

CI C0040106

HYD Tusket 1 Generator Refurbishment

REDACTED

October 5, 2026





NSEB APPROVAL SHEET

Project Title: HYD Tusket Unit 1 Generator Refurbishment

CI Number: C0040106

Date: October 5, 2026

Expenditure Profile			Type of Filing	
Year	Budget Amount	Project Estimate	☒	Capital Project Authorization
			☐	Unforeseen and Unbudgeted (U&U)
			☐	Planned & Advanced (P&A)
			☒	Subsequent Approval Item
			☐	Authorization to Overspend (ATO)
			☐	Scope Change
			☐	Final Cost (FIN)
2019	23,413			
2020	21,814			
2021	320			
2022	-			
2023	-			
2024	159,985			
2025	331,525			
2026	3,411,894	169,780		
2027	1,701,003	1,835,257		
2028	-	326,647		
Total	\$5,649,954	\$2,331,683		

COMMENTS

This project was originally included in the scope of CI 49595, however, it has been separated out into this new CI number (C0040106) to better capture the investment in the two distinct assets.

Submitted on behalf of NOVA SCOTIA POWER INCORPORATED

Authorized Signatory
Dave Pickles
Chief Operating Officer

DATE

October 5, 2026

Approved on behalf of NOVA SCOTIA ENERGY BOARD

DATE

CI Number: C0040106

Title: HYD Tuskett 1 Generator Refurbishment

Start Date: 2026/08
In-Service Date: 2027/12
Final Cost Date: 2028/12
Function: Hydro
Forecast Amount: \$2,331,683

DESCRIPTION:

This project is for the refurbishment of Tuskett Unit 1 generator rotor and stator. The scope includes a complete stator rewind, replacement of rotor pole insulation and associated rotor refurbishment, replacement of deteriorated electrical components, replacement of aging neutral leads, and refurbishment of the DC exciter. The generator rotor, stator, and exciter components will be removed from the powerhouse and shipped to a qualified contractor's facility for inspection, refurbishment and/or replacement, testing, and reassembly. The project will restore generator insulation integrity, improve reliability and maintainability, reduce the risk of electrical faults and forced outages, and extend the operating life of Unit 1.

The Tuskett Hydro Station is located on the Tuskett River. It operates 3 units at 0.9 MW each and it has been in service since 1929. There is no record of any major refurbishment to the rotor, stator, or exciter since 1930.

Summary of Related CIs +/- 2 years:

Pursuant to Section 11.2 of the CEJC, related CIs for Hydro projects include "Work completed on the same generating unit and dam structures, but not necessarily the same asset."

• 2024-2025	CI C0073168	HYD TUS PH Fish Passage	\$949,804
• 2024-2026	CI C0064966	HYD TUS Tidal Pool Fish Passage	\$1,763,971
• 2025-2026	CI C0080230	HYD TUS 3 Stator Refurbishment	\$632,975
• 2025-2026	CI C0019199	HYD TUS Crane Refurbishment	\$105,107
• 2026	CI C0083572	HYD TUS Powerhouse Refurbishment	\$582,538
• 2026-2027	CI 49595	HYD Tuskett 1 Overhaul	\$3,016,690
• 2026-2028	CI C0084249	HYD TUS PH Fish Passage	\$15,216,454
• 2008-2030	CI 29807-H541	HYD Tuskett Falls Main Dam	\$90,475,518
• 2016-2032	CI 48913-H765	HYD TUS Facility Repairs	\$32,496,885

Depreciation Class: Hydraulic Production Plant - Tuskett

Retirement Information:

- Categorization of Retirement: Accounting Policy 6420 - Retirement and Disposal of Capital Assets
- Percentage of Asset Pool: 2.18%

Estimated Life of the Asset: 40 years

JUSTIFICATION:

Justification Criteria: Hydro, Wind and Biomass

Why do this project?

A generator condition assessment was completed in 2019 (Attachment 1) which identified significant age-related deterioration throughout the stator, rotor, and excitation systems.

The stator winding is original to the unit and exhibited low insulation resistance and polarization index test results, indicating insulation degradation and moisture contamination. The condition assessment (Attachment 1) concluded that cleaning or repainting would only serve as a temporary measure and recommended a complete rewind. The rotor is also original to the unit and is demonstrating advanced insulation deterioration. Testing found poor rotor insulation resistance readings, while inspections identified aging field windings, deteriorating connections, and pole washers that are splitting and beginning to deform. The assessment concluded that the rotor requires full refurbishment rather than incremental repairs.

Similarly, the exciter system is showing signs of advanced deterioration. Excessive commutator wear is generating copper dust throughout the assembly, contributing to contamination, reduced electrical reliability, and increased maintenance requirements. The condition assessment recommends removal and refurbishment of the exciter armature to restore the assembly to a serviceable and reliable operating state.

The project will also support environmental objectives and regulatory commitments. The Tusket Hydro System operation is strictly balanced to ensure water management supports generation requirements in conjunction with environmental regulatory requirements, which include seasonal ecological maintenance flows in accordance with NS Power's provincial water approval, and effective upstream and downstream fish passage in accordance with the *Fisheries Act*. The System is also balanced to ensure safe water management downstream in the Tusket River for residents and the commercial and Indigenous gaspereau fishery which takes place annually in the spring. Reduced powerhouse capacity results in a greater reliance on spill operations at the Tusket Main Dam to manage river flows, and therefore reduces flexibility in water management to meet these environmental commitments, which has been a subject of ongoing concern from Fisheries and Oceans Canada (DFO) and local gaspereau harvesters. Concerns raised with respect to increased spill include less effective upstream fish passage during critical gaspereau migration periods, and safety related concerns when local harvesters are conducting fishery operations in high water levels and high spillway flows. NS Power has collaborated with DFO and harvesters to manage spill operations to reduce impacts to upstream fish passage and gaspereau fishery operations over the last 5 years. Increased generating capacity will support reduce spill requirements during many operating conditions, supporting consistent fish passage conditions and reducing operational interactions with DFO and the fishery community.

The project also improves employee safety on the Tusket system. To achieve the environmental requirements around elevation and flows from the Tusket Main Dam, employees must be available to manually operate tainter gates at any time of day, and during all weather conditions. Having Tusket Unit 1 available increases NS Power's ability to move water through the system by operating the Unit remotely.

Why do this project now?

NS Power intends to complete construction of the Main Dam with the Lake Vaughan Reservoir remaining within its regulated operating range. This will require the support of the generating units and it is critical to have all three units in operation at the beginning of construction in the event of an unplanned outage on one of the three units during construction.

In addition, continued operation of the Tusket Powerhouse with only two generating units increases dependence on aging water control infrastructure, limits operational flexibility, and increases exposure to reliability, safety and environmental risks. Completion of the overhaul will restore the station's full water management capability, improve maintenance flexibility, and reduce long-term operational risk.

The project is being executed concurrently with the planned Unit 1 turbine overhaul to maximize the efficiency of the outage and minimize overall lifecycle costs. Completing both scopes of work during the same outage avoids future disassembly and reassembly costs, reduces generation impacts, and eliminates the need for a separate extended outage to remove major turbine components at a later date. Undertaking the work now, while the unit is already unavailable and access has been established, represents the most cost-effective and operationally efficient approach. It also reduces the risk of in-service electrical failure, maximizes the use of outage resources, and enables repairs to be completed before component deterioration results in more extensive and costly corrective work. By completing the generator refurbishment in a planned and coordinated manner, NS Power will reduce the risk of future unplanned outages and improve generation availability and operational flexibility within the Tusket system.

Why do this project this way?

Refurbishing the stator, rotor, and exciter as a single electrical project addresses the primary age-related risks associated with Unit 1's original 1929 generator components. Completing all major generator work at the same time ensures that critical electrical systems are restored together, reducing the likelihood of future outages and improving overall unit reliability.

Reusing the existing rotor poles and replacing only the pole insulation is the most economical approach to restoring the rotor, as the pole laminations remain suitable for continued service. This approach provides the benefits of a renewed insulation system while avoiding the significantly higher cost of manufacturing replacement poles.

The generator components will be shipped to a specialized repair facility where the required refurbishment work can be completed using established processes, equipment, and expertise. Performing the work off-site in a controlled environment reduces overall project costs and schedule risk compared to completing the refurbishment in the field.

When combined with the turbine rehabilitation, this approach provides the greatest lifecycle value by restoring both the mechanical and electrical components of Unit 1 as a complete generating unit, thereby maximizing reliability, extending asset life, and reducing the likelihood of future forced outages.

Contingency Statement

Contingency for this project has been determined using a combination of internal subject matter expert (Professional Engineers) judgment, previous experience with hydro unit generator refurbishment projects, as well as the non-binding contingency guidelines. Consistent with the maturity matrix, this project is being filed as a Class 3 estimate with a contingency of 20 percent. The contingency is intended to account for unforeseen repairs to the rotor, stator, and exciter that may only become apparent following complete disassembly and detailed inspection. This includes defects, deterioration, or damage concealed by insulation, paint, varnish, or assembled components that could not reasonably be identified during the previous condition assessments. The contingency will also cover potential unforeseen increases in labour and material costs.

Reason for Variance

This project was not listed in the 2026 ACE Plan as the scope was included under CI 49595 HYD Tusket 1 Overhaul at project total of \$5,649,954, which included both the turbine overhaul and generator scope. Since that time, the generator scope was removed from CI 49595 and moved to this CI (C0040106). Separating the project into two projects will better capture the investment in the two distinct assets during the same outage and is consistent with how NS Power has managed these projects in the past. The decrease of \$3,318,271 from the 2026 ACE Plan subsequent submittal estimate for CI 49595 of \$5,649,954 is due to this split. The overall cost for the two projects (\$5.4M) remains well aligned with the \$5.7M included in the 2026 ACE Plan, however reduced slightly following further scope definition and development of the Class 3 Estimates.

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.



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							
Hydropower		Required fields:	Estimate Classification				
Project Name: HYD TUS 1 Generator Refurbishment		Started or Preliminary Defined or Complete	Class 5	Class 4	Class 3	Class 2	Class 1
Maturity Level of Project Definition Deliverables							
General Project Data							
A. Scope							
Project Scope of Work Description		Defined (D)	P	P	D	D	D
Site Infrastructure (Access, Construction Power, Camp, etc.)		Defined (D)	NR	P	D	D	D
B. Capacity							
Facility Output / Production Profile		Preliminary (P)	P	P			
Electrical Power Requirements (when not the primary capacity driver)		Defined (D)	NR	P	D	D	D
C. Project Location							
Plant and Associated Facilities		Not Applicable (NA)					
D. Requirements							
Codes and/or Standards		Defined (D)	NR	P	D	D	D
Communication Systems		Not Applicable (NA)	NR				
Fire Protection and Life Safety		Not Applicable (NA)	NR				
Environmental Monitoring		Not Applicable (NA)	NR	NR			
E. Technology Selection							
Not Applicable							
F. Strategy							
Contracting/Sourcing		Defined (D)	NR	P	D	D	D
Escalation		Defined (D)	NR	P	D	D	D
G. Planning							
Regulatory Approval & Permitting		Defined (D)	P	P	D	D	D
Material Utilization (Borrow Sources)		Defined (D)	P	P	P/D	D	D
Logistics Plan		Defined (D)	P	P	P	D	D
Work Breakdown Structure (WBS)		Preliminary (P)	P	P	P/D		
Decommissioning/Demolition Plan		Defined (D)	NR	P	D	D	D
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
Risk Register		Defined (D)	NR	P	D	D	D
Stakeholder Consultation/Engagement/Management Plan		Not Applicable (NA)	NR				
Start-up & Commissioning Plan		Preliminary (P)	NR	P	P/D		
H. Studies							
Hydraulics		Defined (D)	P	P	D	D	D
Topography & Bathymetry		Not Applicable (NA)					
Environmental Impact/Sustainability Assessment		Not Applicable (NA)	NR				
Environment/Existing Conditions		Not Applicable (NA)	NR				
Soils & Hydrology		Not Applicable (NA)	NR				
Geotechnical Investigation		Not Applicable (NA)	NR				
Technical Deliverables (Specifications and/or Drawings)							
Block Flow Diagrams		Not Applicable (NA)					
Hydraulic Design & Probable Maximum Flood (PMF)		Not Applicable (NA)					
Equipment Data Sheets		Preliminary (P)	NR/S	P			
Equipment Lists: Electrical		Complete (C)	NR/S	P	C	C	C
Equipment Lists: Process/Utility/Mechanical		Not Applicable (NA)	NR/S				
Design Specifications		Complete (C)	NR	S/P	C	C	C
Electrical One-Line Drawings		Started (S)	NR	S/P			
General Equipment Arrangement Drawings		Preliminary (P)	NR	S/P			
Instrument List		Complete (C)	NR	S/P	C	C	C
Construction Permits		Complete (C)	NR	S/P	P/C	C	C
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		Not Applicable (NA)	NR				
Mitigation Measures (Aquatic, Terrestrial, Heritage, etc.)		Not Applicable (NA)	NR				
Dam Design & Drawings		Not Applicable (NA)	NR				
De-silting Basins		Not Applicable (NA)	NR				
Gates & Cranes Design & Drawings		Complete (C)	NR	P	P	P/C	C
Intake Design & Drawings		Not Applicable (NA)	NR				
Penstock Design & Drawings		Not Applicable (NA)	NR				
Powerhouse Design & Drawings		Not Applicable (NA)	NR				
Spillway Design & Drawings		Not Applicable (NA)	NR				
Turbine and Generator Design & Drawings		Preliminary (P)	NR	P	P	P/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		Complete (C)	NR	NR/S	P	P/C	C
Spare Parts Listings		Started (S)	NR	NR			
Electrical Discipline Drawings		Started (S)	NR	NR	S/P		
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		Not Applicable (NA)	NR	NR			
Auxiliary Electrical Design & Drawings		Not Applicable (NA)	NR	NR			
Auxiliary Mechanical Design & Drawings		Not Applicable (NA)	NR	NR			
Protection & Controls System Design & Drawings		Preliminary (P)	NR	NR	S	P	
Total # Deliverables for Class Estimate			7	27	29	26	23
% Defined/Complete towards Class Estimate			100%	100%	83%	74%	66%

Comments:

This project is being submitted as a Class 3 estimate. The deliverables of this project indicate that 83% of the Class 3 deliverables have been completed. A 20% contingency has been selected to account for specific risks, including additional component refurbishments that may be required based on the as-found condition following unit isolation and disassembly, as there are components that are not accessible for assessment/inspection until after unit disassembly.

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 *hydropower industries* is assumed to include private and public utilities involved with the production of electrical power, exclusive of transmission and distribution, using natural gravitational force of falling or flowing water, excluding tidal forces, to drive a turbine that powers a generator.

The common thread among private and public utilities (for the purpose of estimate classification) is their reliance on user requirements, statement of objectives, design reports (i.e. geotechnical investigations, sourcing borrow materials and hydraulic design/modeling) and/or environmental data collection and studies 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.

Cost estimates for hydropower facilities are typically composed of key features such as:

- Reservoir area preparation (e.g., clearing, removal of structures and earthmoving).
- River management (e.g., cofferdams, diversion channels or tunnels, sediment management plans, environmental monitoring programs).
- Principal structures (e.g., dams, dykes, intakes, penstocks, powerhouse(s), low level outlet(s), power tunnel(s), de-silting basin(s), and spillway structure(s)).
- Permanent infrastructure (e.g., access roads, railroads, bridges, offices, warehouse and housing).
- Temporary infrastructure (e.g., construction camp, site access roads, airport, workshops, construction power etc).
- Environmental mitigation features (e.g. fish ladder(s), water bypass and creation of new fish or wildlife habitat).
- Owner's costs (e.g., stakeholder involvement, licensing, studies and investigations, administration and overhead, catering).

Some, but not all, of these features are unique to the hydropower industries.

Typical hydropower facilities may include: turbines, generators, exciters, governors, transformers, gates for intake, spillway and draft tubes, and supporting electrical, mechanical, telecom, protection, and control systems. The water storage reservoir is typically required to support the operations of the hydropower facility.



Voith Hydro

FIELD TEST PLAN

CUSTOMER:	Nova Scotia Power	
STATION:	Tusket	
Job Number:		
UNIT #:	1	
Machine Type:	Vertical	
Rating	900 KVA	
Voltage	6600	
Work scope	Test and Inspect	
Coil Type	Multi Turn	
Number Slots		
Side Packing Type		
Customer PO #		
Rotor Poles	32	
Rotor Pole Leads	Cable	
Rotor Pole Type	Edge Wound	
Insulation Class		
START DATE:	July 3 2019	
COMPLETION DATE:	July 3 2019	
PLAN PREPARED BY:	Darrel Cormier	

Test plan

Item	Status	Description		Inspected By
1	Done	Visual Inspection of stator and rotor		D.Cormier
2	Done	Stator Megger and P.I. Test		D.Cormier
3	Done	Rotor Megger and P.I. Test		D.Cormier
4	Done	Pole Drop Test		D.Cormier
5	Done	Prepare Report		D.Cormier

[illegible]

	YES	NO
Have all required Inspections and Tests been completed?		
Have all required Inspection and Test Sheets been completed?		
Has the customer witnessed all tests as required by contract?		
Is the equipment ready for return to customer?		

Job Completion date: _____

Sign-Off Voith Rep _____

Sign-Off Customer Rep _____



Voith Hydro

Customer:	Nova Scotia Power	KV:	6600	
Site:	Tusket	Rating:	900 KVA	
Unit:	1	Number of Slots:	0	
Job Number:	0	Sidepacking Type:	0	
Cuts Ref:	0	Coil Type:	Multi Turn	
Work Scope:	Test and Inspect	Insulation:	0	
Machine:	Vertical			

STATOR CORE INSPECTION CHECKLIST

Inspection Point Description	AS FOUND
1.0 - CORE SLOTS & VENTS:	
1.1 Sides & bottom for any debris	N/A
1.2 Width dimension measurements:	N/A
1.2.1 Minimum & Maximum normal slots	N/A
1.2.2 Minimum & Maximum splits slots	N/A
1.3 Sides & bottom, proud punching's	N/A
1.4 Burn from coil failures	None Seen
1.5 Wedge grooves clear full length	N/A
1.6 Core vents clear (unobstructed)	None
1.7 Other notable points	N/A
2.0 - TOP FINGERS & UPPER ENDPLATE:	
2.1 Fingers alignment with core teeth	Good
2.2 Fingers contact on core teeth	Good
2.3 Fingers contact to upper endplate	Cant see
2.4 Welds to upper endplate bore	N/A
2.5 Clearance @ stud-to-frame blocks	N/A
2.6 Endplate welds to frame plugs	N/A

Inspection Point Description	AS FOUND
3.0 - BOTTOM FINGERS & LOWER ENDPLATE:	
3.1 Alignment with core teeth	Good
3.2 Contact with core teeth	Good
3.3 Contact with lower endplate	N/A
3.4 Welds to lower endplate	N/A
3.5 other notable points	N/A
4.0 - CORE STUDS & CORE TIGHTNESS:	
4.1 Stud welds to frame rings	N/A
4.1.1 Studs-to-top frame ring	N/A
4.1.2 Studs-to-middle frame ring	N/A
4.1.3 Studs-to-bottom frame ring	N/A
4.2 Core teeth tight by knife check	N/A
4.3 Nuts torque value as found	Riveted
4.4 Nuts torque value as corrected	Riveted
4.5 Core splits packing tightness	No Splits
4.6 Bore side core wave condition	Rotor Still in
4.7 Back side core wave condition	Some wave
4.8 Evidence of fretting at studs	No
5.0 - FRAME JOINTS & CORE APPEARANCE	
5.1 Frame joints and hardware	N/A
5.2 Core back iron finish appearance	Painted

STATOR COIL INSPECTION

Inspection Point Description	AS FOUND
6.0 Coil condition	
6.1 Missing or broke insulation	No Looks original
6.2 Oil or contamination on coils	Caked oil Very Dirty
6.3 Loose or Missing Diamond spacers	None
6.4 Coil Spacing	Tight
6.5 Corona Activities	No
6.6 Cut out coils	No
7.0 Wedges and center sticks	
7.1 Wedge Tightness	Rotor In
7.2 Wedge Packing	None
7.3 Center Stick	Cant see Blocking on both side of coil

Inspection Point Description	AS FOUND
8.0 Supports	
8.1 Support rings	None
8.2 Support lashes	N/A
9 Circuit Rings & Mains And Neutrals	
9.1 Corona Activities	Leads come straight out No rings
9.2 Loose in support	N/A
9.3 Support shape	N/A
10.0 Other	
10.2	
10.3	
10.4	



Voith Hydro

Customer:	Nova Scotia Power	Volts:	6600
Site:	Tusket	Insulation:	0
Unit Number:	1	Number slots:	0
Job Number:	0	Side Packing Type:	0
Customer Ref.:	0	Rating:	900 KVA
Work Scope:	Test and Inspect	Coil Type:	Multi Turn
Machine Type:	Vertical		

STATOR TESTING

STATOR POLARIZATION INDEX RESULTS

Test Instrument:	Megger	Identification #:	E6028
Calibration Date:	05-29-20		
Tested By:	Darrel Cormier	Temp	16 C
		Humidity	40%

Yellow A Phase			Blue B Phase			Red C Phase		
Minutes	kV DC	Resistance MΩ	Minutes	kV DC	Resistance MΩ	Minutes	kV DC	Resistance MΩ
0.5	5 KV		0.5	5 KV	0.56	0.5	5 KV	
1	5 KV		1	5 KV	0.57	1	5 KV	
2	5 KV		2	5 KV	0.57	2	5 KV	
3	5 KV		3	5 KV	0.58	3	5 KV	
4	5 KV		4	5 KV	0.59	4	5 KV	
5	5 KV		5	5 KV	0.61	5	5 KV	
6	5 KV		6	5 KV	0.63	6	5 KV	
7	5 KV		7	5 KV	0.62	7	5 KV	
8	5 KV		8	5 KV	0.64	8	5 KV	
9	5 KV		9	5 KV	0.65	9	5 KV	
10	5 KV	10	5 KV	0.62	10	5 KV		
A Phase			B Phase			C Phase		
P.I. =	#DIV/0!		P.I. =	1.09		P.I. =	#DIV/0!	
P.I. Acceptable - N			P.I. Acceptable - N			P.I. Acceptable - N		

MEGGER TESTING		
Import Data from 1 minute PI chart		
Phase A =	T1	0 MΩ
Phase B =	T2	0.57 MΩ
Phase C =	T3	0 MΩ

Exciter Testing				
Test Instrument: Megger		Identification #: E6028		
Calibration Date: 29-May				
Tested By: Darrel Cormier				
	Volts	Megger		Comment
Exciter	500V	22.6 M		Full of copper Dust
Fields	500V	1240 M		Full of copper Dust
Inerpoles	500V	26.4 M		Full of copper Dust

Copper Dust coming from commutator wear Should be cleaned and dried



Customer:	Nova Scotia Power	KV:	6600	
Site:	Tusket	Rating:	900 KVA	
Unit:		Number of Slots:	0	
Job Number:	0	Sidepacking Type:	0	
Cuts Ref:	0	Coil Type:	Multi Turn	
Work Scope:	Test and Inspect	Insulation:	0	
Machine:	Vertical			

ROTOR INSPECTION CHECKLIST

Inspection Point Description	AS FOUND
1.0 - Rotor Core & Shaft	
1.1 Condition of Core	Good Cast 1 piece
1.2 Any sign of Fretting	No
1.3 Laminations	N/A
1.4 Core vents	N/A
1.5 Contamination	Oil and dirt Very Dirty
1.6 Core bolts	N/A
1.7 Pole keeper plates	Visial is good
1.8 Pole Stops	Cant see
2.0 - Poles	
2.1 Pole washers	Thin And Warping and split
2.2 Pole Turn Insulation	Hard to say Very dirty and old rotor Looks original 1929
2.3 Pole Inter Connection	Good bolted copper turn material
2.4 Pole main leads	Cable
2.5 Pole damper connections	N/A
2.6 Pole Iron	Couldn't see Rotor still Installed

Inspection Point Description	AS FOUND
3.0 - Slip Rings	
3.1 Wear	Both rings has a film of oil and work carbon Will cause issues
3.2 Brush rig	Very Dirty Oily and carbon
4.0 -Fasteners	
4.1 Pole keys	N/A
4.2 Pole Bolts	N/A
4.3 Balance weights	None Seen



Voith Hydro

ROTOR FIELD WINDING TESTING

Customer:	Nova Scotia Power	Volts:	6600
Site:	Tusket	Rating:	900 KVA
Unit Number:	1	Lead Type:	Cable
Job Number	0	Insulation:	0
Customer Ref.:	0	Coil Type:	Edge Wound
Number Poles:	32	Quantity	32
Work Scope:	Test and Inspect	Machine Type:	Vertical

ROTOR FIELD POLARIZATION INDEX RESULTS

Test Instrument:	Megger	Identification # :	E6028
Calibration Date:	2020-05-29		
Acceptance Criteria:	Above 1.5		

Field Winding			
Time	Voltage KV DC	Resistance MΩ	
0.5	500V	0.01	
1	500V	0.01	
2	500V		
3	500V		
4	500V		
5	500V		
6	500V		
7	500V		
8	500V		
9	500V		
10	500V		
P.I. =	0.00		
Tested By:	Darrel Cormier	Test Date:	June 18 2019
Is the P.I. Acceptable ? (Yes or No)		N	

This was with the leads disconnected

ROTOR FIELD MEGGER TESTING

Test Instrument:	Megger	Identification Number:	E6028
Calibration Date:	2020-05-29	Test Dates:	
Acceptance Criteria:	5 MΩ or Better		
		K,M,G,T	
Megger Value from 1 minute field of PI chart	0.01	MΩ	Tested By: Darrel Cormier
Is the Meggar Value Acceptable? (Yes or No)	N		

ROTOR FIELD WINDING HIGH POTENTIAL TESTING

Test Instrument:	Hipot	Identification Number:	0
Calibration Date:	1900-01-00	Temperature:	
Test Date:			
Acceptance Criteria:			

Rotor Field Hipot Test	Voltage kV DC	Leakage μA	Tested by	Test Results Acceptable?	Date
Original	N/A				
AC	N/A				

ROTOR FIELD COIL AC VOLTAGE DROP TEST

Test Instrument: Multi-meter	ID Number: VFO139
Calibration Date: 2020-05-29	Test Dates: June 19 2019
Acceptance Criteria + or - 5% of Average:	Applied Volts: 121.4 Volts AC
Recorded Amps:	

Coil #	Volts	Coil #	Volts	Coil #	Volts	Coil #	Volts	Coil #	Volts
1		21		41					
2		22		42					
3		23		43					
4		24		44					
5		25							
6		26							
7		27							
8		28							
9		29							
10		30							
11		31							
12		32							
13		33							
14		34							
15		35							
16		36							
17		37							
18		38							
19		39							
20		40							
Tested By:				Date:					
Average volts		#DIV/0!	Plus 5 %	#DIV/0!	Minus 5%	#DIV/0!			

Customer Witness and approval of Test Results IF required: _____

Technical Director Approval of Test Results: _____

Date: _____

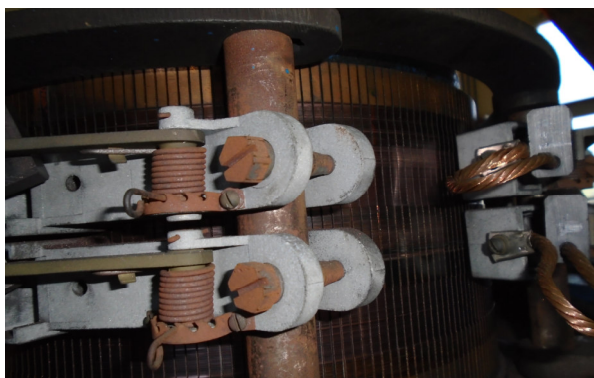
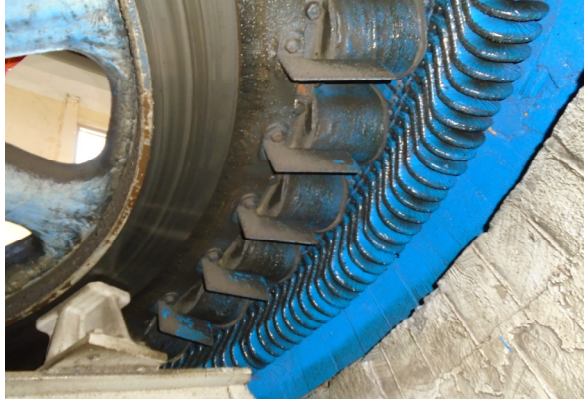
NSP-27T HYDRO UNIT INSPECTION CRITERIA		
Plant		Tusket
Unit		1
Date		June 18 2019
Exciter Inspection	Rating	Comments
Age	3	
Maintenance History		
Operational Performance		
Cabinet		
Collector Ring Cleanliness	4	Very Dirty Needs to be cleaned to bring Megger readings better
Exciter Housing Condition	3	Copper dust and grease
Missing Parts	0	
Damaged Parts		
Collector Ring Wear	4	Extreamly dirty and has film on top ring
Commutator Wear	4	Above Average and copper dust is flying on exciter parts
Water ingress	1	None
Overheating		
Worker safety conditions		
Power Circuitry Tests	3	Could use Cleaning
Control Circuitry Tests		
Availability of Spare Parts		
Rotor Inspection	Rating	Comments
Age	3	Original 1929 rotor
Maintenance History	4	Megger was 0.01
Voltage and Current overrating		
Operating Limits		
Loss of Field		
Over-speed or runaway		
Rotor Hub, radial arms and rim	3	Good one piece But very dirty
Braking Surface/ Pads/ Assembly	2	Good
Field Poles, keys, collars and pole faces	4	Older poles. Washer are thin and starting to warp showing and spliting
Bearings (Upper/Lower/Thrust)		
Instrumentation Function		
Field windings	4	Older poles that have had work done.
Connections	3	
Winding Leads	3	Causing Very low Megger readings
IR/PI testing	4	Very Low readings
Stator Inspection	Rating	Comments
Age	4	Original Winding Very Low Megger
Maintenance History		
routinely operated above 105% rated voltage		

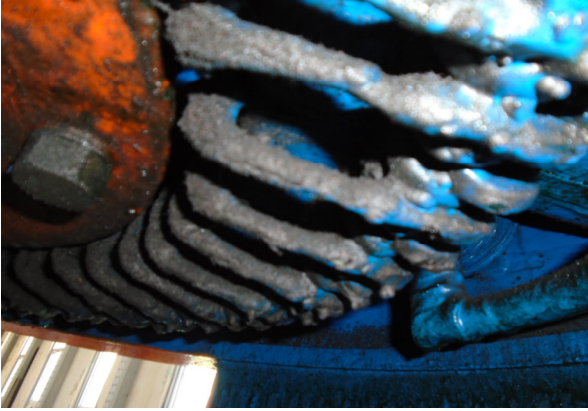
Out of phase breaker closings		
History of winding problems	2	none
Operated significantly above maximum allowable temperature (above 120 C)		
Stator Winding	4	Very low megger and very dirty Original winding
Wedges, packing, blocking and bracing	2	
Ring Bus		
Main and Neutral Leads	3	New from Stator to breaker Old on stator
End Turn condition	2	
Core Laminations	3	Old core
IR/PI testing	4	Not good

Revised Generic Inspection Rating System, Please follow rating guide where possible.

- | |
|---|
| 1) Component is within tolerance. No Change since Last Inspection |
| 2) Component is above normal operating range (wear, temperature or leakage) but does not |
| 3) Component is in excess of normal tolerance and is affecting unit operation but is not likely |
| 4) Component deficiencies are affecting unit operation and are likely to fail prior to next |
| 5) Component has failed or is likely to fail within the next six months. Immediate Repair |

NSP-27T HYDRO UNIT INSPECTION CRITERIA		
Plant		Nova Scotia Power
Unit		





	Comments And Recommendations
1	Rotor was at 0 Megs By cleaning the rings and the leads to try to get readings up, This will just be a fix. The rotor is original and needs a full refurbishment
2	Combined bearing is leaking oil. It has to be fixed, Leaking oil on rings
3	Exciter Armature has commutator wear and is blowing copper dust everywhere. Exciter needs to be taken off and sent to turn and undercut
4	Stator is original and pulling in a lot of moisture and causing very low megger reading .006M. They might come up with a cleaning and a paint but its just a patch. Recommend rewind
5	Pole washers are splitting Needs to be replaced Very soon
6	Neutral Leads needs to be replaced. They are original and are going through the wall and are not easily accessible. Did not test individual phases for that reason

Table 1—Guidelines for direct voltages to be applied during insulation resistance test

Winding rated voltage (V) ^a	Insulation resistance test direct voltage (V)
<1000	500
1000–2500	500–1000
2501–5000	1000–2500
5001–12 000	2500–5000
>12 000	5000–10 000

^aRated line-to-line voltage for three-phase ac machines, line-to-ground voltage for single-phase machines, and rated direct voltage for dc machines or field windings.

Table 3—Recommended minimum values of polarization index for insulation per thermal classes machine components^a

Thermal class rating ^{b, c, d}	Minimum <i>P.I.</i>
Class 105 (A)	1.5
Class 130 (B) and above	2.0

^aThe P.I. test is not applicable to non-insulated field windings (see 12.2.1).

^bIEC 60085-01

^cIEEE Std 1

^dNEMA MG-1

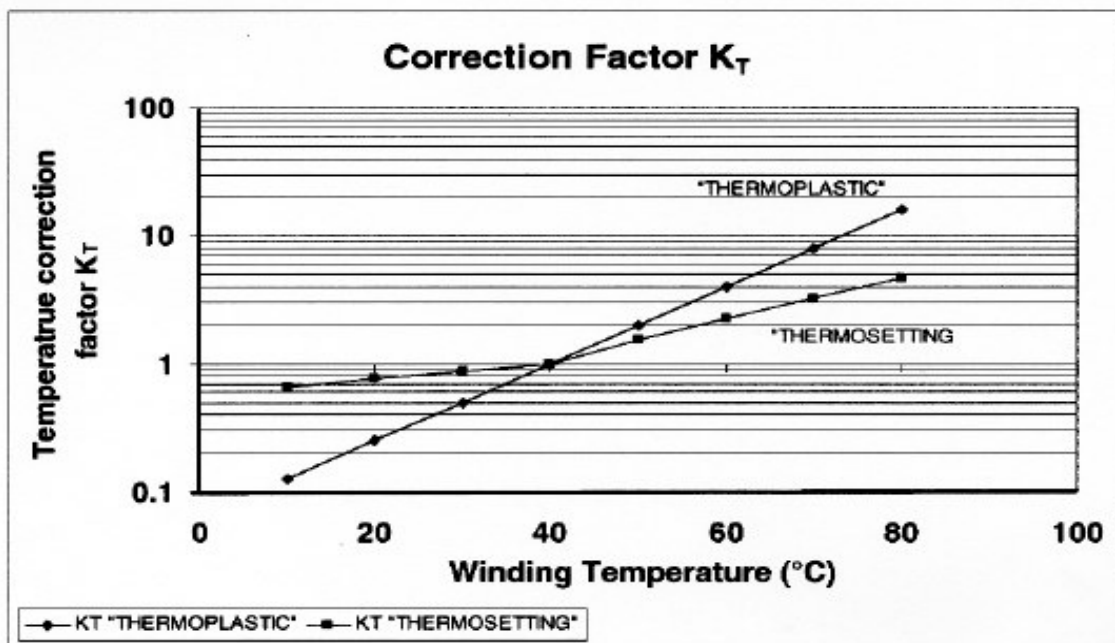


Figure 5—Temperature correction factors for "THERMOPLASTIC" (asphaltic) and "THERMOSETTING" (epoxy or polyester) insulation systems



TUSKET 1 GENERATOR REFURBISHMENT

RFP-04-2026-739

**COMMERCIAL PROPOSAL
R1
JULY 16,2026**



7.14 COMMERCIAL / PRICING PROPOSAL REQUIREMENTS

[illegible]

Date:2026-07-16



Pricing and quantities:

Rotor pricing breakdown

Item	Description	Lump Sum (CAD)
1	Asbestos testing, sampling, and analysis, as required	
2	Optional: Asbestos abatement and compliant handling, if required	
3	Rotor pole refurbishment (per pole) - per pole	
4	Cleaning, inspection, and coating of rotor spider. Also includes dismantle of poles from rotor.	
5	Re-insulation of pole jumpers and associated connections. Also includes assembly of rotor after poles refurbishment is complete	
6	Freight and transportation to and from the vendor's facility. As per technical document cost shared with stator	
7	Fabrication or procurement of any additional jigs or fixtures required for transportation or refurbishment (e.g., rotor hitch, transportation stands, etc.)	
Total as per NSPI pricing sheet		
a	Pole keys 32 sets at per set price to be confirmed	
b	Estimate for lead replacement not included in pole refurbishment price 32 poles at per pole	
c	New crates 4 poles per crate per crate	
d	Insured transportation from Moncton to Montreal for pole shipment per shipment	
e	Refurbishment of three coils only - per coil	
Wajax total based on expected requirements for project		

Stator pricing breakdown Global VPI

Item	Description	Lump Sum (CAD)
2	Optional: Green coils for Global VPI.	
3	Engineering Assessment to determine if an uprate is possible.	
7	AC High-Potential (Hi-Pot) test to failure	
8	Surge test to failure	
9	Freight and transportation to and from the vendor's facility. As per technical document cost shared with rotor.	
Total as per NSPI pricing sheet with Global VPI option		



Exciter Pricing breakdown

Item	Description	Lump Sum (CAD)
1	Baseline test, cleaning/drying set up, one cleaning cycle, inspection and re-test	
2	Turning and undercutting including mandrel	
3	Replace brushes and brush holders and provided spare. Price includes 24 boxes for armature and 24 boxes for slip rings. Also included is a total of 72 brushes 36 of each design.	
4	Balancing and mandrel fabrication. Note Mandrel is included in turn and undercut as it will be required for that task.	
a	Complete refurbishment of slip rings - each	
b	Replace all insulating component on exciter armature brush gear	
c	Replace insulating components on slip ring brush gear	
d	Replacement of main leads for armature circuit	
Wajax total based on expected requirements for project		

WRITTEN AND SUBMITTED BY WITH BEST REGARDS'

Ed Newhook
 NorthPoint Technical Services
 80 Enterprise Street
 Moncton, NB
 E1E 3P7
 Ph: 506-857-8458
 Fax: 506-858-9483
 Cell: 506-866-3628
 Email: enewhook@northpointts.com



Website: www.northpointts.com

END OF SECTION

QUOTATION



141 GLENCOE DRIVE - MOUNT PEARL - NEWFOUNDLAND - A1N 4S7

TO:

NAME: Patrick Pellerin
 ADDRESS Nova Scotia Power
 C/O Account Payable
 Halifax NS

DOCUMENT NO.	2025-0200
DATE:	07-Feb-25
CUSTOMER REF NO:	Basler DECS-250 & BE1-25 Relay

VESSEL/SITE:	
MADSEN CONTACT:	Gina Earle
TELEPHONE:	(709) 726-6774
MADSEN REF:	423529

Item Number and Description	Qty	Price	Subtotal
BE1-25-M1EA6PN4N1F Basler Sync-Check Relay	1.00		
Delivery: 8-10 weeks			
DECS-250-CN1CA1N DIGITAL EXCITATION CONTROL SYSTEM	1.00		
Delivery: 4-5 weeks			
Shipping Freight Costs (estimate)	1.00		

TERMS:

Quote is valid for 30 days from quotation date.

CORES must be returned within 30 days of purchase and be suitable for rebuild to be eligible for refund.

REMIT PAYMENT TO:

MADSEN DIESEL & TURBINE INC.
 141 GLENCOE DRIVE
 MOUNT PEARL, NEWFOUNDLAND
 A1N 4S7
 (709)726-6774

Subtotal:	
Tax:	
TOTAL:	

CAD

EMAIL: AccountingMDT.1010@madsen.ca

HST #: 892727777RT

QUOTATION ONLY