

CI C0017098

Ragged Lake Generator Replacement

NON-CONFIDENTIAL

July 7, 2025



NSEB APPROVAL SHEET

Project Title: Ragged Lake Generator Replacement

CI Number: C0017098

Date: July 7, 2025

Expenditure Profile			Type of Filing	
Year	Budget Amount	Project Estimate	☐	Capital Project Authorization
2019	40,065	40,065	☐	Unforeseen and Unbudgeted (U&U)
2020	232,318	24,899	☐	Planned & Advanced (P&A)
2021	1,558,075	196,628	☐	Subsequent Approval Item
2022	398,808	842,380	☐	Authorization to Overspend (ATO)
2023		538,777	☐	Scope Change
2024		8,384	☒	Final Cost (FIN)
2025		30,582		
Total	\$2,229,267	\$1,681,714		

COMMENTS

Approved	\$2,229,267
Current Amount	<u>\$1,681,714</u>
Variance	<u>-\$547,553</u>

Submitted on behalf of NOVA SCOTIA POWER INCORPORATED



Authorized Signatory
Dave Pickles
Chief Operating Officer

DATE
July 4, 2025

Approved on behalf of NOVA SCOTIA ENERGY BOARD

DATE

CI Number: C0017098**Title: Ragged Lake Generator Replacement**

Start Date: 2019/06
In-Service Date: 2021/10
Final Cost Date: 2025/07
Function: General Plant
Forecast Amount: \$1,681,714

DESCRIPTION:

The NS Power Control Centre is critical for the safe and reliable operation of the Nova Scotia electrical system and is essential for the operation of the NS Power generation fleet, operation of the interconnections to New Brunswick and Newfoundland, control and monitoring of the distribution and transmission systems, houses NS Power's Emergency Operations Centre, and is the central location for NS Power's operational technology network infrastructure including Supervisory Control and Data Acquisition (SCADA) and Telecommunications.

Currently, the building is electrically supplied by a single service connection from the distribution grid. A reliable building power supply is essential to keep the Control Center functioning at all times to maintain the safe and reliable operation of the electrical grid. For back-up, the building is equipped with two identical back-up generators that are each individually sized to service the building. The generators provide a redundant back-up power supply in the event of loss of supply from the distribution system. The electrical service equipment is 32 years old and dates from the time of the building construction in 1987. This equipment has reached the end of its expected useful life of approximately 30 years (useful life is dependent on both age and hours of operation) and requires replacement. NS Power engaged CBCL Limited to review the building electrical system and provide an assessment of the Control Center and recommendations for improvement. The CBCL engineering report is included as Attachment 1.

The scope of this project includes replacing the 300kW, 600V diesel generators, 600V switchgear breakers, building service entrance including transformer and cables, purchasing a mobile load bank for generator maintenance/full load testing, and inspecting internal cabling and molded case circuit breakers.

Depreciation Class: General Plant – Buildings Structures and Grounds

Estimated Life of the Asset: 30 years

Summary of Related CIs +/- 2 years:

Pursuant to Section 11.2 of the CEJC, related CIs for General Plant projects include "work completed on the same asset (application, building, etc.)."

- No other projects in 2018, 2019, 2020, 2021 or 2022

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Building Replacement/Modifications

Why do this project?

The Control Center is critical to the operation of NS Power's transmission, distribution, and generation systems. A reliable building power supply is essential to keep the Control Center functioning at all times to meet safety, reliability, and regulatory requirements of the power system. The existing generators and switchgear have recently experienced failures, raising concern over the reliability of the equipment. The equipment has been temporarily repaired. Due to the 32-year age of both the switchgear and generators, and the original generator control system being discontinued in 2000, locating spare parts and receiving manufacturer support has become difficult. Due to the criticality of this equipment for the operation of the Control Center, the equipment needs to be replaced.

Why do this project now?

On December 28, 2018, an outage event occurred where there was a loss to the primary electrical supply to the Control Center from the distribution system. During this event, backup generator #1 experienced an issue and failed after 45 seconds. This resulted in backup generator #2 being the only power supply for the Control Center for the duration of the outage event.

A similar event occurred on January 25, 2019, where loss of supply to the Control Center necessitated the use of the back-up generators. Repairs to back-up generator #1 had not yet been completed, so maintenance personnel were required to be continuously on-site for the duration of the outage event to respond in case of further issues. Additionally, while attempting to reconnect to street supply, a failure occurred in one of the 600V draw-out switchgear breakers, further jeopardizing power to the Control Centre building.

The electrical equipment at the control center is beginning to experience failures. Not doing this project now significantly increases the risk to the critical operation of the building. Replacement parts have become increasingly harder to locate, increasing the cost and duration to respond and repair.

Why do this project this way?

NS Power engaged CBCL Limited to review the building electrical system and provide an assessment of the Control Center and recommendations for improvement. In addition to the electrical equipment assessment, the review included maintenance practices and recommended inspections. CBCL concluded that the generators and switchgear are approaching the end of their serviceable life, recommended the acquisition of a mobile load bank for generator testing, and recommended replacement of the building service transformer. Equipment replacement is the only long-term solution to ensure backup power reliability. The CBCL engineering report is included as Attachment 1.

A second independent distribution supply option was considered, but is not technically feasible at this time, as this infrastructure is not currently available in the Ragged Lake Control Centre area. Constructing infrastructure for a second supply would be significantly more expensive than replacing and maintaining standby generators for the facility. Therefore, it is recommended that the generators and switchgear be replaced to provide a reliable and necessary backup power source for the Ragged Lake Control Centre. The switchgear will be provisioned to accept a second utility source in case a second distribution circuit becomes available in the future.

Reason for Variance – FIN

This project was underspent by approximately \$548K compared to the approved 2020 P&A budget of \$2,229,267 for a total final spend of \$1,681,714. Overall, the project was less complex from a technical perspective than initially estimated. The labour and associated overhead costs incurred were approximately \$310K less than originally estimated, and the estimate assumed contract labour would be needed for specialized skills. During implementation, it became evident that NS Power's internal resources had the skills and capacity to do the work also at a reduced effort than initially anticipated, thereby reducing contract costs and related overhead by approximately \$269K. A decrease of \$111K in consulting costs resulted from fewer services needed based on a less complex scope than originally anticipated. The contingency amount of \$152K was not utilized.

The project material costs were estimated prior to the COVID-19 Pandemic. Material costs fluctuated significantly after the pandemic, which resulted in increased material costs of approximately \$352K. However, the ability for NS Power to offset consulting and contractor efforts with internal labour was a helpful contributor to the lower cost overall implementation.

This project was placed in-service when the first portion of the work was completed in October of 2021. The final portion of the work to install breakers and configure capabilities to allow Operator control of the switchgear breakers was completed in February 2025 and is being submitted for FIN within 6 months of final project execution. The initial estimate forecasted work to begin in August 2020 and be completed by March 2022.

The project was delayed for completion due to availability of some critical parts, availability of vendor teams to complete final testing and subsequent external expertise to enable remote operator control capabilities of the switchgear breakers. Additional delays were related to the availability of other construction vendors to address encroachment of new fuel tanks onto the Employee Exit which was created during initial fuel tank installation work.

Please refer to the Variance sheet for more detail.

C0017098 - Ragged Lake Generator Replacement				
Account	Approved	Current Submission	Variance	Reason for Variance
Regular Labour	230,056	25,419	(204,637)	Less labour was required than estimated as a result of less complex project scope.
Overtime Labour		13,178	13,178	Overtime was required based on resource availability.
Term Labour		62,848	62,848	Term resource was leveraged to offset availability of Regular resources.
Term Labour-Overtime		2,394	2,394	
Travel Expense	10,100	25	(10,075)	A travel and lodging estimate was included in the original estimate to allow for the potential for travel to be required from other regional resources. Local team members were found to be capable and available which reduced the travel costs.
Materials	371,000	722,787	351,787	The project estimates were based on Engineering Consulting Company's recommendations and their estimates prior to the COVID 19 outbreak. The Pandemic caused fluctuations in material costs resulting in increased actual costs.
Contracts	736,938	520,590	(216,348)	Initial estimates were based on Engineering Consulting Company's recommendations which assumed external resourcing would be required due to complexity and requirement for specialized skills. During implementation, it became evident that NS Power's internal resources had the skillsets to carry out much of this work, which significantly reduced contractor costs.
Freight Postage Delivery		3,056	3,056	Shipping costs were not included in original estimate.
Tools and Equipment		258	258	
Consulting	244,625	133,592	(111,033)	Effort required from the Engineering Consulting Company Subject Matter Expert, as well as the Consultant PM were overestimated based on the anticipated complexity of this project.
Personal Equipment		2,003	2,003	
Meals	6,350	1,068	(5,282)	Due to local resourcing, fewer meal expenditures were required.
Other Goods and Services	151,568	-	(151,568)	Forecasted contingency was not required to complete this project
Vehicle Allocated Costs	93,887	13,803	(80,084)	Due to the reduction in labour, less labour AO was required
Admin Overheads	175,481	71,486	(103,995)	Due to the reduction in labour, less labour AO was required
Contractor Admin Overhead	147,358	95,197	(52,161)	Due to the reduction in contract labour, less AO was required
Energy Use (Non-Electric)		3,000	3,000	Fuel for Standby Generator was omitted from the original estimate in error.
AFUDC Interest	61,904	11,012	(50,892)	The asset was placed into service earlier than forecast as the first asset was live in production sooner than anticipated, and this resulted in decreased AFUDC.
Total	2,229,267	1,681,714	(547,553)	