CI C0067906

POA Boiler Refurbishment 2025

NON-CONFIDENTIAL

July 7, 2025

Nova Scotia POWER
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NSEB APPROVAL SHEET

Project Title: POA Boiler Refurbishment 2025

CI Number: C0067906 **Date:** July 7, 2025

Expenditure Profile		
Year	Budget Amount	Project Estimate
2025	973,152	1,218,254
2026	240,000	
Total	$1,213,152	$1,218,254

Type of Filing

- [X] Capital Project Authorization
- [ ] Unforeseen and Unbudgeted (U&U)
- [ ] Planned & Advanced (P&A)
- [X] Subsequent Approval Item

- [ ] Authorization to Overspend (ATO)
- [ ] Scope Change
- [ ] Final Cost (FIN)

COMMENTS

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: C0067906

Title: POA Boiler Refurbishment 2025

Start Date: 2025/05
In-Service Date: 2025/11
Final Cost Date: 2026/05
Function: Steam
Forecast Amount: $1,218,254

DESCRIPTION:

This project is for the refurbishment of the Point Aconi Boiler. The scope of work includes the refurbishment and replacement of boiler and air heater components critical to environmental compliance and the safe, reliable, and efficient operation of the system. This includes tubing, headers, casing, ducting, insulation, cladding, tube shields, and other miscellaneous components identified as deficient. The final scope of this project will be determined through the annual boiler condition data collection and analysis. This effort includes evaluation and prioritization of activities to be undertaken during the annual outage. Additionally, protective erosion shields identified as missing or degraded will be replaced with new shields. Boiler tubes and tube bends will be replaced in the areas where the thickness readings are below the minimum requirements specified by American Society of Mechanical Engineers specifications, and the Nova Scotia Labour and Advanced Education Regulations.

The Board provided the following Directive in its Decision pertaining to the Decarbonization Deferral Account (DDA) (M11220):

> NS Power must provide specific notice to all participants in this proceeding upon filing any future capital work order applications involving assets that are forecasted to be included in the DDA and to confirm this was done in its applications to the Board.

In accordance with the Board's directive, NS Power provided notice of this investment to participants in the DDA proceeding on July 4, 2025.

Summary of Related CIs +/- 2 years:
Pursuant to Section 11.2 of the CEJC, related CIs for Steam projects includes "work completed on the same asset (turbine, boiler, etc.) and on the same unit (Lingan Unit #3, for example)."

- 2023 – C0052294 POA - Boiler Refurbishment 2023 - $943,103
- 2023 – C0052275 POA Boiler Arrowhead Replacements 2023 - $273,644
- 2023 – C0052302 POA SH1 Refurbishment 2023 - $405,836
- 2023 – C0055601 POA Waterwall Panel Replacement - $48,639
- 2023 – C0056864 POA UU Left wall Tube Replacement - $354,461
- 2024 – C0060250 POA Boiler Refurbishment 2024 - $1,121,251
- 2024 – C0060246 POA Boiler Arrowhead Replacements 2024 - $273,624
- 2024 – C0052438 POA BA Center Drain Valve Replacements 2024 - $118,768
- 2024 – C0071229 POA UU RH1 Refurbishment - $893,600
- 2025 – C0067947 POA SH3 Refurbishment 2025 - $659,405
- 2025 – C0067951 POA SH1 Refurbishment 2025 - $518,000
- 2025 – C0068028 POA Arrowhead Refurbishment 2025
- 2025 – C0068029 POA SUB Upgrades - $254,321
- 2025 – C0074768 POA UU RH1 Refurbishment - $238,855
- 2026 – TBD POA Boiler Refurbishment 2026 - $TBD
- 2026 – TBD POA Arrowhead Refurbishment 2026 - $TBD
- 2026 – TBD POA Boiler Refractory Replacement 2026 - $TBD
- 2027 – TBD POA Boiler Refractory Replacement 2027 - $TBD

Depreciation Class: Steam Production Plant – Point Aconi

Retirement Information:

- Categorization of Retirement: Accounting Policy 6420 - Retirement and Disposal of Capital Assets
- Percentage of Asset Pool: 0.14%

Estimated Life of the Asset: 8 Years

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement/ Refurbishment

Why do this project?

NS Power conducts condition and risk assessment and analysis based on the annual boiler inspection reports, boiler tube failure reports, root cause analyses, and boiler header reports. As a result of the most recent assessments, the replacement of boiler tubes, omega shielding, and superheater tubes is required. This proactive strategy is essential to enhance the ongoing reliability of the boiler system and mitigate the risk of unplanned outages, particularly those resulting from tube leaks or failures. Operationally, the continued operation of the boiler with degraded components—such as boiler tubes, tube bends, and tube shields—significantly increases the likelihood of failures during operation, potentially leading to forced outages and production losses. From a safety perspective, tube leaks can lead to high-temperature steam releases and localized over-pressurization, posing safety hazards to personnel and damaging surrounding equipment. Financially, unplanned outages caused by component failures often incur significantly higher refurbishment costs, emergency labour premiums, and replacement energy costs compared to scheduled replacement during planned outages. Additionally, there is an asset integrity risk, as delaying the replacement of worn components accelerates damage to adjacent systems, leading to larger-scale refurbishment requirements and reducing the useful life of the boiler.

By addressing wear and degradation in key components prior to failure, this project aims to reduce the likelihood and consequence of these outlined risks. Replacement of deteriorated components is therefore essential to ensure the continued safe, efficient, and cost-effective operation of the boiler, while supporting sustained asset integrity and reliability of the asset.

Why do this project now?

The inspection, refurbishment, and replacement of tubes and tube shields in the superheater and reheater sections can only be effectively conducted during a scheduled outage. These components operate under extreme temperatures and pressures, making it unsafe and impractical to access or service them during normal operation. Carrying out this work during a planned outage significantly reduces the risk of unplanned downtime caused by tube leaks or component failures. A recent condition, risk, and health assessment has identified emerging issues that necessitate completing this work during this year's outage, rather than deferring it to a future cycle. Moreover, performing these activities as part of the outage schedule is essential to maintaining compliance with applicable industry standards and regulations such as Boiler and Pressure Equipment Regulations. This compliance is critical not only for operational safety but also for ensuring the ongoing efficiency and reliability of the boiler system.

Why do this project this way?

Replacing boiler tubes, tube bends, and shields is the most cost-effective way to significantly reduce the risk of tube leaks and minimize the likelihood of unplanned outages that could disrupt production and result in operational inefficiencies. This refurbishment is supported by detailed inspections, which have identified this work as essential to sustaining reliable boiler performance.

Contingency Statement

Contingency for this project has been determined using a combination of internal subject matter expert judgement (professional engineers) based on previous experience with these assets, and the non-binding contingency guidelines. Consistent with the maturity matrix, this project is being filed as a Class 3 estimate with a contingency of 10 percent. Risks intended to be covered by this contingency include unforeseen price increases of materials (as a result of needing to expedite delivery) and additional scope that may be required during the refurbishment. While the refurbishment is

planned, certain conditions of the boiler components cannot be fully assessed until the unit is opened up. If unexpected deterioration or damage is discovered at that stage, it may necessitate the urgent procurement of replacement materials to avoid schedule delays and minimize downtime.

Reason for Variance

The increase of approximately $5,000 from the 2025 ACE Plan subsequent submittal estimate of $1,213,152 is primarily due to refinement of the scope.

Capital Project Detailed Estimate

Location: Steam
CI# : C0067906
Title: POA Boiler Refurbishment 2025
Execution Year: 2025

Description	Unit	Quantity	Unit Estimate	Total Estimate	Cost Support Reference	Completed Similar Projects (FP#'s)
Regular Labour						
Electrician	PD	10	$ 403	$ 4,033		C0052294, C0060250
Engineering	PD	10	$ 457	$ 4,569		C0052294, C0060251
Maintenance Trades	PD	20	$ 411	$ 8,212		C0052294, C0060253
Power Engineer	PD	10	$ 439	$ 4,392		C0052294, C0060254
Power Plant Technician	PD	20	$ 422	$ 8,438		C0052294, C0060255
Utilityworker	PD	20	$ 286	$ 5,720		C0052294, C0060256
Technologists	PD	20	$ 363	$ 7,257		C0052294, C0060258
			Sub-Total	$ 42,621		
OT Labour						
Maintenance Trades	PD	10	$ 821	$ 8,212		C0052294, C0060250
Power Engineer	PD	5	$ 878	$ 4,392		C0052294, C0060250
Power Plant Technician	PD	10	$ 844	$ 8,438		C0052294, C0060250
Utilityworker	PD	10	$ 572	$ 5,720		C0052294, C0060250
Technologists	PD	5	$ 643	$ 3,213		C0052294, C0060250
			Sub-Total	$ 29,976		
Term Labour						
Maintenance Trades	PD	30	$ 411	$ 12,318		C0052294, C0060250
Power Plant Technician	PD	30	$ 422	$ 12,658		C0052294, C0060250
Utilityworker	PD	20	$ 286	$ 5,720		C0052294, C0060250
			Sub-Total	$ 30,695		
Materials						
Refractory Components	lot	1	$ 50,000	$ 50,000		C0052294, C0060250
Center Drain Components	lot	1	$ 30,000	$ 30,000		C0052294, C0060250
Boiler Tubes	lot	1	$ 50,000	$ 50,000		C0052294, C0060250
Tube Shields	lot	1	$ 50,000	$ 50,000		C0052294, C0060250
Misc Consumables	lot	1	$ 10,000	$ 10,000		C0052294, C0060250
			Sub-Total	$ 190,000		
Contracts						
Blasting Services	lot	1	$ 200,000	$ 200,000		
Scaffolding Services	lot	1	$ 125,000	$ 125,000		
Rescue Services	lot	1	$ 50,000	$ 50,000		
Cleaning Services	lot	1	$ 100,000	$ 100,000		
Boilermakers	lot	1	$ 200,000	$ 200,000		
			Sub-Total	$ 675,000		
Rental/ Main of Equipment						
Diesel Compressor Rental Services	lot	1	$ 25,000	$ 25,000		
			Sub-Total	$ 25,000		
Meals						
Overtime Meals	lot	1	$ 3,000	$ 3,000		
			Sub-Total	$ 3,000		
Other Goods & Services						
Contingency	%	10%	$ 996,292	$ 99,629		
			Sub-Total	$ 99,629		
Interest Capitalized						
AFUDC				$ 5,606		
			Sub-Total	$ 5,606		
Administrative Overhead						
Labour AO				$ 33,155		
Contractor AO				$ 83,572		
			Sub-Total	$ 116,726		
			SUB-TOTAL (no AO, AFUDC)	$ 1,095,921		
			TOTAL (AO, AFUDC included)	$ 1,218,254		
Original Cost				$ 808,994		

Note 1: The labour figures noted above are an average of salaries across a variety of jobs within similar classifications including fringe, and are used solely for budgeting purposes.
Note 2: Small differences in totals are attributable to rounding.

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Instructions: Select option in Column B. Columns C through G will auto-populate.

Document No: XXX-XX-XXXX-XXXX

Project Cost Estimate Input Checklist and Maturity Matrix

Process Industries	Required fields:	Estimate Classification				
Project Name: POA Boiler Refurbishment 2025	Started or Preliminary	Class 5	Class 4	Class 3	Class 2	Class 1
Maturity Level of Project Definition Deliverables	Defined or Complete					
General Project Data						
A. Scope						
Non-Process Facilities (Infrastructure, Ports, Pipeline, Power Transmission)	Defined (D)	P	P	D	D	D
Project Scope of Work Description	Defined (D)	P	P	D	D	D
Byproduct and Waste Disposal	Defined (D)	NR	P	D	D	D
Site Infrastructure (Access, Construction Power, Camp, etc.)	Defined (D)	NR	P	D	D	D
B. Capacity						
Plant Production/Facility (includes power facilities)	Defined (D)	P	P	D	D	D
Electrical Power Requirements (when not the primary capacity driver)	Defined (D)	NR	P	D	D	D
C. Project Location						
Plant and Associated Facilities	Defined (D)	P	P	D	D	D
D. Requirements						
Codes and/or Standards	Defined (D)	NR	P	D	D	D
Communication Systems	Defined (D)	NR	P	D	D	D
Fire Protection and Life Safety	Defined (D)	NR	P	D	D	D
Environmental Monitoring	Defined (D)	NR	NR	P	P	D
E. Technology Selection						
Process Technology	Not Applicable (NA)					
F. Strategy						
Contracting/Sourcing	Defined (D)	NR	P	D	D	D
Escalation	Defined (D)	NR	P	D	D	D
G. Planning						
Logistics Plan	Preliminary (P)	P	P	P		
Integrated Project Plan	Preliminary (P)	NR	P			
Project Code of Accounts	Defined (D)	NR	P	D	D	D
Project Schedule	Defined (D)	NR	P	D	D	D
Regulatory Approval & Permitting	Preliminary (P)	NR	P			
Risk Register	Preliminary (P)	NR	P			
Stakeholder Consultation/Engagement/Management Plan	Preliminary (P)	NR	P			
Work Breakdown Structure (WBS)	Preliminary (P)	NR	P			
Start-up & Commissioning Plan	Preliminary (P)	NR	P	P/D		
H. Studies						
Environmental Impact/Sustainability Assessment	Not Applicable (NA)	NR				
Environment/Existing Conditions	Not Applicable (NA)	NR				
Soils & Hydrology	Not Applicable (NA)	NR				
Technical Deliverables (Specifications and/or Drawings)						
Block Flow Diagrams	Not Applicable (NA)					
Equipment Data Sheets	Complete (C)	NR/S	P	C	C	C
Equipment Lists: Electrical	Complete (C)	NR/S	P	C	C	C
Equipment Lists: Process/Utility/Mechanical	Complete (C)	NR/S	P	C	C	C
Heat & Material Balances	Complete (C)	NR	C	C	C	C
Process Flow Diagrams (PFDs)	Complete (C)	NR	C	C	C	C
Utility Flow Diagrams (UFDs)	Complete (C)	NR	C	C	C	C
Design Specifications	Complete (C)	NR	S/P	C	C	C
Electrical One-Line Drawings	Not Applicable (NA)	NR				
General Equipment Arrangement Drawings	Complete (C)	NR	S/P	C	C	C
Instrument List	Complete (C)	NR	S/P	C	C	C
Piping & Instrumentation Diagrams	Complete (C)	NR	S/P	C	C	C
Plot Plans/Facility Layouts	Complete (C)	NR	S/P	C	C	C
Construction Permits	Not Applicable (NA)	NR				
Civil/Site/Structural/Architectural Discipline Drawings	Not Applicable (NA)	NR				
Demolition Plans and Drawings	Not Applicable (NA)	NR				
Erosion Control Plan & Drawings	Not Applicable (NA)	NR				
Fire Protection & Life Safety Drawings & Details	Complete (C)	NR	S/P	P	C	C
Electrical Schedules	Preliminary (P)	NR	NR/S	P	P/C	
Instrument & Control Schedules	Complete (C)	NR	NR/S	P	P/C	C
Instrument Data Sheets	Preliminary (P)	NR	NR/S	P	P/C	
Piping Schedules	Not Applicable (NA)	NR	NR/S			
Piping Discipline Drawings	Complete (C)	NR	NR/S	S/P	C	C
Spare Parts Listings	Complete (C)	NR	NR	P	P/C	C
Electrical Discipline Drawings	Complete (C)	NR	NR	S/P	P/C	C
Facility Emergency Communication Plan & Drawings	Complete (C)	NR	NR	S/P	P/C	C
Information Systems/Telecommunication Drawings	Not Applicable (NA)	NR	NR			
Instrumentation/Control System Discipline Drawings	Complete (C)	NR	NR	S/P	P/C	C
Mechanical Discipline Drawings	Complete (C)	NR	NR	S/P	P/C	C
	Total # Deliverables for this Project	5	33	38	36	34
	% Defined/Complete towards Class Estimate	100%	100%	88%	88%	84%

Comments:

This project is being filed as a AACE Class 3 estimate. The defined deliverables for this project indicate that 88% of Class 3 deliverables are completed. AACE recommends applying between 10% and 30% contingency to estimates in this class. A contingency value of 10% was selected to account for specific risks such as unforeseen material cost increases particularly resulting from expedited procurement timelines, as well as additional scope that may be required once refurbishment activities are underway and exisiting conditions are fully revealed.

Legend:

The maturity level is an approximation of the completion status of the deliverable. The completion is indicated by the following descriptors:

General Project Data:

- Not Required (NR): May not be required for all estimates of the specified class, but specific project estimates may require at least preliminary development.
- Preliminary (P): Project definition has begun and progressed to at least an intermediate level of completion. Review and approvals for its current status has occurred.
- Defined (D): Project definition is advanced, and reviews have been conducted. Development may be near completion with the exception of final approvals.

Technical Deliverables:

- Not Required (NR): Deliverable may not be required for all estimates of the specified class, but specific project estimates may require at least preliminary development.
- Started (S): Work on the deliverable has begun. Development is typically limited to sketches, rough outlines, or similar levels of early completion.
- Preliminary (P): Work on the deliverable is advanced. Interim, cross-functional reviews have usually been conducted. Development may be near completion except for final reviews and approvals.
- Complete (C): The deliverable has been reviewed and approved as appropriate.

Inclusions

For the purposes of this document, the term *process industries* is assumed to include firms involved with the manufacturing and production of chemicals, petrochemicals, and hydrocarbon processing. The common thread among these industries (for the purpose of estimate classification) is their reliance on process flow diagrams (PFDs), piping and instrument diagrams (P&IDs), and electrical one-line drawings as primary scope defining documents. These documents are key deliverables in determining the degree of project definition, and thus the extent and maturity of estimate input information. This RP applies to a variety of project delivery methods such as traditional design-bid-build (DBB), design-build (DB), construction management for fee (CM-fee), construction management at risk (CM-at risk), and private-public partnerships (PPP) contracting methods.

Estimates for process facilities center on mechanical and chemical process equipment, and they have significant amounts of piping, instrumentation, and process controls involved. As such, this recommended practice may apply to portions of other industries, such as pharmaceutical, utility, water treatment, metallurgical, converting, and similar industries.

Most plants also have significant electrical power equipment (e.g., transformers, switchgear, etc.) associated with them. As such, this RP also applies to electrical substation projects, either associated with the process plant, as part of power transmission or distribution infrastructure, or supporting the power needs of other facilities. This RP excludes power generating facilities and high-voltage transmission.