenance "A"	4	2	2
Mechanical Maintenance Supervisor	1	1	
Mechanical Maintenance "A" - Millwright	4	2	2
Mechanical Maintenance "A" - Welder	1		1

Carpenter	1		1
General Maintenance "B"	3	1	2
Industrial Cleaner (Temp)	2	1	1
Maintenance Totals	24	12	12
Support Services			
Team Lead - Support Services	1	1	
Office Clerk	2	1	1
Stores Worker	2	1	1
Utility Worker - Janitor	1		1
Security Guard	0		
Support Services Totals	6	3	3
Safety /Health/Environment			
Manager - Safety, Health, & Environment	1	1	
Plant Chemist	1	1	
Emergency Response Coordinator	1	1	
Technologist - Environment	2	2	
Technologist - Chemical	2	1	1
Emergency Response Technician	1	1	
Safety / Health/ Environment Totals	8	7	1
Long Term Asset Planning			
Manager - Long Term Asset Planning	1	1	

Asset Operations - Day Shift Supervisors	2	2	
Plant Engineer - Electrical	1		1
Project & QA Engineer	1	1	
Plant Engineer - Civil	1	1	
Long Term Asset Planning Totals	6	5	1
Totals	**67**	**34**	**33**
Number of Staff Remaining			**33**

Rationale for Each Position Remaining at Holyrood during the Period Post Steam Synchronous Condenser Operation -2020 without De-Commissioning.

Positions highlighted in italics are for De-commissioning but now "Eliminated Completely"

Labour Manager – Operations -- The Operations Manager presently holds the position as Chief Engineer for the plant as recognized by the Plant Registration issued by the government of Newfoundland and Labrador. Due to the Synchronous Condenser Operation the registration requirements will change but it is not known at this time as to what degree that will be. The Labour Manager-Operations will still be required to maintain and monitoring the operating crews to ensure the plant is operated within the regulations which are in force and to ensure the operators are properly trained to carry out the Operations. The Pant Chemist and the Chemical Technicians will report directly to the Labour Manager Operations.

Operations Specialist *- The Operations Specialist position will become redundant.*

Manager - Work Execution - Required over-seeing the total plant operation in co-ordination with NALCOR's Head Office while overseeing the station Maintenance section which will still be one of the largest labour groups within the plant. The Plant Engineer –Electrical /Stores Workers and the Office Clerk will all report to the Manager-Work Execution. The Labour Manager- Operations will fill in during absences of the incumbent.

Maintenance Engineer - Work Execution *– This position becomes redundant.*

Mechanical Maintenance Supervisor - *This position is not required.*

Electrical Supervisor - *This position is no longer required.*

Planner *– No longer required.*

Plant Engineer – Electrical - Reports directly to The Manger- Work Execution and is required to ensure that as the plant transitions from a generating facility to a synchronous condenser operation that all aspects of the electrical systems are properly dealt with. This will include supervising the Electrical Maintenance "A" and the Instrument Technologist staff while consulting with contractors hired to complete electrical projects with respect to Synchronous Condenser Operation.

Project Mechanical / QA Engineer *– No longer required. Any mechanical engineering required would be provided by NALCOR Head Office.*

Plant Engineer – Civil *- No longer required. Any civil engineering required would be provided by NALCOR Head Office.*

Plant Chemist *– No longer required. The Chemical/Environment Technologist would report directly to the Labour Manager-Operations.*

Emergency Response Coordinator *- Any Emergency Response issues should be dealt with NALCOR's Head Office.*

Operations

Lead Thermal Plant Operator – One for each Operating Crew is recommended and this position will become "union supervisory" thus eliminating the need for the shift supervisor position. Because this is a union position hands on work would be still allowable. While working the Supernumerary Schedule the LTPO would have to fill in as Labour Manager - Operations during absences.

Thermal Plant Operator - Depending on the number of units providing voltage support as Synchronous Condensers and depending on the number of auxiliary boilers and air compressors in service that would determine the number of TPO's required on shift at any given time. 10 TPO's (2/Crew) will be required to staff the plant 24/7. TPO's will be required to take on some of the Emergency Response Technicians job duties as well.

Maintenance

Electrical Maintenance "A" - Two will be required to provide support for the safe efficient operation of the plant.

Mechanical Maintenance "A" - Millwright - Two will be required to carry on the duties necessary to keep the plant operational during the post steam mode of operation.

Mechanical Maintenance "A" - Welder - One will be required to perform the welding tasks necessary.

Technologist-Instrumentation & Control - Two are required to ensure the control systems and the relaying is in good working order.

Carpenter - One is required for odd jobs related to the maintenance and operation of the plant and would be assigned General Maintenance duties to provide meaningful work.

General Maintenance "B" - Two required to ensure that the proper scaffolding and safety systems are being built for use by the Maintenance Trades while performing work. Other duties that may be required to be done by this work group could include snow plowing and shovelling and those listed on their job document. May be required to fill in as a stores worker on occasion.

Industrial Cleaner (Temp) - One required to assist the General Maintenance crew as needed and to fill in as the Utility Worker Janitor.

Office Clerk – One required for documentation control and payroll inputting reporting directly to the Manager –Work Execution.

Stores Worker - Two required for ensuring parts and sundry goods are provided to staff on an as needed basis.

Utility Worker – Janitor - One required to clean office buildings etc. Use of Industrial Cleaner Temps would be required for fill in due to absences.

Security Guard *- Use of contracted service should be maintained.*

Technologist - Environment *– Combining the role of Chemical and Environment Technologist.*

Chemical/ Environment Technologist - One Technologist would continue to monitor water quality, operate the WTP, take lube oil samples, monitor generator hydrogen dewpoints and ensure the quality of stored systems and check out any environmental issues that may occur such as oil leaks etc. etc.

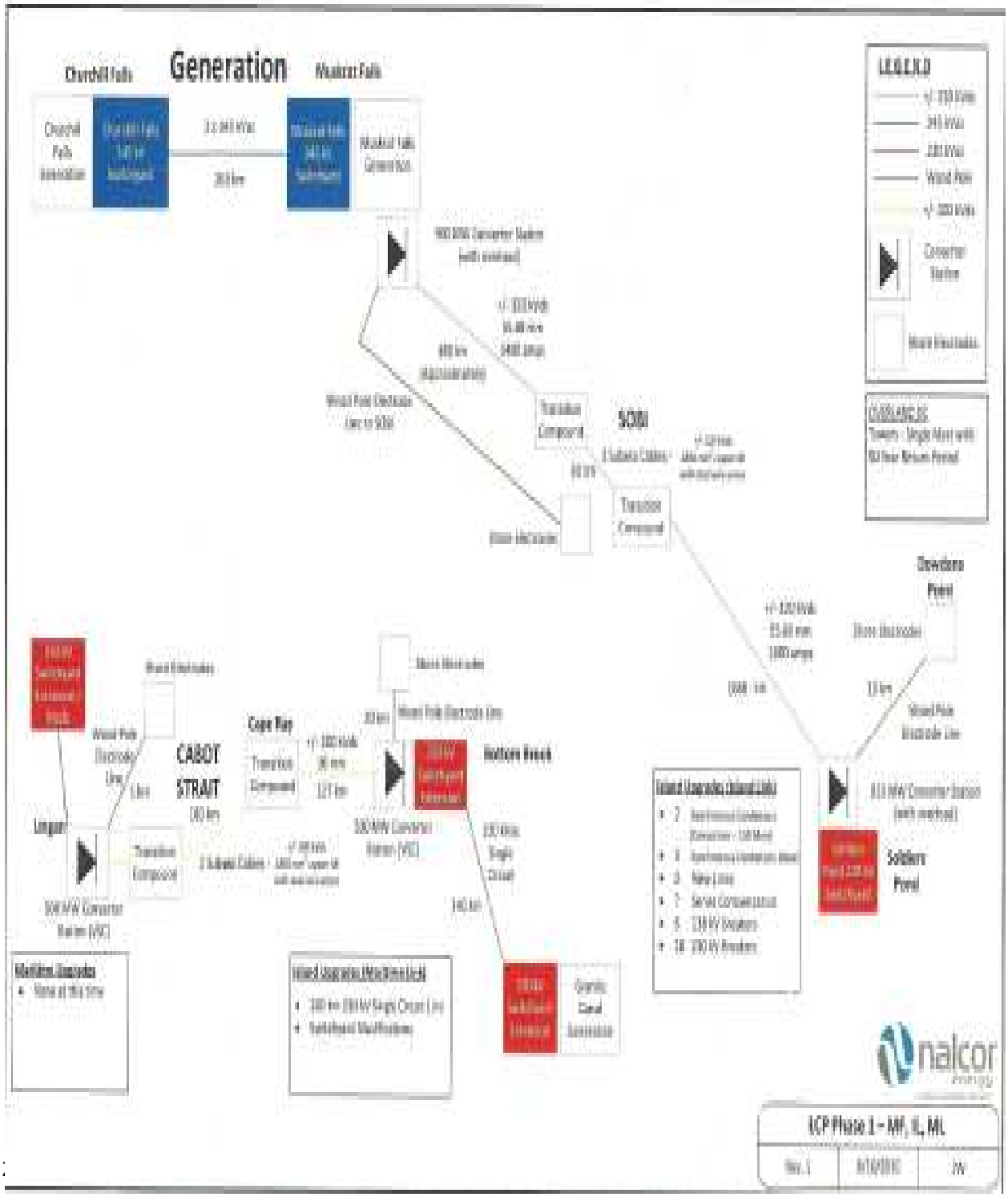
Emergency Response Technician *– This position becomes redundant.*

APPENDICES

Appendix 1

Concept Drawing of HVDC Transmission Line

Muskrat Falls Labrador to Lingan Nova Scotia



Appendix 2
Burrard Thermal Generating Station
BC Hydro
Thermal Operations Workforce Plan

DRAFT - VERSION 10

Generating units: 6 3 3 4 5 6 6 6

(Possible productivity improvements italicized)

Location	Category	Union		F04	F05	F06	Sep 07	F08	F09	F10	F11	
Area	Management	M&P	Manager, Thermal Operations	1	1	1	1	1	1	1	1	
		M&P	Manager, Maintenance and Engineering	2	2	1	1	1	1	1	1	
		M&P	Manager, Maintenance Planning						1	1	1	
	Mtce	M&P	Senior Thermal Engineer	2	2	2	2	2	2	2	2	
		M&P	Thermal Technical Specialist	1	1	1	1	1	1	1	1	
		~~M&P~~	~~Manager, Health & Safety~~	0	0	1						
		~~COPE~~	~~Coord, Occup Safety & Health~~	1	0	1						
		~~M&P~~	~~Manager, Env/Social Issues~~	1	1	1						
		~~M&P~~	~~Business Planning Manager~~	1								
		COPE	Area Office Admin	1	1	1	1	1	1	1	1	
		COPE	Office Administrator	3	2	2	1.5	1.5	1.5	1.5	1.5	
		COPE	Records Management/Admin	0	0	0	1	1	1	1	1	
		~~COPE~~	~~Financial Analyst~~	1								

		~~M&P~~	~~Plant Engineer~~	1	1							
			Area Mgmt Subtotal	**15**	**11**	**11**	**8.5**	**8.5**	**9.5**	**9.5**	**9.5**	
			Possible Productivity Improvements									
BGS	Plant	~~M&P~~	~~Plant Manager~~	0	0	1						
		IBEW	Mechanic	16	9	9	7	7	9	9	9	
		IBEW	Electrician	7	6	6	5	5	6	6	6	
		IBEW	Inst & Ctrl Tech	9	8	8	7	7	8	8	8	
		IBEW	CPC Tech	2	2	2	2	2	2	2	2	
		IBEW	Area Scheduler	1	1	1	1	1	1	1	1	
		IBEW	Custodian	1	1	1	1	1	1	1	1	
		~~COPE~~	~~Apparatus Tech~~	1	1	1	1					
		~~IBEW~~	~~Driver/Helper~~	1								
			BGS Mtce Subtotal	**38**	**28**	**28**	**24**	**23**	**27**	**27**	**27**	
	Ops	M&P	Manager, Operations	1	1	1	1	1	1	1	1	
		M&P	Shift Supervisor	6	6	5	5	5	5	5	5	
		IBEW	Operator	40	31	29	26	25	25	25	25	
		COPE	Lab Technician	3	3	3	3	3	3	3	3	
		IBE	General Trades	6	3	3	4	4	5	5	5	

		W										
		~~IBEW~~	~~Chemist~~	1	1							
			BGS Ops Subtotal	**57**	**45**	**41**	**39**	**38**	**39**	**39**	**39**	
			Possible Productivity Improvements									
			BGS Subtotal	**95**	**73**	**69**	**63**	**61**	**66**	**66**	**66**	
			Including Possible Productivity Improvements									

FNG	Management	M&P	Plant Manager	1	1	1	1	1	1	1	1	
		COPE	Office Administrator	1	1	1	1	1	1	1	1	
	Ops	IBEW	Senior Thermal Plant Operating Tech	7	7	7	6	6	6	6	6	
		IBEW	Junior Thermal Plant Operating Tech							0	0	
	Mtc	IBEW	Thermal Plant Maintenance Tech	1	1	1	2	2	2	2	2	
			FNG Subtotal	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	
			Early Replacements						2	5	4	
			THERMAL GRAND TOTAL *Including Possible Productivity Improvements*	**120**	**94**	**90**	**81.5**	**79.5**	**87.5**	**90.5**	**89.5**	

FNG	Trainees	IBEW	Developmental Operating Tech						2	3	4	

External BCH Resources Dedicated to Thermal Operations

~~M&P~~	~~Manager, Health & Safety~~				1					
COPE	Coord, Occup Safety & Health				1	1	1	1	1	
M&P	Financial Analyst					1	1	1	1	
M&P	Senior Environmental Coordinator					1	1	1	1	
	External BCH Resources Dedicated to Thermal				2	3	3	3	3	

Analysis by Affiliation (Excluding Early Replacements)	F04	F05	F06	Sep 07	F08	F09	F10	F11	0
M&P	17	16	15	12	12	13	13	13	0
IBEW	92	70	67	61	60	65	65	65	0
COPE	11	8	9	8.5	7.5	7.5	7.5	7.5	0

Appendix 3

Holyrood Plant Registration Certificate and Staff Requirements

Index No. PR1001 Serial No. 2011-04

Newfoundland Labrador

Certificate of
Plant Registration

This is to certify that the plant owned by
Newfoundland And Labrador Hydro - A Nalcor Energy Company

of P.O. Box 29 Holyrood, NL A0A 2R0
has complied with the requirements of the Public Safety Act, 1996, with respect to registration of the plant situated at
Newfoundland and Labrador Hydro, Holyrood *consisting of*

Power Boilers		Heating Boilers		Refrigeration Compressors		Air, Gas Compressors	
No.	Kilowatt	No.	Kilowatt	No.	Kilowatt	No.	Kilowatt
3	1,305,924	-	-	-	-	3	432

CLASSIFICATION Power Plant REGISTERED CAPACITY 1,306,356 SUPERVISION Continuous
CHIEF ENGINEER First (1) ASSISTANT Third (5)
SHIFT ENGINEER Second (1) ASSISTANT -
OTHERS -

Dated at St. John's this 22 day of August 20 11

Power Engineer staffing requirements for various modes of operations are per the attached Addendum 'A'.

Chief Inspector

Notice: This certificate must, at all times, be exposed to view in the plant compressor or boiler room. Re-Registration is necessary only when a change has been made in the pressure, or kilowatt rating of the plant or when the plant has changed ownership.

Holyrood Thermal Generating Station-Operations Staff Requirement

Addendum A

January 6, 2010

Holyrood Thermal Generating Station-Conditions of Plant Registration			
Operators and Power Engineer's Certificate Required per Shift Basis			
Units in Operation	**Shift Engineer (2nd Class)**	**Assistant Shift Engineer's (3rd Class)**	**Total**
Boiler in Operations-3 (Three)	1	5	6
Boiler in Operations-2 (Two)	1	4	5
Boiler in Operations-1 (One)	1	3	4
Air Compressors- 3,2 or 1	1	2	3

Gerard Cochrane
Gerard Cochrane
Labour Manager Operations
Chief Power Engineer
Holyrood Thermal Generating Station

Appendix 4: Work Execution Holyrood Staffing Requirements – Assumptions and Notes

(Document provided by Holyrood Maintenance Staff and used with permission)

Maintenance	**Existing**	**Stand-By**	**Post Steam**
Electrical Maintenance "A"	6	3	3
Mechanical Maintenance "A" - Millwright	6	3	2
Mechanical Maintenance "A" - Welder	3	1	1
Technologist - Instrumentation & Control	6	3	2
Carpenter	1	1	1
General Maintenance "B"	7	3	2
Planning Clerk	1	1	0
General Maintenance "B" (Industrial Cleaner - Temp)	1	0	0
Industrial Cleaner (Temp)	2	2	1
Manager - Work Execution	1	1	1
Maintenance Engineer - Work Execution	1	1	0
Instrumentation Supervisor	1	0	0
Mechanical Maintenance Supervisor	2	1	1
Planning Supervisor	1	0	0
Electrical Supervisor	1	1	1
Planner	2	1	1
Totals - Work Execution	**42**	**22**	**16**

Stand-By/Post Steam

General Assumptions:

1. Plant existing operation and FTE levels continue to the end of 2016. For the Stand-By period (2017 – 2020), one unit is selected for operation – possibly the last unit receiving a major turbine overhaul. In 2016, the unit selected would receive a boiler overhaul to be ready for 3 years of Stand-By operation – one unit for one week per year (150 MWs for 5 days, 100 MWs for 2 days). In the Post-Steam period this unit would be used for the period of time required to burn down the tanks.
2. The plant maintenance requirements for the majority of each year (i.e. boiler not operating) in the Stand-By period are not vastly different from the requirements for the Post-Steam period. With only one unit required for one week per year, the current full PM program would not be executed except maybe semi-annual and annual requirements. Weekly and Monthly service intervals would be re-evaluated and replaced by a prescribed program mainly for Operations personnel to do lay-up checks and routines on dormant systems to maintain them ready for the week of unit operation per year. The boiler and related systems for the stand-by unit would be nitrogen blanketed until placed into service. The other two boilers would be removed from service. Otherwise, through the Stand-By period (2017-2020), all three units will be available to operate in synchronous condensing mode.
3. Based on this, Stand-By and Post-Steam staffing levels will be similar (see table above) and based around maintaining the PM program prescribed in the Corporate AMS for the equipment listed in the table below, i.e. Post-Steam & Synchronous Condenser operation.
4. Stand-By and Post-Steam staffing levels assume routine O&M only, i.e. no consideration has been given for decommissioning efforts that may occur during either period - it is assumed any additional resources required for site decommissioning would be by contract forces through approved capital programs.
5. Stand-By and Post-Steam staffing levels assume only minimal Holyrood labour is used for any capital projects, i.e. Holyrood personnel would provide final tie-ins and commissioning support – all other work required for capital projects during these periods would be by contract forces.
6. Waste Water Treatment Plant (WWTP) – there would be no requirement in the Post-Steam period – staffing levels assume that the Controlled Waste Landfill (CWL) has been de-commissioned, i.e. there would be no requirement to treat contaminated rain water flow from the hill; all other dirty water drains from the plant would pass through the oil water collection system with minimal monitoring as agreed by the Provincial Environment. Drains from the auxiliary heating boiler would flow through the clean water basin with existing pH and temperature monitoring.

7. Minimal environmental monitoring (emissions) may be required for a single auxiliary heating boiler – if oil fired. If electric, there would be no requirement, except periodic Gas Turbine and Diesel emissions testing to be completed by a testing contractor. The site Certificate of Approval (CA) would be revised to reflect the removal of the more labour intensive monitoring efforts required for the WWTP, CWL, Continuous Emissions Monitoring System (CEMS), Continuous Opacity Monitoring System (COMS) and Ambient Air Monitoring Stations (AAMS). The new CA would cover items like waste disposal, biogreen, the continuous basin operation and GAP for the diesel fuel system for the gas turbine and diesels.
8. The Water Treatment Plant (WTP) would not required in its current form in the Post-Steam period – it would be scaled back to providing clarified water (clarifier & sand filters). Operations would assume control of this area – with a Chemist/Water Treatment Specialist providing technical support. It is assumed that clarified water would be suitable for use in the plant heating boiler.
9. One Pump-house would be de-commissioned and the remaining one used for the operation of auxiliary cooling pumps for synchronous condenser operation – Stand-By and Post-Steam.
10. Environmental monitoring (emissions) systems – CEMS, COMS, AAMS – are de-commissioned. The reduced environmental monitoring requirement moves back to the Instrumentation Shop, where it originally resided.
11. The heavy oil system would be de-commissioned after all fuel in the tanks is burned down. The light oil system would be maintained for gas turbine and back-up diesels.
12. PM's are not included for the additional Synchronous Condensing equipment to be installed in 2015 and 2016 – but staffing levels are assumed to cover this increase in mainly electrical equipment.
13. The PM program is the AMS Program endorsed by Corporate, for the equipment listed.
14. Staffing estimates are pro-rated based on the reduction in equipment and the associated PM program. A detailed resource balance, if required, would need more time to complete.
15. **Electrical Maintenance A** - the quantity three (3) – reflects that some tasks, e.g. 4160, switching, require two people and therefore, a third has been added for leave coverage.
16. **Mechanical Maintenance A (Millwright)** – the extra one in the Stand-By period is included for Synchronous Condenser change-over.
17. **Mechanical Maintenance A (Welder)** – minimal requirement – support for Millwright leave coverage, with a dual ticket.
18. **Technologist – Instrumentation and Control** – the requirement is significantly reduced both in the Stand-By and the Post-Steam periods – the nature of the work leans more toward that typically handled by P&C technologists. The number three includes one person (possibly an Environmental Technologist) who covers reduced CA requirements but also provides leave coverage for the other two Instrumentation Technologists. As per the Post-Steam Equipment listing below, the requirement is greatly reduced due to the removal of the analytical and process control aspects of the operation.

19. **Carpenter** – general building custodian, supplemented by Service Agreements.
20. **General Maintenance B** – no comment.
21. **Planning Clerk** – not required in Post-Steam – a single Planner will handle reduced scope of Work Order flow.
22. **Industrial Cleaner** – one if for plant cleaning only (plus assisting General Maintenance B), two if they provide full janitorial services. Assumes the workload would be significantly reduced following a full plant clean-up and abatement exercise after the de-commissioning of boilers.
23. **Manager, Work Execution** – required to run maintenance unless completed by a single Plant Manager.
24. **Maintenance Engineer** – the work load would be significantly reduced with no boiler and turbine contracts to maintain. Further, the activity level of the remaining service contracts would be reduced with less equipment running. Site contracts would be handled through the Manager, Work Execution or delegated to the Plant Engineer. There would be a single Plant (Electrical) Engineer with Mechanical, Civil and Contract support for tendering provided by Project Execution and Technical Services (PETS).
25. **Instrumentation Supervisor** – not required – the Electrical Supervisor would have both shops.
26. **Mechanical Maintenance Supervisor** – required.
27. **Planning Supervisor** - not required.
28. **Electrical Supervisor** – required for two shops.
29. **Planner** – one required.
30. Staffing levels reflect the continued use of the following Service Contracts in the Post-Steam period. Some of this work could be executed by Plant forces but would require re-training/certification. Contract activity and expenditures would be reduced with the reduction in equipment. The contracts/agreements would be:

    - Generator Maintenance;
    - Auxiliary Heating Boiler – minor service agreement
    - Inverter/UPS Maintenance;
    - Motor Repairs;
    - Vacuum Truck and Pressure Wash (waste oil, oil water separators);
    - Bottled Drinking Water;
    - Garbage and Waste;
    - Fire System Service;
    - Pest Control;

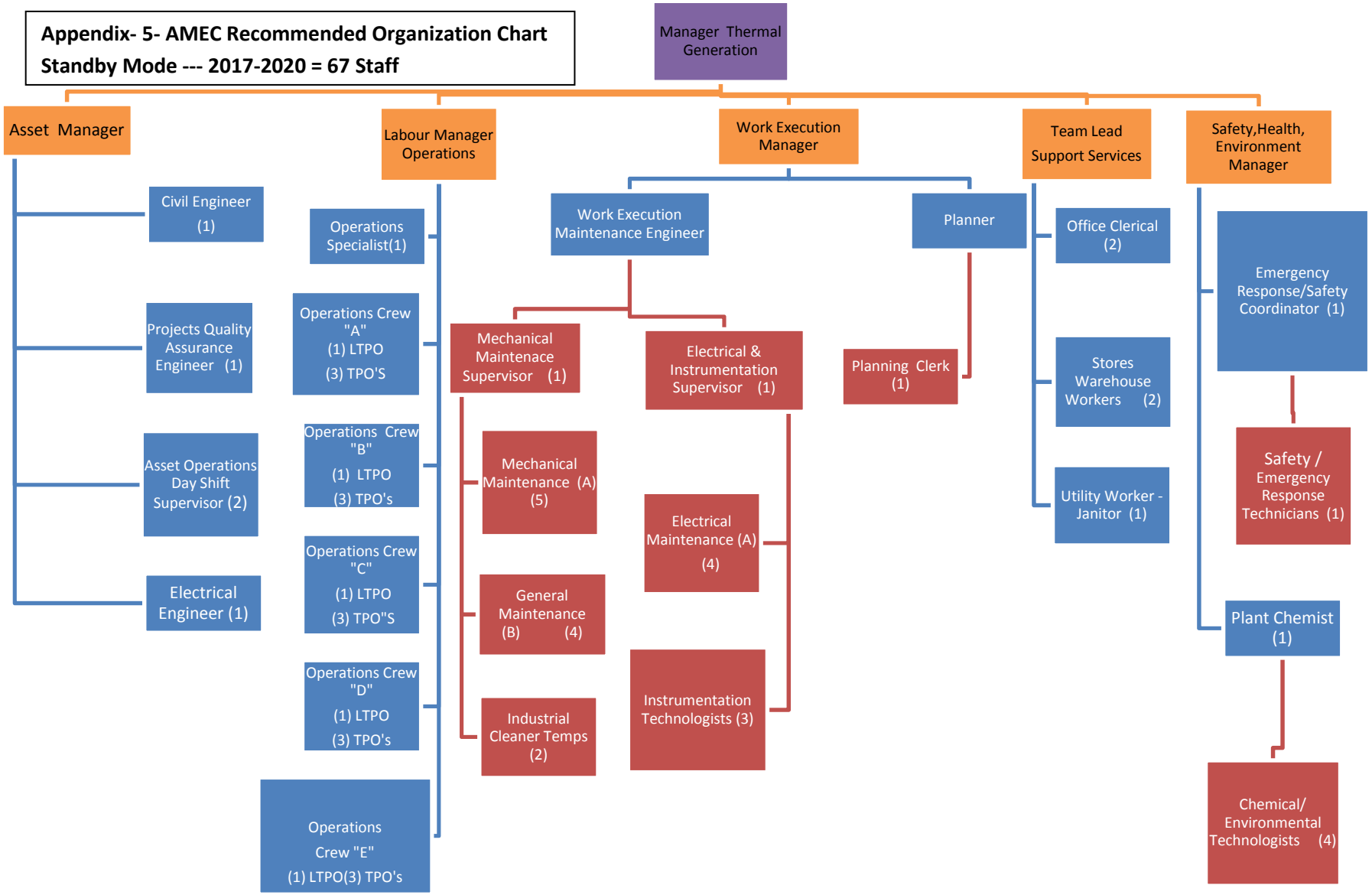
- Elevator Service;
- Snow Clearing;
- HVAC Maintenance (Relay Room, Control Room, Administration);
- Cranes and Hoists – Maintenance, Testing and Certification.
- Diving Services – Quarry Brook and single sea water inlet for auxiliary cooling Sync. Condenser operation.
- DCS Services
- Compressor Maintenance;
- Diesel Maintenance;
- Lube Oil Analysis;
- Chemical Consultant (Clarifier);
- Janitorial (if not done by Plant Cleaners);
- Security.

31. The following service contracts would not be required in the Post-Steam era:

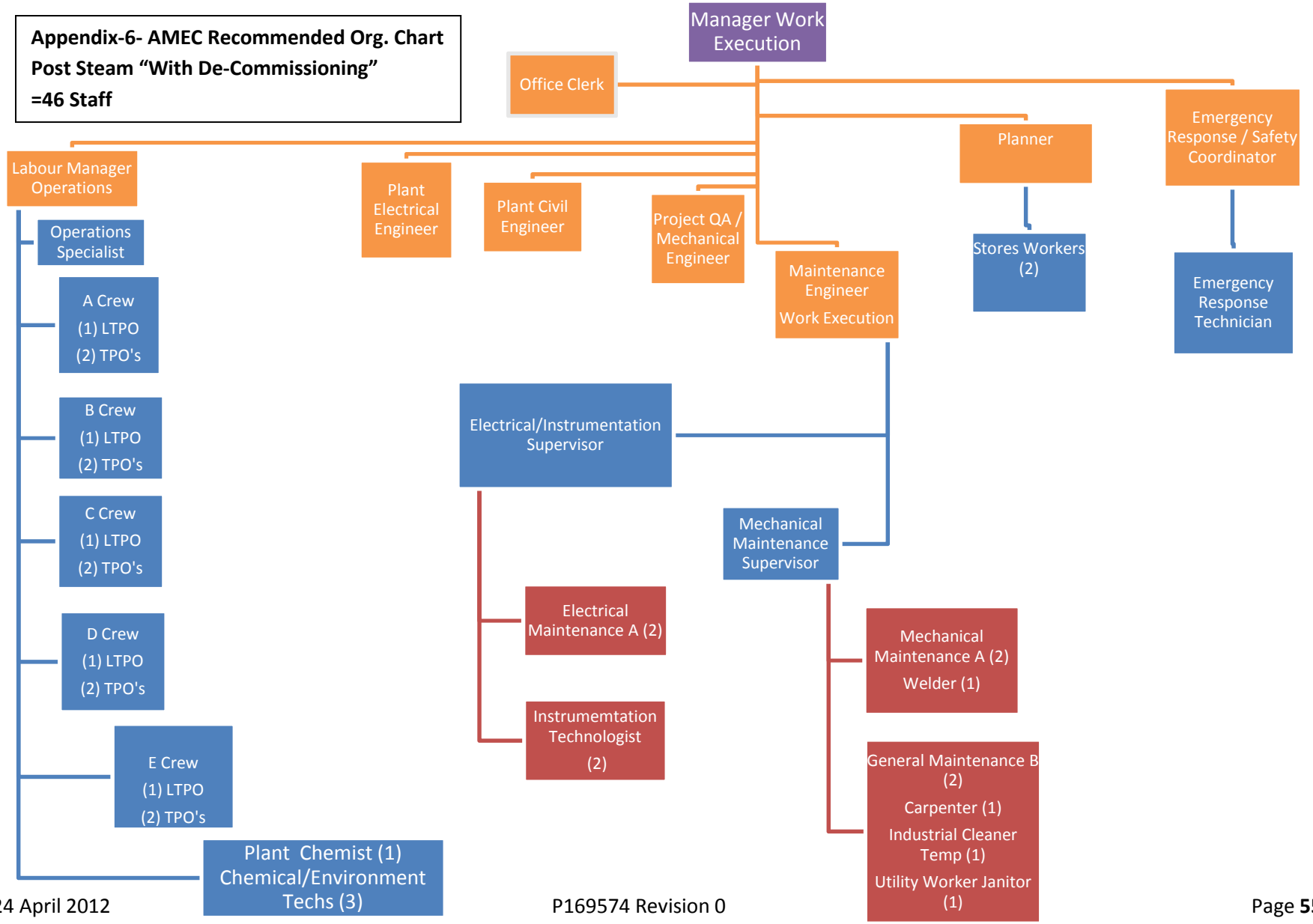
- Boiler Maintenance – large scale;
- Turbine Maintenance;
- Safety Valve Services;
- NDE Testing;
- Insulation Services;
- Tanker and Boom Support;
- Pumps Maintenance Services (replaced with critical spares);
- Abatement Services – assumes a full plant clean-up and residual abatement exercise is completed through Capital – following the de-commissioning of boilers;
- Waste Dumpsters to Landfill;
- CWL Maintenance;
- Waste Water Consultant;

- Water Treatment Consultant;
- FOMIS;
- Lab Service Agreements;
- Landfill Analysis;
- CALA;
- Resin Analysis;
- DOL Testing (unless for Auxiliary Boiler System);
- EtaPRO;
- Furnace Characterization;
- Welding Consultant;
- Air Quality Monitoring;
- Asbestos Sampling;
- Materials Analysis.

Appendix- 5- AMEC Recommended Organization Chart
Standby Mode --- 2017-2020 = 67 Staff



Appendix-6- AMEC Recommended Org. Chart
Post Steam "With De-Commissioning"
=46 Staff



Appendix- 7 – AMEC Recommended Organization Chart Post Steam "Without De-Commissioning" =33 Staff