



Review of Nova Scotia Power Inc.'s Ruth Falls Main Dam Refurbishment Authorization to Overspend Application

NSUARB Matter M11927

SUBMITTED BY

Midgard Consulting Inc.

DATE

January 13, 2025



Midgard, established in 2009, provides consulting services across the electrical power and utility sector. Midgard's principals and staff have direct experience in project development, design, contract procurement, finance, construction, and operations. This combined experience has translated into mandates in project due diligence, lender's technical advisor, loan guarantee assessments, and Independent Engineer roles in Canada, the United States, and internationally. Midgard has worked for developers, utilities, government agencies, and both project lenders and equity providers.

Midgard's team has extensive experience modelling fuel sources, creating energy yield estimates, reviewing contracts, reviewing pro-formas, and assessing project risks from a construction, operations, and financial perspective.

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REPORT SIGN-OFF

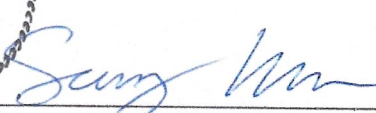


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1 INTRODUCTION

Midgard Consulting Inc. (“**Midgard**”) has been retained by Counsel for the Nova Scotia Utility and Review Board (“**NSUARB**”) to carry out a review of Nova Scotia Power Inc.’s (“**NS Power**”) “*CI 50518 - HYD Ruth Falls Main Dam Refurbishment Authorization To Overspend*” Application (referred to in this report as “**the ATO Application**”), NSUARB Matter M11927. NS Power, a wholly owned subsidiary of Emera Incorporated, is a vertically integrated electric utility regulated by the NSUARB.

The ATO Application follows the initial application for NS Power’s “*2019 Annual Capital Expenditure (ACE)*” Application (referred to in this report as “**the Original Application**”), NSUARB Matter M08984, which was originally filed in November 2018 and approved by the NSUARB in May of 2019.

In the ATO Application, NS Power requests that the NSUARB approve an Authorization to Overspend (“**ATO**”) on its originally approved project budget by \$8,201,806. This would bring the total Project budget to \$15,445,508.¹

While Midgard understands its mandate is to review NS Power’s ATO Application on behalf of NSUARB Counsel (with specific focus on NS Power’s actions since the close of the Original Application proceeding), the extended timeline of this project in general and extended regulatory schedule of NS Power’s filing necessitates some review of past evidence and decisions that reflect directly on this current application.

Note that throughout this report Midgard uses the term “**the Project**” to refer generally to the Ruth Falls Dam Refurbishment Project.

The findings stated within this report are the professional opinion of Midgard and are based on a review of the information described in Section 1.4.

1.1 Overview of the Ruth Falls Main Dam

The Ruth Falls Dam, located near Sheet Harbour in Nova Scotia, Canada, is part of the East River hydroelectric system, which has been generating power for the region since the late 19th century. Constructed in 1925, the facility has an installed capacity 7.2 MW. Its physical structure includes the main and wing dams, which are 32.8 feet high, as well as a spillway that spans 1,190 feet. The dam’s power canal is 8,000 feet long, with an exposed canal area of 30,795 m².²

NS Power’s proposed Ruth Falls Main Dam Refurbishment Project includes the following NSUARB-approved scope of work:³

¹ M11927, Exhibit N-1, p. 1 of 10.

² NS Power, *Hydro Asset Study*, Appendix B, Section 2.15, Table 12, p. 39. [Link](#).

³ M11927, Exhibit N-1, p. 1 of 10.

- Refurbish the Ruth Falls Main Dam embankments to address slope stability deficiencies and ensure compliance with Canadian Dam Association (“**CDA**”) Guidelines for all loading conditions.
- Replace the existing sluiceway gates with screw stem vertical lift gates to enhance operational functionality and structural stability under Inflow Design Flood (“**IDF**”) and earthquake conditions.
- Install rubber dams on the left portion of the dam (looking downstream) and construct an uncontrolled overflow spillway on the right portion to meet design flow requirements.
- Strengthen the spillway structure to address stability deficiencies and ensure its ability to pass the required design flood safely.
- Procure required materials in 2019, including rubber dams and vertical lift gates, with construction activities scheduled for 2020.

At the time of writing, NS Power has progressed with planning and preliminary activities for the refurbishment of the Ruth Falls Main Dam. However, beginning in 2019, the Project encountered challenges related to evolving regulations and interpretations of a 2019 amendment of the Fisheries Act. This change in the Fisheries Act resulted in additional and previously unforeseen environmental permitting requirements.

These included securing authorizations from Fisheries and Oceans Canada (“**DFO**”), the Nova Scotia Department of Environment and Climate Change (“**NSECC**”), and Transport Canada’s Navigation Protection Program.

After the Original Application, NS Power followed typical industry practice and submitted a Request for Review to DFO as a prudent step to establish adequate diligence and protect it from potential sanction under the federal Fisheries Act. Based on its interpretations of the 2019 Fisheries Act and evolving policies therefrom, DFO concluded that a Fisheries Act Authorization (“**FAA**”)⁴ would be required. This determination resulted in a four-year ordeal to have its application for FAA accepted as complete and resulted in the introduction of new conditions for fish passage design and the implementation of an Environmental Offsetting Program. All of these necessitated additional studies, design efforts, and construction activities. These requirements were not anticipated in the original Project budget and contributed to delays in the construction schedule. At the time of this writing, DFO has yet to grant an FAA.

The extended timeline has resulted in increased Project costs due to shifts in market pricing for materials such as concrete and steel, as well as additional labour requirements to support ongoing project and environmental management efforts. Further, enhanced engagement with the Mi’kmaq of Nova Scotia and archaeological investigations were undertaken to address concerns about pre-contact archaeological sites and the environmental impacts associated with lowering the reservoir level.

⁴ DFO, *Project planning: Applying for a Fisheries Act authorization*, [Link](#). A FAA permits activities that may cause the death of fish or harm to fish habitat, as required under the Fisheries Act. It includes terms for mitigation, offsetting, and monitoring to manage impacts on aquatic environments.

- 1 The impacts of permitting challenges, construction delays, and additional engagement and mitigation
2 measures form the basis for the variance reported as part of the ATO Application.⁵

1.2 Application Context

- 3 NS Power's ACE Plan process, guided by adherence to the Capital Expenditure Justification Criteria ("CEJC"),
4 ensures that capital expenditures undergo scrutiny and justification within the regulatory framework.

- 5 The Original Application, submitted as NSUARB Matter M08984, was filed in November 2018 and approved
6 by the NSUARB in May 2019. Its purpose was to provide customers, the NSUARB, and other stakeholders with
7 an overview of NS Power's planned capital expenditures for the upcoming year.

- 8 The Original Application sought approval for \$190.4 million in capital projects, including the Ruth Falls Main
9 Dam Refurbishment Project, which was the largest hydro capital project in the filing. NS Power estimated a
10 total cost of \$7,244,422 for the Ruth Falls project, with \$1,561,074 allocated for expenditure in 2019. This
11 allocation was subsequently approved in May 2019.⁶

- 12 In the ATO Application, NS Power is seeking approval from the NSUARB to exceed its initially approved
13 project budget by \$8,201,806, raising the total project budget to \$15,445,508.⁷

1.3 Report Structure

- 14 To organize its report, Midgard reviewed a previously stated requirement for an ATO justification noted by
15 NS Power in its 2012 General Rate Application proceeding:

- 16 *"In requesting an ATO, Nova Scotia Power must show that it acted prudently and with due diligence*
17 *and that the project remains economically justified and in the best interests of customers."*⁸

- 18 Midgard has viewed NS Power's application through the lens of these requirements. This report is structured
19 to address the following questions:

- 20 1. Are the cost increases being sought in the ATO the result of prudent actions by NS Power? To answer
21 this question, Midgard analyzes the three "Reasons for Variance" that NS Power provided in the ATO
22 Application:
23 a. Environmental Permitting Requirements (Section 2)
24 b. Extended Construction Timeline (Section 3)
25 c. Archaeology and Mi'kmaq Engagement (Section 4)

⁵ M11927, Exhibit N-1, pp. 2-3 of 10.

⁶ M08984, NSPI 2019 ACE Plan, Decision, Schedule A, p. 32.

⁷ M11927, Exhibit N-1, p. 1 of 10.

⁸ M04104, NSPI 2012 GRA, Exhibit N-8, Liberal RIR-19, p. 1 of 1.

2. Does the Project continue to be in the best economic interest of ratepayers after accounting for the overspending for which authorization is being sought (Section 6)?

In view of this, Midgard has organized its report as follows:

- Section 2: Review of the “Environmental Permitting Requirements” reason for variance.
- Section 3: Review of the “Extended Construction Timeline” reason for variance.
- Section 4: Review of the “Archaeology and Mi’kmaq Engagement” reason for variance.
- Section 5: Analysis and Conclusions on Overspending amounts by category, in consideration of the given reasons for variance.
- Section 6: Consideration of whether the Project continues to be in the economic interest of ratepayers.

1.4 Overview of Information Reviewed

Table 1 contains a summary of documentation in this proceeding reviewed by Midgard during the preparation of this report.

Table 1: Relevant Proceeding Documentation Reviewed by Midgard

Exhibit #	Document
N-1	ATO Application
N-2	Letter of Comment
N-3	NSPI (CA) RIR-1 to 18
N-4	NSPI (IG) RIR-1 to 10
N-5	NSPI (Midgard) RIR-1 to 6
N-6	NSPI (NSUARB) RIR-1 to 13
N-7	NSPI (SBA) RIR-1 to 4

1.5 Site Visit

On September 8, 2021, Midgard staff member Michael Potyok attended the Ruth Falls Main Dam site for a site visit led by NS Power and attended by NSUARB staff. Midgard would like to thank NS Power and its on-site team for their courtesy and hospitality in arranging the site visit and for making themselves available for questions and discussion during the site visit.

1.6 Report Contributors

This report was contributed to by the following individuals, whose curricula vitae are attached as Appendix A.

- Michael Potyok, P.Eng., MBA
- Sam Mason, P.Eng.
- Matthew Matusiak, P.Eng.

2 REASON FOR VARIANCE: ENVIRONMENTAL PERMITTING REQUIREMENTS

In the ATO Application, NS Power cites “Environmental Permitting Requirements” as one of three reasons for variance, stating:

“Additional project costs of approximately \$4.4 million are directly attributable to the additional work required to obtain the necessary environmental permits from Fisheries and Oceans Canada (DFO), Nova Scotia Department of Environment and Climate Change (NSECC), as well as an authorization in accordance with Transport Canada’s Navigation Protection Program to temporarily lower the Ruth Falls Reservoir by approximately 18 feet while constructing the new dam.”⁹

In this section, Midgard assesses this reason for variance.

2.1 Fisheries Act Authorization

2.1.1 NS Power Submission

In the ATO Application, NS Power states:

“Subsequent to the approval of the original filing, NS Power was required to obtain a Fisheries Act Authorization (FAA) for the work from DFO, which was not required at the time of original filing. This FAA contained new conditions around fish passage requirements as well as requirements for NS Power to implement an Environmental Offsetting Program. The costs associated with the required studies, design, and construction of fish passage per the FAA were approximately \$3 million and the project costs associated with the Environmental Offsetting Program were approximately \$1.3 million.”¹⁰

Between NS Power and the DFO, several key communications and milestones have taken place in relation to the Ruth Falls Project, with both parties engaging in a series of submissions, responses, and requests for additional information:¹¹

1. In March 2020, DFO informed NS Power that Fisheries Act authorization was required for the Project. NS Power submitted its FAA application in June 2020, but DFO requested further details in August, including information on fish habitat, an offsetting plan, and operational procedures. NS Power responded by providing the requested materials, including a plan developed with the Confederacy of Mainland Mi’kmaq and a drawdown monitoring plan.
2. In 2021, DFO requested more information due to changes in the Project’s scope, and NS Power submitted a watercourse alteration application to address a portion of the Project separately. This

⁹ M11927, Exhibit N-1, p. 2 of 10.

¹⁰ M11927, Exhibit N-1, p. 2 of 10.

¹¹ M11927, Exhibit N-1, pp. 1-3 of 10.

work was approved and completed in 2022, and NS Power clarified the broader Project scope and submitted updated supporting documents, including third-party monitoring plans. Further requests for supplemental information were made in 2022, to which NS Power responded with additional studies and plans, including those related to fish passage and hydraulic modeling.

3. By 2023, DFO had requested additional clarifications, particularly regarding the post-construction monitoring plan, fish habitat, and offsetting plans. NS Power made the necessary revisions and submitted the updated information. In December 2023, DFO asked for further revisions and more details on wetland and fish entrainment monitoring. NS Power responded with the required clarifications.
4. In early 2024, DFO identified remaining considerations that may require modifications to NS Power's proposal. Feedback from the Mi'kmaq of Nova Scotia was also received in June 2024, prompting additional requests for offsetting and monitoring clarifications.

2.1.2 Analysis – Amendments to the Fisheries Act

Significant changes to the federal Fisheries Act were enacted in 2012. These changes changed the previous focus of the Fisheries Act to protect the "sustainability and ongoing productivity of commercial, recreational or Aboriginal fisheries" as opposed to protecting all fish more broadly. Section 35 of that version of the Act, stated:

*"No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery."*¹²

"Serious harm to fish" was defined in Subsection 2(2) of the Fisheries Act as:

*"...the death of fish, or any **permanent** alteration to, or destruction of, fish habitat".*¹² [emphasis added]

Two important considerations of this prohibition were:

1. The constraint of application to "commercial, recreational or Aboriginal fishery" as opposed to the previous application to all fish; and
2. The application to "permanent alteration"

The most significant impact expected from the Project results from the proposed drawdown of the reservoir to enable dam crest works to be carried out in the dry. While subject to debate, it can be argued that the drawdown of the reservoir would have resulted in non-permanent effects.

Midgard concludes that NS Power was acting reasonably in expecting that, at the time of its original ACE filing, an FAA would not have been required.

¹² Government of Canada, Fisheries Act, R.S.C., 1985, c. F-14 (Previous Version 2013-11-25 to 2015-02-25), Section 35(1). [Link](#).

In June 2019, the Fisheries Act was again amended, this time to largely reverse the previous 2012 amendments. A new Section 34.4 (1) states:

“No person shall carry on any work, undertaking or activity, other than fishing, that results in the death of fish.”¹³

This definition results in a much broader application of the Fisheries Act. All reference to “permanent alteration” has been removed. It was under this new version of the Fisheries Act that NS Power submitted a Request for Review.

In May 2023, DFO published a new position statement “The Management of Existing Facilities and Structures under the Fisheries Act and the Species at Risk Act”. That document states:

*“The purpose of this statement is to outline the position and approach of Fisheries and Oceans Canada (the Department) with respect to the application of the fish and fish habitat protection provisions of the Fisheries Act, in combination with relevant provisions of the Species at Risk Act and the Aquatic Invasive Species Regulations, to an existing facility or structure, in or near water frequented by fish, **including a facility or structure that was constructed prior to the enactment of these provisions.**”¹⁴ [emphasis added]*

The position further states that a person who carries on, owns, or has the charge, management or control of an existing facility or structure:

“Is responsible for ensuring that the ongoing operation, modification, maintenance, decommissioning or any work, undertaking or activity associated with an existing facility or structure, is in compliance with the Fisheries Act and the Species at Risk Act. However, if the construction of the existing facility or structure precedes the enactment of the fish and fish habitat protection provisions of the Fisheries Act or relevant provisions of the Species at Risk Act, then impacts resulting from the construction (i.e., death of fish or harmful alternation, disruption or destruction of fish habitat from the construction of the facility or structure) are outside the scope of these provisions.”¹⁵

It is presumed that under this policy DFO established expectation that the alteration of the Ruth Falls Dam constituted a “modification” and would therefore be subject to the new requirements under the act. This includes the requirement for a new fish ladder to allow for the migration of the previously excluded species of American Eel, which constituted a significant increase in scope over the originally filed project.

¹³ Government of Canada, Fisheries Act, R.S.C., 1985, c. F-14, Section 78.2, p. 28. [Link](#).

¹⁴ Government of Canada, *The Management of Existing Facilities and Structures under the Fisheries Act and the Species at Risk Act*, Position Statement, p. 3. [Link](#).

¹⁵ Government of Canada, *The Management of Existing Facilities and Structures under the Fisheries Act and the Species at Risk Act*, Position Statement, p. 5. [Link](#).

2.1.3 Analysis – DFO Correspondence

In December 2019, NS Power submitted a Request for Review¹⁶ for its Ruth Falls Main Dam Refurbishment Project. Section 78.6 of the Fisheries Act states:

*“No person shall be convicted of an offence under this Act if the person establishes that the person...
...exercised all due diligence to prevent the commission of the offence; nor reasonably and honestly
believed in the existence of facts that, if true, would render the person’s conduct innocent.”*

The Request for Review is generally considered a prudent approach to establish that diligence.

In a March 13, 2020, response, DFO identified several project components, including replacing stoplog bays with rubber dams, adding an uncontrolled overflow spillway, resurfacing concrete crests, and constructing cofferdams and temporary access roads. The works also involved fish migration measures and a 2.1–4.6 meter headpond drawdown, affecting up to 1.35 km² of the littoral zone.¹⁷ Midgard confirmed the described scope aligned with the 2019 ACE Plan filing. DFO concluded the works were likely to harm fish and fish habitat, necessitating a FAA.

NS Power’s mitigation and offsetting proposals, submitted in its June 24, 2020, FAA application, aimed to address impacts on fish and fish habitat under the new Fisheries Act and evolving interpretations and regulations. The application included measures such as fish passage systems, adherence to best practices, and a 5:1 offsetting ratio to account for risks associated with incomplete project designs.¹⁸ This higher ratio exceeded typical prior standard practice, which in Midgard’s experience, was closer to a 2:1 risk adjusted habitat offsetting ratio.

DFO’s response on August 4, 2020, deemed the FAA application incomplete, citing the need for detailed offsetting plans and noting challenges due to limited project details and the drawdown’s residual impacts:

“We understand that NSPI would like to combine offsetting work for Sloane and Ruth Falls as they are within the same watershed. With both projects being delayed to 2021, sufficient time is available for NSPI to provide additional details related to planned offsetting.”¹⁹

In Midgard’s experience, DFO has historically accepted conceptual offsetting plans and this case marked a shift toward requiring detailed designs, delaying approval and prompting NS Power to refine its plans further.

¹⁶ DFO, *Request For Review*, [Link](#). A Request for Review is submitted to DFO to assess potential impacts on fish and fish habitat under the Fisheries Act and determine if a Fisheries Act Authorization is required.

¹⁷ M11927, Exhibit N-6, NSUARB RIR-12, Attachment 1, pp. 1-3 of 3.

¹⁸ M11927, Exhibit N-6, NSUARB RIR-12, Attachment 2, Section 16.0, p. 22 of 50.

¹⁹ M11927, Exhibit N-6, NSUARB RIR-12, Attachment 3, p. 2 of 3.

While Midgard did not review NS Power's initial estimate of impacted habitat, subsequent data (a 2006 bathymetric map) suggested the estimate incorporated elements beyond subjective evaluation.²⁰

Previously discussed amendments to the Fisheries Act introduced new requirements, forcing DFO to adapt without a clear policy framework, resulting in inconsistent, case-by-case project approvals. The evolving requirements underscored uncertainties arising from the transition away from the previous Act's "serious harm" language.²¹

*"The modernization of the Fisheries Act in 2019 included the addition of previously removed provisions on "death of fish" and the "Harmful Alteration, Disruption or Destruction (HADD) of fish habitat", and considerations for impacts to Indigenous Peoples of Canada. These provisions directly relate to the interpretation of impacts to fish and fish habitat as a result of the temporary drawdown and overall regulatory review process for the Ruth Project."*²²

On July 8, 2021, DFO acknowledged NS Power's updated project scopes and timelines, requesting a new Request for Review:

*"As per communication from NS Power on July 6, 2021, the Program understands that the scope of work and timelines will change for the proposed project. Please provide a new Request for Review document to the Program that describes the revised scope of work and associated timelines."*²³

DFO declined to provide feedback on prior submissions due to these changes:

*"As changes to the scope of work and timelines are being proposed by the proponent, we are not providing comments [on] the previous Fisheries Act Authorization application or supporting documents (including proposed monitoring plan) at this time."*²³

Successive DFO communications demanded increasingly detailed submissions from NS Power, yet concerns persisted. While the application was deemed "complete" by January 2024,²⁴ subsequent communications, including a June 6 email, raised unresolved issues related to Mi'kmaw concerns and DFO's technical comments on the monitoring plan.²⁵

²⁰ M11927, Exhibit N-6, NSUARB RIR-12, Attachment 4, pp. 55-57 of 57.

²¹ M11927, Exhibit N-6, NSUARB RIR-12, Attachment 2, Section 10.0, Table 5, pp. 15-17 of 50.

²² M11927, Exhibit N-3, CA RIR-4(c), p. 2 of 2.

²³ M11927, Exhibit N-6, NSUARB RIR-12, Attachment 5, p. 2 of 2.

²⁴ M11927, Exhibit N-6, NSUARB RIR-12, Attachment 13, p. 1 of 2.

²⁵ M11927, Exhibit N-6, NSUARB RIR-12, Attachment 14, p. 1 of 3.

2.1.4 Conclusion

While the Project was initially developed in accordance with earlier frameworks and included mitigation and offsetting proposals, the 2019 amendments to the Fisheries Act introduced new requirements that triggered the need for a FAA. Historically, habitat offsetting projects have been approved with conceptual plans, supported by letters of credit. However, in this instance, DFO's evolving expectations necessitated more detailed submissions. As a result, DFO rejected the initial and supplemental proposals, delaying the approval process until further information on the Project's potential impacts could be submitted.

Midgard's opinion is that despite its best efforts, NS Power had little choice but to invest significant time and effort in attempting to meet a series of changing and increasingly detailed requests for alterations and additional information from DFO – each of which imposed schedule and cost requirements on NS Power.

Ultimately, Midgard concludes that the changing context of the Fisheries Act and resulting consequences on NS Power's Project execution process has imposed significant costs on NS Power, and ultimately on its ratepayers. However, these costs were a necessary response to evolving regulatory requirements and, in Midgard's opinion, represent an appropriate investment to secure compliance with the amended Fisheries Act. These costs are reviewed in further detail in the sections below, where specific cost allocations and their justifications are outlined. Midgard also views NS Power's actions in navigating these challenges as generally prudent, in its attempts to respond to DFO's requests in the face of an evolving regulatory environment.

2.2 Watercourse Alteration Permit

2.2.1 NS Power Submission

In the ATO Application, NS Power stated the following with respect to its application for a Watercourse Alteration Permit with the Nova Scotia Department of Environment and Climate Change ("NSECC"):

"NS Power applied for the Watercourse Alteration Permit on December 17, 2019 and received the Permit Approval on June 30, 2024."²⁶

In response to IRs NS Power provided additional detail, including a table outlining its correspondence with NSECC (reproduced as Table 2 below), as well as copies of said correspondence.

²⁶ M11927, Exhibit N-1, p. 2 of 10.

Table 2: NS Power Correspondence with NSECC²⁷

NSECC Communication	Date Received	NS Power Response	NS Power Response Date	Attachment Reference
		Watercourse Alteration Approval Application submitted to NSECC	December 16, 2019	1
Additional Information Requested	January 7, 2020	NS Power provided a letter response to NSECC	February 27, 2020	2 & 3
Additional Information Requested	March 25, 2020	NS Power provided a letter response to NSECC	June 22, 2020	4 & 5
Additional Information Requested	March 31, 2021	NS Power provided an updated project and environmental description and associated appendices to NSECC	April 9, 2021	6 & 7
Additional Information Requested	June 18, 2021	NS Power provided an updated project and environmental description and associated appendices to NSECC	February 14, 2022	8, 11 & 12
		NS Power submits standalone Watercourse Alteration Approval Application for the sluice gate and control building scope of work	July 17, 2021	9
Approval issued for sluice gate and control building scope of work	October 22, 2021			10
Additional Information Requested	April 1, 2022	NS Power provided and updated project and environmental description and associated appendices to NSECC	May 6, 2022	13 & 14
		NS Power applied for an amendment to extend the expiry date of the Watercourse Alteration Approval for the sluice gate and control building scope	July 8, 2022	15
Amended Approval issued for sluice gate and control building scope	September 7, 2022	NS Power submitted a completion of work form to NSECC indicating the control building scope had been completed. The Sluice gate scope was not completed	September 22, 2022	16 & 17
Additional Information Requested	December 9, 2022	NS Power submitted an updated project and environmental description and associated appendices	March 20, 2023	18 & 19
Additional Information Requested	May 25, 2023	NS Power submitted an updated project and environmental description and associated appendices	August 21, 2023	20 & 21
Watercourse Alteration Approval Received	July 31, 2024			22

²⁷ M11927, Exhibit N-3, CA RIR-5(a), pp. 1-3 of 3.

2.2.2 Analysis

Midgard has conducted a high-level review of the extensive correspondence between NSECC and NS Power. Midgard does not have direct experience or background with NSECC processes and interactions, and is therefore not in a position to provide an opinion on whether or not the NSECC process as part of this Project should have been foreseeable by NS Power at the time of the Original Application.

Nevertheless, Midgard's review of the provided correspondence suggests that in general NS Power was responding appropriately and promptly to NSECC's requests. Moreover, it appears that the requests from NSECC were at times "piecemeal" (i.e., additional issues being raised only after unrelated answers provided by NS Power).

An issue that arose repeatedly in NS Power's correspondence with NSECC was NS Power's inability to provide finalized design drawings and contractor documentation to NSECC. Midgard notes that NS Power did not have these documents primarily due to the shifting Project design and schedule, which itself was caused by NS Power needing to adapt to changing request from DFO.

2.2.3 Conclusion

In Midgard's opinion NS Power was acting reasonably in its interactions with NSECC. The delays associated with the watercourse alteration permit issuance appear to stem from issues that originally initiated with the DFO FAA process (i.e., not having design or contractor documentation available to provide to NSECC).

NS Power has not detailed how much of its \$4.4 million in cost overages that it attributes to Environmental Permitting Requirements is due to its interactions with DFO vs NSECC. However, this question is likely immaterial – NSECC costs appear to stem primarily from delays associated with DFO, and therefore the "cause" of both cost centers appears to be the same (DFO requirements).

Midgard concludes that this is a valid reason for variance, which will inform Midgard's comments on the quantity of the cost increases, as discussed in Section 5.

2.3 Navigable Waters Authorization

2.3.1 NS Power Submission

In response to IRs, NS Power stated:

"NS Power applied for a Navigable Waters Authorization on April 30, 2021. This application is submitted through TC's online Navigation Protection portal. A copy of the email confirming

1 *submission of the application is provided in Attachment 23. Authorization has not yet been received*
2 *and is expected to be issued at the same time as DFO authorization.”²⁸*

3 **2.3.2 Analysis**

4 There is little information provided on this permit – the referenced attachment is an automated email
5 response from 2021.

6 Review of the Transport Canada website shows two applications for the Ruth Falls dam (the second having
7 been submitted in July 2021), both listed as “In Progress”. Furthermore, the East River is not listed as a
8 “Scheduled” waterway by Transport Canada, meaning that the review requirements are decreased and in
9 some cases are even voluntary.

10 **2.3.3 Conclusion**

11 Based on the limited information available, Midgard does not have any reason to doubt NS Power’s
12 expectation that an authorization will be issued in due course, and considers this to be an area of low risk to
13 the project. The navigable waters permit does not appear to have had a material contribution to the cost
14 overruns for which approval is being sought in the ATO.

15 Midgard concludes that this is a valid reason for variance, which will inform Midgard’s comments on the
16 quantity of the cost increases, as discussed in Section 5.

²⁸ M11927, Exhibit N-3, CA RIR-5(b), p. 3 of 3.

3 REASON FOR VARIANCE: EXTENDED CONSTRUCTION TIMELINE

In the ATO Application, NS Power cites “Extended Construction Timeline” as one of three reasons for variance, stating:

“As a result of the additional work required to address environmental permitting requirements, the construction timeline was extended leading to increased project costs of approximately \$2 million. The project costs submitted as part of the original Application were established in 2018; however, as a result of the additional environmental permitting requirements, construction is now deferred until 2025 and 2026. There have been substantial pricing shifts in concrete and steel commodity markets since 2018, resulting in increased costs. There have also been increases in the amount of project support labour, technical support labour, and term environmental support labour as a result of the extended construction timeline.”²⁹

In this section, Midgard assesses this reason for variance.

3.1 Inflation

3.1.1 Analysis

Midgard has referenced additional metrics to provide context to NS Power's claim that an extended construction timeline contributed significantly to the \$2 million cost variance. The Consumer Price Index (“CPI”) is a measure of the average change in prices over time for a basket of goods and services commonly purchased by households. It serves as a general indicator of inflation and helps track price trends across various sectors of the economy. Table 3 outlines the CPI trends for Nova Scotia, comparing May 2019 (approval of the Original Application) and October 2024 values:

Table 3: Nova Scotia CPI Trend³⁰

Description	May 2019	October 2024	Increase (%)
Nova Scotia CPI (All Items)	137.8	164.6	19.4%

The CPI indicates a general increase in economic pressures, offering context for broader trends that may indirectly affect material costs. However, while the CPI provides a benchmark for inflation, it does not capture the unique price dynamics of materials like concrete and steel, which are influenced by global markets, supply chain issues, and local factors.

²⁹ M11927, Exhibit N-1, p. 3 of 10.

³⁰ Statistics Canada, *CPI, Monthly, Not Seasonally Adjusted*. [Link](#). Index: 2002 = 100.0.

The Industrial Product Price Index (“**IPPI**”) measures the price changes of products sold by manufacturers in Canada, tracking fluctuations in the cost of goods at the factory gate before taxes and transportation costs. Unlike the CPI, the IPPI specifically includes categories such as construction materials and cement, which are closely tied to the materials cost increases reported by NS Power. It serves as a more targeted indicator of inflationary trends in the production sector, reflecting economic pressures on these relevant material costs over time. Specifically, the material cost increases described by NS Power correspond most closely to the following IPPI categories:

1. Machinery and equipment [P72]: Accounts for items like generators and other equipment.
2. Cement, glass, and other non-metallic mineral products [P81]: Relevant due to increased costs for concrete works.

Table 4 illustrates trends in the IPPI between May 2019 and October 2024, highlighting the price increases for categories directly associated with the materials used in NS Power’s project. Notable increases are seen in machinery and equipment, as well as cement, glass, and other non-metallic mineral products—categories closely tied to construction activities:

Table 4: Canada IPPI Trend³¹

Description	May 2019	October 2024	Increase (%)
Total, IPPI	101.4	127.2	25.4%
Machinery and equipment [P72]	100.0	121.9	21.9%
Cement, glass, and other non-metallic mineral products [P81]	100.4	137.5	37.0%

The IPPI data suggests that an increase for inflationary reasons on the order of 25.4% across all sectors is in line with general economic trends. However, more specific categories, such as and cement, glass, and other non-metallic mineral products, have experienced a sharper rise of 37.0%.

3.1.2 Conclusion

In general Midgard concludes that NS Power did face an environment of dramatically increasing costs from the time of its original submission to the time of the ATO Application. Inflationary pressures, as seen in both CPI and IPPI data, explain part of the material cost increase, particularly in categories like concrete and fabricated metal products, with inflation data in these areas showing increases on the order of 35-40% from the time of the Original Application to the ATO Application.

³¹ Statistics Canada, *IPPI, Monthly, Not Seasonally Adjusted*. [Link](#). Index: 2001 = 100.0.

Midgard concludes that this is a valid reason for variance, which will inform Midgard's comments on the quantity of the cost increases, as discussed in Section 5.

3.2 Additional Labour Costs

3.2.1 Analysis

In the ATO Application states:

*"...there have also been increases in the amount of project support labour, technical support labour, and term environmental support labour as a result of the extended construction timeline."*³²

Given the updated environmental permit requirements and the need for additional regulatory oversight, the increased labour and material costs reflect actions taken to address these challenges. The four staff types associated with regular labour costs—Hydro River Staff, Environmental Staff, Administrative Support, and Project Support Staff³³—represent necessary resources for managing the project's complexity, regulatory compliance, and extended timeline. The allocation of costs across these staff categories aligns with the Project's evolving needs. Additionally, overtime labour, which constitutes a modest portion of the overall variance, typically represents a prudent strategy to control costs while maintaining project timelines.

NS Power was asked to elaborate on the cost minimization efforts made with respect to labour costs, to which NS Power responded:

*"Cost minimization will be realized by using internal labour rather than contracted labour at a marked-up rate during the upcoming monitoring during the nine months drawdown of Ruth Falls reservoir. NS Power also sought to minimize internal labour costs by incorporating lessons learned in preparing other FAA and Watercourse Alteration Approval applications to reduce the amount of questions asked by regulators and the additional work required to answer the questions. The Company also assigned internal labour resources to the Project that were already familiar with the Sheet Harbour Hydro System and the requirements of its operation, environmental considerations, and geographic constraints."*³⁴

3.2.2 Conclusion

Faced with the increased regulatory requirements that emerged as NS Power progressed the Project, it is Midgard's view that NS Power had little choice but to increase the amount of effort that its internal resources dedicated to the Project, which necessarily incurs additional costs.

³² M11927, Exhibit N-1, p. 3 of 10.

³³ M11927, Exhibit N-6, NSUARB RIR-11(c) p. 3 of 7.

³⁴ M11927, Exhibit N-3, CA RIR-9(a), p. 3 of 3.

- 1 Furthermore, NS Power's cost minimization efforts, including the use of internal labour and efforts to reduce
- 2 regulatory delays, reflect a commitment to due diligence. These measures align with NS Power's
- 3 responsibility to ensure economic efficiency while meeting the Project's requirements.
- 4 Midgard concludes that this is a valid reason for variance, which will inform Midgard's comments on the
- 5 quantity of the cost increases, as discussed in Section 5.

4 REASON FOR VARIANCE: ARCHAEOLOGY AND MI'KMAQ ENGAGEMENT

In the ATO Application, NS Power cites “Archaeology and Mi’kmaq Engagement” as one of three reasons for variance, stating:

*“Further engagement with the Mi’kmaq of Nova Scotia and archaeological investigation was required to understand and meaningfully address concerns associated with the protection of pre-contact First Nations archaeological sites and other environmental issues associated with the lowering of the Ruth Falls Reservoir 18 feet below the minimum operating level. This has led to additional costs of approximately \$400,000.”*³⁵

In this section, Midgard assesses this reason for variance.

4.1 Archaeology

4.1.1 NS Power Submission

In response to IRs, NS Power indicated that the ATO has increased the archaeological costs for the project from \$2,256 to \$250,361, as indicated in Table 5:

³⁵ M11927, Exhibit N-1, p. 3 of 10.

Table 5: Ruth Falls Archaeological Costs³⁶

Description	UARB Approved Original Submission	ATO Submission	Variance
Archaeological Reconnaissance and Mitigation for Dewatering of Ruth Falls Reservoir in 2025-2026: To complete archaeological reconnaissance during the drawdown of the Ruth Falls headpond in 2025-2026 and complete preliminary historical background and predictive modeling report.	-	\$106,302	\$106,302
Archaeology Security costs: Costs to provide security for the exposed pre-contact First Nations archaeological sites on the reservoir during the drawdown of Ruth Falls reservoir in 2025-2026.	-	\$133,900	\$133,900
Methodology and Costing for Archaeological Screening: Additional costs related to methodology and costing for archaeological screening	\$2,256	\$7,966	\$5,710
Other historical costs	-	\$2,193	\$2,193
Total	\$2,256	\$250,361	\$248,105

NSPI goes on to explain why these costs were not included in the original application:

“NS Power was not aware the reservoir exhibited high potential for impacting archaeological resources prior to the original application. A desktop Archaeological Resource Impact Assessment (ARIA) was completed for the Ruth Falls headpond in 2023 to inform the development of an archaeological protection plan for the drawdown as referenced in CA IR-13, part (c), which determined the headpond was considered elevated potential to encounter archaeological resources.”

³⁷

4.1.2 Analysis

Though NS Power suggests that it was not aware that there was a high potential for archaeological resources in the headpond, it also goes on to admit that exclusion of these costs was an oversight:

³⁶ M11927, Exhibit N-3, CA RIR-13(c), pp. 2-3 of 3. Table reproduced from NSPI submission (totals calculated and added by Midgard).

³⁷ M11927, Exhibit N-4, IG RIR-9(a), p. 1 of 2.

1 *“Archaeological costs for the drawdown for the Ruth Falls Project were not included in the original*
2 *application; this was an oversight by NS Power. ...”³⁸*

3 However, in the same passage, NS Power suggests that even if the costs had been included, they would have
4 been estimated at an immaterial level:

5 *“... However, the cost associated with an archaeological protection for a drawdown at the time of the*
6 *original application would have been immaterial compared to the revised costs in the ATO*
7 *application. As an example, an archaeological reconnaissance was conducted during the drawdown*
8 *of Wright’s Reservoir, as part of the Wright’s Dam Refurbishment project in 2015, by a qualified*
9 *archaeological consultant for approximately \$11,500. The area of Wright’s Reservoir is significantly*
10 *larger than Ruth Headpond.*

11 *Revised archaeological costs in NS Power’s ATO application are a result of increased expectations and*
12 *requirements for archaeological protection during extended drawdowns which have evolved since*
13 *2018.”³⁹*

14 Midgard has had direct experience with several projects that have involved shoreline archaeological
15 reconnaissance and/or security – the archaeological costs associated with these projects (as well as the
16 Wright’s Dam project referenced by NS Power) is summarized chronologically in Table 6, alongside the Ruth
17 Falls project:

Table 6: Comparison of Recent Project Archaeological Costs

Application	Date Filed	Archaeological Cost
Gaspereau Dam Safety Remedial Works (Original)	May 3, 2007	\$150,000 ⁴⁰
Wright’s Dam Refurbishment	2015	\$11,500
Tusket Falls Main Dam Refurbishment (Original)	July 5, 2017	\$194,893 ⁴¹
Ruth Falls Main Dam Refurbishment (2019 ACE Plan)	November 29, 2018	\$2,256
Gaspereau Dam Safety Remedial Works (ATO)	February 3, 2020	██████████ ⁴²
Tusket Falls Main Dam Refurbishment (ATO)	July 23, 2021	\$1,132,662 ⁴³
Ruth Falls Main Dam Refurbishment (ATO)	November 29, 2024	\$250,361

³⁸ M11927, Exhibit N-4, IG RIR-9(c), p. 2 of 2.

³⁹ Ibid.

⁴⁰ M09579, Exhibit N-1(C) (Application – Partially Confidential), p. 5 of 42.

⁴¹ NSUARB M08162, Exhibit N-1, Section 4.3, Figure 12, p. 27 of 48.

⁴² M09579, Exhibit N-1(C) (Application – Partially Confidential), p. 5 of 42.

⁴³ NSUARB M10197, Exhibit N-1, Section 3.4, Figure 7, p. 24 of 40. ATO states an increase of \$937,769; this amount has been added to the figure from the original application to arrive at the total stated archaeological cost.

Reviewing the timeline above suggests that at the time that the 2019 ACE Plan was being prepared, NSPI had the following experience with archaeological costs in addition to the Wright's Dam Refurbishment:

- Two submitted applications (the original Gaspereau and Tuskent applications) in which refurbishment or remediation of a dam was associated with archaeological costs on the order of \$150,000 - \$200,000.
- Was likely well into its process of updating Gaspereau archaeological costs, which were ultimately significantly increased in its ATO application.
- May have been in the process of updating Tuskent archaeological costs, which were ultimately significantly increased in its ATO application.

4.1.3 Conclusion

Midgard considers that the archaeological costs estimated in the Ruth Falls ATO are not overstated, and are in line with previously estimated amounts for Tuskent and Gaspereau. Furthermore, in the context of this ATO application, Midgard suspects that a failure to account for \$248,105 in the original ACE application would not materially affect the outcome of a decision on this capital expenditure.

However, it is Midgard's opinion that at the time of the ACE submission, given its recent experience with similar dam refurbishment (i.e., Tuskent, Gaspereau), NS Power should have been aware that archaeological costs for the Project would be several orders of magnitude higher than its estimated figure of \$2,256. Midgard therefore concludes that NS Power was not appropriately estimating this portion of its original costs, and that this therefore may not be a valid reason for variance. However, the magnitude of these costs is unlikely to have materially affected the outcome of the original decision.

This conclusion will inform Midgard's comments on the quantity of the cost increases, as discussed in Section 5.

4.2 Mi'kmaq Engagement

4.2.1 NS Power Submission

NS Power states that these costs are:

*"...required to cover additional monthly KMKNO capacity payments as a result of the project's extended timeline and service of the Mi'kmaq observer as a result of evolving expectations."*⁴⁴

⁴⁴ M11927, Exhibit N-3, CA RIR-13(b), pp. 2-3 of 3.

1 **4.2.2 Analysis**

2 The timeline for execution of the Project increased dramatically in response to evolving DFO requirements.
3 As a result of this extended timeline, as well as the changing project conditions, NS Power would have
4 necessarily been required to consult with KMKNO as the Project changed and progressed over time.

5 **4.2.3 Conclusion**

6 Midgard concludes that this is a valid reason for variance, which will inform Midgard's comments on the
7 quantity of the cost increases, as discussed in Section 5.

5 OVERSPENDING REVIEW

- 1 Table 7 provides a categorized breakdown of the Project's financial allocations, comparing the NSUARB-
- 2 approved amounts, the ATO submission amounts, and the resulting variances for each category.

Table 7: Ruth Falls Main Dam Refurbishment Variance Summary⁴⁵

Category	NSUARB Approved (\$)	ATO Submission (\$)	Variance (\$)
Labour (Reg, Term, OT)	\$177,052	\$722,529	\$545,477
Materials	\$1,520,000	\$2,928,689	\$1,408,689
Contracts	\$3,652,031	\$6,247,833	\$2,595,802
Consulting	\$246,562	\$1,877,234	\$1,630,672
Mi'kmaw Engagement	\$-		
Administrative	\$511,058	\$1,138,573	\$627,515
AFUDC	\$272,553	\$884,768	\$612,215
Other ⁴⁶	\$22,452	\$75,061	\$52,609
Contingency	\$842,715	\$1,342,714	\$499,999
Total	\$7,244,423		

- 3
- 4 In the following sub-sections, Midgard will analyze the variance of each category, applying its conclusions for
- 5 the "Reason for Variance" analyses in Sections 2, 3, and 4 in order to opine on the overall prudence of the
- 6 Project cost increases and the extent to which the submitted variances are justified.

5.1 Labour (Regular, Term, Overtime)

5.1.1 NS Power Submission

- 8 NS Power reported labour cost increases from the 2019 ACE to the ATO Application as detailed in Table 8 and
- 9 Table 9 which resulted in labour expense overspending of \$545,477.

⁴⁵ M11927, Exhibit N-1, pp. 7-8 of 10.

⁴⁶ "Other" includes the Project's Travel, Freight, Legal, Equipment Rental, Equipment, and Meal line items, which are grouped together for collective analyses.

Table 8: 2019 ACE Labour Costs⁴⁷

Description	Total Estimate (\$)
Hydro River Staff - Construction	\$4,225
Environmental Staff	\$5,738
Project Support Staff	\$162,701
Administrative Support	\$2,629
Project Support Term	\$1,759
TOTAL:	\$177,052

Table 9: ATO Application Labour Costs⁴⁸

Description	Total Estimate (\$)
Project Support - Engineering	\$619,734
Project Support - Engineering	\$6,186
Project Support - Environmental	\$96,609
TOTAL:	\$722,529

1

2 5.1.2 Analysis

3 Table 10 summarizes NS Power's detailed yearly breakdown of the labor cost variances resulting from the
4 extended construction timeline:

Table 10: Yearly Breakdown – Labour Variance⁴⁹

Year	Regular Labour (\$k)	Term Labour (\$k)
2017-2020	(\$19)	\$3
2021	\$85	\$0
2022	\$124	\$1
2023	\$56	-
2024	\$47	\$1
2025	\$104	\$30
2026	\$47	\$60
TOTAL:	\$446	\$95

5

⁴⁷ M08984, NSPI 2019 ACE Plan, Exhibit N-2(C), CI 50518, p. 4 of 4.

⁴⁸ M11927, Exhibit N-1, p. 7 of 10.

⁴⁹ M11927, Exhibit N-3, CA RIR-9(a), pp. 1-2 of 3.

NS Power's IR response also provides reasons, by year, for the overages. The regular and term labour variances are primarily attributed to efforts associated with managing permitting and associated project activities:⁴⁹

1. Regular Labour: driven by managing permitting activities with agencies (e.g., DFO), contract activities, and engineering work related to the controls building and fish passage upgrades. Costs also reflect ongoing management of project execution, environmental studies, and offsetting measures, with labour demands in the final months of the project to ensure completion and financial closure.
2. Term Labour: driven by managing site work associated with obtaining permits and executing permit conditions throughout the project. This includes support for environmental monitoring, post-construction activities, and ensuring compliance with the conditions outlined in the permits.
3. Overtime Labour: NS Power did not provide a breakdown in IRs of the overtime labour by year. However, its amount (\$6,186) is not material to the overall conclusion on labour overages.

5.1.3 Conclusion

The increased labour and material costs reported by NS Power stem from updated environmental permitting requirements and an extended timeline to meet regulatory conditions. The allocation of costs across regular labour categories, including Hydro River, Environmental, Administrative, and Project Support Staff, reflects the necessary resources to manage the project's complexity and ensure compliance. While overtime labour is modest, it supports efforts to control costs and maintain progress. Additionally, NS Power's use of internal labour and efforts to reduce regulatory delays demonstrate a responsible approach to managing expenses.

Based on these factors, Midgard concludes that the scope items associated with labour cost increases are reasonable, and that the quantity of the cost increases are reasonable. Therefore, Midgard concludes that the labour cost portion of the overspending is reasonable.

5.2 Materials

5.2.1 NS Power Submission

NS Power reported material cost increases from the 2019 ACE to the ATO Application as detailed in Table 11 and Table 12, which resulted in labour expense overspending of \$1,408,689.

Table 11: 2019 ACE Materials Costs⁵⁰

Description	Total Estimate (\$)
Gates and Actuators	
Rubber Dam (Supply)	
Compressor and Blower House	
TOTAL:	\$1,520,000

1

Table 12: ATO Application Materials Costs⁵¹

Description	Total Estimate (\$)
Supply of gates and actuators	\$193,640
Supply of rubber dams	\$525,187
Backup generator during winter construction	\$15,450
Generator for compressor building	\$125,000
Supply of insulated storage containers	\$15,487
Concrete, steel, electrical, piping, rebar	\$1,387,144
Fish passage upgrades including eel ramp	\$666,781
TOTAL:	\$2,928,689

2

3 In its IR Responses, NS Power provided an additional breakdown of the material cost overages – see Table 13.

⁵⁰ M08984, NSPI 2019 ACE Plan, Exhibit N-2(C), CI 50518, p. 4 of 4.

⁵¹ M11927, Exhibit N-1, p. 7 of 10.

Table 13: Material Cost Increase Breakdown⁵²

Description	Increase in Costs (\$k)
ADDITIONAL SCOPE: NEW PERMITTING REQUIREMENTS	
Fish passage upgrades	\$667
EXTENDED CONSTRUCTION TIMELINES	
Increased Material Costs - concrete works	\$689
Increased Material Costs - rebar dowels	\$196
General contract - steel walkway	\$176
Generator for the rubber dams control building	\$125
General contract - lighting system	\$100
Insulated storage containers (for rubber dams)	\$16
Back-up generator (winter construction)	\$15
Rubber dams control building	-\$20
Gates and actuators	-\$256
Rubber dam supply	-\$300
TOTAL:	\$1,408

5.2.2 Analysis – Additional Scope

NS Power attributes \$667k of costs to new scope, in the form of fish passage upgrades. This amount appears reasonable, and the DFO requirement for these upgrades is well documented.

5.2.3 Analysis – Extended Construction Timelines

The extended project timeline, resulting from delays in securing environmental permitting approvals, contributed to fluctuations in the costs of key construction materials, including steel and concrete. NS Power attributes \$741k of material cost overages to this factor.

As discussed in Section 3.1, Midgard analyzed inflation metrics for the Project region. The CPI showed a 19.4% rise in Nova Scotia since 2019, reflecting general economic pressures, while the IPPI revealed sharper increases in categories relevant to the project, such as cement and construction materials (37.0%). These trends align with the broader economic environment impacting material costs.

However, Midgard notes that the \$741k material cost increase due to extended construction timelines is composed of an increase of \$1,317k on seven line items, and a savings of \$576k on three line items. The \$1,317k increase represents an 87% increase over the original materials cost estimate of \$1,520 – an amount that would not appear to be fully explained by inflation.

⁵² M11927, Exhibit N-6, NSUARB RIR-10(a)(i), p. 3 of 7.

Furthermore, Midgard notes that the original 2019 ACE application included only three line items for materials: “Gates and Actuators”, “Rubber Dam (Supply)”, and “Compressor and Blower House”. However, NS Power nevertheless attributes increased material costs due to extended timeline to scope line items not found in the original 2019 ACE, such as “concrete works”, “rebar dowels”, and “steel walkway”.

Based on the scope of work described in the 2019 ACE, it would be expected that at least some concrete, rebar, and steel walkway work would be required. Therefore, it is possible that these costs were simply grouped in with one of the three presented categories. However, based on the information available, this remains unclear.

5.2.4 Conclusion

As Midgard noted in Section 3.1.2, NS Power was facing an environment of dramatically increasing costs between its Original Application and the ATO Application. On its face this would not appear to fully explain the 87% increase in those line items that did not see savings. That said, broad societal indices are not a substitute for project-specific information, and the inflation data available may not account for localized impacts related to specific regions, suppliers, contractors, etc. Broadly, Midgard’s analysis supports the assertion that there was significant inflationary escalation that contributed to NS Power’s overspending.

However, Midgard notes that this is a lack of clarity and concordance between the material cost line items in NS Power’s 2019 ACE Application and the ATO Application. While the three line items present in the 2019 ACE material cost were all apparently acquired at a net savings to the Project, there is nevertheless an 87% increase attributable to new material cost line items, but which NS Power has categorized as being caused by “Extended Construction Timelines” (i.e., not due to “Additional Scope”).

There are several possible explanations for this discrepancy:

- NS Power was categorizing material costs differently between the 2019 ACE and the ATO Application.
- Some material costs have been attributed to “Extended Construction Timelines” which should actually be considered “Additional Scope”.
- Some costs have been classified as “Materials” in the ATO Application, which were previously categorized differently (e.g., “Contracts”).
- NS Power erred in its original estimation of material costs for the 2019 ACE.

From the information provided it is unclear if there are other contributing factors to these line items, or if there are in fact also scope increases incorporated into these line items.

At a high level Midgard notes that the overall increase in material costs (93%) is in line with the overall cost increase for the Project as a whole (113%), and therefore does not on its face appear unreasonable.

- 1 However, it is not possible to make a conclusive determination of the reasonableness of the material costs
- 2 due to the conflicting information currently available. Midgard recommends that NS Power provide
- 3 additional clarification on the reasons for and categorization of material cost overages.

5.3 Contracts

5.3.1 NS Power Submission

- 5 NS Power reported contract cost increases from the 2019 ACE to the ATO Application as detailed in Table 14
- 6 and Table 15, which resulted in contract expense overspending of \$2,595,802.

Table 14: 2019 ACE Costs – Contracts⁵³

Description	Total Estimate (\$)
Contractor Costs (Mob/Demob, etc.)	████████
Environmental Controls	████████
Site Access (Roads, Laydown Areas, Staging, etc.)	████████
Crane Rental and Operation	████████
Dewatering — Cofferdam & Pumping	████████
Gate Installation & Modification to Gate Guides	████████
Concrete Installation	████████
Rubber Dam Installation	████████
Access Walkway (approx. 200')	████████
Access Bridge (approx. 200')	████████
Embankment Dam Upgrades (Riprap, etc.)	████████
Construction Supervision	████████
Methodology and Costing for Archaeological Screening	████████
Engineering Support	████████
Concrete Removal & Disposal	████████
TOTAL:	\$3,652,031

⁵³ M08984, NSPI 2019 ACE Plan, Exhibit N-2(C), CI 50518, p. 4 of 4.

Table 15: ATO Application Costs – Contracts⁵⁴

Description	Total Estimate (\$)
General Contract - LNTP	\$1,136,916
Mobilization / Demobilization	\$125,000
Environmental Management	\$25,000
Water Controls	\$60,000
Concrete Works	\$1,033,440
Rubber Dam Installation	\$225,000
Vertical Lift Gates Installation	\$150,000
Earthworks, retaining wall	\$25,000
Rubber Dam Inspection	\$37,520
Wiring electrical to Compressor Building	\$61,801
Pre-clearing nesting bird survey	\$9,336
Concrete testing	\$45,332
Escalation costs due to execution deferral	\$612,787
Archaeology related costs	\$232,573
Vegetation removal	\$67,738
New Upstream Eel Ramp	\$368,658
Upstream Fishway upgrades	\$995,722
Downstream Louvre System upgrades	\$265,658
Construction supervision	\$374,451
Engineering support for envir. permitting	\$15,443
Construction demolition activities	\$360,000
Barn swallow nest removal	\$10,735
Bird habitat building construction	\$9,725
TOTAL:	\$6,247,833

1

- 2 NS Power reported contractor Administrative Overhead (“AO”) cost increases from the 2019 ACE to the ATO
- 3 Application as detailed in, which resulted in contract expense overspending of \$286,012.

⁵⁴ M11927, Exhibit N-1, p. 7 of 10.

Table 16: Contractor Administrative Overhead Cost Increase

Category	NSUARB Approved (\$)	ATO Submission (\$)	Variance (\$)
Contractor Administrative Overhead	\$438,973	\$724,985	\$286,012

1

2 5.3.2 Analysis - Contracts

3 NS Power attributes the increase in contracting costs, totalling \$2,595,802, to new scope items that were not
4 included in the 2019 ACE Plan Application. These costs are driven by additional project requirements such as
5 fish passage upgrades, construction supervision, and archaeological mitigation efforts. The year-over-year
6 breakdown of these costs is summarized in Table 17, which outlines the individual new scope items and their
7 associated costs.

Table 17: Contracting Cost Increase Breakdown⁵⁵

Description	New Scope Items (\$k)
Fish Passage upgrades	\$1,630
Limited Notice to Proceed	\$331
Construction supervision	\$241
Security services during archaeological mitigation	\$134
Equipment rental costs	\$91
Vegetation removal	\$68
Electrical work to wire compressor building	\$62
Concrete testing	\$45
Rubber dam inspection in 2024	\$37
Engineering support for environmental permit application	\$15
Barn Swallow nest removal	\$11
Bird habitat building construction	\$10
Pre-tree clearing nesting bird survey	\$10
Methodology and costing for archaeological screening	\$6
SUBTOTAL	\$2,689⁵⁶

⁵⁵ Exhibit N-6, NSUARB RIR-10(b)(ii), p. 4-5 of 7.

⁵⁶ In comparing contracting cost increases, Midgard note a discrepancy between the \$2,595,802 delta reported in the ATO Application and the \$2,689,000 delta provided in IR responses, a difference of \$93,158. For consistency, Midgard's analysis relies on the ATO Application value, as it

NS Power attributes the contract cost increase to several new scope items. Notable items include:

1. Fish Passage Upgrades (\$1,630,000): Updated environmental permit requirements, including design, construction, and installation
2. Construction Supervision (\$241,000): Extended timeline and project execution delays
3. Security Services (\$134,000): Environmental permit requirements and First Nations archaeological site mitigation, requiring increased monitoring.

When compared to the original contracting costs in the Original Application, the expanded scope is evident, with significant increases in several areas, such as installation of the rubber dam, concrete works, and construction supervision, each tied to the larger and more complex scope of work now required. For example:⁵⁷

1. Concrete Installation: The original estimate was [REDACTED] but the revised application reflects higher costs in this area due to changes in design, materials, and labor requirements.
2. Site Access and Environmental Controls: The original estimates were [REDACTED] and [REDACTED], respectively, reflecting minor increases that correspond with expanded construction activities and compliance with environmental regulations.

In total, the contracting cost increase of \$2,595,802 is driven by these additional scope items and the evolving requirements of the Project.

NS Power evaluated cost minimization opportunities during the extended project timeline. In 2021, while waiting for approvals from DFO and NSECC, NS Power issued a Limited Notice to Proceed (“LNTP”) to the Contractor, allowing mobilization and early site preparation work:

“The Contractor mobilized to site, cleared vegetation, grubbed the laydown area, laid out safety and environmental storage containers, started working on the access roads downstream of the dam, and demobilized from site. This work allowed NS Power to minimize the amount of deferral costs (i.e. price of construction labour/accommodations/fuel for mobile equipment) that year.”⁵⁸

However, while the LNTP aimed to minimize prolonged delays and associated escalation costs, it resulted in an incurred cost of \$331,000. This cost reflects the mobilization, demobilization, and preparatory work required under the LNTP, which, although necessary for keeping the Project moving forward, still contributed to the overall increase in contracting costs.

is the official figure submitted for regulatory review. However, Midgard recommends that NS Power reconcile this discrepancy to ensure clarity in the reported costs.

⁵⁷ M08984, NSPI 2019 ACE Plan, Exhibit N-2(C), CI 50518, p. 4 of 4.

⁵⁸ M11927, Exhibit N-3, CA RIR-11(b), p. 1 of 2.

1 Later in 2021, NS Power further explored cost minimization opportunities, focusing on completing parts of
2 the Ruth Falls main dam refurbishment without a drawdown, due to delays in the DFO Fisheries Act
3 Authorization process:

4 *“It was evaluated whether refurbishment of the sluiceway scope and new control building could be*
5 *completed with the headpond at normal supply level via a stand-alone Watercourse Alteration*
6 *Approval in July 2021...”⁵⁹*

7 Safety concerns required integrating these tasks into the broader dam refurbishment, limiting cost
8 minimization efforts. However, the construction of the rubber dam control building was completed by
9 September 2022, helping reduce deferral costs related to concrete, steel, labor, and mobile equipment fuel.⁶⁰

10 **5.3.3 Analysis – Contractor Administrative Overhead**

11 NS Power attributes the \$286,012 increase in Contractor AO costs to the expanded project scope and
12 extended timeline driven by environmental permitting requirements. These factors increased the complexity
13 of contractor coordination and administrative support needed for the delayed Project. Table 18 provides a
14 detailed breakdown of these costs as reported by NS Power.

⁵⁹ M11927, Exhibit N-3, CA RIR-11(b), p. 2 of 2.

⁶⁰ Ibid.

Table 18: Contractor Administrative Overhead Cost Increase⁶¹

Year	Total Contract Costs	Contractor Administrative Overhead Rate Applied	Total Contractor Administrative Overhead
2017	\$2,256	10.76%	\$243
2018	\$8,028	9.71%	\$780
2019	\$1,027	12.02%	\$123
2020	\$22,269	9.75%	\$2,172
2021	\$641,718	10.08%	\$64,704
2022	\$727,217	8.38%	\$60,926
2023	(\$27,224)	11.36%	(\$3,092)
2024 ⁶²	\$37,520	12.30%	\$4,613
2025 (Estimated)	\$4,445,491	12.30%	\$546,619
2026 (Estimated)	\$389,532	12.30%	\$47,897
Total	\$6,247,834		\$724,985

1

2 NS Power attributed the \$286,012 increase in contractor AO costs to two key factors: increased contract
3 costs and an extended project timeline:

- 4 1. Increased Contract Costs: AO charges are directly proportional to total contract costs. These costs
5 rose significantly due to new scope items, higher commodity prices, and additional work required to
6 meet regulatory demands.
7 2. Extended Project Timeline: Delays in securing environmental permits prolonged the schedule,
8 leading to deferred execution and increased contract activity. This extended timeline required
9 sustained contractor oversight and administrative management, further driving up AO costs.

10 Efforts to minimize contractor costs, as outlined in Section 5.3.2, directly mitigated additional contractor AO
11 costs. NS Power confirmed that every dollar of contract investment attracts a proportional AO charge,
12 making these cost minimization measures integral to controlling the AO variance.⁶³

⁶¹ M11927, Exhibit N-3, CA RIR-16(a), pp. 1-2 of 2.

⁶² 2024 includes actual costs to August 31, 2024, and forecasted costs for the remainder of the year.

⁶³ M11927, Exhibit N-3, CA RIR-16(b), pp. 2 of 2.

5.3.4 Analysis – Archaeology

As discussed in Section 4.1, Midgard is of the opinion NS Power should have been aware that archaeological costs for the Project would be several orders of magnitude higher than its estimate in the 2019 ACE.

Archaeological costs are not a first-level category of costs in either the 2019 ACE or the ATO Application. However, Midgard notes that \$232,573 of costs under “Contracts” are allocated to “Archaeology Related Costs”. It is not clear how the “Contracts” portion of archaeology costs concord with NS Power’s stated archaeology costs in IR responses, as presented in Section 4.1.1.

5.3.5 Conclusion

1. Contracts: The \$2,689,000 increase in contract costs reflects the expanded project scope and evolving requirements, including fish passage upgrades, construction supervision, and archaeological mitigation. While the \$331,000 incurred under the LNTP appears counterintuitive to cost savings, it enabled preparatory work during regulatory delays, mitigating broader escalation risks.

Based on the above factors, Midgard concludes that the scope items associated with contract cost increases are reasonable, and that the quantity of the cost increases are reasonable. Therefore, Midgard concludes that the contract cost portion of the overspending is reasonable.

2. Contractor AO: The \$286,012 increase in contractor AO costs is due to the expanded scope and extended timeline caused by environmental permitting delays. As contractor AO charges are linked to contract costs, the increase in contractor coordination and administration was inevitable. Despite cost minimization efforts, the prolonged project timeline required additional contractor oversight, justifying the AO cost increase.

Based on the above factors, Midgard concludes that the Contractor AO cost portion of the overspending is reasonable.

3. Archaeology: As discussed in Section 4.1, Midgard considers that archaeological costs may not be a valid reason for variance. In that case, cost overages associated with these would not be considered reasonable.

5.4 Consulting

5.4.1 NS Power Submission

NS Power reported consulting cost increases from the 2019 ACE to the ATO Application as detailed in Table 19 and Table 20, which resulted in consulting expense overspending of \$1,630,672.

Table 19: 2019 ACE Application Costs – Consulting⁶⁴

Description	Total Estimate (\$)
Design	\$142,281
RFP Support	\$6,000
Construction Support	\$17,500
Environmental	\$4,780
KMKNO Capacity Payments	
TOTAL:	

1

Table 20: ATO Application Costs – Consulting⁶⁵

Description	Total Estimate (\$)
Conceptual / Detailed design of refurb.	\$231,374
Juvenile Gaspereau Entrainment Study	\$135,199
Wetland delineation and functional assessment	\$22,971
Wetland & Fish Habitat Monitoring	\$55,405
Archaeological Reconnaissance	\$108,495
Design of fish passage upgrades	\$192,102
Post-construction monitoring	\$309,000
Offsetting (West River Project)	\$547,142
3D Hydraulic Modelling	\$117,545
Environmental maintenance flow assessment	\$1,539
Electrical work on Compressor Building	\$3,664
Fish Count and review	\$120,399
Electrical work during construction	\$32,400
TOTAL:	\$1,877,234

2

⁶⁴ M08984, NSPI 2019 ACE Plan, Exhibit N-2(C), CI 50518, p. 4 of 4.

⁶⁵ M11927, Exhibit N-1, p. 7 of 10.

5.4.2 Analysis

NS Power attributes the \$1,630,672 in consulting cost increase to compliance with the Fisheries Act Authorization, including:⁶⁶

- Fish ladder, louvres, and eel ramp improvements verification
- Post-construction monitoring for environmental permits
- Detailed engineering designs for fish passage upgrades with 3D modeling
- Development of monitoring programs for:
 - Wetlands
 - Fish passage
 - Fish entrainment
 - Drawdown (required by NS Environment and DFO)
- Archaeological assessments and mitigation efforts per Crown-Mi'kmaq consultation agreements

There is little concordance between the scope line items between the 2019 ACE and the ATO Application. However, Midgard observes that the vast majority of the consulting costs in the ATO Application are directly attributable to environmental and fish related costs. Such increases can be considered to stem directly from the increased requirements on the Project due to DFO requirements, as discussed in Section 2.1.

5.4.3 Analysis – Archaeology

As discussed in Section 4.1, Midgard is of the opinion NS Power should have been aware that archaeological costs for the Project would be several orders of magnitude higher than its estimate in the 2019 ACE.

Archaeological costs are not a first-level category of costs in either the 2019 ACE or the ATO Application. However, Midgard notes that \$108,495 of costs under “Consulting” are allocated to “Archaeological Reconnaissance”. It is not clear how the “Consulting” portion of archaeology costs concord with NS Power’s stated archaeology costs in IR responses, as presented in Section 4.1.1.

5.4.4 Conclusion

From the information provided, the vast majority of the consulting cost increases are directly linked to increased Project requirements associated with environmental protection and with fish. As previously discussed, Midgard considers these to be valid reasons for variance.

Based on these factors, with the exception of the archaeological reconnaissance costs, Midgard concludes that the scope items associated with labour cost increases are reasonable, and that the quantity of the cost

⁶⁶ M11927, Exhibit N-1, p. 5 of 10.

1 increases are reasonable. Therefore, Midgard concludes that the labour cost portion of the overspending is
2 reasonable.

3 As discussed in Section 4.1, Midgard considers that archaeological costs may not be a valid reason for
4 variance. In that case, cost overages associated with these would not be considered reasonable.

5.5 Mi'kmaw Engagement

5.5.1 NS Power Submission

6 NS Power did not report "Mi'kmaw Engagement" as a separate cost category in the 2019 ACE, however it did
7 include [REDACTED] for "KMKNO Capacity Payments". The Mi'kmaw engagement costs given in the ATO
8 Application are presented in Table 21.

Table 21: ATO Application Mi'kmaw Engagement Costs⁶⁷

Description	Total Estimate (\$)
KMKNO capacity agreement payments	[REDACTED]
Mi-kmaq observer during construction	[REDACTED]
TOTAL:	[REDACTED]

9
10 In response to IRs, NS Power indicated that the ATO has increased the Mi'Kmaq engagement costs for the
11 Project from [REDACTED] to [REDACTED], as indicated in Table 22:

Table 22: Ruth Falls Mi'kmaq Engagement Costs⁶⁸

Description	UARB Approved Original Submission	ATO Submission	Variance
Additional KMKNO Capacity Payments: To provide the KMKNO with necessary resources to meaningfully engage with NS Power.	[REDACTED]	[REDACTED]	[REDACTED]
Mi'kmaq observer: Member of the Mi'Kmaq community observe the drawdown and archaeological work in 2025 (per month: \$20/hr x 40 hrs/wk. x 4 weeks + expenses)	[REDACTED]	[REDACTED]	[REDACTED]
Total	[REDACTED]	[REDACTED]	[REDACTED]

⁶⁷ M11927, Exhibit N-1, p. 8 of 10.

⁶⁸ M11927, Exhibit N-3(C), CA RIR-13(c), pp. 2-3 of 3. Table reproduced from NSPI submission (totals calculated and added by Midgard).

1 This gives a total variance for Mi'kmaw engagement costs of [REDACTED].

2 **5.5.2 Analysis**

3 As discussed in Section 4.2.2, Midgard considers that NS Power would necessarily have had to conduct
4 significantly more Mi'kmaw engagement as a result of the dramatically increased Project timeline.

5 **5.5.3 Conclusion**

6 It is Midgard's view that the "Additional KMKNO Capacity Payments" increased costs are reasonable, as NS
7 Power was required to continue consultation with KMKNO as the Project changed.

8 With respect to the Mi'kmaq observer costs, as noted in Section 4.1, Midgard considers that NS Power could
9 have known at the time of its ACE submission that its archaeological costs were underestimated, which could
10 be considered to include the need for a Mi'kmaq observer of that archaeological work. However, the
11 magnitude of these costs is unlikely to have materially affected the outcome of the original decision.

12 Based on these factors, Midgard concludes that the scope items associated with Mi'kmaw engagement cost
13 increases are reasonable, and that the quantity of the cost increases are reasonable. Therefore, Midgard
14 concludes that the Mi'kmaw engagement cost portion of the overspending is reasonable.

5.6 Administrative Overhead

15 **5.6.1 NS Power Submission**

16 NS Power reported AO cost increases from the 2019 ACE to the ATO Application as detailed in Table 23 and
17 Table 24, which resulted in administrative overhead expense overspending of \$627,515.

Table 23: 2019 ACE Administrative Overhead Costs⁶⁹

Description	Total Estimate (\$)
Labour AO	\$72,085
Contractor AO	\$438,973
TOTAL:	\$511,058

Table 24: ATO Application Administrative Overhead Costs⁷⁰

Description	Total Estimate (\$)
Labour AO	\$413,588
Contractor AO	\$724,985
TOTAL:	\$1,138,573

⁶⁹ M08984, NSPI 2019 ACE Plan, Exhibit N-2(C), CI 50518, p. 4 of 4.

⁷⁰ M11927, Exhibit N-1, p. 8 of 10.

5.6.2 Analysis

NS Power attributes \$341,503 of its cost increases to Labour AO, driven by increased internal labor and changes in AO rates. The increase is a result of the original filing's estimation using 2020 AO rates, while the ATO filing reflects actual AO incurred and updated 2024 AO rates for future periods. Table 25 provides a detailed breakdown of these costs as reported by NS Power.

Table 25: Cost Increase – Administrative Overhead⁷¹

Year	Total Regular, Term and Overtime Labour	AO Rate Applied	Total AO
2017 ⁷²	\$16,312	51.90%	\$8,141
2018	\$21,446	42.69%	\$9,155
2019	\$36,107	39.29%	\$14,186
2020	\$71,116	37.16%	\$26,426
2021	\$101,011	40.28%	\$40,689
2022 ⁷³	\$131,361	46.15%	\$59,196
2023	\$55,732	55.46%	\$30,912
2024 ⁷⁴	\$47,588	77.70%	\$36,973
2025 (Estimated)	\$134,500	77.70%	\$104,500
2026 (Estimated)	\$107,356	77.70%	\$83,410
Total	\$722,529		\$413,588

NS Power explained the increase in AO costs over the past five years and the steps taken to minimize these costs where possible. NS Power attributed the increase in Labour AO costs to two key factors – increase in labor spend and higher AO rates:⁷⁵

1. Labor expenditures rose by \$545,477 compared to the original filing, reflecting higher regular and overtime labor costs.
2. The AO rate used in calculations increased significantly, from 39.29% in 2019 to 77.70% in 2024.

⁷¹ M11927, Exhibit N-3, CA RIR-15(a), pp. 1-2 of 2.

⁷² Prior to August 2017, AO was calculated based on individual employee rates. As such, individual differences will occur when calculating Administrative AO by multiplying Labour by the Admin AO rate.

⁷³ 50% of overtime labour is included for the purposes of the AO calculation. 2022 includes \$6,186 in overtime labour.

⁷⁴ 2024 includes actual costs to August 31, 2024, and forecasted costs for the remainder of the year.

⁷⁵ M11927, Exhibit N-3, CA RIR-15(c), p. 2 of 2.

To mitigate AO costs, NS Power has emphasized cost-efficiency strategies in the execution of the Project. NS Power states:

“Cost minimization will be realized by using internal labour rather than contracted labour at a marked-up rate during the upcoming monitoring during the nine months drawdown of Ruth Falls reservoir. NS Power also sought to minimize internal labour costs by incorporating lessons learned in preparing other FAA and Watercourse Alteration Approval applications to reduce the amount of questions asked by regulators and the additional work required to answer the questions. The Company also assigned internal labour resources to the Project that were already familiar with the Sheet Harbour Hydro System and the requirements of its operation, environmental considerations, and geographic constraints.”⁷⁶

NS Power demonstrated prudent cost management by prioritizing internal labor over costlier contractors, applying regulatory experience from similar projects, and using staff familiar with the Project's operational and environmental requirements. These optimization efforts likely prevented even higher administrative costs.

The AO variance of \$341,503 is justified by both underlying factors and NS Power's cost control measures. These costs are reasonable given the Project's extended timeline and complexities, which required more internal resources and longer labor commitments.

NS Power attributes an additional \$286,012 of AO costs to increases in Contactor AO. Midgard considers this to be a natural extension of the increases in Contract costs – see Section 5.3.

5.6.3 Conclusion

NS Power has described its efforts to minimize AO costs, which have increased as a result of the other increases throughout the Project budget. Based on the factors discussed above, Midgard concludes that the overspending associated with administrative overhead is reasonable.

5.7 AFUDC

5.7.1 NS Power Submission

NS Power reported Allowance for Funds Used During Construction (“AFUDC”) cost increases from the 2019 ACE to the ATO Application as detailed in Table 26 and Table 27, which resulted in labour expense overspending of \$612,215.

⁷⁶ M11927, Exhibit N-3, CA RIR-9(b), p. 3 of 3.

Table 26: 2019 ACE AFUDC Costs⁷⁷

Description	Total Estimate (\$)
AFUDC	\$272,553

Table 27: ATO Application AFUDC Costs⁷⁸

Description	Total Estimate (\$)
AFUDC	\$884,768

1

2 5.7.2 Analysis

3 NS Power attributes the increase in AFUDC interest, totaling \$612,215, to higher project costs, an expanded
4 project scope, and an extended project timeline.⁷⁹ This is reflected in the year-over-year growth of AFUDC
5 interest balances, as shown in Table 28, which also highlights the applicable rates used during the Project
6 timeline.

Table 28: Cost Increase – AFUDC Interest⁸⁰

Year	AFUDC Incurred During the Year	End of Year AFUDC Balance	Rate Used
2017	\$6,611	\$6,611	Feb-Dec 7.01% Jan-Dec 6.96%
2018	\$10,865	\$17,476	6.89%
2019	\$21,125	\$38,601	6.84%
2020	\$61,646	\$100,246	6.62%
2021	\$117,331	\$217,577	6.47%
2022	\$199,068	\$416,646	6.33%
2023	\$0	\$416,646	6.48%
2024 ⁸¹	\$0	\$416,646	Jan-Mar 6.48% Apr-Dec 6.72%
2025 (Estimated) ⁸²	\$315,106	\$731,751	6.72%

⁷⁷ M08984, NSPI 2019 ACE Plan, Exhibit N-2(C), CI 50518, p. 4 of 4.

⁷⁸ M11927, Exhibit N-1, p. 8 of 10.

⁷⁹ M11927, Exhibit N-1, p. 6 of 10.

⁸⁰ M11927, Exhibit N-5, Midgard RIR-4(b), pp. 1-2 of 2.

⁸¹ 2024 includes actual costs to August 31, 2024, and forecasted costs for the remainder of the year.

⁸² AFUDC was ceased as of January 2023 in line with policy 6240 – Allowance for Funds Used During Construction due to a forecasted delay in construction greater than one year. Construction forecasted to resume July 2025.

Year	AFUDC Incurred During the Year	End of Year AFUDC Balance	Rate Used
2026 (Estimated) ⁸³	\$153,017	\$884,768	6.72%

Table 29 summarizes the factors contributing to the \$612,215 increase in AFUDC.

Table 29: Factors Contributing to AFUDC Increase⁸⁴

Factor	Total Change Due to Stated Factor
Change in Interest Rates	(\$42,691)
Increase in Total Scope/Project Timeline	\$654,906

Table 14 shows the AFUDC increase stems primarily from expanded project scope and extended timeline, which contributed \$654,906 to costs. Interest rate fluctuations (6.33% to 7.01%) reduced costs by \$42,691, indicating that market factors had minimal impact on the overall variance.

The steady balance increase from 2017 to 2022, without significant offsets in 2023-2024, demonstrates the cumulative financial impact of prolonged timelines and sustained capital investment. Of the total \$612,215 increase, project scope expansion and timeline extensions were the primary drivers.

5.7.3 Conclusion

The AFUDC increase reflects extended project duration, expanded scope, and increased costs, all of which required sustained capital investment. This growth, evidenced by steady AFUDC balance increases from 2017 to 2022, aligns with expectations for projects of this scale and their long-term financial commitments. As discussion in Sections 2 and 3, Midgard considers scope increases and extended construction timeline (which are the primary drivers of cost increases) to be valid reasons for variance.

Based on these factors, Midgard concludes that the AFUDC cost increases are reasonable, and that the quantity of the cost increases are reasonable.

⁸³ Project estimated to be placed in-service March 2026.

⁸⁴ M11927, Exhibit N-5, Midgard RIR-4(b), pp. 2 of 2.

5.8 Other Costs

5.8.1 NS Power Submission

NS Power attributes various cost increases to additional travel, freight, legal, and meal expenses, driven by the sequenced construction approach, environmental compliance requirements, delivery of critical materials, and legal reviews. Table 30 provides a detailed breakdown of these costs as reported by NS Power.

Table 30: Cost Increase – Other Expenses⁸⁵

Description	NSUARB Approved (\$)	ATO Submission (\$)	Variance (\$)
Travel Expenses	\$17,074	\$28,819	\$11,745
Freight/Postage/Delivery	\$0	\$17,440	\$17,440
Legal	\$0	\$141	\$141
Meals	\$5,378	\$8,074	\$2,696
Equipment	\$0	\$4,473	\$4,473
Equipment Rental	\$0		

5.8.2 Analysis

The increase in the additional travel, legal, and meal expenses can be attributed to the extended construction timeline and associated environmental permitting requirements. Specific comments on each of expense is as follows:

- Travel Expenses:** Project delays from approval processes and additional regulatory requirements increased travel needs for NS Power personnel overseeing compliance and site activities. The sequenced construction approach and 2022 rubber dam controls building work further drove travel requirements.⁸⁶ The \$11,745 cost increase for travel expenses aligns with the Project's extended timeline and expanded scope.
- Legal:** Legal expenses of \$141, attributed to corporate legal fees, are reasonable and prudent as they represent necessary due diligence to mitigate risks and ensure unencumbered project progress. While minor, this variance aligns with NS Power's broader efforts to address permitting requirements and legal obligations, which drove the Project's extended timeline and increased costs.
- Meals:** Extended project timelines due to environmental approval delays and follow-up compliance work required prolonged on-site presence by NS Power staff and contractors. The resulting increase in meal expenses of \$2,696 aligns with the Project's extended schedule and expanded scope. While

⁸⁵ M11927, Exhibit N-1, pp. 5-6 of 10.

⁸⁶ M11927, Exhibit N-6, NSUARB RIR-12(c)(ii)(b), pp. 7-8 of 9. The total internal NS Power labour costs for the construction of the Rubber Dams Controls Building (May–October 2022) amount to \$69,915, which includes travel, meals, and equipment rentals.

meal costs represent a minor portion of the overall variance, they reflect the additional time demands on project personnel.

4. Equipment: These costs of \$4,743 are associated with the purchase of personal protective equipment for staff. In an environment of increased scope, such expense are expected.
5. Equipment Rental: These costs of [REDACTED] are associated with rental of an office trailer and boom truck during the rubber dam control building construction in 2022. In IR responses, NS Power explained why this was not included in the ACE Application:

“The assumption in the estimate included with the original filing anticipated the General Contractor would include the costs for the rental of on-site trailers/generators/fuel for the NS Power site supervision/environmental services personnel as part of their bid. However, the selected General Contractor did not include an allowance for these rental costs in their bid submission and must be added to the overall cost to execute the project as planned.”⁸⁷

While this can be considered an oversight in estimating by NS Power, Midgard considers that this may simply be part of the unknowns of the project planning process. Furthermore, the amount of costs in question is likely immaterial.

6. Freight: Midgard notes that freight costs associated with the delivery of rubber bladders and sluice gates, totaling \$17,440, were not included in the Original Application. NS Power explained the omission and variance as follows:

“Freight costs associated with delivery of rubber bladders and sluice gates were not included in the 2019 ACE Plan Application because at the time of submission, it was assumed that the rubber dams would be manufactured locally. However, through the competitive RFP process that was used to select the manufacturing vendor, the lowest cost option required the materials to be shipped from overseas.”⁸⁸

Midgard further notes that rubber dam costs were associated with a significant material cost savings (\$300k). Given the competitive procurement process and the ultimate savings, freight-related expenditures represent a prudent decision by NS Power to minimize overall project costs.

5.8.3 Conclusion

Based on the factors discussed above, Midgard concludes that the scope items associated with travel, meals, freight, equipment, equipment rental, and legal expenses are reasonable, and that the quantity of the cost increases for each are reasonable. Therefore, Midgard concludes that the overspending associated with each is reasonable.

⁸⁷ M11927, Exhibit N-6, NSUARB RIR-10(e), p. 7 of 7.

⁸⁸ M11927, Exhibit N-6, NSUARB RIR-10(c), p. 7 of 7.

5.9 Contingency

5.9.1 NS Power Submission

NS Power attributes \$500k of its cost increases to additional contingency. Table 31 provides a detailed breakdown of these costs as reported by NS Power.

Table 31: Cost Increase – Other Goods & Services (Contingency)⁸⁹

Description	NSUARB Approved (\$)	ATO Submission (\$)	Variance (\$)
Other Goods & Services (Contingency)	\$842,715	\$1,342,714	\$499,999

5.9.2 Analysis

NS Power states that contingency was expanded to address uncertainties surrounding the potential variability of Environmental Offsetting Program costs required by DFO. NS Power confirmed that the additional contingency is exclusively allocated to address uncertainty around DFO offsetting costs.⁹⁰

NS Power provided two key explanations regarding the determination and potential variability of contingency costs. First, contingency was calculated based on updated feedback from DFO, who indicated that the originally proposed 2,700 m² of offsetting was insufficient. In response, NS Power engaged the Confederacy of Mainland Mi'kmaq (CMM) to develop an updated offsetting plan. In describing how it determined the contingency amount, NS Power explained:

“NS Power estimated that approximately 20,000 m² could be expected as a sufficient offsetting amount based on the total size of area exposed as a result of the drawdown. NS Power used an average offsetting cost of \$25/m² based on costs of other projects executed to date. Another \$500,000 was added as a contingency to account for possible increases in the amount of offsetting required for the Project through DFO’s regulatory review and Crown consultation. The additional \$500,000 in contingency could increase the total amount of offsetting to 40,000 m² or more, as the cost per m² of offset decreases due to efficiencies gained in offset execution as more area is added.”

Second, NS Power acknowledged the potential for significant variance in offsetting requirements.⁹¹ While DFO has not yet specified a final offset amount, subsequent regulatory reviews and communications

⁸⁹ M11927, Exhibit N-1, p. 6 of 10.

⁹⁰ M11927, Exhibit N-5, Midgard RIR-4(a), p. 1 of 2.

⁹¹ M11927, Exhibit N-1, p. 6 of 10.

suggested it could be as high as 57,500 m².⁹² To address this, NS Power provided an estimate of the potential variance in costs, highlighting both the low-end and high-end scenarios:

“The potential variance ranges from \$320,000 to up to \$1.45 million. This range includes a 23 low-end estimate based on the budget for NS Power’s original offsetting plan for 2,700 m², and a high-end estimate based on the 57,000 m² referenced in DFO’s June 6th 2024 email. The high-end was derived from DFO as guidance to offset the Harmful Alteration, Disruption and Destruction (HADD) of fish habitat using the total area of the Ruth Headpond to be dewatered during the temporary drawdown, the duration of the drawdown, and an average cost of \$25/m² of offsetting to impact area using other NS Power projects which have undergone offsetting.”⁹³

NS Power clarified that it does not anticipate the high-end scenario being required but instead based its contingency estimate on the more reasonable 20,000 m² estimate at \$25/m², resulting in a total budget of \$1 million for offsetting, including contingency.⁹⁴

Midgard supports NS Power’s inclusion of the \$500,000 contingency for offsetting requirements as a prudent measure to address regulatory uncertainty. This contingency reflects evolving guidance from DFO, particularly the potential need for greater offsetting, while being grounded in a reasonable estimate of 20,000 m² at \$25/m².

5.9.3 Conclusion

Based on the factors discussed above, Midgard concludes that the overspending associated with additional contingency is reasonable.

⁹² M11927, Exhibit N-3, CA RIR-14(a), p. 1 of 2.

⁹³ M11927, Exhibit N-3, CA RIR-14(b), pp. 1-2 of 2.

⁹⁴ M11927, Exhibit N-3, CA RIR-14(b), p. 2 of 2.

6 ECONOMIC INTEREST OF RATEPAYERS

6.1 Appropriate Alternatives Considered

6.1.1 NS Power Submission

The Project involves the refurbishment of the Ruth Falls Main Dam's water-retaining structures, with five alternatives reviewed during the conceptual design phase.⁹⁵

1. Option 1: Replace the existing stoplogs with screw stem vertical lift gates.
2. Option 2: Replace approximately half of the existing stoplog bays, add an uncontrolled overflow section, and replace the remaining stoplog bays with screw stem vertical lift gates.
3. Option 3: Replace approximately half of the existing stoplog bays, construct an uncontrolled labyrinth spillway, and replace the remaining stoplog bays with screw stem vertical lift gates.
4. Option 4: Remove the stoplog bays, install rubber dams on the left portion of the dam (looking downstream), and install an uncontrolled overflow spillway and rubber dams on the right portion of the dam. The existing sluiceway gates would also be replaced with screw stem vertical lift gates.
5. Option 5: Construct a new dam immediately downstream of the existing dam, like Option 4, with an uncontrolled overflow section, deep sluice gates, and a rubber dam section.

Option 4 was ultimately chosen due to its cost-effectiveness, meeting operational requirements while being approximately \$500,000 cheaper than the next closest option.

NS Power asserts that it did not need to re-evaluate the options it considered as part of the ATO Application, since all of the options would be equally negatively affected by the FAA delays:

*"Re-evaluation was not necessary as all five options considered would have the same cost increases as a result of increases in costs associated with environmental permitting. A Fisheries Act Authorization with the same conditions would be required regardless of the option selected. All five options would also see increases in costs as a result of the deferral of construction and the construction cost differences between the five options remains the same."*⁹⁶

⁹⁵ M11927, Exhibit N-1, p. 5 of 10.

⁹⁶ M11927, Exhibit N-6, NSUARB RIR-7(a), p. 2 of 2.

6.1.2 Analysis

All of the alternatives considered by NS Power require the drawdown of the headpond, which is the primary driver of environmental permitting requirements and costs. When asked whether alternatives were considered which would not require drawdown, NS Power stated:

“NS Power considered the use of a cofferdam or bulkhead system to isolate the dam and provide a dry work area, both of which were considered infeasible due to the required size of a cofferdam structure to allow a dry work area and concerns around the safety of workers under significant head differential. NS Power also had concerns around the ability to safely manage water during construction as. an ROV survey of the existing sluiceway stop log checks confirmed the presence of several waterlogged and deteriorated stop logs making a dry seal for isolation difficult to achieve.”⁹⁷

Additionally, NS Power did not consider (either in the Original Application or the ATO Application) an option to decommission the Project entirely. NS Power has justified this as follows:

“The Company has not considered selling or decommissioning the Ruth Falls Generating Station. Ruth Falls is included in small hydro capacity and is a part of the path to achieve 2030 legislated requirements.”⁹⁸

And:

“The estimated remaining life on the Ruth Fall’s major components (e.g. turbines and generators), is estimated to be at least 14 years. Major replacement or refurbishment on two of the turbines planned for 2038 and generating units will be overhauled as necessary based on asset health assessments. As per the 2020 IRP conclusions, the long-term outlook supports continued sustaining investment in these small hydro assets over the 25-year planning horizon.”⁹⁹

6.1.3 Midgard Conclusion

NS Power’s justification for not considering an alternative that did not require drawdown of the headpond appears reasonable. Therefore, the “repair or replace” alternatives considered by NS Power are appropriate.

However, despite Project costs increasing by 113% and \$8.2M, NS Power has not re-evaluated its decision to not consider a decommissioning option. Midgard understands the stated justifications for this (that the Project is a part of NS Power’s plans to meet its legislated requirements and its IRP), however presumably this assertion is not true at any cost. As such, Midgard would suggest that the NSUARB should have been

⁹⁷ M11927, Exhibit N-5, Midgard RIR 6(b), pp. 1-2 of 2

⁹⁸ M11927, Exhibit N-4, IG RIR-4(b), p. 1 of 1.

⁹⁹ M11927, Exhibit N-4, IG RIR-8(a), p. 1 of 1.

afforded the ability as part of this proceeding to evaluate whether a decommission option would be in the best interest of NS Power's ratepayers. Given the extreme decommissioning cost options that have been presented in other recent proceedings it is likely that such an option would not be considered economic by NS Power. Again, Midgard suggests that this is a decision and outcome that should be put before the NSUARB for review and approval.

6.2 Potential Additional Cost Increases

6.2.1 NS Power Submission

In the ATO Application and in response to IRs, NS Power has asserted that its currently estimated cost estimate is a Class 1 estimate (as per AACE Standard 69R-12), with an expected accuracy range of -10% and +15%. Of note, the majority of the project costs are based on quotes from the general contractor, suppliers, or consultants.

NS Power is implying, therefore, that the currently estimated cost of \$15.4 M is reliable and unlikely to increase further. NS Power confirms this, stating:

*"NS Power does not expect further delays to the project which would affect the revised costs. The General Contractor was awarded the work, and the NSECC and Transport Canada permits were obtained in June 2024. NS Power continues to work towards receiving FAA from DFO as the Project cannot proceed until the FAA has been granted. This is contingent on satisfying additional information requests directed to NS Power through DFO's email on June 6, 2024."*¹⁰⁰

6.2.2 Analysis – Environmental Offsetting Costs

In response to DFO's regulatory review of NS Power's FAA application and the associated Crown consultation, NS Power was directed to evaluate additional offsetting for the project. As outlined in a follow-up email from DFO dated June 6, 2024:

*"In response to DFO's regulatory review of NS Power's Fisheries Act Authorization (FAA) application and Crown consultation, DFO directed NS Power to evaluate additional offsetting for the Project in a follow up email dated June 6, 2024. Please refer to NSUARB IR-12 Attachment 14 for a copy of this correspondence. In its original offsetting plan submitted to DFO as part of the FAA application, NS Power proposed 2,700 m of offsetting. DFO has not specifically requested NS Power provide a set amount but has referenced the required offset could be up to 57,500 m²."*¹⁰¹

¹⁰⁰ M11927, Exhibit N-6, NSUARB RIR-1(b), p. 1 of 1.

¹⁰¹ M11927, Exhibit N-3, CA RIR-14(a), p. 1 of 2.

In relation to the potential financial impact of additional offsetting, NS Power has provided an estimated cost variance for the Project:

“The potential variance ranges from \$320,000 to up to \$1.45 million. This range includes a low-end estimate based on the budget for NS Power’s original offsetting plan for 2,700 m², and a high-end estimate based on the 57,000 m² referenced in DFO’s June 6th 2024 email. The high-end was derived from DFO as guidance to offset the Harmful Alteration, Disruption and Destruction (HADD) of fish habitat using the total area of the Ruth Headpond to be dewatered during the temporary drawdown, the duration of the drawdown, and an average cost of \$25/m² of offsetting to impact area using other NS Power projects which have undergone offsetting. However, NS Power does not expect this high end estimate to be required by DFO and, as such, the Company estimated a reasonable variance of the cost of offsetting for the Project to be 20,000 m² based on feedback provided by DFO. NS Power used the average cost of 25/m² to determine a budget of \$500,000 for offsetting. The Company also included an additional \$500,000 in contingency to account for possible additional offsetting, should it be required by DFO through the regulatory review and Crown consultation process.”¹⁰²

However, NS Power does not expect this high end estimate to be required by DFO and, as such, the Company estimated a reasonable variance of the cost of offsetting for the Project to be 20,000 m² based on feedback provided by DFO. NS Power used the average cost of 25/m² to determine a budget of \$500,000 for offsetting. It is not clear how NS Power arrived at an estimated offsetting amount of 20,000 m².

Furthermore, Midgard notes that NS Power’s own estimate of the cost of offset works had a unit cost of [REDACTED]¹⁰³, and that the unit rate of \$25/m² was in fact suggested by DFO since this rate was used by NS Power on a previous project. It is not clear why NS Power now believes that the unit rate suggested by DFO is more appropriate than its original estimate.

6.2.3 Analysis – Archaeological Costs

Midgard notes the examples of the Tusket and Gaspereau projects identified in Table 6. For these projects archaeological costs were originally estimated at amounts that are comparable to the revised estimate in this ATO Application. However, the costs ultimately applied for in the ATO applications for each of those projects, respectively, were many times greater than the original estimate – 5.8x for the Tusket project, and [REDACTED] for the Gaspereau project.

¹⁰² M11927, Exhibit N-3, CA RIR-14(b), p. 1 of 2.

¹⁰³ M11927, Exhibit N-6(i)(C), NSUAR B RIR 12 Attachment 14b (Confidential)

While NS Power has already corrected the archaeological costs upwards significantly as part of this ATO Application, past experience suggests that there remains a risk of future significant increases.

6.2.4 Analysis – Geotechnical Issues

Geotechnical issues have only been explored in limited fashion thus far on the project. NS Power has not yet completed a detailed geotechnical investigation at the Project site:

“NS Power has not completed a detailed geotechnical investigation at the project site. Potential technical issues were reviewed during the conceptual design phase of the project, and the Company’s external engineering consultant was able to proceed with the detailed design phase and issuance of the IFC drawing package based on that review.”¹⁰⁴

Midgard notes that geotechnical issues (in the form of water ingress to dry work areas through bedrock cracks) have been a primary driver of millions of dollars of cost overruns on the Tusket Falls project. As such, this remains a risk area to the Project.

6.2.5 Conclusion

Midgard is concerned that the Project remains exposed to several risk areas (environmental compensation costs, archaeological costs, and geotechnical risks) that have the potential to cause additional overages to Project costs beyond the contingency allowances and Class 1 error bounds currently forming NS Power’s estimate. Had NS Power completed an analysis of a decommissioning option, it may be clearer to what extent Project costs could exceed the ATO estimate and not change the conclusion of an economic analysis (i.e., that reinvestment in the Project is in ratepayers’ best interests).

¹⁰⁴ M11927, Exhibit N-6, NSUARB RIR-6(b)(i), pp. 1-2 of 2.

7 SUMMARY AND CONCLUSIONS

7.1 Reasons for Variance

Midgard makes the following conclusions on the three reasons for variance presented by NS Power – see Sections 2, 3, and 4 for additional detail:

- **Environmental Permitting Requirements:** This is a valid reason for variance.
- **Extended Construction Timelines:** This stems from the environmental permitting requirements, and is a valid reason for variance.
- **Archaeology and Mi'kmaq Engagement:** The requirement for additional Mi'kmaq engagement stems from the environmental permitting requirements, and is a valid reason for variance. However, it is Midgard's opinion that at the time of the ACE submission, NS Power should have been aware that archaeological costs for the Project would be several orders of magnitude higher than its original estimate. Midgard therefore concludes that NS Power was not appropriately estimating this portion of its original costs, and that this therefore may not be a valid reason for variance.

7.2 Review of Overspending Amounts

Midgard makes the following conclusions (as summarized in Table 32) regarding the overspending amounts resulting from the above reasons for variance – see Section 5 for additional detail.

Table 32: Summary of Overspending Amount Conclusions

Cost Category	Midgard Conclusion
Labour	Reasonable
Materials	Recommend that NS Power provide additional clarity on the source of the material cost overspending.
Contracts	Reasonable, with the possible exception of archaeology-related costs, as archaeology may not be a valid reason for variance.
Consulting	Reasonable, with the possible exception of archaeology-related costs, as archaeology may not be a valid reason for variance.
Mi'kmaw Engagement	Reasonable
Administrative Overhead	Reasonable
AFUDC	Reasonable
Other Costs	Reasonable
Contingency	Reasonable

7.3 Economic Interest of Ratepayers

1 Midgard makes the following comments regarding the economic interest of ratepayers – see Section 6 for
2 additional detail.

3 7.3.1 Considered Alternatives

4 Despite Project costs increasing by 113% and \$8.2M, NS Power has not re-evaluated its decision to not
5 consider a decommissioning option. Midgard understands the stated justifications for this (that the Project is
6 a part of NS Power's plans to meet its legislated requirements and its IRP), however presumably this
7 assertion is not true at any cost. As such, Midgard would suggest that the NSUARB should have been afforded
8 the ability as part of this proceeding to evaluate whether a decommission option would be in the best
9 interest of NS Power's ratepayers.

10 7.3.2 Potential Additional Cost Increases

11 Midgard is concerned that the Project remains exposed to several risk areas (environmental compensation
12 costs, archaeological costs, and geotechnical risks) that have the potential to cause additional overages to
13 Project costs beyond the contingency allowances and Class 1 error bounds currently forming NS Power's
14 estimate. Had NS Power completed an analysis of a decommissioning option, it may be clearer to what
15 extent Project costs could exceed the ATO estimate and not change the conclusion of an economic analysis
16 (i.e., that reinvestment in the Project is in ratepayers' best interests).

APPENDIX A: CONTRIBUTOR CIRRICULUM VITAE

- 1 This appendix contains curricula vitae for the following report contributors:
- 2 ▪ Michael Potyok, P.Eng., MBA
- 3 ▪ Sam Mason, P.Eng.
- 4 ▪ Matthew Matusiak, P.Eng.

PROFILE

Mr. Potyok has over 25 years of commercial and technical experience in project permitting, design, construction and operation of hydroelectric project or dams. He has been a project developer, consultant, Independent Engineer, Owner's Engineer, project owner and operator while serving the hydropower industry in Canada and internationally. Additionally, Mr. Potyok has appeared as witness, expert in the design, permitting, financing, construction, and operation of small hydroelectric projects in front of an arbitration tribunal.

Over the past 17 years, he has worked on or evaluated over 50 hydroelectric projects that are either operational or in construction (ranging from as small as 250 kW to 1,000 MW), and over 100 additional projects that either remain in development or have been placed into abeyance. The broad exposure to so many projects, in different jurisdictions, has provided a deep understanding of the mechanics of hydro project design, construction, finance and operation.

A professional engineer, with a finance focused MBA he has combined a technical and financial background to successfully assume a strategic due diligence role on multiple assignments, providing comprehensive project review and evaluation on behalf of project lenders and other capital providers. These roles require not only an understanding of project design considerations and engineering properties, but also regulatory permits, construction contracts, Power Purchase Agreements, Interconnection Agreements, and operating and maintenance plans, that all combine to constitute a successful project and ensure long term safe and reliable operations.

Beyond a successful consulting career, Mr. Potyok incorporated a company with two partners to purchase and, for 3 years, own and operate a 10 MW run-of-river project in BC. That experience, in balancing the requirements of equity backers, lenders, provincial regulators and the power purchaser, while operating and maintaining the plant has provided hands on practical knowledge of operations and maintenance of small non-utility generating stations.

EXPERIENCE

OWNER'S ENGINEER / INDEPENDENT ENGINEER / LENDER'S ENGINEER

- Independent Engineer for regulatory agencies reviewing design and monitoring construction.
- Lender's Engineer for senior lenders evaluating project viability and certifying construction draws.
- Owner's Engineer providing strategic technical and financial advice to project owners and developers

PRELIMINARY ENGINEERING & PROJECT DEVELOPMENT

- Design of preliminary project layouts evaluating for energy potential, capital cost, permitability, & constructability.
- Financial feasibility analysis.
- Project permitting and environmental certificates
- Preparation of tender documents and specifications

M&A DUE DILIGENCE

- Technical due diligence of hydroelectric project portfolios in Canada, US and Internationally
- Risk profiling and asset valuation

DETAILED ENGINEERING & CONSTRUCTION MANAGEMENT

- Detailed design, drawings and specification for construction packages for earth dams.
- Resident Engineer managing multidisciplinary teams for construction supervision.

EMPLOYMENT

MIDGARD CONSULTING INC. <i>Principal, Vancouver BC</i>	2009 - Present
SKOOKUM POWER CORP. <i>Principal, Vancouver BC</i>	2009 - 2012
ELEMENTAL POWER DEVELOPMENT LTD. <i>Principal, Vancouver BC</i>	2001 - Present
GOLDER ASSOCIATES <i>Project Engineer and Construction Resident Engineer, Toronto/Vancouver/Santiago de Chile</i>	1995 - 2001

EDUCATION

MASTER OF BUSINESS ADMINISTRATION , University of Western Ontario, London	2001
BACHELOR OF SCIENCE, ENGINEERING , Queen's University, Kingston	1995

PROFESSIONAL REGISTRATIONS

PROFESSIONAL ENGINEER, BRITISH COLUMBIA
PROFESSIONAL ENGINEER, ONTARIO
PROFESSIONAL ENGINEER, SASKATCHEWAN

PROFILE

Graduate of the University of British Columbia's Mechanical Engineering program and recipient of the Leston Prize as his program's top graduating student. A detail-oriented and organized individual with a strong background in mechanical engineering fundamentals, project management, and the electric utility industry. Has strong written and verbal communication skills with a good understanding of audience needs. Experience with technical project design, project development, due diligence analysis, the regulation of utilities, and project management.

INDUSTRY EXPERIENCE

REGULATION OF UTILITIES

- Extensive experience in the regulated utility environment, having worked on regulatory and quasi-regulatory matters in British Columbia, Alberta, Ontario, Nova Scotia, and Newfoundland & Labrador.
- Author of numerous expert reports submitted as evidence in regulatory proceedings – both on behalf of intervenor organizations, and as a consultant to board counsel.
- Previously empaneled to give expert evidence in regulatory proceedings before the Nova Scotia Utility and Review Board and the Alberta Utilities Commission.
- Project lead in 25+ interventions on BCUC proceedings on behalf of the Residential Consumer Intervenor Association.
- Application and Cost of Service modelling in support of the creation of a new regulated utility in British Columbia.

PROJECT DEVELOPMENT

- Author and participant in multiple screening, pre-feasibility, and feasibility level project development studies.
- Involvement in the hydrological, energy, and financial modeling of projects, both to assess project feasibility and to optimize project configuration.
- Contributor to multiple final reports communicating the findings of technical work.
- Carried out a pre-feasibility study on the potential Anudol Creek hydroelectric project (8+ MW), located in northern British Columbia. Estimated costs and modeled hydrology, energy production, and economic performance.
- Carried out a feasibility study on the potential Betmai Falls hydroelectric project (25+ MW), located in Sierra Leone. Estimated costs and modeled hydrology, energy production, and economic performance.
- Carried out a feasibility study on the potential Grease Rapids hydroelectric project (20+ MW), located in northern Saskatchewan. Estimated costs and modeled hydrology, energy production, and economic performance.

DUE DILIGENCE

- Experience with the due diligence analysis of a variety of renewable resource projects, including the evaluation and modeling of the revenues and costs associated with mid-life energy projects.
- Evaluation of site visit materials and subsequent technical modeling for a variety of hydroelectric projects being considered for purchase by a Canadian client.
- Participant in owner's engineer work on behalf of the Zambia Electricity Supply Corp. Ltd. with respect to a proposed hydroelectric development.
- Detailed energy modeling (including hydrological modeling) of a hydroelectric asset in Idaho, USA, being considered for purchase by an American client.
- Participant in the evaluation of multiple renewable energy projects on behalf of the Ontario Finance Authority. Review and reporting on materials including technical, economic, and contractual aspects.

PROVINCIAL RESOURCE PLANNING & REGULATORY FILINGS

- Technical and economic modeling and reporting for Yukon Development Corp.'s Next Generation Hydro and Transmission Viability Study.
- Northwest Territories Long Term Power System Plan.
- Long-term resource plan for a FortisBC (including load forecasts, rate forecasts, load/resource balance, portfolio analysis).
- Multiple papers and reports on electricity markets, price forecasting, planning reserve margin, and various generation technologies.
- Province-wide hydroelectric inventory for Saskatchewan.
- Co-authored a report on pumped storage hydro technologies for very low head hydro applications.

TECHNICAL DESIGN

- Experience with technical design software, including AutoCAD, Solidworks, and PLS-CADD.
- Involvement in feasibility-level technical design of several hydroelectric generation and electrical transmission projects, including the use of design software and the preparation of drawings.
- Produced feasibility-level drawings in AutoCAD while also carrying out design work and quantity estimation using AutoCAD's Civil3D features.
- Performed clearance checks on a proposed fiber optic line in northwestern BC using PLS CADD, testing for extreme environmental conditions.
- Detailed design using AutoCAD Civil3D and Solidworks of several British Columbia run-of-river hydroelectric projects while on secondment to Kawa Engineering Ltd.

OPERATIONS

- 3 years of operating experience for a 10 MW run-of-river hydroelectric plant in southwest BC.
- Daily check-ins and monitoring through HMI interface and monthly site inspections.
- On-call for managing plant trips and getting the plant back on-line (after an outage).
- Project manager and on-site engineer for annual shutdown maintenance programs, including multiple pelton nozzle replacements, coanda screen replacements, intake sluice gate clearing, intake box de-sedimentation, headpond draining operations, exhaust fan maintenance, dye penetrant testing, transformer clean out, and general inspections.

EMPLOYMENT HISTORY

MIDGARD CONSULTING INC.

2011 - Present

Consultant, Vancouver BC

- Integral part of a small consulting firm with exposure to many aspects of the electricity industry.
- Provide consulting services to electric utilities, governments, First Nations, and developers.
- Focus on electrical transmission and generation design, resource planning, project feasibility analysis, project development, and project management.

EDUCATION & TRAINING

DESIGN OF OVERHEAD TRANSMISSION LINES USING PLS CADD

2013

- Power Line Systems, Inc.

BACHELOR OF APPLIED SCIENCE IN MECHANICAL ENGINEERING

2010

- University of British Columbia
- Recipient of the Leston Prize as top graduating student in "General" option.

PROFILE

A dependable and driven professional engineer with a Bachelor of Science in Electrical Engineering and work experience in technical analysis and project planning, project management, due diligence analysis, and business development activities in the energy industry. Emphasizes completing work in a safe and responsible manner and can convey results to multi-disciplinary personnel and clients through strong verbal and written proficiencies.

INDUSTRY EXPERIENCE

MIDGARD CONSULTING INC.

2021 - Present

Consultant, Vancouver BC

- Conducted comprehensive analyses of solar photovoltaic systems using PSS/E, assessing integration, performance, and grid impact, including power output, voltage stability, and response to transient conditions like voltage fluctuations, frequency variations, and disturbances.
- Conducted feasibility studies, developed conceptual designs, and estimated costs to support the early stages of project development.
- Managed project operations, including technical consultants, budget tracking, status reporting, regular discussions with other project managers, and overseeing construction plans, procurement, vendor selection, and commissioning activities.
- Managed an interdisciplinary team of engineers and specialists to engage in regulatory filings and preparation of expert reports for submission to the BC Utilities Commission.
- Provided audits of Pre-Construction Development Costs ("PCDC") of previously terminated Feed-in Tariff ("FIT") contracts from over 150 suppliers in Ontario.
- Conducted screening and on-site audits as Vendor of Record of Feed-in Tariff Contract facilities comprised of solar photovoltaic infrastructure.
- Authored and contributed to technical reports for consulting services and technical analysis.
- Integral part of a multidisciplinary consulting firm, providing services to electric utilities, municipalities, First Nations, and renewable energy developers across various aspects of the electricity industry.

CANADIAN NUCLEAR LABORATORIES

2021

Electrical Engineering Intern, Chalk River ON

- Designed retrofits and modifications to existing electrical engineering systems.
- Performed electrical power studies (e.g., load flow, short circuit, coordination, and arc flash) using power studies ETAP software.
- Prepared specifications of technical components for electrical systems.
- Prepared design documentation including design plans, concept reports, design requirements, design descriptions, design manuals, design guides, technical specifications, and technical notes.
- Engineering support during the construction, installation, and commissioning project phases.
- Customer liaison.
- Develop engineering specifications and standards facilitating a consistent design approach.

CANADIAN NUCLEAR LABORATORIES

2019 - 2021

Project Engineering Representative, Chalk River ON

- Interacted with design participants, operations engineering, technical staff, and nuclear operators to obtain technical input as required to meet project and client requirements in an Integrated Project Delivery (IPD) method.
- Provided technical support during the design, procurement, construction, and commissioning phases of assigned projects.
- Prepared technical documents, work scopes and specifications.
- Aided in surveillance of design, construction, and commissioning activities.
- Assessed equipment selection options and make recommendations.
- Supported and implemented the project quality assurance plan.
- Assisted in developing project work packages, deliverables, budgets, and schedules.
- Ensured that deliverables meet the quality objectives of the project and are completed on schedule and within budget.
- Identified, assessed, and initiated changes to approved design, work scope, budgets and schedules following applicable change control processes.

CANADIAN NUCLEAR LABORATORIES

2018 - 2019

Co-op Student Designer, Chalk River ON

- Updated multi-disciplinary technical drawings using AutoCAD software.
- Examined technical documentation to extract information on equipment specifications and contractual obligations relating to the construction project and its clients.

CANADIAN NUCLEAR LABORATORIES

2018

Laboratory Renewal Projects Co-op Student, Chalk River ON

- Interpreted engineering drawings by comparing specifications to installed systems on the construction site, checking for errors and overall quality control.
- Maintained a Master Equipment List of all components installed to date in construction.
- Participated in client meetings with the project team to interpret needs and requirements and represent them in the field.

EDUCATION & TRAINING

BACHELOR OF SCIENCE, ELECTRICAL AND COMPUTER ENGINEERING

2019

- University of Victoria, Victoria BC

BUSINESS ADMINISTRATION DIPLOMA

2013

- University of the Fraser Valley, Abbotsford BC

PROFESSIONAL REGISTRATIONS

PROFESSIONAL ENGINEER, BRITISH COLUMBIA

PROFESSIONAL ENGINEER, YUKON

PROFESSIONAL ENGINEER, ONTARIO



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