

# **Nova Scotia Utility and Review Board**

IN THE MATTER OF *The Public Utilities Act*, R.S.N.S. 1989, c.380, as amended

## **Nova Scotia Power Incorporated Battery Energy Storage System (BESS) Project Capital Cost Approval Application**

January 25, 2024

REDACTED

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1		TABLE OF CONTENTS	
2	1	BACKGROUND.....	4
3	2	INTRODUCTION.....	7
4	3	POLICY AND PLANNING CONTEXT FOR THIS APPLICATION.....	10
5	3.1	Policy Context.....	10
6	3.2	Historical Energy Storage Considerations and Stakeholder Engagement.....	12
7	4	GOVERNANCE STRUCTURE AND PROJECT CONTROLS.....	14
8	5	BESS PROJECT COMPETITIVE PROCUREMENT.....	17
9	5.1	Procurement Program Design.....	17
10	5.1.1	BESS RFP Process.....	18
11	5.1.2	Supporting Construction and Supply Contracts and Initiatives.....	22
12	6	BESS PROJECT SCOPE.....	23
13	6.1	Overall Project Scope.....	23
14	6.1.1	Major Components.....	23
15	7	PROJECT COSTS AND FUNDING AND PROJECT-RELATED BENEFITS.....	27
16	7.1	Project Costs.....	27
17	7.1.1	Regular Labour.....	28
18	7.1.2	Project Non-Labour Costs.....	29
19	7.1.3	Materials.....	30
20	7.1.4	Contracts.....	31
21	7.1.5	Consulting, Legal & Strategic Procurement Support.....	33
22	7.1.6	Land Purchase and Freight.....	34
23	7.1.7	Contingency.....	35
24	7.1.8	Allowance for Funds Used During Construction (AFUDC).....	36
25	7.2	Depreciation.....	36
26	7.3	Project Funding.....	37
27	7.3.1	Smart Renewables and Electrification Pathways (SREP) Program Funding.....	37
28	7.4	Benefits arising from this Project.....	37
29	7.4.1	Canada Infrastructure Bank Low-Cost Debt.....	37
30	7.4.2	Investment Tax Credits.....	39
31	8	COMMUNITY ENGAGEMENT AND SUPPORT.....	40

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32	9	PROJECT NEED.....	42
33	10	CONCLUSION & RELIEF SOUGHT .....	43

34

35

**Table of Figures**

36	Figure 1	Rendering of typical Energy Storage Facility .....	26
37	Figure 2	Breakdown of Project Capital Costs.....	28
38	Figure 3	Regular Labour by Function.....	28
39	Figure 4	Materials Costs .....	30
40	Figure 5	Contract Costs .....	31
41	Figure 6	Consulting, Legal and Strategic Procurement .....	33
42	Figure 7	Freight.....	34

43

44

**List of Appendices**

45

46	Appendix A	Partially Confidential Limited Notice to Proceed – Battery Energy Storage System	
47		Vendor	
48	Appendix B	Partially Confidential Purchase Agreement for Power Transformers	
49	Appendix C	Partially Confidential CI C0045132 Battery Storage Project Capital Work Order	
50	Appendix D	Natural Resources Canada Smart Renewables and Electrification Pathways Program -	
51		Funding Approval	
52	Appendix E	Stakeholder Letters of Support	

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1 **1 BACKGROUND**

2  
3 Nova Scotia is in the midst of an historic energy transition. The Federal and Provincial  
4 governments are focused on reducing carbon emissions at an expedited pace as the impacts of a  
5 changing climate become clearer. Nova Scotia Power Inc. (NS Power, Company) fully supports  
6 these efforts and is committed to achieving legislated environmental targets by 2030, including  
7 reaching 80 percent renewable electricity sales and phasing out coal-fired electricity generation in  
8 the province in a manner that provides the best value for customers while providing safe and  
9 reliable service.

10  
11 At NS Power, we have been on a journey to reduce our carbon footprint for over 15 years. Since  
12 2005, we have reduced carbon emissions by 46 percent and more than quadrupled our renewable  
13 energy output from nine percent to over 40 percent in 2023. But more needs to be done to reach  
14 2030 decarbonization requirements.

15  
16 Through the 2020 Integrated Resource Plan (IRP), the subsequent Evergreen IRP process, and  
17 Nova Scotia's 2030 Clean Power Plan<sup>1</sup>, it's clear that a mix of energy solutions will be required  
18 to support our energy transition and create a path to 2030. In support of Nova Scotia's climate  
19 goals, the province has enacted regulations under section 4D of the *Electricity Act*, directing NS  
20 Power to install three 50 MW four-hour duration (200MWh each) lithium-ion grid-scale batteries  
21 (the Battery Energy Storage System (BESS) Project) at specified locations in the province (the  
22 Regulations)<sup>2</sup>. In furtherance of this direction, the Company submits this application to the Nova  
23 Scotia Utility and Review Board (Board, NSUARB) for capital cost approval of the BESS Project.

24  
25 Utility scale battery storage such as the BESS Project is poised to play a key role in Nova Scotia's  
26 energy transition. As more renewable generation is added to the electricity system, batteries  
27 provide grid stabilization response services and can store energy during times when the wind is  
28 blowing or when the sun is shining and then dispatch that energy during peak times when

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<sup>1</sup> Nova Scotia Department of Natural Resources and Renewables. [Nova Scotia's 2030 Clean Power Plan](#).

<sup>2</sup> N.S. Regulation 250/2023 made under Section 4D of the *Electricity Act* 2004, c. 25, s1.



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1 customers need it to heat their homes and run their businesses. As Nova Scotia invests in more  
2 wind and solar generation, the BESS will support integration of that generation onto the grid while  
3 minimizing costs and optimizing value for customers.  
4

5 NS Power has secured considerable financial support for the Company's BESS Project from the  
6 Government of Canada in the form of grant funding from Natural Resources Canada's Smart  
7 Renewables and Electrification Pathways (SREP) program of approximately one third of total  
8 project costs up to a maximum of \$130 million. The financial support committed to this Project  
9 from the Government of Canada will help to minimize costs to NS Power customers as investments  
10 are made to meet climate goals. As a result of this project, NS Power has also secured low-cost  
11 debt financing from the Canada Infrastructure Bank (CIB) of approximately [REDACTED], which  
12 will reduce NS Power's overall debt financing costs to the benefit of customers.  
13

14 Engaging stakeholders and local communities is a priority for NS Power as it transitions to a clean  
15 energy future. Throughout the development phase of the BESS Project, NS Power met with  
16 community members, municipal leaders and organizations across the province invested in the  
17 energy transition. Letters of support for the BESS Project are included with this application and  
18 the Company has been, and remains, committed to effective engagement with all Project  
19 stakeholders. NS Power particularly appreciates the opportunity to collaborate with the Wskijnu'k  
20 Mtmo'taquow Agency Limited (WMA) in bringing this sustainable energy project to Nova  
21 Scotia. WMA was formed by all of Nova Scotia's thirteen Mi'kmaq First Nations and is committed  
22 to environmental stewardship as essential to maintaining the way of life and well-being for future  
23 generations of the Mi'kmaq and all Nova Scotians.  
24

25 NS Power has worked diligently to secure a utility-scale energy storage solution that will provide  
26 value for its customers. Significant investments are required to meet 2030 climate goals. Reaching  
27 these goals while maintaining stable, predictable, and reasonable electricity rates is a priority of  
28 the Company. The rigorous competitive procurement process for the BESS project has resulted in  
29 a solution that is in the best interest of customers and technically strong. With a broad range of  
30 functions to support the path to coal-phase out and decarbonization, the BESS Project provides an

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1 important tool for bridging the gap between the potential of wind and solar generation and the  
2 technical requirements of the grid to keep power flowing reliably for Nova Scotians.

3

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1 **2 INTRODUCTION**

2  
3 NS Power is seeking approval from the NSUARB for the capital costs, including AFUDC, required  
4 to engineer, procure, construct, commission, and place into service CI C0045132; the BESS  
5 Project. NS Power also seeks approval of a five percent annual depreciation rate for the grid-scale  
6 battery and inverter components of the BESS Project on an interim basis until the next depreciation  
7 study proceeding, as there is currently no NSUARB-approved asset class and associated  
8 depreciation rate for these assets.

9  
10 The BESS Project is comprised of three 50 MW, four-hour battery facilities, each located at  
11 project sites that will enhance grid benefits and provide 150MW of storage capacity to the NS  
12 Power electrical system. Each of the three BESS sites will include the following major  
13 components:

- 14
- 15 1. Batteries with energy storage capacity of at-least 200 megawatt-hours (MWh) at the start  
16 of operation and balance of system components, including the battery management systems  
17 (BMS) and safety systems.
  - 18 2. A power conversion system (PCS), with grid-forming functionality and sufficient power  
19 capacity to deliver 50 MW of alternating current at the point of interconnection (POI) with  
20 NS Power's grid, net of losses and auxiliary loads, with inverter system controls.
  - 21 3. An energy management system (EMS) to dispatch the BESS based on monitoring of grid  
22 frequency, voltage, power factor, and other relevant grid parameters at the point of  
23 interconnection (POI) and to manage operations of the BESS safely and reliably.
  - 24 4. Connection to the 138kV transmission system and full integration with the Energy Control  
25 Centre and provision for site access to BESS facilities.
- 26

27 The BESS Project will play an important role in phasing out coal, integrating new renewable  
28 generation and providing system benefits critical to Nova Scotia's energy transition.

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1 Consistent modelling results from NS Power’s Integrated Resource Planning (IRP) process  
2 confirm the important role that utility-scale battery energy storage will play as the required energy  
3 transition proceeds. Batteries add firm, dispatchable capacity onto the grid, perform energy time-  
4 shifting functions to meet system demand and provide essential grid services such as fast-  
5 frequency response and contributions to operating reserve. These essential grid reliability services  
6 are central to the safe and reliable operation of the transmission system and currently are largely  
7 provided by NS Power’s existing thermal and hydro units. The ability of a utility operated battery  
8 energy storage system to provide these services will contribute to the further integration of  
9 renewables onto the grid in a safe, cost-effective and less carbon intensive manner.

10  
11 In response to Regulations recently enacted under Section 4D of the *Electricity Act* directing NS  
12 Power to install the BESS, this application seeks NSUARB approval pursuant to section 35 of the  
13 Nova Scotia *Public Utilities Act (PU Act)* for the expenditures required to deploy the directed  
14 BESS Project. The enacted Regulations establish the need for the BESS Project. The availability  
15 of SREP funding and CIB financing, as well as the provincially mandated 2030 coal phase out and  
16 the other decarbonization requirements discussed in more detail later in this application, support  
17 proceeding with this project now. NS Power anticipates putting two BESS sites into service in  
18 2025, and the third in 2026.

19  
20 Given the legislative mandate to proceed with this project pursuant to, and as defined in, the  
21 Regulations, the focus of this application is on providing support and justification for the capital  
22 costs, including AFUDC, to construct, commission and put into service the BESS Project.  
23 Therefore, in the balance of this filing, NS Power:

- 24  
25 1. Addresses the policy and planning context for consideration of this application.  
26  
27 2. Describes the governance structure and project controls and practices put in place to  
28 ensure the safe, cost effective and timely execution of the BESS Project.  
29

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- 1        3. Describes how the BESS Project will be executed.
- 2
- 3        4. Details the scope and functionality of the BESS Project.
- 4
- 5        5. Details the BESS forecast project costs and funding.
- 6
- 7        6. Outlines community and stakeholder engagement conducted and planned for the project.
- 8
- 9        7. Comments on Project need.
- 10
- 11       8. Particularizes the relief requested in this application.
- 12

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1 **3 POLICY AND PLANNING CONTEXT FOR THIS APPLICATION**

2  
3 Regulations enacted under Section 4D of the *Electricity Act* direct implementation of the BESS  
4 Project which has been consistently identified as of value to the evolution and decarbonization of  
5 NS Power's system through Nova Scotia's 2030 Clean Power Plan, IRP development and planning  
6 and through NS Power Annual Capital Expenditure (ACE) filings which have been the subject of  
7 discussion with stakeholders for some time.

8  
9 **3.1 Policy Context**

10  
11 Nova Scotia has historically been more reliant on coal fired electricity generation than many  
12 provinces, with coal being a domestic natural resource of the province. NS Power owns and  
13 operates<sup>3</sup> eight coal-fired generation units. Constructed largely in the 1970s, 1980s and early 1990s  
14 these eight units currently provide approximately 1200 megawatts (MW) of firm, dispatchable  
15 generation to Nova Scotia customers, amounting to 47 percent of NS Power's firm generating  
16 capacity<sup>4</sup>, as well as various grid supporting and stabilizing services.

17  
18 For more than 15 years, NS Power has been transforming its generation mix and replacing coal  
19 with cleaner energy sources. Since 2005, the utility has tripled the share of renewable energy, with  
20 the share of renewables serving customer sales exceeding 40 percent in 2023. While NS Power  
21 has made significant progress in its decarbonization journey, increasingly stringent carbon  
22 reduction policies and legislation require continued decarbonization efforts, including the phase  
23 out of coal fired generation on an expedited basis.

24  
25 In alignment with the framework set forth in the United Nations Paris Agreement on Climate  
26 Change, the imperative and timing to phase out coal fired generation in Nova Scotia is driven by  
27 a number of legislative requirements, including the following:

---

<sup>3</sup> The Lingan 2 coal unit was removed from economic dispatch August 15, 2022 and will remain in cold reserve.

<sup>4</sup> NS Power system firm capacity is approximately 2,593.7 MW, inclusive of Lingan 2 and approximately 134.9 MW of firm capacity contracted under power purchase agreements with Independent Power Producers.

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- 1       • The Nova Scotia Environmental Goals and Climate Change Reduction Act (EGCCRA)  
2       legislates the goal of phasing out of coal-fired electricity generation in Nova Scotia by  
3       2030.
- 4
- 5       • Greenhouse gas (GHG) emission caps, including electricity specific provincial emission  
6       caps for various time periods through 2030<sup>5</sup>, are specified in the Nova Scotia Greenhouse  
7       Gas Emissions Regulations under the Nova Scotia *Environment Act*, and there are  
8       associated compliance costs to meet those caps and financial penalties for exceeding those  
9       caps.
- 10
- 11       • The Nova Scotia Output-Based Pricing System<sup>6</sup> for facilities emitting 50,000 tonnes of  
12       CO<sub>2</sub> or more annually came into effect in January 2023. The carbon backstop price mirrors  
13       the federal price and has been set at \$65 in 2023 and is legislated to increase by \$15/tonne  
14       annually, reaching a level of \$170/tonne by 2030<sup>7</sup>.
- 15
- 16       • The Renewable Electricity Regulations under Nova Scotia’s *Electricity Act* require NS  
17       Power to deliver 80 percent renewable energy sales by 2030, including an additional 1100  
18       GWh of renewable energy from independent power producers<sup>8</sup>.
- 19
- 20       • The Federal government’s *Reduction of Carbon Dioxide Emissions from Coal-Fired*  
21       *Generation of Electricity Regulations (Coal Regulations)* under the *Canadian*  
22       *Environmental Protection Act* set limits on coal fired power plant emissions of 420 tonnes  
23       CO<sub>2</sub>/GWh by 2030. These limits effectively result in the requirement to phase out unabated  
24       coal fired generation by 2030.

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<sup>5</sup> *Greenhouse Gas Emissions Regulations*, section 4(1).

<sup>6</sup> Output-Based Pricing System Registration and Opt-in Regulations made under Section 112ZJ of the *Environment Act*. Effective January 1, 2023.

<sup>7</sup> Federal benchmark for carbon pollution pricing system in Canada: 2023-2030. <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/carbon-pollution-pricing-federal-benchmark-information/federal-benchmark-2023-2030.html#toc2>

<sup>8</sup> Renewable Electricity Regulations, Section 6(B)

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1 The BESS Project plays an important role in NS Power’s program to comply with these legislative  
2 requirements to phase out coal and integrate new renewable sources of generation.

3  
4 **3.2 Historical Energy Storage Considerations and Stakeholder Engagement**

5  
6 NS Power has been closely engaged in the study of battery technology for some time. The utility  
7 began to include this form of utility-scale energy storage in its system planning studies in 2017  
8 with the Generation Utilization and Optimization Study<sup>9</sup>.

9  
10 Following this initial planning work, in 2020, NS Power conducted an IRP process with the  
11 NSUARB and stakeholders. During the process, a wide range of scenarios and resources were  
12 studied with the particular focus of evaluating what NS Power’s system would need to replace the  
13 1200MW of firm, dispatchable generation provided by its coal fleet. NS Power incorporated  
14 extensive stakeholder engagement into the process, including input from nine public workshops,  
15 six rounds of formal submissions from stakeholders, independent expert analysis, and ongoing  
16 consultation with participants<sup>10</sup>. The scenarios examined in the 2020 IRP showed that in order for  
17 NS Power to phase out coal generation while continuing to operate the system reliably, new firm  
18 capacity resources are needed.<sup>11</sup> Battery energy storage was identified during the IRP work as a  
19 resource that provides firm capacity and the essential grid services required to phase out coal while  
20 supporting the integration of renewable generation<sup>12</sup>. In the IRP processes that followed,  
21 including those in support of the updated IRP Roadmap and Action Plan filing with the NSUARB  
22 in early August 2023, battery energy storage is consistently identified as providing system benefits  
23 critical to the cost-effective energy transition for Nova Scotia. Within the current IRP Action Plan  
24 battery energy storage is selected in all scenarios.<sup>13</sup>

25  

---

<sup>9</sup> M08059, Generation Utilization and Optimization, NSUARB Letter to NS Power, May 5, 2017.

<sup>10</sup> *Powering a Green Nova Scotia, Together: 2020 Integrated Resource Plan*, November 27, 2020, page 5.

<sup>11</sup> *Powering a Green Nova Scotia, Together: 2020 Integrated Resource Plan*, November 27, 2020, page 21.

<sup>12</sup> *Powering a Green Nova Scotia, Together: 2020 Integrated Resource Plan*, November 27, 2020, page 23.

<sup>13</sup> M11307, NS Power Updated IRP Roadmap and Action Plan, August 8, 2023 [Nova Scotia Power Evergreen IRP \(nspower.ca\)](https://www.nspower.ca), page 7.

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1 Regulations under Section 4D of the *Electricity Act* now direct NS Power to proceed with the  
2 BESS Project, recognizing and establishing the need for the project and prescribing the overall  
3 scope for the project.

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1 **4 GOVERNANCE STRUCTURE AND PROJECT CONTROLS**

2  
3 To support the technically robust, cost effective and timely execution of the BESS Project, NS  
4 Power implemented a project management structure and methodologies widely used for large  
5 capital projects to guide project development, approval, and implementation. These methodologies  
6 include: i) a formal decision gate process; ii) a clear internal project governance hierarchy; iii) a  
7 formal cost and schedule risk assessment; and iv) independent third-party review of project  
8 controls.

9  
10 NS Power and its personnel have experience in large procurement processes and construction  
11 works and have demonstrated success in executing solutions that meet defined project  
12 requirements. As with all of NS Power’s capital projects, a Project Director is engaged and actively  
13 guiding project development and execution, and a rigorous project management structure is in  
14 place. This structure has and will continue to:

- 15
- 16 • Guide the development, approval, and execution of the work.
  - 17 • Support timely identification and securing of the resources required for successful  
18 execution of the project.
  - 19 • Ensure that appropriate stakeholders (internal and external) are identified and engaged.
  - 20 • Ensure visibility for senior management of the project development stage, risks, and  
21 vulnerabilities, and support timely and early mitigation plans as warranted.
- 22

23 A “Decision Gate” (DG) process has been implemented for the BESS Project. The DG process is  
24 a recognized, best-practice methodology widely used for large and complex capital projects and is  
25 appropriate to apply to Nova Scotia’s first utility-scale energy storage initiative. It entails  
26 sequential development of increasingly detailed project budgets which promotes appropriately  
27 timed and detailed development and planning activities. It demands checkpoints (referred to as  
28 “Decision Gates”) to ensure all necessary activities for each stage of project development have  
29 been completed and the results continue to support advancement. The Decision Gates occur  
30 immediately before substantial incremental funding and resource commitments are made. Each

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1 gate requires approval from the specified “gate keeper”, whose approval is itself contingent on the  
2 preparation of specific and detailed supporting documentation with all information necessary to  
3 decide whether to advance the project to the next phase of development.

4  
5 The DG project management process has the following benefits:

6  
7 *Structured Decision-Making Framework*

8 Helps to ensure large projects undergo systematic evaluation, and key decisions are made based  
9 on predefined criteria.

10  
11 *Risk Management*

12 Emphasizes risk management throughout the project lifecycle. Incorporating gate reviews and risk  
13 assessments at each stage, identifies potential risks and uncertainties early in the project life cycle  
14 allowing for timely mitigation.

15  
16 *Resource Allocation*

17 Ensures resources are allocated strategically and utilized efficiently across the business.

18  
19 *Lessons Learned and Continuous Improvement*

20 Supports the capture of lessons learned and continuous improvement. This knowledge is  
21 documented and used to inform future projects, improve processes, and enhance project  
22 management practices over time.

23  
24 In keeping with the Decision Gate Governance model adopted for the Project, the BESS Project  
25 Team has conducted planning and preparation to validate the suitability and efficiency of the  
26 concept designs for the BESS as well as confidence in the project cost estimate and schedule. The  
27 project team conducted risk and constructability workshops and prepared a cost and schedule risk  
28 assessment. This assessment included a review of the BESS Project cost estimate and schedule,  
29 the identification of BESS Project risks to date, and BESS Project contingency assessments. The  
30 output from this risk assessment was used to validate the level of overall cost and schedule

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1 contingency required for the BESS Project. This included both tactical and strategic risks based  
2 upon the predictive range (P10 – P90) of the probabilistic curves generated by a Monte Carlo  
3 simulation. It was used to evaluate the total Project cost estimate (base costs plus contingency) at  
4 a P75 cost confidence range as well as the confidence level of completing the Project according to  
5 the established schedule.

6  
7 These documents were then reviewed, and interviews conducted with project personnel associated  
8 with these scopes by independent experts in project management and utility-scale battery energy  
9 storage projects for the DG2 Independent Project Review (IPR). The IPR provided an overall  
10 assessment of the Project to support advancement through this Decision Gate and into the next  
11 phase of project execution. As the Project advances to the execution phase, NS Power will continue  
12 to employ robust project processes for contract procurement and contractor management.

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1 **5 BESS PROJECT COMPETITIVE PROCUREMENT**

2  
3 NS Power engaged rigorous competitive procurement and contracting processes which laid the  
4 groundwork for successful execution of BESS procurement.

5  
6 **5.1 Procurement Program Design**

7  
8 A multidisciplinary team was formed and dedicated to the procurement of the BESS engineering,  
9 procurement and construction (EPC) services and ancillary works, including development of a  
10 request for proposal (RFP) for the design, supply, construction, commissioning and testing of the  
11 BESS. This team is comprised of members with technical, financial, procurement and legal  
12 expertise in large procurement processes and construction works.

13  
14 To develop the BESS RFP, NS Power retained DNV Energy Systems Canada Inc. (DNV). The  
15 DNV project team has provided energy storage consulting, modeling, and design review services  
16 to storage project developers, investors, utilities, regulators, and energy storage vendors and  
17 manufacturers in various jurisdictions. Working with performance requirements detailed by NS  
18 Power's technical experts in system planning, transmission and distribution engineering and NS  
19 Power's Energy Control Center (ECC), DNV worked with NS Power to prepare technical  
20 specifications for an EPC contract for the BESS. With DNV's expertise, NS Power was able to  
21 draw on utility-scale energy storage technology industry standards developed in other  
22 jurisdictions.

23  
24 DNV:

- 25  
26 a. provided NS Power with feedback on its suggested BESS system performance  
27 specification which informed RFP documentation;  
28  
29 b. incorporated BESS and balance of system industry codes and standards requirements  
30 specific to BESS installations through the technical specification; and
-

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1 c. reviewed the conceptual design for the project to be included in the RFP package.

2  
3 NS Power incorporated materials from the Electric Power Research Institute's (EPRI) Energy  
4 Storage Integration Council in crafting the evaluation matrix to evaluate BESS RFP respondents.  
5 EPRI is an independent non-profit energy research, development, and deployment organization  
6 with the purpose to deliver independent, objective thought leadership and industry expertise to  
7 help the energy sector identify issues and needs that can be addressed through collaborative  
8 research and development programs.

9  
10 The competitive procurement program identified leading global battery suppliers, developed a  
11 well-defined request for proposal process and implemented a protocol for the evaluation of  
12 contract bids against pre-defined criteria. This program also involved the review of proponent  
13 offerings, including site visits and interviews with proponent personnel, and was geared to identify  
14 the proponent that offered the best overall combination of technical compliance, proven  
15 experience, work execution strategy, contracting risk allocation and cost.

16  
17 **5.1.1 BESS RFP Process**

18 Working with DNV, NS Power performed a market review which identified leading global utility-  
19 scale battery suppliers for participation in the BESS RFP process. An initial RFP was issued to  
20 identified suppliers in May 2022. A total of ten proposals were received in response to the initial  
21 request for proposals for four 50 MW, four-hour battery capacity grid battery facilities. DNV  
22 assisted in reviewing the technical aspects of the proposals received. Following the initial review  
23 of proposals, NS Power conducted discussions with proponents to address questions or points of  
24 clarification and formed a short list of leading proponents in late summer 2022. Risk identification  
25 workshops were held throughout the process to assign critical weightings to identified risks. In  
26 addition, credit reviews were performed regularly, including a review of key suppliers and their  
27 major subcontractors. In August 2022, the project team recommended pursuing negotiations with  
28 a short list of leading battery proponents to maintain the competitive tension necessary to achieve  
29 an optimal energy storage solution for customers.

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1 In the Fall of 2022, NS Power paused the BESS procurement to re-evaluate this capital investment.  
2 During this pause, work by the project team continued to refine technical project configurations  
3 and siting considerations while seeking to maximize Federal government support of the BESS  
4 project through grant funding opportunities. Upon re-initiation of the BESS Project in February  
5 2023, and as a result of this optimization process, NS Power requested a cost and proposal update  
6 from proponents for three 50 MW battery facilities.

7  
8 Updated proposals were received, and members of the team formed commercial and technical  
9 groups, completing separate commercial and technical evaluations and compiling clarification  
10 questions to the proponents. Risk identification reviews continued through this process. In keeping  
11 with industry standard procurement practices, NS Power evaluated these proposals using a  
12 weighted point scoring method covering both technical and commercial scopes of review.  
13 Following this process, meetings were held with a short list of lead proponents to receive further  
14 details on their proposals and prepare for an intensive negotiation process.

15 Working closely with external legal experts with international experience in utility-scale battery  
16 procurements, and building on prior large project experience, NS Power developed a contract  
17 standard that formed the basis for negotiations with short listed utility-scale battery suppliers. As  
18 the procurement process was advanced, the Company entered into negotiations with its short list  
19 of lead proponents using this contract standard. In parallel with these discussions and negotiations,  
20 the Company conducted due diligence reference calls with leading proponent-provided references  
21 and completed two proponent reference site visits.

22 Throughout the procurement process, supply and demand risks respecting the material required to  
23 manufacture utility-scale battery modules as well as foreign currency exchange volatility remained  
24 a key focus. Lithium carbonate, a highly specialized commodity that is produced in limited  
25 quantities and with volatile pricing in the recent past, forms a significant component of the EPC  
26 contract price. Presently, there are no direct financial mechanisms, such as hedges, that can secure  
27 the price of battery-grade lithium carbonate, the primary compound included within the battery  
28 modules. Battery modules represent approximately ■ percent of the total EPC contract price and  
29 ■ percent of the total cost of the BESS Project. Mitigation of commodities and foreign currency

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1 exchange risks was a significant focus of the team in proponent discussions; however, utility-scale  
2 battery proponents were generally unable to provide pricing certainty beyond a very short time  
3 horizon that would not accommodate the time required to complete comprehensive project  
4 planning and then the required regulatory approval process for the Project.

5 Through discussions focused on increasing cost certainty for customers, the project team obtained  
6 an offer of a Limited Notice to Proceed (LNTP) contract structure from [REDACTED]  
7 [REDACTED] BESS Vendor) to secure a firm contract price for the engineering,  
8 procurement and construction of the BESS Project.

9 Under the final negotiated LNTP structure, in exchange for an [REDACTED]  
10 exclusivity commitment to the BESS Vendor and payment of [REDACTED] percent of the full turnkey price  
11 to engineer procure and construct the BESS, [REDACTED] the BESS  
12 Vendor committed to:

13 (a) fix the final price of the BESS [REDACTED]

14 [REDACTED]  
15 (b) maintain an agreed schedule for execution of the BESS to maintain commercial  
16 operation dates in 2025 and 2026;

17 (c) reserve manufacturing capacity for the BESS Project [REDACTED]  
18 [REDACTED]

19 (d) finalize and, [REDACTED]

20 enter into a substantially agreed form of EPC Contract that is attached to the LNTP form.

21 [REDACTED]

22 [REDACTED]

23 [REDACTED]

24 [REDACTED]. Moreover, this structure serves to secure manufacturing capacity in a  
25 heated market to preserve the opportunity to meet commercial operation dates for the BESS Project  
26 in 2025 and 2026, maintain timely support of Federal funding opportunities and incentives, and



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1 align with the significant additions of new variable renewable generation anticipated to be added  
2 to the Nova Scotia system over the same period.

3 NS Power concluded that the BESS Vendor's proposal for development, construction, and  
4 implementation of the BESS, including the negotiated LNTP structure, offered the best overall  
5 combination of technical compliance, experience, work execution strategy, contract risk allocation  
6 and cost. In addition to providing a technically strong offering, the BESS Vendor's strengths  
7 include its ability to provide a fully integrated solution for the supply of the BESS, including the  
8 procurement of materials and the manufacture of battery components. This integrated structure  
9 bolstered the BESS Vendor's ability to commit to [REDACTED]

10 [REDACTED]  
11 [REDACTED] as well as maintain BESS commercial operation dates in 2025 and 2026. Additionally,  
12 the BESS Vendor selected [REDACTED] to perform the site construction portion of the EPC  
13 Contract. [REDACTED] is a general construction contractor possessing the experience necessary for the safe  
14 and competent completion of the civil works portion of the EPC Contract.

15 NS Power signed a Limited Notice to Proceed with the BESS Vendor on October 31, 2023. A  
16 copy of the LNTP is attached to this application as Partially Confidential **Appendix A**. In order  
17 for NS Power to meet the milestone dates directed by the LNTP and preserve the advantages  
18 thereby secured for customers as discussed in this section, NS Power respectfully requests  
19 NSUARB approval of this application by June 30, 2024.

20 The EPC Contract as accepted by the BESS Vendor is a turnkey arrangement that includes the  
21 performance of all work and services required in connection with the design, engineering,  
22 procurement, delivery, construction, installation, interconnection, start up, testing, commissioning,  
23 and completion of each of the three BESS installations. The BESS Vendor will be required to  
24 conduct and pass certain acceptance tests to provide assurance that each BESS system meets  
25 guaranteed capacity levels prior to achieving substantial completion. The EPC Contract provides  
26 for a [REDACTED] warranty [REDACTED]

27 [REDACTED]  
28 [REDACTED]

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1 [REDACTED]. To deal with potential changes  
2 in scope, cost, or schedule, the EPC Contract includes change request provisions that permit the  
3 BESS Vendor to seek relief [REDACTED]. Such BESS Vendor-  
4 initiated change requests, [REDACTED]  
5 [REDACTED] In addition, the Contract [REDACTED]  
6 [REDACTED]  
7 [REDACTED]  
8 [REDACTED]

9 **5.1.2 Supporting Construction and Supply Contracts and Initiatives**

10 The full scope of the BESS Project includes supporting work and supply arrangements, in addition  
11 to the EPC Contract, to complete all aspects of the Project and connect BESS infrastructure to the  
12 Nova Scotia electrical system.

13 Through an RFP process separate from the BESS procurement, NS Power placed an order for three  
14 60MVA main transformers from [REDACTED] NS Power advanced this procurement  
15 in May 2023 to address long-lead supply chain constraints, preserve the ability to advance the  
16 contemplated BESS schedule to enable timely support for integration of renewable resources onto  
17 the grid, and support the advancement of federal funding and incentives as discussed elsewhere in  
18 this application. [REDACTED] offered an ability to meet NS Power's  
19 schedule and provided [REDACTED] for its main transformer offering, as well as  
20 payment terms that served to [REDACTED]

21 [REDACTED] These factors in addition to the technically  
22 sound quality of the [REDACTED] offering and previous favorable service and on time delivery from this  
23 supplier supported its selection as the successful proponent for main transformer supply for the  
24 Project. NS Power issued a contract and Purchase Order for the main transformer supply on  
25 August 11, 2023. Please refer to Partially Confidential **Appendix B** for a copy of this agreement.

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1 **6 BESS PROJECT SCOPE**

2  
3 **6.1 Overall Project Scope**

4  
5 In accord with the enacted Regulations, the BESS Project entails the design, construction, and  
6 installation of 150 MW of four-hour battery energy storage capacity, distributed at three strategic  
7 locations each with a 50MW/200MWh facility (each a BESS Site or installation). The BESS Sites  
8 will be located at Bridgewater (Municipality of the Town of Bridgewater), Spider Lake (Halifax  
9 Regional Municipality) and White Rock Road (Municipality of the County of Kings). The full  
10 BESS Project includes configuration, preparation and interconnection of each BESS Site to NS  
11 Power’s 138 kV transmission system, procurement and installation of equipment ancillary to the  
12 batteries and full integration of the BESS with the NS Power Energy Control Centre. The BESS  
13 Project will be designed for a 20-year life.

14  
15 Each BESS Site will have a footprint of approximately 100m by 100m (10,000m<sup>2</sup>), about 50  
16 percent larger than the average soccer field, and will contain multiple, modular shipping container-  
17 like battery enclosures and associated power conversion and energy management systems. Figure  
18 1, below, is a rendering of a typical BESS site, the major components of which are described in  
19 the following section. A detailed description of the functionality that the BESS Project affords NS  
20 Power, while not needed in support of this application for NSUARB approval, is provided for  
21 information in Partially Confidential **Appendix C**.

22  
23 **6.1.1 Major Components**

24 The major components of each of the three BESS Sites are described in the following table:

<b>Site Component</b>	<b>Description</b>
Energy Management System (EMS)	The EMS monitors and controls the energy flow of the entire BESS Site. It coordinates the work of all other systems on site including the Battery Management Systems and Power

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	<p>Conversion Systems. The EMS is connected to NS Power’s Energy Control Center through the Supervisory Control and Data Acquisition System (SCADA) system. The facility EMS, plant controller, and SCADA are all housed within a control building within the perimeter of the facility.</p>
Battery containers	<p>The battery containers house the build-up of batteries which are comprised of lithium-ion battery cells wired together within a frame to create a battery module. The battery modules are stacked within racks in the container and are connected to reach the specified voltage and current for that system. Also within each container is the container battery management system, Heating Ventilation and Air Conditioning (HVAC), and fire protection systems which are further described below.</p>
Battery Management System (BMS)	<p>The BMS continuously monitors each battery module’s state of charge, state of health, temperature, voltage, power level, fault and alarms to ensure safe, reliable and efficient performance. The BMS also provides cell balancing functions, ensuring individual battery cells maintain uniform temperature and voltage which are critical for the thermal management of the battery. There is a built-in universal power supply to maintain monitoring during a power outage.</p>
Fire Protection	<p>The BMS also ensures that the battery is operating within safe parameters or will shut the operation of the battery down. In addition, there are a number of other safety features within, each container. These are redundant smoke, heat, and gas detectors, explosion prevention active ventilation, non-walk-in container design, coolant leak detection, and emergency stop. The site layout also has three meter spacing between</p>

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	containers to limit the spread of fire to other containers in the rare event of fire or thermal runaway. Water storage tanks with a total of 227,125 litres in capacity will be installed at each site to assist with response in the unlikely event of a fire within the system.
Heating, Ventilation, and Air Conditioning Equipment (HVAC)	HVAC equipment functions to regulate the battery container environment within the optimal operating temperature range. HVAC operation both prevents battery overheating that could lead to thermal runaway and helps to prolong battery life. Containers have a combination of liquid cooling/heating for the battery modules and air cooling for other electrical components and humidity control.
Power Conversion System (PCS)	A PCS is comprised of a bidirectional inverter with grid-forming functionality and medium voltage transformer which convert the direct current (DC) produced by the batteries into alternating current (AC) and step the voltage up when discharging (and the reverse when charging) the battery. Each PCS will be paired with two or three battery containers. Black start functionality will be implemented at sites where beneficial.
Facility Security	There will be a perimeter fence surrounding each facility utilizing the same specification as other NS Power substations. Security cameras will provide monitoring and alarm back to the NERC certified 24/7 BESS Vendor control centre and the NS Power Energy Control Centre (ECC).

- 1
- 2 Each BESS Site will have a main transformer and switchgear and will be connected to the 138
- 3 kV transmission system through the 138 kV transmission station bus at each adjacent substation.
- 4

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1 Each BESS Site will also be fully integrated with NS Power’s ECC. To enable the 150MW of  
2 stored BESS energy to be incorporated into the overall system dispatch, planning, and grid  
3 management activities, several processes and procedures will be revised and others newly  
4 implemented. Integrating the BESS Project onto NS Power’s electrical grid will require:

- 5 • changes to the Supervisory Control and Data Acquisition System (SCADA);
- 6 • adjustments to the Operations Training Simulator to incorporate the BESS into training  
7 activities;
- 8 • control alarm settings, protection and control settings and voltage support optimization;
- 9 • study and guideline revisions for future System Impact Studies when the BESS is online;
- 10 and,
- 11 • historical data capture, data storage, and data lake integration from the BESS for Business  
12 Intelligence (BI) reporting.

13 Figure 1 is a rendering of a typical battery energy storage site. The rectangular containers house  
14 the battery cells and the BMS, the smaller containers located in front of each set of battery  
15 containers are the power conversion systems. The plant controller/energy management system is  
16 located in the control building in the centre of the rendering at the end of the upper row of battery  
17 containers. Each of NS Power’s BESS sites will be located adjacent substations, as stipulated in  
18 the Regulations.

19  
20 **Figure 1 Rendering of typical Energy Storage Facility**  
21



22

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1 **7 PROJECT COSTS AND FUNDING AND PROJECT-RELATED BENEFITS**

2  
3 The total forecasted cost of the BESS Project is \$354 million, including contingency and allowance  
4 for funds used during construction (AFUDC). Unique and time-limited federal grant funding  
5 through the SREP program is forecast to reduce the capital cost to Nova Scotia customers by  
6 approximately \$111 million, for a net customer capital cost of \$243 million.

7  
8 While not impacting the capital cost of the project for which approval is sought in this application,  
9 NS Power has also negotiated a beneficial financing package related to the BESS Project. In  
10 aggregate, the value to customers is approximately \$20 million (net present value) as compared to  
11 conventional financing terms at NS Power's market cost of capital.

12  
13 In addition to these savings, proposed refundable Federal investment tax credits arising from this  
14 project will drive customer benefits through a reduction in NS Power's revenue requirement in  
15 the years the BESS Sites go into service, which is currently planned to be in 2025 and 2026.

16  
17 **7.1 Project Costs**

18  
19 As detailed in **Section 5**, above, NS Power completed a competitive procurement process for  
20 award of the EPC contract for the BESS to identify the proponent that offered the best overall  
21 combination of technical compliance, proven experience, work execution strategy, risk allocation  
22 and cost. The estimated cost of the BESS EPC contract is [REDACTED], representing approximately  
23 [REDACTED] percent of total capital costs before AFUDC. The main components of the BESS EPC contract  
24 include the design and engineering of the battery sites, the batteries themselves, the balance of  
25 system materials, all to be installed at the three BESS Sites. The Battery EPC cost is captured in  
26 the Materials, Contracts, Consulting and Freight cost categories included in the total Project cost  
27 breakdown provided in Figure 2 and explained below. A more detailed cost estimate is provided  
28 with CI C0045132 included as Partially Confidential **Appendix C**.

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1

**Figure 2 Breakdown of Project Capital Costs**

Expense Type	Cost
Regular Labour	\$9,575,228
Project Non-Labour Costs	\$5,491,452
Materials	\$220,021,441
Contracts	\$48,801,142
Consulting	\$5,143,823
Legal and Strategic Procurement Support	\$2,088,550
Land Purchase	\$670,170
Freight	\$22,667,051
Contingency	\$26,195,509
Allowance for Funds Used During Construction	\$13,365,727
<b>BESS Gross Project Total</b>	<b>\$354,020,093</b>
NRCAN Smart Renewables & Electrification Pathways Grant Funding	(\$111,175,859)
<b>BESS Project Net Total</b>	<b>\$242,844,234</b>

2

3 **7.1.1 Regular Labour**

4 Regular Labour represents NS Power employees directly engaged in the design, engineering,  
 5 procurement, implementation, safety management, environmental management, quality  
 6 management and project management of the BESS Project. The Regular Labour costs are forecast  
 7 at \$9.58 million over the three-year execution phase of the project. This amount is broken down  
 8 by business function in Figure 3 below. Contract labour is discussed further in Section 7.1.4.

9

10 **Figure 3 Regular Labour by Function**

11

Function	Cost
Project Management Team	\$6,289,927
NS Power Business Unit Support	\$1,842,396
Energy Control Centre	\$659,164
Other Engineering and Technical Resources	\$783,740
<b>Total</b>	<b>\$9,575,228</b>

12



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1 (a) Project Management Team – Refers to the internal expertise required to manage day-to-  
2 day Project activities and provide direction and oversight on tasks to ensure goals are  
3 achieved, and project milestones are met. The roles include team members in the  
4 engineering, construction management, project controls, quality management, finance,  
5 and legal functions.

6  
7 (b) NS Power Business Unit Support – Refers to project support from various business units  
8 across the Company including safety, environment, procurement, communications, and  
9 human resources.

10  
11 (c) Energy Control Centre – Refers to the subject matter experts required to complete the  
12 integration of the BESS Sites to the ECC for operation and control. Resources include  
13 system operators, IT architects, SCADA engineers and system security engineers.

14  
15 (d) Other Engineering and Technical Resources – Refers to the allocation of time to the  
16 Project provided by NS Power subject matter experts in the areas of transmission and  
17 distribution engineering, system maintenance, and asset management.

18  
19 **7.1.2 Project Non-Labour Costs**

20 The BESS Project will not incur administrative overhead (AO). Due to its magnitude, the project  
21 will attract charges for administrative items such as office supplies, application software and  
22 computer hardware, rent, travel expenses and meals. These charges have been determined to be  
23 directly attributable costs for construction activities required to bring the assets into the condition  
24 necessary for their intended use.

25  
26 NS Power project team members and representatives are required to travel to the BESS sites from  
27 commencement of early site investigation and preparation work, through construction until the  
28 commissioning and handover of site to operations once the commercial operation date (COD) is  
29 reached, and until there is full demobilization from site by the major contractors. Several support

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1 teams within NS Power will travel to the sites for specific activities such as site inspections, site  
2 civil works and performance testing. In addition, travel to project sites was required as part of the  
3 procurement due diligence process, and there will be travel to manufacturing locations to conduct  
4 quality due diligence and to witness factory acceptance testing.

5

6 **7.1.3 Materials**

7 The major equipment procurement cost is the largest cost component of the Project. The  
8 projected materials investment of \$220 million is broken down in Figure 4.

9

10 **Figure 4 Materials Costs**

Function	Cost
Batteries & Balance of System (included in EPC Contract)	[REDACTED]
Main Transformer and Required Electrical Equipment	
Other Project Materials	\$800,485
<b>Total</b>	<b>\$220,021,441</b>

11 (a) Batteries & Balance of System - includes the battery modules themselves, battery  
12 containers and battery racks, HVAC equipment, fire protection equipment, and battery  
13 management systems for each site. This equipment is the largest material cost for the  
14 project and includes Lithium-carbonate commodity costs. Other equipment required for  
15 each BESS Site includes the power conversion system, energy management system, and  
16 control building.

17

18 (b) Main Transformer and Required Electrical Equipment - includes three main transformers,  
19 one to support each BESS Site. As noted in Section 5, above, this major material  
20 component of the project scope has been competitively procured through a strategic  
21 procurement contract for transformers. Other materials required to complete this portion of  
22 the project scope include 138 kV circuit breakers, surge arresters, switches, potential

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transformers, and additional associated materials.

(c) Other Project Materials – include, but are not limited to, materials such as gravel, sedimentation control materials, and culverts required to construct adequate site access and driveways to the BESS facilities. In addition, community engagement materials such as story boards and site signage for community open houses at BESS Project locations are included in this category.

**7.1.4 Contracts**

The cost of all contracts associated with the BESS project, beyond the materials costs set out above, is forecast at \$49 million. This category of costs includes site preparation, installation of battery and balance of system equipment, and interconnection to the 138 kV transmission line. The breakdown is included in Figure 5.

**Figure 5 Contract Costs**

Function	Cost
Batteries & Balance of System Installation (included in EPC Contract)	
Substation Equipment Installation	
Site Investigation and Preparation	\$1,399,381
Sound Mitigation	\$2,040,000
Generator Interconnection	\$9,375,379
Project Management	\$6,687,533
ECC Integration Design & Implementation	\$1,974,090
Energy Capacity & Availability Guarantee	
<b>Total</b>	<b>\$48,801,142</b>

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- 
- 1 (a) Batteries & Balance of System Installation (included in EPC Contract) - Installation  
2 activities required include civil works such as construction of equipment foundations,  
3 placement of major equipment and electrical cabling, and termination of cables  
4 between battery containers, power conversion systems, and up to the medium voltage  
5 side of the step-up transformer. Placement and installation of controller and  
6 communication equipment within the control building and construction of perimeter  
7 fencing is also included in this work scope.  
8
- 9 (b) Substation Equipment Installation - Work required to install the main transformer and  
10 associated equipment within either the BESS site area or within existing NS Power  
11 substations.  
12
- 13 (c) Site Investigation and Preparation – Contract work associated with geotechnical  
14 investigations for each project site and clearing, grubbing and general site preparation  
15 including installation of driveways.  
16
- 17 (d) Sound Mitigation – Installation of sound attenuation enclosures at all power conversion  
18 system units and contracting as required for other sound attenuation measures.  
19
- 20 (e) Generator Interconnection – Costs associated with the transmission generation  
21 interconnection process include required studies and transmission interconnection  
22 scope of work.  
23
- 24 (f) Project Management and ECC Integration Design and Implementation – Contract work  
25 is required to support project activities including commercial negotiations with the EPC  
26 vendor, technology cyber security preparation and integration with the ECC.  
27
- 28 (g) Energy Capacity & Availability Guarantee – [REDACTED]  
29 [REDACTED]  
30 [REDACTED]
-

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7.1.5 Consulting, Legal & Strategic Procurement Support

The cost of consulting and strategic procurement support services associated with the BESS project is forecast at \$7.2 million as outlined in Figure 6. Consulting services include the design of the facilities, professional technical services to support integration with the ECC, site investigations, quality management support, and project communications consulting.

Figure 6 Consulting, Legal and Strategic Procurement

Function	Cost
EPC Battery Facility Design and Project Management	
Communications	\$124,528
Quality Management	
Engineering & Studies	\$1,619,402
Legal and Strategic Procurement Support	\$2,088,550
<b>Total</b>	<b>\$7,232,373</b>

(a) Battery Facility Design and Project Management (included in EPC Contract) – Includes site-specific design work associated with the equipment and control topography development for NS Power specified functionality for the facilities.

(b) Communications - Consulting services associated with community engagement and project specific information must be conveyed to the public through social media and local events.

(c) Quality Management - Resources required for shop quality inspections at foreign manufacturing facilities and on-site quality activities to inspect the installation and the construction progress.

Battery Energy Storage System Project  
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- 1 (d) Engineering & Studies – Includes consulting services for conceptual design and  
2 preliminary engineering studies. For the BESS Project, these costs include such activities  
3 as business case development, third party consulting, and detailed design. There are  
4 additional consulting services required for the planning and execution of the Project  
5 including access driveway design, geotechnical investigation, sound surveys, and  
6 operational studies. In addition, each location was reviewed for the potential of  
7 archeological artifacts and additional investigations will be completed where the location  
8 is deemed to have high potential for such discoveries.  
9
- 10 (e) Legal and Strategic Procurement Support - External expertise and support in all aspects  
11 of procurement, contracting and strategic project matters (including in the development  
12 of BESS-related contracting strategies, competitive processes, and contract  
13 awards/negotiations).  
14

15 **7.1.6 Land Purchase and Freight**

16 Land Purchase costs for the BESS Project are associated with the purchase of 52 hectares located  
17 at White Rock Road adjacent to the Cannan Road substation. The cost of freight for the BESS  
18 project is forecast at \$22.7 million and outlined in Figure 7 below. The main system components  
19 require multiple heavy haul shipments.  
20

21 **Figure 7 Freight**

Function	Cost
Batteries and balance of system	
Main Power Transformers	
Communications and Other	\$9,078
<b>Total</b>	<b>\$22,667,051</b>

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1 **7.1.7 Contingency**

2 A contingency of \$26,195,509 has been determined based on a methodology consistent with NS  
3 Power's Non-Binding Contingency Guidelines. In the 2020 Annual Capital Expenditure Plan  
4 Order, the NSUARB directed NS Power to "develop non-binding guidelines describing how it  
5 determines when a capital cost estimate contingency amount is merited and at what level, and to  
6 submit the draft version of the guidelines to stakeholders by August 31, 2020." NS Power's Non-  
7 Binding Contingency Guidelines were further refined in the 2021 ACE Stakeholder Engagement  
8 process and submitted as Appendix I to the NS Power 2021 ACE Plan Stakeholder Engagement  
9 Report on October 1, 2021. The NSUARB accepted the report as filed on November 2, 2021.

10 The guidelines provide several methods for determining contingency. Choosing the most  
11 appropriate method to use is based on factors such as the maturity of the cost estimate (AACE  
12 Class Estimate Classification System), the type and duration of the project and its associated risk  
13 exposure.

14 To calculate the contingency for the BESS Project, simulation software was used to perform a  
15 Monte Carlo analysis to test thousands of trial runs of project outcomes. There are three steps in  
16 this process:

- 17 1. Project baseline costs are assessed individually to assign an expected cost accuracy range  
18 as prescribed in the Non-Binding Contingency Guidelines. This analysis included EPC cost  
19 items with firm pricing achieved, Project Management Team (PMT) and other third-party  
20 contracts yet to be awarded.
- 21 2. Project risks are assessed by applying a cost impact and probability of occurrence to each  
22 risk independently. Strategic risks assessed include legal disputes, international relations,  
23 supply chain and transportation, environment/archaeology, delays, safety, and inflation.
- 24 3. Once the trial runs are complete on these two data sets, the software calculates the  
25 probability distribution of the project's overall cost certainty outcomes, based on the input  
26 variables and respective assigned probabilities. Through statistical analysis, it provides a  
27 cost confidence curve which is used to determine the appropriate amount of contingency  
28 to be budgeted for the project.

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1 For the BESS Project, the contingency amount calculated was assessed at a P75 cost risk  
2 confidence in alignment with an AACE Estimate Class and related accuracy range (i.e. Class 2 =  
3 -15% to +20% cost certainty). The contingency value of approximately 9 percent is below the  
4 mid-point of the recommended range of +5% to +20%.

5 NS Power confirms that only funds ultimately spent to manage these contingent risks will be  
6 charged to the Project.

7 **7.1.8 Allowance for Funds Used During Construction (AFUDC)**

8 AFUDC will be applied to each BESS Site at the effective NSUARB-approved WACC rate in  
9 accordance with NS Power Accounting Policy 6240. AFUDC for the Project is forecast at \$13.4  
10 million.

11

12 **7.2 Depreciation**

13

14 As NS Power does not currently have an asset class and associated depreciation rate applicable to  
15 grid scale battery and inverter assets that form the proposed depreciation class Battery Storage  
16 Systems, NS Power seeks NSUARB approval of an interim annual depreciation rate for these  
17 assets of 5 per cent. The proposed annual depreciation rate for these assets is required in order to  
18 recover the costs over the expected 20-year life of the assets. These interim depreciation rates will  
19 be updated, and final approval of the applicable depreciation rate will be sought from the  
20 NSUARB, as part of the proceeding that next considers and approves a depreciation study.

21

22 The balance of the BESS Project assets, chiefly comprised of the EMS and infrastructure to be  
23 connected to the 138kV transmission system and integrated with the Energy Control Center, will  
24 be depreciated at NSUARB-approved depreciation rates and included in existing asset classes.

25

26

27

28



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1 **7.3 Project Funding**

2

3 **7.3.1 Smart Renewables and Electrification Pathways (SREP) Program Funding**

4 The Government of Canada, through Natural Resources Canada’s (NRCan’s) SREP program is  
5 committed to supporting the BESS Project with grant funding. Confirmation letters from NRCan  
6 are included as **Appendix D**.

7

8 SREP provides funding for smart renewable energy and electrical grid modernization projects.  
9 This program is designed to reduce greenhouse gas emissions by encouraging the replacement of  
10 fossil-fuel generated electricity with renewable energy technology that can provide essential grid  
11 services while supporting Canada’s equitable transition to an electrified economy. The “equitable  
12 transition” objective of the program recognizes that the federal government’s off-coal mandate for  
13 the country will disproportionately affect the Maritime Provinces. Despite having less than three  
14 percent of Canada’s population, Nova Scotia will bear 55 percent of the estimated cost for the  
15 country to phase out coal by 2030.

16

17 The SREP funding, which is equal to one-third of eligible capital expenditures for the project, to  
18 a maximum of \$130 million<sup>14</sup>, will reduce project costs for the benefit of NS Power customers by  
19 approximately \$111 million.

20

21 **7.4 Benefits arising from this Project**

22

23 **7.4.1 Canada Infrastructure Bank Low-Cost Debt**

24 NS Power has obtained confirmation from the Canada Infrastructure Bank (CIB) for low-cost debt  
25 financing which, while enabled by the Project, will reduce the Company’s weighted average cost  
26 of capital (WACC).

---

<sup>14</sup> The SREP program will provide funding equal to the lesser of \$43.3 million or 33 percent of the cost for each of the three proposed BESS Sites

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1 The BESS Project has enabled the Company to secure CIB debt financing of approximately [REDACTED]  
2 [REDACTED]  
3 [REDACTED]. As the rate is indexed to the GoC Bond rates, the precise rate will not be  
4 known until financial close, which is expected to occur in the first quarter of 2024. Based on  
5 current Government of Canada bond pricing, the cost to NS Power for the CIB debt funding would  
6 be approximately [REDACTED] percent. This represents savings of greater than [REDACTED] relative to  
7 what NS Power could achieve through a market debt issuance.  
8

9 As a component of the debt financing arrangements with CIB and through the CIB's Indigenous  
10 Equity Initiative, the Wskijnu'k Mtmo'taquow Agency Limited (WMA) will be making an equity  
11 investment in NS Power in connection with the BESS Project. NS Power and WMA have entered  
12 into a Memorandum of Agreement (MOA) to establish a framework for WMA's investment.  
13

14 The WMA, which is owned by Nova Scotia's 13 Mi'kmaq First Nations, is committed to  
15 environmental stewardship to protect and enhance the lands and resources of Nova Scotia as  
16 essential to maintaining the way of life, culture and the well-being of future generations of the  
17 Nova Scotia Mi'kmaq and all Nova Scotians. Recognizing the fit of the BESS project with these  
18 values, and the importance of collaboration and reconciliation with Nova Scotia's Indigenous  
19 Peoples, and in accord with the expectations of CIB, together NS Power and WMA have shaped  
20 an investment arrangement, supported by the CIB, that will enable WMA, on behalf of its thirteen  
21 communities to participate in Nova Scotia's energy transition in a manner which recognizes the  
22 key role that these communities can and will play as partners in Nova Scotia's sustainable energy  
23 future.  
24

25 WMA has committed to invest [REDACTED] in preferred shares of NS Power [REDACTED]  
26 [REDACTED]  
27 [REDACTED] which approximates the market rate that NS Power could expect  
28 to obtain for a preferred share issuance (estimated at [REDACTED] per cent).  
29

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1 As a result of these CIB financing arrangements, NS Power calculates a net present value cost  
2 saving for Nova Scotia customers resulting from the combination of CIB financing of the BESS  
3 and the WMA preferred share investment relative to market rate financing of approximately [REDACTED]

4 [REDACTED]

5  
6 While this cost saving is not a project capital cost saving and the financing costs associated with  
7 it are not subject to or part of the approval NS Power is seeking with this application, it is a  
8 significant benefit to customers that arises as a result of the BESS Project and so has been  
9 summarized here for the benefit of the NSUARB and interested parties.

10

11 **7.4.2 Investment Tax Credits**

12 The March 2023 Federal Budget proposed a refundable tax credit of up to 30 percent, referred to  
13 as the Clean Technology Investment Tax Credit, which is applicable to qualified costs of certain  
14 types of investments, including the BESS Project. Draft legislation relating to this tax credit was  
15 released in August 2023. Based on the draft legislation, NS Power calculates a net present value  
16 revenue requirement reduction resulting from the investment tax credit of approximately \$70  
17 million.<sup>15</sup> As required by NS Power Accounting Policy 5900, paragraph 03, investment tax credits  
18 are recorded as a reduction to income tax expense thus reducing the revenue required to be  
19 collected from customers in the year earned. In the case of BESS, the year the ITC is earned for a  
20 particular site is the year in which the site is placed in service/available for use. The impact on  
21 customers of this revenue requirement reduction will be determined based on actual overall  
22 revenue earned and expenses incurred in the subject test year.

---

<sup>15</sup> As the legislation has not yet been enacted, it is possible that changes may occur prior to enactment, or that further clarity on how the legislation should be interpreted could be provided, which could impact the magnitude of the benefit available to NS Power.

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1 **8 COMMUNITY ENGAGEMENT AND SUPPORT**

2

3 NS Power is committed to thoughtful and informed engagement with its various community  
4 stakeholders as the Company makes the transition to a clean electricity grid. Building off  
5 stakeholder participation in the 2020 IRP and Evergreen IRP processes, NS Power has and will  
6 continue to engage with Nova Scotians, particularly members of the communities adjacent to the  
7 proposed BESS Project installations.

8

9 Through this engagement process, NS Power aims to effectively communicate to stakeholders and  
10 community members by being the first and best source of information about the BESS Project,  
11 particularly when any questions or concerns may arise. The Company has established a dedicated  
12 point of contact within the BESS Project Team to respond to stakeholder inquiries. The team is  
13 committed to providing information, opportunities for discussion, consultation for feedback, and  
14 continued proactive tactics throughout the construction and commissioning of each of the three  
15 BESS Sites.

16

17 **Community Engagement**

18

19 During the early stages of the BESS Project, the Company hosted meetings with the Town of  
20 Bridgewater, the Municipality of the County of Kings and the Halifax Regional Municipality  
21 (HRM) to introduce the project, outline its functions, benefits and discuss the locations.  
22 Throughout 2023, NS Power provided updates on the status of the Project to the Mayors and  
23 Council members of each municipality. Meetings were also held with key stakeholders and  
24 community interest groups, including Members of Parliament (MPs) and Members of the  
25 Legislative Assembly from each region, representatives from HalifACT, Energize Bridgewater  
26 and the Ecology Action Centre. Presentations about the Project were also made to Town of  
27 Bridgewater Council and HRM's Environment and Sustainability Standing Committee.  
28 Engagement letters were sent to local MPs and fire departments in each community and post-cards  
29 were mailed to residents living within one kilometre of each of the three BESS Sites.

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1 Following these engagement efforts, the Town of Bridgewater, the Municipality of the County of  
2 Kings, HRM and the EAC have submitted letters of support for the BESS Project. Letters of  
3 Support are attached at **Appendix E**.

4  
5 **Community Open Houses**

6  
7 After meeting with key stakeholders in each region, NS Power hosted Community Open Houses  
8 in Bridgewater, Waverley and White Rock during the month of October 2023. Throughout the  
9 planning for the three Open Houses, NS Power engaged and consulted key stakeholders on the  
10 locations, community outreach and format for the events. Stakeholders were sent promotional  
11 materials to help broaden outreach throughout each community.

12  
13 The Open Houses were informal and inclusive events. The Company welcomed community  
14 members to explore information about the Project and provided opportunities to ask questions and  
15 provide feedback. They were based on a drop-in format, with no set agenda or presentations  
16 scheduled. Information on BESS site locations, project benefits, project timelines, and on how to  
17 stay engaged was shared on a series of storyboards (or poster boards) located around the event  
18 space. Project team members were in attendance to help answer questions and facilitate  
19 conversations.

20  
21 Each session attracted approximately 50-90 attendees receiving generally positive feedback with  
22 several attendees commenting on the energy transition and the contribution batteries will make in  
23 phasing out coal-fired generation. In addition, NS Power engaged in discussions with community  
24 members on such issues as BESS site fire safety, noise impacts, site visibility and lithium sourcing  
25 and recycling.

26  
27 The Company is committed to continuing this engagement with the communities adjacent to the  
28 BESS Project sites through all phases of the Project.

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1 **9 PROJECT NEED**

2

3 As articulated in NS Power’s Capital Planning & Capital Expenditure Justification Criteria  
4 Detailed Document (CEJC), a capital expenditure is justified when the “need” for the expenditure  
5 is established, and it is demonstrated that the proposed project is the best alternative and is being  
6 implemented within the optimal timeframe.<sup>16</sup>

7 In the case of the BESS, the need for the BESS Project is established by the legislative direction  
8 provided to NS Power through the enacted Regulations under Section 4D of the *Electricity Act* to  
9 do the BESS Project and through the balance of the legislative policy outlined earlier in this  
10 application pursuant to which renewable generation continues to be added to the NS Power system  
11 and which requires the phase out of unabated coal generation and 80 percent decarbonization of  
12 NS Power’s operations by 2030 all of which support proceeding with this project now. The  
13 currently available federal funding supports and the favorable commercial terms secured under the  
14 project LNTP arrangement all as outlined earlier in this application further support proceeding  
15 with the BESS now. NS Power asserts that the BESS Project meets all of the criteria articulated in  
16 the CEJC. However, in this instance “need” has been established by the legislative direction  
17 provided in the Regulations and other legislated decarbonization requirements.

---

<sup>16</sup> CEJC, page 25.

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1 **10 CONCLUSION & RELIEF SOUGHT**

2  
3 NS Power submits that the Regulations enacted under section 4D of the *Electricity Act* establish  
4 the need for the BESS Project and the balance of the legislative policy in place in the province as  
5 well as the time limited federal funding available for the project all support proceeding with the  
6 project now.

7  
8 The information provided in this application demonstrates that:

- 9
- 10 1. NS Power has put in place a rigorous project management structure and widely used  
11 methodologies for large and complex capital projects to guide the development, internal  
12 governance and approval, and implementation of the BESS Project in a technically robust,  
13 cost effective, and timely manner.  
14
  - 15 2. Through a carefully researched technical specification and attendant competitive  
16 procurement process NS Power has secured an EPC contract arrangement that provides the  
17 optimal overall combination of technical compliance, experience, work execution strategy,  
18 risk allocation and cost.  
19
  - 20 3. Integration of the proposed BESS onto NS Power's system has been purposely designed in  
21 order to optimize the value and operability of the batteries in support of the Nova Scotia  
22 electricity system.  
23
  - 24 4. The forecast of BESS Project costs is appropriate and prudent, and the proposed funding  
25 program for the Project will leverage currently available clean energy incentives to  
26 minimize customer costs and maximize customer value.  
27
  - 28 5. NS Power has secured community and stakeholder support for the Project.  
29

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1 In consideration of all of the foregoing, and pursuant to the Regulations under section 4D of the  
2 *Electricity Act*, NS Power requests approval of the NSUARB under section 35 of the Public  
3 Utilities Act of Nova Scotia approving the BESS Project and the approval the depreciation rate  
4 of 5 percent for the Battery Storage System assets on an interim basis, with such rate to be  
5 updated and approval sought from the NSUARB as part of a future depreciation study  
6 proceeding. In order for NS Power to meet the milestone dates directed by the LNTP and EPC  
7 contract arrangement and preserve the advantages thereby secured for customers as discussed  
8 earlier in this application, NS Power respectfully requests NSUARB approval of this application  
9 by June 30, 2024.

10



**LIMITED NOTICE TO PROCEED**

**(NSP Systems)**

This **LIMITED NOTICE TO PROCEED** (“**LNTP**”) is made and entered into as of October 31, 2023 (the “**Execution Date**”), by and among [REDACTED] a corporation duly incorporated pursuant to the laws of Canada (the “**Contractor**”) and **NOVA SCOTIA POWER INC.**, a corporation duly incorporated pursuant to the laws of Nova Scotia (the “**Company**”). Each entity is individually referred to herein as a “**Party**” and together they are referred to as the “**Parties**”.

**RECITALS**

**WHEREAS** the Company and the Contractor have negotiated all material terms of an Engineering, Procurement and Construction Agreement (the “**EPC Contract**”) pursuant to which the Contractor will perform the Work including the design, engineering, procurement, delivery, construction, installation, interconnection, start up, testing, commissioning and completion of each System (including the supply of certain related products (collectively, the “**Products**”)) to be installed in the three (3) Systems being developed by the Company in the Province of Nova Scotia, being the Spider Lake, Bridgewater, and White Rock projects (collectively, the “**Project**”).

**AND WHEREAS** the agreed form of the EPC Contract (including the agreed System Price for each System and the agreed Project Schedule) is set out in Schedule 1.

**AND WHEREAS** the Company intends to seek Regulatory Approval from the Applicable Regulator and it is expected that a decision by the Applicable Regulator in respect of the Regulatory Approval may take multiple months to receive.

**AND WHEREAS** the Company wishes to: (i) engage the Contractor to proceed with the scope of work in respect of the Systems set forth in Schedule 2 (the “**LNTP Scope of Work**”), (ii) have the Contractor fix the Price and schedule under the EPC Contract during the Exclusivity Period, and (iii) concurrently reserve manufacturing capacity for certain equipment for the Project prior to the Company’s receipt of Regulatory Approval (collectively, the “**Contractor’s LNTP Obligations**”).

**AND WHEREAS** subject to the terms and conditions of this LNTP, the Company has agreed to provide a binding purchase and exclusivity commitment to the Contractor during the Exclusivity Period and to provide the Contractor with the LNTP Payment in consideration of the performance by Contractor of the Contractor’s LNTP Obligations.

**NOW THEREFORE**, in consideration of the mutual covenants contained herein, the Parties hereby agree as follows:

**AGREEMENT**

1. Engagement of Contractor. The Company hereby retains the Contractor to commence the LNTP Scope of Work, and the Contractor agrees to perform the LNTP Scope of Work subject to the terms and conditions set forth herein and in accordance with the standards and requirements of the EPC

Contract. Except as otherwise specifically provided for in this LNTP, the Contractor shall not be required to perform, and the Company shall not be required to purchase, any additional Work not included within the LNTP Scope of Work, unless mutually agreed in writing.

2. Exclusivity. During the Exclusivity Period, the Company shall not enter into commercial discussions to engage an alternative contractor or supplier to perform Contractor’s scope of work under the EPC Contract. The period of time from the Execution Date until the earlier of [REDACTED] [REDACTED] [REDACTED] the “Exclusivity Period”; [REDACTED] [REDACTED] [REDACTED] [REDACTED]

3. Payment. In consideration of the Contractor’s performance of the Contractor’s LNTP Obligations the Company shall pay to the Contractor the amount of [REDACTED] (the “LNTP Payment”) within fifteen (15) days of receipt of the Contractor’s invoice for the LNTP Payment delivered to the Company by the Contractor on the Execution Date.

4. Execution of EPC Contract and Delivery of System NTPs.

a. Provided the Regulatory Approval with no Material Adverse Impact is received on or before the Target Approval Date, the Parties shall execute and deliver the EPC Contract (including the agreed System Price for each System and the agreed Project Schedule) in the form set out in Schedule 1 (as completed pursuant to Section 6) on or before [REDACTED] [REDACTED] and, subject to Contractor’s compliance with Article 2.3 of the EPC Contract, the final Notices to Proceed for each of the three Systems (the “System NTPs”) will be issued by the Company to the Contractor pursuant to the EPC Contract concurrently with execution and delivery of the EPC Contract by the Parties. In accordance with the invoicing and payment terms of the EPC Contract, concurrently with the delivery of the System NTPs, Company will process Contractor’s Invoice for payment of the Notice to Proceed Payment Milestones (as identified in the Exhibit 11 to the EPC Contract) for each of the three Systems delivered to Company concurrently with the issuance of the System NTPs. Upon execution and delivery by the Parties of the EPC Contract and issuance of the System NTPs by Company: (i) the LNTP Payment shall be treated and accounted for as if paid on account of the Price and credited towards the total amounts of the Price payable by the Company under the EPC Contract and will be deemed to have been made pursuant to the EPC Contract; (ii) all LNTP Scope of Work performed by the Contractor hereunder shall be deemed to have been performed under the EPC Contract and the LNTP Scope of Work shall be deemed included in the “Work”, as such term is defined in the EPC Contract; and (iii) all liabilities, duties and obligations of the Contractor under the EPC Contract shall apply to the LNTP Scope of Work as if originally performed pursuant to the EPC Contract.

The immediately previous sentence of this Section 4.a. shall survive termination or expiration of this LNTP and remain in full force and effect.

b. ■

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

[REDACTED]

■ [REDACTED]

5. Target Approval Date and Finalization of EPC Contract.

a. Target Approval Date. The Company agrees to diligently, reasonably, and in good faith seek the Regulatory Approval on or before [REDACTED]

[REDACTED] (the "Target Approval Date"). In connection with seeking the Regulatory Approval, the following shall apply:

- i. The Contractor shall furnish to the Company such information and assistance as the Company may reasonably request in order to prepare and apply for the Regulatory Approval, provided that the Contractor shall not be obligated to provide any information or assistance not already developed in preparing and negotiating the EPC Contract and performing the LNTP Scope of Work or that results in material additional cost or expense to the Contractor.
- ii. The Company shall promptly notify Contractor of material developments related to obtaining Regulatory Approval including any development which is reasonably likely to impact in any material respect the Work, the Project Schedule or the LNTP Scope of Work or any development that the Company determines is reasonably likely to result in a Material Adverse Impact.

6. Finalization of EPC Contract and LTSAs. The Parties agree to diligently, reasonably, and in good faith seek to finalize the terms and conditions of (i) the EPC Contract (including all Exhibits thereto) and (ii) individual System-specific long term services agreements ("LTSAs") pursuant to which the Contractor will provide certain long-term operation and maintenance services with respect to each of the Systems (including all Exhibits thereto) each on mutually agreeable terms as soon as reasonably practicable following the Execution Date [REDACTED]

[REDACTED] The Parties acknowledge and agree that the terms and conditions of the EPC Contract is set out in Schedule 1 (including the agreed System Price for each System and the agreed Project Schedule) are agreed and will not be changed other than as provided in Section 9 of this LNTP with the exception of any items (including any Exhibits) expressly noted in Schedule 1 as remaining to be completed. The Parties further acknowledge and agree that all relevant terms and conditions in the LTSAs will be aligned to equivalent terms and conditions agreed and contained within the EPC Contract, save and except for reasonable revisions justified by the difference in the Parties' obligations under the EPC Contract compared to the Parties' obligations under the LTSAs.

7. Termination and its Effects.

a. Termination by Execution of the EPC Contract. This LNTP will automatically terminate upon the execution and delivery of the EPC Contract by both Parties, in which case the EPC Contract will supersede this LNTP and the LNTP Payment shall be credited against amounts due from the Company under the EPC Contract as provided for in Section 4.a.

b. Termination for Default by Contractor. [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]

c. Termination for Default by the Company.

[REDACTED]

[REDACTED]

d. Termination by the Company for Convenience. [REDACTED]

[REDACTED]

8. Force Majeure. [REDACTED]

9. Compensable Event. [REDACTED]

[REDACTED]

- 10. Contractor an Independent Contractor. In the performance of this LNTP, Contractor is an independent contractor and neither Contractor nor Contractor’s Personnel shall be employees of Company. Contractor’s Personnel shall be under the direct supervision and control of Contractor and not of Company. Contractor accepts complete responsibility as the principal for Contractor’s Personnel. Contractor is not an agent of Company or an agent of any Affiliate of Company. Contractor shall not represent or hold itself out as an agent of Company or an agent of any Affiliate of Company. This LNTP shall not constitute a joint venture or partnership of Company and Contractor or of Company and any Subcontractor.
  
- 11. Waiver. No waiver of any provision of this LNTP shall be of any force unless such waiver is in writing, is expressly stated to be a waiver of a specified provision of this LNTP and is signed by the Party to be bound thereby. Either Party’s waiver of any breach of, or failure to enforce, any of the covenants, conditions or other provisions of this LNTP, at any time, shall not in any way affect or limit that Party’s right thereafter to enforce or compel strict compliance with every covenant, condition or other provision hereof.
  
- 12. Limitation of Liability. [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]
  
- 13. Entire Agreement. This LNTP and the terms of the EPC Contract referenced or incorporated herein, as executed by authorized representatives of Company and Contractor, constitutes the entire agreement between the Parties with respect to the matters dealt with herein. This LNTP (including the terms of the EPC Contract referenced or incorporated herein) replaces and supersedes all prior agreements, documents, writings and verbal understandings between the Parties in respect of the subject matter addressed herein and there are no oral or written understandings, representations or commitments of any kind, express or implied, which are not expressly set forth herein.
  
- 14. Assignment. Neither Party shall assign this LNTP, or any of its rights or obligations hereunder, to any other Person, except in accordance with Article 31 of the EPC Contract.

15. Confidentiality. The provisions of Article 29 of the EPC Contract are hereby incorporated herein by reference in their entirety. This Section 15 shall survive termination or expiration of this LNTP and remain in full force and effect.
  
16. Ethical Practices. Contractor agrees to perform the LNTP Scope of Work and to conduct its operations in a manner which is in accordance with all Applicable Laws. Contractor shall comply with its corporate code of conduct provided to Company prior to the Execution Date and attached to the EPC Contract as Exhibit 34. Contractor also agrees to cause all subcontractors to perform the LNTP Scope of Work and conduct its operations in the same manner. Contractor agrees to perform the LNTP Scope of Work so that such work will be sourced from suppliers and producers using ethical manufacturing, procurement and production methods in compliance with Contractor’s Code of Conduct, Applicable Laws and the Ethical Standard Requirements.
  
17. Reserved.
  
18. Defined Terms. Unless otherwise defined herein (including in the Whereas clauses of this LNTP), capitalized terms used but not defined in this LNTP shall have the meaning given to them in the EPC Contract. For the purpose of this LNTP, except as is otherwise expressly provided herein or unless the context otherwise requires, the terms defined in this Section 18 shall have the following meanings assigned to them:
  - a. **“Applicable Regulator”** means Nova Scotia Utility and Review Board.
  
  - b. **“Change in Applicable Law”** has the meaning given to such term in the EPC Contract; provided that references to the “Effective Date” in such definition shall be replaced with references to the “Execution Date”.
  
  - c. **“Compensable Event”** means the occurrence of an event of Force Majeure or a Change in Law.
  
  - d. **“Force Majeure”** has the meaning given to such term in the EPC Contract; provided that references to the “Effective Date” in such definition shall be replaced with references to the “Execution Date”.
  
  - e. **“Material Adverse Impact”** means [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]
  
  - f. **“Regulatory Approval”** means approval by the Applicable Regulator of the forecast capital costs of the Company for the Project and other necessary capital for inclusion in the Company’s rates set by the Applicable Regulator for recovery of the Company’s costs in respect of the Systems and related assets.

19. This LNTP shall be construed and the relations between the Parties determined in accordance with the Applicable Laws of Nova Scotia and Canada, including any limitation periods, and reference to such Applicable Laws shall not, by application of conflict of laws rules or otherwise, require the application of the Applicable Laws in force in any jurisdiction other than Nova Scotia.
20. No modification of this LNTP by Contractor or Company, either before or after the execution of this LNTP, shall be of any force or effect unless such modification is in writing, is expressly stated to be a modification of this LNTP and is signed by duly authorized representatives of each of the Parties.
21. The illegality or unenforceability of any provision of this LNTP shall in no way affect the legality or enforceability of any other provision hereof. Any illegal or unenforceable provision shall be deemed severed from this LNTP and the remainder of this LNTP shall be construed and enforced as if this LNTP did not contain such illegal or unenforceable provision.
22. This LNTP may be executed in any number of counterparts and any Party may transmit by email in portable document format, or by other means of electronic signature (such as *DocuSign*) to the other Party a copy of this LNTP executed by that Party, the receipt of which shall have the same force and effect as if the original thereof had in fact been delivered at the same time.
23. Each Party represents and warrants to the other that it has all requisite power and authority to enter into this LNTP and to perform its obligations hereunder and that this LNTP has been duly authorized, executed and delivered by it and constitutes a valid and binding obligation, enforceable against it in accordance with its terms.

*[Signature page follows]*



IN WITNESS WHEREOF, the Parties have executed this LNTP as of the Execution Date.

**(Company)**

**(Contractor)**

**NOVA SCOTIA POWER INC.**



By: Chris Smith  
Name: Chris Smith  
Title: EVP, Finance

By: \_\_\_\_\_  
Name:  
Title:

By:   
Name:  
Title: Peter Gregg  
President & CEO

By: \_\_\_\_\_  
Name:  
Title:

IN WITNESS WHEREOF, the Parties have executed this LNTP as of the Execution Date.

**(Company)**

**(Contractor)**

**NOVA SCOTIA POWER INC.**

[REDACTED]

By: \_\_\_\_\_

[REDACTED] \_\_\_\_\_

Name:

[REDACTED]

Title:

[REDACTED]

By: \_\_\_\_\_

[REDACTED] \_\_\_\_\_

Name:

[REDACTED]

Title:

[REDACTED]

[REDACTED]

**Schedule 1**

**EPC CONTRACT**

See attached.

**ENGINEERING, PROCUREMENT AND CONSTRUCTION AGREEMENT**

**BETWEEN**

**NOVA SCOTIA POWER INC.**

**- AND -**



**Contract No.**

**TABLE OF CONTENTS**

ARTICLE 1 GENERAL PROVISIONS .....3

ARTICLE 2 SCOPE OF WORK; COMMENCEMENT OF WORK .....28

ARTICLE 3 CONTRACTOR'S STATUS.....31

ARTICLE 4 CONTRACTOR OBLIGATIONS.....31

ARTICLE 5 CONTRACTOR'S ITEMS .....39

ARTICLE 6 CONTRACTOR'S PERSONNEL.....40

ARTICLE 7 SUBCONTRACTS .....42

ARTICLE 8 COORDINATION .....44

ARTICLE 9 PERFORMANCE SECURITY .....45

ARTICLE 10 POLICY ON ETHICS/CONFLICTS OF INTEREST .....46

ARTICLE 11 COMPLIANCE WITH LAWS .....46

ARTICLE 12 COMPANY'S OBLIGATIONS .....47

ARTICLE 13 COMPENSATION AND TERMS OF PAYMENT .....48

ARTICLE 14 TAXES .....54

ARTICLE 15 AUDIT AND REVIEW OF RECORDS .....55

ARTICLE 16 HEALTH, SAFETY AND ENVIRONMENTAL PROTECTION.....56

ARTICLE 17 ACCESS; QUALITY; INSPECTION AND TESTING .....60

ARTICLE 18 WARRANTY PROVISIONS .....63

ARTICLE 19 LIQUIDATED DAMAGES.....67

ARTICLE 20 CONTRACTOR INSURANCE.....70

ARTICLE 21 PROJECT INSURANCE .....74

ARTICLE 22 LIABILITY AND INDEMNIFICATION .....77

ARTICLE 23 CONTRACTOR'S REPRESENTATIONS AND WARRANTIES .....82

ARTICLE 24 TITLE AND RISK.....84

ARTICLE 25 PROJECT SCHEDULE AND PROGRESS.....86

ARTICLE 26 INTERIM MILESTONES; COMMISSIONING AND TESTING; SUBSTANTIAL  
COMPLETION; FINAL COMPLETION .....87

ARTICLE 27 CHANGES TO THE WORK; EQUITABLE ADJUSTMENTS .....95

ARTICLE 28 PUBLIC COMMUNICATIONS.....98

ARTICLE 29 CONFIDENTIALITY .....99

ARTICLE 30 INTELLECTUAL PROPERTY .....102

ARTICLE 31 ASSIGNMENT; CHANGE OF CONTROL .....103

ARTICLE 32 FORCE MAJEURE .....105

ARTICLE 33 DEFAULT AND TERMINATION .....106

ARTICLE 34 BANKRUPTCY, INSOLVENCY AND RECEIVERSHIP.....113

ARTICLE 35 SUSPENSION.....114

ARTICLE 36 LABOUR RELATIONS.....115

ARTICLE 37 NOTICES .....116

ARTICLE 38 ENTIRETY OF AGREEMENT, NON WAIVER.....118

ARTICLE 39 SEVERABILITY .....119

ARTICLE 40 SURVIVAL OF PROVISIONS.....119

ARTICLE 41 DISPUTE RESOLUTION.....119

ARTICLE 42 GOVERNING LAW AND JURISDICTION.....121

ARTICLE 43 COMPLIANCE WITH PROJECT DOCUMENTS, ETC.....122

ARTICLE 44 LIENS AND CLAIMS.....122

ARTICLE 45 ENUREMENT .....123

ARTICLE 46 COUNTERPARTS.....123

**THIS ENGINEERING, PROCUREMENT AND CONSTRUCTION AGREEMENT MADE** as of \_\_\_\_\_  
\_\_\_\_\_, 202[\_] (the "Effective Date")

**BETWEEN:**

**NOVA SCOTIA POWER INC.** a company incorporated pursuant to the laws of the Province of Nova Scotia (hereinafter referred to as "Company")

- and -

\_\_\_\_\_ a corporation duly incorporated pursuant to the laws of Canada (hereinafter called "Contractor").

**WHEREAS**, Company desires the performance of certain Work described in this Agreement;

**WHEREAS**, Contractor is engaged in the business of performing such Work and will provide expertise, equipment and personnel to perform the Work;

**WHEREAS**, Company and Contractor wish to set out the terms and conditions on which Contractor shall carry out the Work;

**NOW THEREFORE**, the Parties, each in consideration of the promises and agreements of the other, hereby agree as follows:

**ARTICLE 1**  
**GENERAL PROVISIONS**

1.1 Exhibits

The following Exhibits are attached hereto and shall form and be read and construed as an integral part of this Agreement:

<b>Exhibit</b>	<b>Description</b>
1	Scope of Work
2	Compensation
3	Major Subcontractors
4	Coordination Procedures
5	Company Supplied Data

6	Commissioning and Acceptance Testing
7	Deliverables List
8	Nova Scotia Diversity and Inclusion Requirements
9	[REDACTED]
10	Declaration of Residency
11	Payment Milestone Schedule
12	Form of Construction Lien Statutory Declaration
13	Reserved.
14	Company Supplied Permits
15	Project Documents
16	Warranty Response Plan
17	Contractor's Personnel
18	Project Insurance
19	Consent to Assignment
20	Health, Safety and Security Requirements
21	Environmental Requirements
22	[REDACTED]
23	Key Dates
24	Quality Requirements
25	Reserved
26	Form of Subcontractor Consent and Agreement
27	Interim Milestones
28	Liquidated Damages
29	Project Schedule
30	Inspection and Test Plan
31	Major Equipment Warranties
32	Ethical Standards Requirements
33	Cybersecurity Requirements
34	Contractor's Code of Conduct

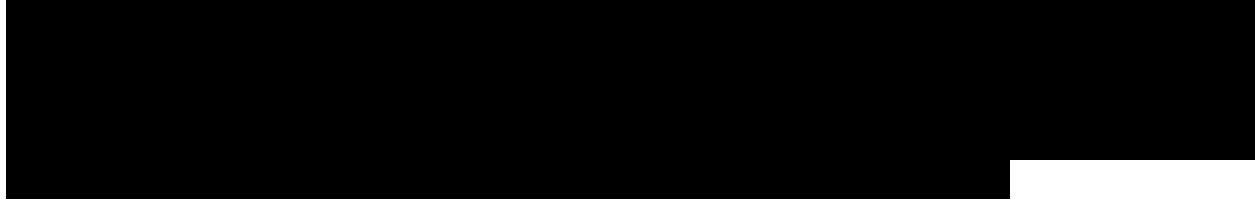
The terms and provisions of the Exhibits are subject to amendment pursuant to Article 27.

1.2 Definitions.

For the purpose of this Agreement, except as is otherwise expressly provided herein or unless the context otherwise requires, the terms defined in this Article 1.2 shall have the meanings assigned to them in this Article 1.2.

(a) [REDACTED]





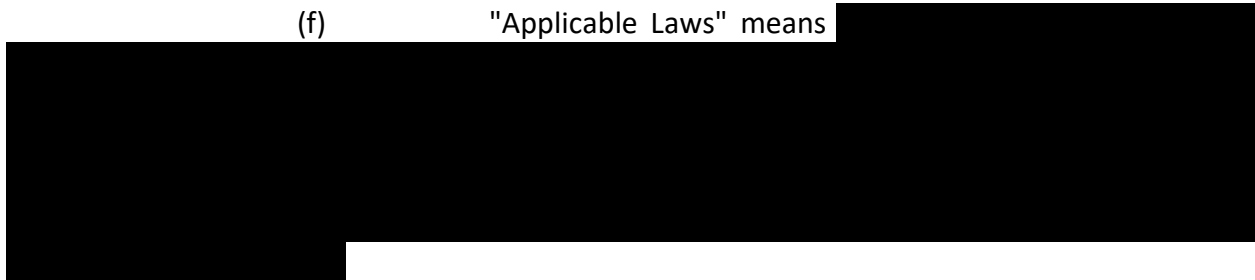
(b) "Acceptance Tests" means the Acceptance Tests set out in Exhibit 6 – Commissioning and Acceptance Testing for the purpose of commissioning and testing the Work.

(c) "Additional Project Document" means any document which Company designates as a "Project Document" by Notice to Contractor following the Effective Date in accordance with Article 43.2.

(d) "Affiliate" or "Affiliate(s)" has the meaning given to affiliate in the Canada Business Corporations Act, R.S.C.1985.

(e) "Agreement" means this document, including the Exhibits as referenced in Article 1.1, originally executed or as they may from time to time be supplemented, amended, revised or otherwise modified in accordance with the applicable provisions of this document and the Exhibits.

(f) "Applicable Laws" means



(g) "Approval" means express acceptance, concurrence or consent in writing and "Approve" and "Approved" shall be construed accordingly.

(h) "As-Built Drawings" means the complete set of drawings issued by Contractor depicting the Work as executed.

(i) "Authority" means any:

- [REDACTED]
- [REDACTED] ■ [REDACTED] ■ [REDACTED] ■ [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

[REDACTED]

(j) "BESS Enclosures" means the battery energy storage products required to be supplied by Contractor hereunder for each System, consisting of

[REDACTED]

(k) "Billing Information" has the meaning ascribed thereto in Article 13.4.

(l) "Business Day" means a day that is not a Saturday, Sunday or any other day which is a statutory holiday in the place where an action is to be performed or a payment is to be made.

- [REDACTED]
- [REDACTED]

[REDACTED]

[REDACTED]

(q) "Capacity Test" means an "Available Energy Capacity Test" as defined in Exhibit 6 (Commissioning and Acceptance Testing) conducted on a System in accordance with the testing requirements, conditions and procedures set forth in Exhibit 6 (Commissioning and Acceptance Testing) and the other requirements of this Agreement.

(r) "Change" has the meaning ascribed thereto in Article 27.1(b).

(s) "Change in Applicable Law" means [REDACTED]

(t) "Change in Project Document" has the meaning ascribed thereto in Article 43.2.

(u) "Change Order" means an order or directive for a Change issued in the form set out in Exhibit 4 – Coordination Procedures (Attachment [ ]), and signed by Company.

(v) "Codes and Standards" means those codes, standards and practices relating to design, engineering, construction, workmanship, equipment and components set forth or called for in Exhibit 1 – Scope of Work.

(w) "Commissioning" has the meaning ascribed thereto in Article 26.2(b).

(x) "Commissioning Plan" means the detailed commissioning plan developed by Contractor in compliance with the requirements of Exhibit 1 – Scope of Work and Exhibit 6 – Commissioning and Acceptance Testing for the Commissioning of each System.

(y) "Company" means the Person identified as Company on the first page of this Agreement and its successors and permitted assigns.

(z) "Company Group" means [REDACTED]

(aa) "Company Indemnified Parties" has the meaning ascribed thereto in Article 22.1.

(bb) "Company Representative" means the person or persons designated by Company in accordance with Section [ ] of Exhibit 4 – Coordination Procedures.

(cc) "Company Supplied Data" means those documents listed in Exhibit 5 – Company Supplied Data, together with such other documents to be provided by Company as shall be designated by Company in writing from time to time.

(dd) "Company's Other Contractors" means [REDACTED]

(ee) "Construction Lien Statutory Declaration" means a statutory declaration to be delivered by Contractor or a Subcontractor pursuant to this Agreement, in the form of Exhibit 12 Construction Lien Statutory Declaration.

(ff) "Confidential Information" has the meaning ascribed thereto in Article 29.1.

(gg) "Contractor" means the Person identified as Contractor on the first page of this Agreement and its successors and permitted assigns.

(hh) "Contractor Group" means [REDACTED]

(ii) "Contractor Indemnified Parties" has the meaning ascribed thereto in Article 22.2.

(jj) "Contractor Invoice" has the meaning ascribed thereto in Article 13.2(a).

(kk) "Contractor's Code of Conduct" has the meaning ascribed thereto in Article 10.2.

(ll) "Contractor's Items" means [REDACTED]

(mm) "Contractor's Personnel" means the Personnel to be provided by Contractor Group from time to time to conduct the Work hereunder.

(nn) "Contractor's Proprietary Information" means [REDACTED]

(oo) "Contractor's Representative" is the person nominated as such in accordance with Article.

(pp) "Court" means a court of competent jurisdiction and includes the Supreme Court of Canada.

(qq) "Cultural and Biological Conditions" means [REDACTED]

(rr) "Defects" means [REDACTED]

(ss) "Deliver, Delivered or Delivery" means that point in time at which Contractor provides and Company takes physical possession of the Work (or any part), in accordance with Article 24.

(tt) "Deliverables" means [REDACTED]

(uu) "Dispute" has the meaning ascribed thereto in Article 41.1.

(vv) "Dollar" or "\$" means the lawful currency of Canada.

(ww) "Drawings" means [REDACTED]

(xx) "EAE Notice" has the meaning ascribed thereto in Article 27.4(b).

(yy) "Effective Date" means the date set forth on the first page of this Agreement.

(zz) "EMS System" means the energy management system forming a part of each System, as described in Exhibit 1 – Scope of Work.

(aaa) "Equitable Adjustment" means [REDACTED]

(bbb) "Equitable Adjustment Event" means [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(ccc) "Ethical Standard Requirements" means

[REDACTED]

(ddd) "Exhibits" means the Exhibits forming part of this Agreement and identified in Article 1.1.

(eee)

[REDACTED]

(fff) "Final Completion" means,

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



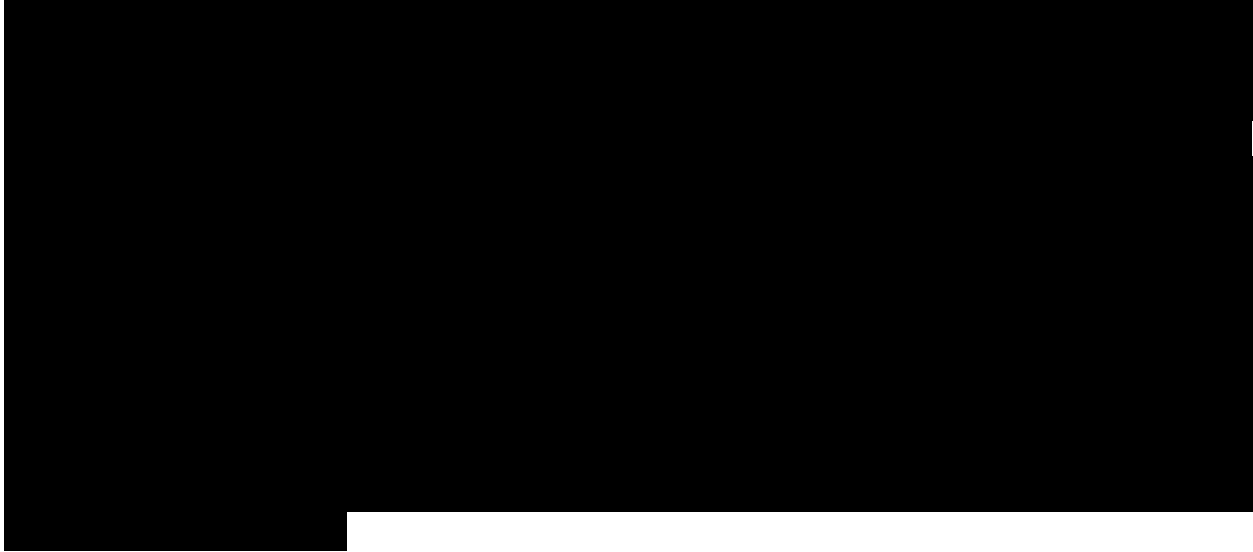
[Redacted]

(ggg) [Reserved.]

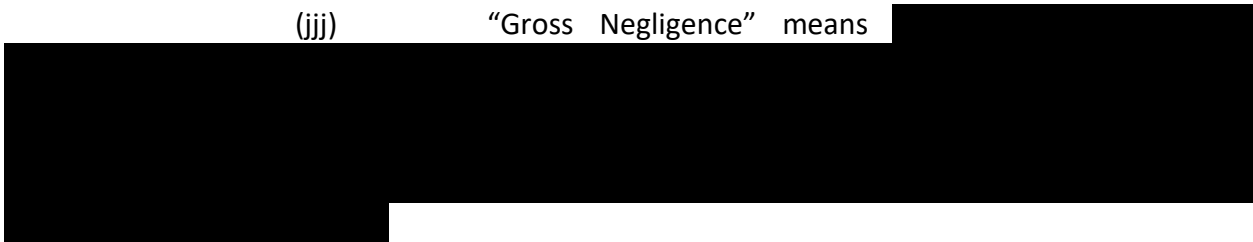
(hhh) [Redacted]

(iii) "Force Majeure" means, [Redacted]

[Redacted]



(jjj) "Gross Negligence" means

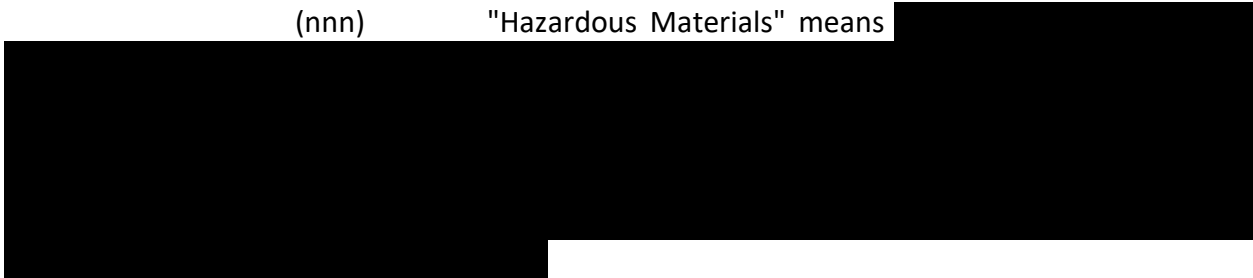


(kkk) "Group" means either the Company Group or the Contractor Group.

(lll) "Guarantee" has the meaning ascribed thereto in Article 9.1.

(mmm) "Guarantor" has the meaning ascribed thereto in Article 9.1.

(nnn) "Hazardous Materials" means



(ooo) "HST" means the tax exigible pursuant to Part IX of the *Excise Tax Act* (Canada), including, for greater certainty, the taxes commonly referred to as the goods and services tax (GST) and the harmonized sales tax (HST).

(ppp) "ICC" has the meaning ascribed thereto in Article 41.3.

(qqq) "Indemnitee" means a person having a right to indemnification under Article 22.

(rrr) "Indemnitor" means the Party having an obligation to indemnity under Article 22.

(sss) [REDACTED]

(ttt) "Inspection and Test Plan" means the inspection and test plan covering the full range of Contractor's and Company's inspection and testing activities in respect of the Work, as set forth in Exhibit 30 – Inspection an Test Plan.

(uuu) [REDACTED]

(vvv) [REDACTED]

(www) "Key Dates" means [REDACTED]

(xxx) "Lender" means (i) any bank, financial institution, trust or other institutional investor providing financing under a financing agreement and any trustee, agent or representative acting on any such Person's behalf, (ii) Her Majesty the Queen in Right of Canada as the guarantor under any federal loan guarantee and any trustee, agent or representative thereof, or (iii) any Person providing guarantees or other credit support to Company, in each case in connection with the Project or a portfolio of projects that includes the Project.

(yyy) [REDACTED]

(zzz) "Limited Notice to Proceed" has the meaning ascribed thereto in Article 2.2(a).

(aaaa) "Liquidated Damages" means any liquidated damages payable by Contractor to Company pursuant to Article 19, in the amounts specified in Exhibit 28 – Liquidated Damages, or pursuant to Article 26.4.

(bbbb) "LNTP Date" means the date on which the Limited Notice to Proceed in respect of all Systems was issued by Company and accepted by Contractor.

(cccc) "LNTP Payment" has the meaning ascribed thereto in Article 2.2(a).

(dddd) "LNTP Period" has the meaning ascribed thereto in Article 2.2(c).

(eeee) "LNTP Scope of Work" has the meaning ascribed thereto in Article 2.2(a).

(ffff) "Losses" means [REDACTED]

(gggg) "LTSA" means the Long Term Services Agreement dated on or about the date of this Agreement between Company and Contractor.

(hhhh) "Major Equipment Warranties" has the meaning ascribed to such term at 18.4.

(iiii) "Major Subcontract" means [REDACTED]

[REDACTED]

(jjjj) "Major Subcontractor" means any Subcontractor that is a party to a Major Subcontract.

(kkkk) "Measured Capacity Level" means the energy capacity of a System demonstrated by the results of a Capacity Test (measured at the Point of Interconnection and expressed in MWh) that has been Successfully Run prior to Substantial Completion.

(llll) "Mechanical Completion" shall occur, with respect to each System, when all of the following have been completed:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(mmmm) "Milestone Completion Certificate" means the certificate submitted by Contractor pursuant to Article 26.1(a), for Approval by Company, in the form set forth in Exhibit 4 – Coordination Procedures (Attachment 4-2).

(nnnn) [REDACTED]

(oooo) "Notice", "Notification" or "Notify" means a written communication that is required to be delivered in accordance with Article 37.

(pppp) "Notice to Proceed" has the meaning ascribed thereto in Article 2.3(a).

(qqqq) "Nova Scotia Court" has the meaning ascribed thereto in Article 41.4.

(rrrr) "NTP Date" means the date on which the Notice to Proceed in respect of a System is issued by Company and accepted by Contractor.

(ssss) "NTP Deadline" means, in respect of each System, the deadline for the Company's issuance of a Notice to Proceed in respect of such System, as set forth in Exhibit 23 – Key Dates.

(tttt) "NTP Payment" has the meaning ascribed thereto in Article 2.3(c).

(uuuu) "NTP Target Date" means, in respect of each System, the expected date for the Company's issuance of a Notice to Proceed in respect of such System, as set forth in Exhibit 23 – Key Dates.

(vvvv) "Party" means Company or Contractor, as the context requires, and "Parties" means Company and Contractor collectively.

(www) "Payment Milestone" means a discrete portion of the Work, for which payment is to be made in accordance with the Payment Milestone Schedule.

(xxxx) "Payment Milestone Completion Certificate" means the certificate described in Article 13.3(b).

(yyyy) "Payment Milestone Schedule" means the schedule in Exhibit 11 – Payment Milestone Schedule, which sets forth the payments to Contractor under this Agreement for the Work, including the Payment Milestones, as the same may be amended from time to time by agreement of the Parties or otherwise in accordance with the provisions of this Agreement.

(zzzz) "Permit" means [REDACTED]

[REDACTED]

(aaaa) "Person" means [REDACTED]

(bbbb) "Personnel" means [REDACTED]

(cccc) "Point of Interconnection" means in respect of each System, the point at which the System's power system is interconnected with the Company's interconnection facilities. [REDACTED]

[REDACTED]

(dddd) [REDACTED]

(eeee) [REDACTED]

(ffff) "Price" means [REDACTED]

(gggg) "Privacy Law" means, individually and collectively, the Freedom of Information and Protection of Privacy Act (S.N.S. 1993, c. 5), and the Access to Information Act (R.S.C., 1985, c. A-1).

(hhhh) "Project" means the project consisting in the aggregate of three (3) 200 megawatts of four (4) hour battery capacity Systems, as described in Exhibit 1 – Scope of Work.

(iiii) "Project Director" means the person appointed by Company in accordance with Article 12.6.

(jjjj) "Project Document" means any contract entered into by Company (including any lease, license, easement or equivalent agreement), pursuant to which rights in respect of the Project are granted to Company, that is listed in Exhibit 15 – Project Documents.

(kkkk) "Project Manager" means the person appointed by Company in accordance with Article 12.6.

(llll) "Project Schedule" means the level II schedule that represents the plan for accomplishing the Work, developed in accordance with Exhibit 4 – Coordination Procedures, Exhibit 11 – Payment Milestone Schedule and Exhibit 23 – Key Dates, and attached hereto as Exhibit 29, as such schedule may be updated from time to time pursuant to this Agreement.

(mmmm) "Punch List" has the meaning ascribed thereto in Article 26.5(b).

(nnnn) "Quality Plan" means the plan set forth in Exhibit 24 – Quality Requirements.

(oooo) "Receiving Party" has the meaning ascribed thereto in Article 29.3.

(pppp) "Rules" has the meaning ascribed thereto in Article 41.3.

(qqqq) "Scheduled Final Completion Dates" means the date each System is scheduled to achieve Final Completion, as set out in Exhibit 23 - Key Dates, as such dates may be adjusted in accordance with this Agreement.

(rrrr) "Scheduled Interim Milestone Completion Dates" means the scheduled dates for completion of the Interim Milestones, as set out in Exhibit 23 – Key Dates, as such dates may be adjusted in accordance with this Agreement.



(sssss) "Scheduled Substantial Completion Dates" means the date each System is scheduled to achieve Substantial Completion, as set out in Exhibit 23 - Key Dates, as such dates may be adjusted in accordance with this Agreement.

(ttttt) [REDACTED]

(uuuuu) "Site" means, in the aggregate, each System Site on which each System is to be constructed, installed or carried out.

(vvvvv) "Standard of a Prudent Contractor" means [REDACTED]

(wwwww) "Subcontract" means [REDACTED]

(xxxxx) "Subcontractor" means [REDACTED]

[REDACTED]

(yyyyy) "Substantial Completion" means, [REDACTED]  
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(zzzzz) "Substantial Completion Date" has the meaning ascribed thereto in Article 26.3(c).

(aaaaaa) "Substantial Completion LD Rate" has the meaning ascribed thereto in Article 19.2(b).

(bbbbbb) "Successfully Run" means (i) with respect to a Capacity Test, that the applicable Capacity Test was completed in accordance with the procedures, conditions and requirements for the proper performance of such test as set forth in Exhibit 6 (Commissioning and Acceptance Testing) and the other requirements of this Agreement, and (ii) with respect to any other Acceptance Test, that the applicable Acceptance Test was completed in accordance with the procedures, conditions and requirements for the proper performance of such test as set forth in Exhibit 6 (Commissioning and Acceptance Testing) and the other requirements of this Agreement.

(ccccc) "Suspension Expenses" has the meaning ascribed thereto in Article 35.2.

(ddddd) "Suspension Period" has the meaning ascribed thereto in Article 35.1.

(eeeeee) "System" means each battery energy storage system a part of the Project including the following major components, packaged as a coordinated single system: DC-side batteries and balance of system components with energy capacity of at-least 200 megawatt-hours (MWh), AC-side inverter system, or power conversion system (PCS), with sufficient power capacity to deliver 50 megawatts (MW) ac at the Point of Interconnection of the system net of all losses and auxiliary loads, with inverter system controls and a battery energy storage system plant controller and/or energy management system (EMS) to dispatch the battery energy storage system based on monitoring grid frequency, voltage, power factor, and other relevant grid parameters at the Point of Interconnection; and to manage functional requirements of the Project safely and reliably and other equipment comprising and integrating the entire system, as described in Exhibit 1 – Scope of Work.

(fffff) [REDACTED]

(ggggg) "System Price" means:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(hhhhh) "System Site" means the land, premises and other places in Nova Scotia on which the applicable System is to be constructed, installed or carried out or upon which the Work is to be executed, including the lay-down areas, marshaling yards, access roads, and temporary offices used for the purposes of this Agreement.

(iiiiii) [REDACTED]

(jjjjj) "Target Capacity Level" is the target total rated design capacity for a System, measured at the Point of Interconnection and expressed in MW / MWh to be demonstrated in a Successfully Run Capacity Test for such System as more specifically set forth in Exhibit 6 – Commissioning and Acceptance Testing.

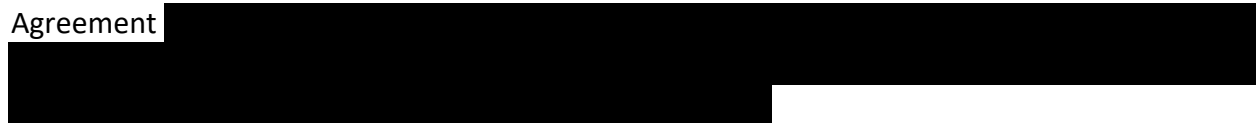
(kkkkk) "Tax" or "Taxes" means [REDACTED]

(lllll) "Warranty" means Contractor's obligations set out in Article 18.

(mmmmmm) "Warranty Period" has the meaning ascribed thereto in Article 18.1.

(nnnnnn) "Warranty Work" has the meaning ascribed thereto in Article 18.5.

(oooooo) "Work" means all necessary work and services required in connection with the design, engineering, procurement, delivery, construction, installation, interconnection, start up, testing, commissioning and completion of each System, as more particularly described in Article 4 and Exhibit 1 – Scope of Work, including Changes and Warranty Work and the provision of all Personnel, equipment, supplies, facilities, documentation, records and other items necessary to the performance of such services and obligations, as well as any item of work and services indicated in the documents comprising this Agreement



1.3 The doctrine of *contra proferentem* shall not apply in the interpretation of this Agreement, meaning that if there is any ambiguous language in this Agreement, it shall not be interpreted more strongly against the Party who prepared or drafted the ambiguous language.

1.4 Reference to any Party includes that Party's executors, administrators, substitutes (including, but not limited to, persons taking by novation), successors and permitted assigns.

1.5 If an action pertaining to the administration of this Agreement, Notices or Disputes is required to be completed on a specified day which is not a Business Day, then the action shall be completed instead on the next Business Day.

1.6 Whenever in this Agreement the singular member or a masculine gender occurs the same shall be respectively construed as the plural, feminine or neuter and vice versa as the context or reference may require. Where a word is defined in this Agreement, a derivative of that word shall have a corresponding meaning.

1.7 Unless the context otherwise requires, reference to any Article is a reference to an Article or paragraph in this Agreement, and any reference to a Section is a reference to a Section or paragraph in an Exhibit.

1.8 The Article headings and any other headings or captions or indices hereto, the recitals or the provisions of a table of contents shall not be used in any way in construing or interpreting any provisions hereof.

1.9 The preamble hereto forms part of this Agreement and is incorporated herein.

1.10 The words "includes" and "including", whether or not used with the words "without limitation" or "but not limited to", shall not be construed to be limited by the specific enumeration of items but shall in all cases be without limitation and construed and interpreted to mean "includes without limitation" and "including without limitation".

1.11 Reference to any Applicable Law, is to the Applicable Law as amended and includes any statutory modification or re-enactment of it, a legislative provision substituted for it and any regulation, subordinate legislation or other statutory instrument issued under it.

1.12 The Exhibits hereto are incorporated herein by reference. If any provision in the Exhibits conflicts with a provision in the Articles of this Agreement, the provision in the Articles of this Agreement shall prevail. [REDACTED]

[REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

[REDACTED]

1.13 [REDACTED]

1.14 The language of this Agreement shall be English and all communications and dealings under and the resolution of any disputes concerning this Agreement shall be conducted in the English language. All information, data or documentation of any nature that Contractor prepares in the performance of the Work, is required to submit to Company or is requested by Company to submit, shall be prepared in English.

1.15 Any Approval by Company shall not waive Contractor's obligations under Applicable Laws or as outlined in this Agreement.

1.16 Whenever an amount of money is referred to in this Agreement, such amount shall, unless otherwise expressly stated, be deemed to be Canadian dollars.

**ARTICLE 2**  
**SCOPE OF WORK; COMMENCEMENT OF WORK**

2.1 Subject to the provisions of this Article 2, Contractor shall perform the Work in accordance with this Agreement as of the Effective Date on a lump sum fixed price turnkey basis to achieve each Interim Milestone on or before the applicable Key Date, to achieve Substantial Completion of each System on or before the Scheduled Substantial Completion Date of such System, to achieve Final Completion of each System on or before the



Scheduled Final Completion Date of such System and to complete the Project, and to perform the Warranty Work all in accordance with this Agreement. In consideration for the Price, Contractor shall provide and pay for all of Contractor's Items, labour, materials, equipment rentals, tools, transportation, insurance required of Contractor, and services to be provided hereunder for the proper and timely execution of the Work in accordance with the provisions of this Agreement.

2.2 Limited Notice to Proceed.

(a) Company and Contractor have entered into a limited notice to proceed (the "Limited Notice to Proceed") pursuant to which Contractor has proceeded with the engineering, procurement, manufacturing and development Work for each of the three Systems (the "LNTP Scope of Work") as provided in the Limited Notice to Proceed. Contractor has commenced the LNTP Scope of Work for the three Systems and Company has paid Contractor the amount set forth in the Payment Milestone Schedule with respect to the Limited Notice to Proceed for the three Systems (the "LNTP Payment").

(b) For avoidance of doubt:

(i) The LNTP Scope of Work shall be included in the Work, whether performed prior to or after the NTP Date, if any;

(ii) Contractor shall be responsible for the performance of the LNTP Scope of Work under the terms and conditions of this Agreement, including the payment, schedule, warranty, indemnity, confidentiality, and intellectual property provisions hereof, even if the LNTP Scope of Work was performed prior to the NTP Date;

(iii) Any payments made by Company under a Limited Notice to Proceed shall be credited towards payment of the applicable System Price; and

(c) Upon issuance of a Notice to Proceed in respect of a System, the LNTP Scope of Work will be deemed part of the Work under this Agreement and Contractor will be responsible for the performance thereof under the terms and conditions of this Agreement as though the LNTP Scope of Work had been performed by Contractor as part of the Work after the NTP Date.

2.3 Notice to Proceed.

(a) Other than the LNTP Scope of Work which shall be performed pursuant to Article 2.2, Contractor shall not be obligated to perform any Work in respect of a System under this Agreement until it receives a written notice from Company authorizing it to commence the Work in respect of the applicable System (a "Notice to Proceed"); provided, that prior to issuance of a Notice to Proceed, Contractor may, at Contractor's sole cost and risk, perform such activities in addition to the LNTP Scope of Work as it deems necessary to efficiently progress the Work. Company has no obligation to issue any Notice to Proceed.

(b) Concurrently with the execution of this Agreement, Company has issued a Notice to Proceed for each of the three Systems and Contractor has provided to Company its written acceptance that the three Notices to Proceed have been issued by countersigning and returning the three Notices to Proceed. Upon issuance of each Notice to Proceed and Contractor's written acceptance thereof, subject to Contractor's compliance with Article 2.3(c), Company shall pay Contractor the amount set forth in the Payment Milestone Schedule with respect to the Notice to Proceed for the applicable System (each an "NTP Payment") in accordance with Article 13.

(c) Concurrently with the execution of this Agreement, Contractor has provided the deliverables and information set forth in Articles 2.3(c)(i) and 2.3(c)(ii).

(i) Contractor has delivered a consent in the form of Exhibit 19 – Consent to Assignment and such opinions and other documents as may reasonably be required by Lender in connection with any financing agreement entered into by Company, provided that, if a legal opinion from Contractor's outside counsel was required, the reasonable cost of the outside counsel's legal opinion incurred by Contractor shall be payable by Company (without duplication) within thirty (30) days of receipt of invoice from Contractor and such costs shall not be included in the Price; and

(ii) Contractor has delivered the Guarantee and Initial LC in accordance with the terms of Article 9.

(d) On the NTP Date (and to the extent not already undertaken at Contractor's discretion) Contractor shall commence the Work in respect of each System according to the terms of this Agreement.

**ARTICLE 3**  
**CONTRACTOR'S STATUS**

3.1 In the performance of this Agreement, Contractor is an independent contractor and neither Contractor nor Contractor's Personnel shall be employees of Company. Contractor's Personnel shall be under the direct supervision and control of Contractor or its Subcontractors and not of Company. Contractor accepts complete responsibility as the principal for Contractor's Personnel.

3.2 Contractor is not an agent of Company or an agent of any Affiliate of Company. Contractor shall not represent or hold itself out as an agent of Company or an agent of any Affiliate of Company.

3.3 This Agreement shall not constitute a joint venture or partnership of Company and Contractor or of Company and any Subcontractor.

3.4 Contractor acknowledges that it shall be carrying on business in the Province of Nova Scotia during the performance of the Work and agrees to comply with the corporate registration requirements of the *Companies Act*, R.S.N.S. 1989, c. 81, s. 1, the *Corporations Registration Act*, R.S.N.S., c. 101, s. 1. and all Applicable Laws, as amended.

**ARTICLE 4**  
**CONTRACTOR OBLIGATIONS**

4.1 Contractor shall carry out all of its obligations under this Agreement and shall perform the Work, which shall include all work required for the design, engineering, procurement, fabrication, construction, testing, transport, delivery, maintenance, storage, preservation, installation, pre-commissioning, commissioning, repair and remediation of the Work, as more fully set forth in Exhibit 1 – Scope of Work, including:

(a) provision of all supervision, services, drafting, accounting, purchasing, expediting, inspection, testing, commissioning, Personnel, Contractor's Items, transportation, mobilization and demobilization required for the compliance with and fulfillment of all Contractor's obligations under this Agreement;

(b) ensuring the Work conforms strictly as to quality and description with the particulars stated in Exhibit 1 – Scope of Work and Company Supplied Data and complies with all Applicable Laws;

(c) satisfaction of the performance requirements, as further set out in Exhibit 1 – Scope of Work;

(d) completion of all Work necessary for the each System to successfully complete the Acceptance Tests for such System.

(e) provision of all Deliverables as required under, and in accordance with, the terms of this Agreement, including the items identified in Exhibit 7 – Deliverables;

(f) compliance with all conditions, requirements and provisions of the Project Documents which relate to the Work or otherwise to the performance of Contractor's obligations, as further described in Article 43.

(g) rectification of any and all Defects in the Work in accordance with the applicable provisions of this Agreement;

(h) completing the Work, and portions thereof, in accordance with the Project Schedule;

(i) providing and maintaining temporary living facilities for all Contractor's Personnel, cellular or satellite phone communications, emergency medevac arrangements, vehicle and equipment fuel handling, and access to these facilities and to work sites, including snow removal;

(j) ensuring that each System and the Project shall be constructed in accordance with the requirements for the Project set forth in Exhibit 1 – Scope of Work; and

(k) ensuring the adequacy, stability and safety of the Work and each System Site's operations under Contractor's control, and of all means, methods, and techniques of construction.

4.2



[REDACTED]

4.3

[REDACTED]

(a) Subject to Contractor's right to make a claim for an Equitable Adjustment pursuant to Article 27, Contractor shall be solely responsible for and assumes all risks associated with the transportation of all Contractor's Personnel to and within each System Site, and the cost of such transportation shall be included in the Price.

(b)

[REDACTED]

(c)

[REDACTED]

4.4 Contractor shall perform the Work to the Standard of a Prudent Contractor, and shall ensure that Subcontractors perform to the same standard. Contractor shall be responsible for any operations comprising the Work performed by Contractor Group.

4.5 Subject to Article 12.4, Contractor shall obtain and maintain all directions, guidelines, Permits, certificates, authorizations, dispensations and licenses of any type whatsoever necessary for the performance of the Work and shall comply with all

Applicable Laws and requirements of Authorities.

Contractor shall promptly provide Company with copies of all Permits that Contractor is responsible for obtaining hereunder upon Contractor's obtaining such Permits.

4.6 Contractor shall assist Company in obtaining the Permits required by Applicable Laws for the performance of the Work which are to be obtained in Company's name, and otherwise provide necessary information and documents to support Company fulfilling Company's obligations set out in Article 12.4. Without limiting the foregoing, Contractor acknowledges that Company is subject to regulation by regulatory Authorities including the Nova Scotia Utility and Review Board and agrees to cooperate with Company and provide reasonably requested assistance to Company with respect to obtaining and complying with any approvals from regulatory Authorities necessary or desirable in connection with the Project.

4.7 During the progress of the Work, Company will furnish to Contractor such additional instructions to supplement this Agreement as reasonably appropriate for the performance of the Work; provided that, if Company's instructions are inconsistent with or alter or expand Contractor's scope of Work hereunder Contractor shall be entitled to make a claim for a Change Order pursuant to Article 27 to the extent that such instructions directly and adversely cause a change in Contractor's costs and/or time to perform the Work. Contractor shall comply with all reasonable instructions of Company pertaining to the performance of the Work, as communicated through the Project Director, the Project Manager, Company Representative or otherwise in accordance with this Agreement. The absence of instructions from Company shall not permit Contractor to avoid its duty to perform its obligations under this Agreement. Contractor shall maintain full responsibility for the adequacy, stability, safety and environmental management of the Work and each System Site's operations under its control and of all means, methods and techniques of construction and of all of the Work and Company's instructions hereunder shall not derogate or detract from such responsibility.

4.8 Contractor shall cooperate with Company, Company's Other Contractors and Personnel of any of Company Group working at each System Site with a view to reducing interference with Company's Other Contractors and Personnel of any of Company Group or with the operations of Company, as further set forth in Article 8, Exhibit 1 – Scope of Work, and Exhibit 4 – Coordination Procedures.

4.9 Reserved

4.10 Without limiting Contractor's obligations elsewhere in this Agreement, Contractor shall submit to Company (i) on a semi-monthly basis during any period that Work is performed at a System Site, a progress report outlining the general progress of the Work and (ii) on a monthly basis, a detailed progress report outlining the progress of the Work, each in accordance with the requirements of Exhibit 4 – Coordination Procedures. Such progress reports shall provide sufficient detail to enable Company to compare the actual progress of Contractor in respect of each activity of the Work with the progress indicated on the Project Schedule. Upon Company's request, Contractor shall provide such additional detail in the progress reports as Company may require. Such revised reports shall be issued to Company within one (1) week of such notification. Without limiting the foregoing, the Contractor shall promptly provide Company with written notice of a delay at any time that the Contractor becomes aware of a material delay or expected delay in any aspect of the Project Schedule.

4.11 Contractor shall use, secure and maintain each System Site in accordance with the following:

(a) Contractor shall use reasonable efforts to confine its offices, shops, storage, assembly, equipment and vehicle parking to each System Site. Should Contractor find it necessary or advantageous to use any additional land outside any System Site for any purpose whatsoever, Contractor shall, at its own expense and without any increase in the Price, provide and make its own arrangements for the use of such additional land and all facilities and services used thereon, including obtaining any environmental and regulatory approvals required for the use of such additional land. Company shall have no responsibility for providing off-Site lay down or parking areas for Contractor or its Subcontractors.

(b) Where Company has designated an entrance to any System Site, Contractor shall use only such entrance for ingress and egress of all Contractor's Personnel, equipment, and construction aids.

(c) Contractor shall not engage in or permit any of its agents or employees, Subcontractors or any third party to engage in any commercial activity other than as necessary to perform the Work as contemplated by this Agreement on any System Site without Company's prior written Approval.

(d) Contractor shall be responsible for arranging at each System Site, at its own expense and without any increase in the Price:

(i) all water, gas and other utilities (other than electricity) and similar services necessary for the performance of the Work, and,

subject to Article 12.10, all electricity required for temporary office facilities, cellular or satellite phone communications, vehicles and Contractor's Items;

(ii) all sanitary facilities intended for use by Contractor or its Subcontractors at each System Site;

(iii) all temporary lighting required at each System Site by Applicable Laws for the protection of Contractor's employees or any other Person at such System Site; and

(iv) all waste separation, collection and disposal services necessary to keep each System Site in a clean, neat and safe condition.

(e) Upon the issuance of the Notice to Proceed and until Substantial Completion, Contractor shall provide reasonable safeguards in accordance with Applicable Laws, the terms of the Project Documents, as applicable, and requirements of its insurance, including fencing for any System Site(s) on which equipment is stored (which fencing shall provide at least two (2) gates for access to each such System Site), signs, security services, fire protection and the like, for the protection of each System Site, the Work and the Project and of all Persons while on each such System Site and any lay down areas.

(f) Contractor shall at all times keep its work areas in a neat, clean, and safe condition. Upon completion of any portion of the Work, Contractor shall promptly remove all of its construction aids, including temporary structures and surplus materials from each System Site. Upon completion of the Work on the applicable System, and prior to final payment, Contractor shall, except as otherwise provided herein, at its sole expense, (i) satisfactorily dispose of all unnecessary plant, building, rubbish, unused materials, and other equipment and materials belonging to it or used in the Work, and (ii) leave each System Site in a neat, clean and safe condition. In the event of Contractor's failure to comply with this Article 4.11(f) within thirty (30) days after Company has issued a Notice to Contractor advising of such failure, Company shall be entitled to reimbursement from Contractor for any documented direct costs it incurs in accomplishing the same.

(g) After it takes possession of any System Site and until Substantial Completion of the System located on such System Site, Contractor shall provide, at its own expense and without any increase in the Price, summer and winter maintenance (including snow removal) at such System Site, including the access roads to the System Site and, if applicable (as set forth in Exhibit 1 – Scope of Work), the transport roads to dumps, storage areas and borrow areas.



4.12 Contractor shall at all times promptly take all steps necessary to maintain good labour relations with Contractor's Personnel to the extent that such requirement is consistent with sound business practice in accordance with the Standard of a Prudent Contractor and, without restricting the generality of the foregoing, shall comply with all applicable labour agreements. Subject to Article 32 the existence of any labour disturbance relating to Contractor's Personnel shall not relieve Contractor of its obligations hereunder.

4.13 Contractor shall, and shall cause each Subcontractor and any contractor or subcontractor thereof performing Work within Canada at any level, to (i) pay all laborers, mechanics and other personnel employed thereby wages at rates not less than the prevailing rates for construction, alteration or repair of a similar character in the locality in which each System is located as most recently determined by the Clean Technology Investment Tax Credit, currently in draft form (the "**Clean Technology ITC**"), (ii) ensure that a percentage of the total labor hours of the construction, alteration or repair work with respect to each System, are performed by qualified apprentices, consistent with the Clean Technology ITC, and any guidance issued by the Ministry of Finance related thereto and (iii) cooperate with Company, including providing information and documentation, as necessary for Company to comply with any reporting requirements with respect to such payment of prevailing wages and use of apprentices and to qualify for the maximum tax benefit possible.

4.14 Reserved.

4.15 Contractor covenants that during the term of this Agreement it:

(a) shall perform the Work in a diligent, safe, efficient and timely manner and in accordance with the Standard of a Prudent Contractor, including, with respect to the performance of engineering and design performed as part of the Work, any additional standards set forth with respect to engineering and design in the Standard of a Prudent Contractor;

(b) shall perform the Work continuously and in accordance with this Agreement, using only appropriately qualified and experienced Contractor's Personnel and Subcontractors;

(c) shall use quality assurance programs in performing the Work which comply with the requirements of Exhibit 24 – Quality Requirements, all Applicable Laws and industry accepted practices, including, for greater certainty, all Applicable Laws related to health, safety and environmental protection;

(d) shall take all steps necessary to maintain good labour relations with Contractor's Personnel to the extent that such requirement is consistent with sound business practice;

(e) shall, to enable Company, acting reasonably, to satisfy itself that Contractor is complying with the terms of this Agreement, provide such reports, records and other information relating to the performance of the Work as Company may reasonably request from time to time, including copies of the qualifications and credentials of Contractor's Personnel and Subcontractors and information relating to quality assurance programs, and permit Company to inspect Contractor's Items and each System Site;

(f) shall execute and deliver such opinions and other documents as may reasonably be required by Lender from time to time in connection with any financing agreement entered into by Company, [REDACTED]

4.16 Contractor acknowledges that in entering into this Agreement Company is relying on the considerable expertise Contractor represents it has in the integration, construction, installation, testing and commissioning of battery energy storage systems of similar scope and size to the Project.

4.17 All Work prepared by or on behalf of Contractor shall be certified by Contractor's Representative as having been prepared by Personnel with appropriate qualifications and experience and otherwise as having satisfied the requirements of this Agreement.

4.18 Contractor acknowledges that it has reviewed Company's diversity and inclusion requirements governing the Work set forth in Exhibit 8 – Nova Scotia Diversity and Inclusion Requirements. Contractor shall, throughout the term of this Agreement, comply with the requirements set forth in Exhibit 8 – Nova Scotia Diversity and Inclusion Requirements.

4.19 Contractor shall provide reports regarding the use of Canadian and Nova Scotia personnel, goods and services in the frequency, manner and format agreed to by the Parties. Subject to Contractor's right to make a claim for a Change Order pursuant to Article 27 to the extent that such additional requirements directly and adversely cause a change in Contractor's costs and/or time to perform the Work, Company may, acting reasonably, specify requirements in addition to those set forth in Exhibit 8 – Nova Scotia Diversity and Inclusion Requirements which Contractor shall be required to comply with so as to enable Company to

comply with Applicable Laws governing the use of local personnel, goods and services, which are in effect or which may come into effect during the term of this Agreement.

4.20 Reserved.

4.21 The Contractor agrees to cooperate with Company and provide reasonably requested assistance to Company with respect to obtaining and maintaining grants, financing or other benefits from Authorities in connection with the Project including by providing readily available documentation and other information reasonably requested by Company, and attending meetings as reasonably requested by Company or Authorities in connection with efforts to obtain such benefits; provided that, to the extent that Company requests extensive assistance, Contractor shall be entitled to make a claim for a Change Order pursuant to Article 27 to the extent that such assistance directly and adversely causes a change in Contractor's costs and/or time to perform the Work.

4.22 The Contractor shall use reasonable efforts, and shall cause its Subcontractors performing Work at each System Site to use their reasonable efforts, to assist Company in creating, assessing and carrying out programs, which shall minimize the impacts upon the host community caused by the construction of each System. Such programs, at a minimum, shall include sequencing of the Work so as to minimize the impacts of noise, dust, and traffic at and around each System Site.

**ARTICLE 5**  
**CONTRACTOR'S ITEMS**

5.1 Contractor shall maintain, at its sole risk, cost and expense, all Contractor's Items throughout the term of this Agreement in the manner necessary to ensure that the representations and warranties in Article 23.1 shall be true and accurate at all times during the term of this Agreement. If any of Contractor's Items do not at any time conform to the representations and warranties given in Article 23.1, Contractor shall, at Contractor's sole expense, repair such Contractor's Items or replace them with items which conform in all respects to such representations and warranties.

5.2 Contractor shall be responsible for and shall bear the cost of packaging, loading and/or carriage of Contractor's Items.

5.3



5.4 Prior to the execution of the Work, Contractor shall review with Company information relative to the equipment and facilities (including temporary structures, machinery, access plans, lay-down areas, marshaling yards, offices and warehouses) it plans to use in connection with the Work.

5.5 Contractor shall be liable for loss of or damage to any of Contractor's Items which may occur in the scope of performing the Work. Contractor shall be responsible for maintaining Contractor's Items on each System Site in a safe working condition.

5.6 Contractor shall be responsible, at its cost, for maintaining such inventories of Contractor's Items as necessary so as to avoid interruptions in the performance of the Work.

**ARTICLE 6**  
**CONTRACTOR'S PERSONNEL**

6.1 Contractor shall select Contractor's Personnel and have them available at each System Site or at other mutually agreed place(s), ready to perform the Work.

6.2 During the term of this Agreement, Contractor shall procure the numbers and classifications of Contractor's Personnel required to perform the Work and, upon the request of Company, furnish such information to Company.

6.3 Contractor shall employ for the Work only persons known to it to be experienced, qualified, reliable, and trustworthy. Contractor shall ensure that throughout the term of this Agreement each of Contractor's Personnel has the qualifications, training and experience, and holds the licenses and certifications necessary to carry out assigned duties in the performance of the Work. Contractor shall require all persons performing the Work at any System Site to be trained in and to comply with Company's policies, procedures, and directives applicable to activities at each such System Site (including diversity, security, environmental protection, employee health, safety, sexual harassment, access, use of controlled substances, and similar activities), and shall further require that all persons performing Work at System Sites in Nova Scotia have received diversity training prior to performing Work at such System Sites. Contractor shall furnish records of competence for all of Contractor's Personnel when requested so to do by Company. Contractor shall not suffer or permit illegal activity at any System Site.

6.4 Contractor shall remove and/or replace, at Contractor's own expense, any of Contractor's Personnel if Company determines in its sole judgment ((in the case of (a),

(b), (d) and (e) below) and in the case of (c) below, acting reasonably), that such Contractor's Personnel:

(a) ceases to carry out his or her duties in a manner satisfactory to Company (or in breach of Company policies) or engages in misconduct, unsafe activities, or is incompetent or negligent;

(b) breaches any requirement of any health, safety and security or environmental rules or policies prescribed by Company including any vaccination requirements;

(c) is lacking in appropriate skills or qualifications;

(d) is certified by a medical practitioner as being medically unfit for the duties required of him or her; or

(e) risks impairing his or her usefulness in the performance of his or her duties in performance of the Work through the use of alcohol or drugs.

6.5 Reserved.

6.6 Contractor shall minimize the risk of labour-related delays or disruption of the progress of the Work. Contractor shall advise Company promptly, in writing, of any actual or threatened labour dispute of which Contractor has knowledge that might materially affect the performance of the Work by Contractor or by any of its Subcontractors.

6.7 Contractor shall nominate in writing one of its Personnel as Contractor's Representative. Contractor's Representative shall:

(a) be in charge of Contractor's Personnel and shall supervise Contractor's Personnel and maintain strict discipline in order to ensure the timely and efficient performance of the Work, and shall Notify Company of the occurrence of or threat of any labour dispute involving Contractor's Personnel;

(b) have full authority to act on behalf of and bind Contractor on all labour and Contractor's Personnel issues which arise between Company and Contractor;

(c) supervise the performance of the Work;

(d) have the authority to commit Contractor to any course of action within the bounds of its rights and obligations under this Agreement; and

(e) be authorized to receive on behalf of Contractor any Notices, information or decisions of Company made pursuant to this Agreement.

6.8



**ARTICLE 7**  
**SUBCONTRACTS**

7.1 Subject to Articles 7.2 and 7.3, Contractor may employ Subcontractors to perform or support the performance of portions of the Work or to furnish equipment to be provided by Contractor hereunder; provided, that Contractor shall not subcontract the whole of the Work to a single Subcontractor.

7.2 Set forth in Exhibit 3 is a schedule of the Major Subcontractors that Contractor shall be entitled to engage without the Approval of Company for the Work specified in Exhibit 3 for such Major Subcontractor. Contractor shall Notify Company of any additional suppliers or subcontractors with which Contractor anticipates engaging that, if engaged, would be deemed a Major Subcontractor. Company shall have the right to review and Approve such engagement, which review and approval shall not be unreasonably withheld or delayed. Within ten (10) Business Days after Company's receipt of Contractor's Notice of any proposed additional suppliers or subcontractors, Company shall Notify Contractor of Company's approval or objection to such engagement. Following such Company's approval, Exhibit 3 shall be deemed to be amended to reflect such additional approved Major Subcontractor, and Contractor shall update Exhibit 3 by Notice to Company from time to time as necessary to reflect such approved additions thereto.

7.3 Contractor shall not be entitled to replace any Major Subcontractor or engage any additional Major Subcontractor without the prior Approval of Company.

7.4 Any subcontracting or delegation permitted under this Article 7 shall not relieve Contractor of any of its duties, obligations, warranties, liabilities or responsibilities under this Agreement. No Subcontract shall bind or purport to bind Company. [REDACTED]

7.5 Contractor shall oversee the performance of all Subcontractors and delegates. All Major Subcontracts shall:

(a) be in writing;

(b) contain a clear statement that Contractor is entering into such Subcontracts as principal and not as agent for any other Person;

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

7.6 Contractor shall take reasonable precautions to ensure that Contractor's Personnel working at any System Site comply with all Applicable Laws and personnel and safety regulations, consistent with the provisions of Article 6 and Article 16.

7.7 [REDACTED]

**ARTICLE 8**  
**COORDINATION**

8.1 Certain other contractors will be charged with the responsibility of developing and constructing portions of the Project. As requested by Company and as further set forth in Exhibit 4 – Coordination Procedures, Contractor shall work with such Company's Other Contractors to prepare procedures for Company's approval, describing how Work performed by Contractor will be coordinated with the development and construction of other portions of the Project and any work to be performed by contractors for other portions of the Project will affect the Work to be performed by Contractor under this Agreement. Contractor agrees to perform the Work as part of the team of participants in the Project in cooperation with all other participants, and subject to all reasonable rules, regulations, and directives of Company, such coordination procedures, Exhibit 1 – Scope of Work, and Exhibit 4 – Coordination Procedures, if applicable.

8.2 Contractor shall plan and execute the Work such that interference with other contractors is minimized. Contractor shall make available information, as requested by Company, to Company's Other Contractors. Consistent with Exhibit 4 – Coordination Procedures, if requested by Company, Contractor shall participate in coordination meetings with Company and Company's Other Contractors, individually, collectively or in any combination, which meetings shall take place not less frequently than monthly. Each such meeting shall address schedules and coordination.

8.3 Contractor shall inform itself regarding the nature, condition and state of progress of work of others which affects or connects with the Work. [REDACTED]

8.4 Where Contractor's performance of any part of the Work will unavoidably interfere with any other contractor's access or work, Contractor shall submit detailed plans, either independently or in conjunction with such other contractor, if appropriate, for such performance to Company for approval, such approval not to be unreasonably withheld or delayed. Upon receipt of Company's approval, Contractor shall execute that part of the Work in accordance with the approved plan and shall divert resources to maintain the plan as necessary. If a conflict arises between the Work and the requirements of the construction and operation of other portions of the Project, and such conflict cannot be resolved through the cooperation of Contractor and the other affected contractor, such conflict shall be resolved by Company subject to Contractor's right to claim an Equitable Adjustment pursuant to Article 27.



**ARTICLE 9**  
**PERFORMANCE SECURITY**

9.1

[REDACTED]

9.2

[REDACTED]

9.3

[REDACTED]

[REDACTED]

[REDACTED]

9.4

[REDACTED]

9.5



**ARTICLE 10**  
**POLICY ON ETHICS/CONFLICTS OF INTEREST**

10.1 Contractor, in performing its obligations under this Agreement, shall establish and maintain appropriate business standards, procedures and controls including those necessary to avoid any real or apparent impropriety or adverse impact on the interests of Company and its Affiliates. Company reserves the right to review such standards and procedures at any time during the term of this Agreement.

10.2 Contractor agrees to perform the Work and to conduct its operations in a manner which is in accordance with all Applicable Laws. Contractor shall comply with its corporate code of conduct provided to Company prior to the Effective Date, and attached as Exhibit 34 (“**Contractor’s Code of Conduct**”). Contractor also agrees to cause all Major Subcontractors to perform the Work and conduct its operations in the same manner.

10.3 Contractor shall not pay any commission or fee, or grant any rebate or make any loan to any Personnel of Company Group or government official, or favour any Personnel of Company Group or government official with any gift or entertainment of significant value or enter into any business arrangement with any Personnel of Company Group or government official. Contractor agrees to cause all Major Subcontractors engaged in the performance of the Work to adopt and enforce the foregoing policy.

**ARTICLE 11**  
**COMPLIANCE WITH LAWS**

11.1 In performing the Work and carrying out the provisions of this Agreement, Contractor shall (and shall cause all Subcontractors to) comply with all Applicable Laws. Each Party shall advise the other Party if it becomes aware of any change in Applicable Laws that it has reason to believe materially impacts the Work.

11.2 Company may from time to time by written request, require Contractor to provide to Company, and Contractor shall promptly so provide, a certificate of an officer of the Contractor certifying that Contractor has complied with the obligations set forth in Article 11.1.

**ARTICLE 12**  
**COMPANY'S OBLIGATIONS**

12.1 Subject to the provisions of this Agreement, Company agrees to engage Contractor to perform the Work in accordance with the terms of this Agreement.

12.2 Company may, from time to time, designate Company Representatives (including the Project Director and the Project Manager) who shall at all times during the term of this Agreement have access to each System Site and may without limitation monitor the performance of the Work.

12.3 Company shall provide to Contractor such instructions and information, including Exhibit 5 – Company Supplied Data, which can only be provided by Company.

12.4 Company shall obtain all Permits listed in Exhibit 14 – Company Supplied Permits and required by Applicable Laws for the performance of the Work and which are required to be and can only be obtained in Company's name. In accordance with Article 4.6, Contractor shall cooperate with Company's requests to reasonably assist Company in obtaining the Permits required pursuant to this Article 12.4. Company shall provide Contractor with such information in Company's possession or reasonably available to Company as Contractor reasonably may request to assist Contractor in applying for Permits required to be obtained by Contractor hereunder.

12.5 Company shall own or obtain and maintain leasehold title to, or easements, licenses, rights-of-way or other similar rights over each System Site. Following issuance of the Notice to Proceed to commence the Work on a System, Company shall provide Contractor with reasonable access to the System Site as needed to perform the Work on the System in respect of which such Notice to Proceed has been issued, through the end of the Warranty Period for such System.

12.6 Company shall designate (i) a Project Director who shall have authority to act on behalf of Company, commit Company regarding matters under this Agreement, receive Notices and perform such other duties and acts reserved to the Project Director under this Agreement and (ii) a Project Manager who shall have authority to monitor and oversee

performance of the Work and perform such other duties and acts reserved to the Project Manager under this Agreement.

12.7 The Project Director, by Notice to Contractor, may delegate any of the Project Director's authority to any nominated deputy. Such Notice shall specify the precise authority of such deputy. The Project Manager, by Notice to Contractor, may delegate any of the Project Manager's authority to any nominated deputy. Such Notice shall specify the precise authority of such deputy.


12.8 Company may change the Project Director or the Project Manager at any time at its sole discretion by Notice to Contractor.

12.9 No decision, instruction or order given by Company, whether issued by the Company Representative or otherwise, shall be effective until written confirmation thereof has been received by Contractor; provided, however, that in any emergency involving the imminent risk of injury to persons or serious damage to property or the environment, Company may issue oral instructions with which Contractor shall immediately comply. Company shall confirm any such oral instruction in writing within twenty-four (24) hours of its issue.

12.10 Subject to Article 4.11(d)(i), Company shall supply all electricity necessary for the proper performance of the Work, including for the purposes of Contractor testing, starting-up and commissioning each System, in accordance with the provisions of Exhibit 1 – Scope of Work.

**ARTICLE 13**  
**COMPENSATION AND TERMS OF PAYMENT**

13.1 As full compensation for the performance by Contractor of all its obligations under this Agreement, Company shall pay Contractor the Price in Dollars in accordance with the terms of this Agreement, including this Article 13 and Exhibit 2 – Compensation.



13.2 Payment and Invoicing.

[REDACTED]

[REDACTED]

13.3 Payment Milestones.

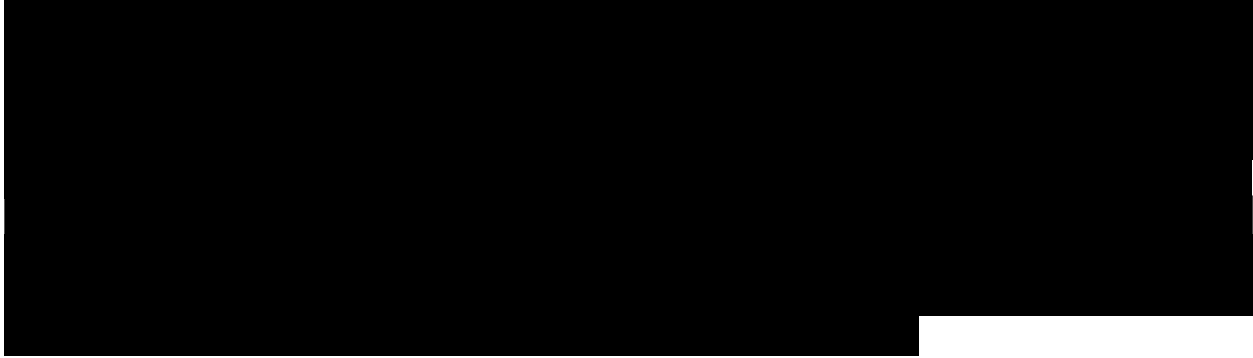
(a) Following the issuance of the Limited Notice to Proceed or the Notice to Proceed, as applicable, Contractor shall be paid the portion of the Price applicable to the LNTP Payment or the NTP Payment, each as set forth on the Payment Milestone Schedule, as applicable, following Approval by Company of the Payment Milestone Completion Certificate that includes such LNTP Payment or NTP Payment, as applicable and in accordance with the provisions of this Article 13.

(b) When Contractor considers that a Payment Milestone has been completed and the criteria for completion of that particular Payment Milestone have been achieved, it shall issue, for Approval by Company, a Payment Milestone Completion Certificate in the form set forth in Exhibit 4 – Coordination Procedures (Attachment [ ]), [REDACTED]

[REDACTED]

13.4 On or before the fifth (5<sup>th</sup>) day after the end of each calendar month following the NTP Date of a System (or during the LNTP Period for such System, if applicable) that a Payment Milestone has been achieved in respect of such System, Contractor shall submit a Contractor Invoice that includes each Payment Milestone successfully achieved prior to the last day of such calendar month (as evidenced by Contractor's receipt of a Payment Milestone Completion Certificate Approved by Company for each such Payment Milestone). [REDACTED]

[REDACTED]



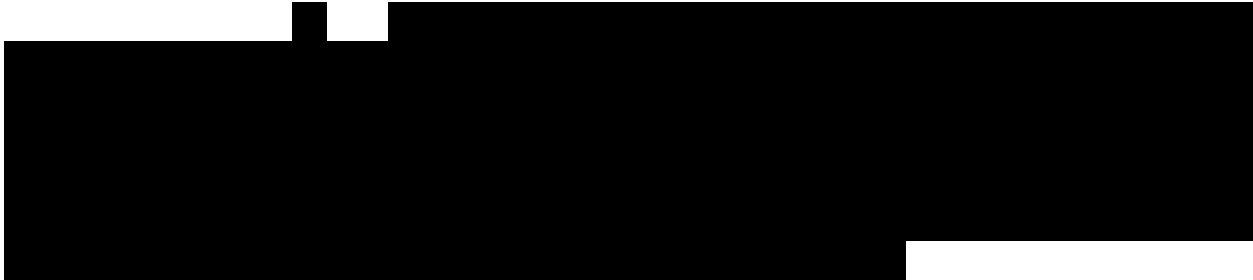
13.5 Contractor shall submit each Contractor Invoice in accordance with the requirements of this Article 13 to:

Nova Scotia Power, Inc.

[  
\_\_\_\_\_]  
\_\_\_\_\_]

Attention: ECEI Accounts Payable

13.6 If any Change affects the Price, Contractor may issue an invoice for the Work completed pursuant to the applicable Change Order.



13.7 Reserved

13.8

[REDACTED]

[REDACTED] Company shall pay to Contractor at the address indicated in the Billing Information the amount stated to be due less any withholding required by Applicable Laws or permitted hereunder including pursuant to Article 13.10 and Article 13.14. Notwithstanding the foregoing, if Company disputes any item charged in any Contractor Invoice, Company shall Notify Contractor of the disputed item, specifying the reason therefor.

[REDACTED]

13.9 Notwithstanding anything in this Agreement to the contrary, the aggregate total compensation under this Agreement payable by Company to Contractor shall not in any event exceed the Price, except with respect to payments under any Change Order in accordance with Article 13.6.

13.10 Company will retain a holdback, equal to ten percent (10%) of the value of all payments due Contractor, for a minimum period of sixty (60) days after Substantial Completion in accordance with Applicable Laws, including the *Builders' Lien Act*, R.S.N.S. 1989, c. 277, s. 1; 2004. c. 14, s. 2. For clarity, the Parties agree that the achievement of Substantial Completion as defined in this Agreement shall be deemed to constitute substantial completion or performance pursuant to *Builders' Lien Act*, R.S.N.S. 1989, c. 277, s. 1; 2004. c. 14, s. 2 and entitle Contractor to the return of the portion of the holdback retained from the System Price in respect of the System having achieved Substantial Completion. Company shall be entitled to the progressive relief of holdback upon completion of any Subcontract in accordance with Sections 131(a) and 131(b) of the *Builders' Lien Act*, R.S.N.S. 1989, c. 277, s. 1; 2004. c. 14, s. 2.

[REDACTED]

13.11

13.12 Payments by Company to Contractor hereunder may be made by electronic transfer to Contractor's bank. Contractor shall provide Company with all necessary information to permit the electronic transfer of such payments.

13.13 Excise Taxes.

(a) For greater certainty, Contractor and Company acknowledge that, notwithstanding any other provision of this Agreement, any amounts payable by Company to Contractor pursuant to this Article 13 are exclusive of any HST payable pursuant to section 165 of the *Excise Tax Act* (Canada). If Contractor is required to collect from Company an amount of HST with respect to the provision of any goods or services supplied pursuant to this Agreement, then Company, subject to compliance by Contractor with this Article 13, shall pay the amount of such HST to Contractor.

(b) Contractor represents and warrants that it is now and shall remain registered for the purposes of the HST in accordance with Part IX of the *Excise Tax Act* (Canada) for the term of this Agreement and that its HST registration number is

(c) Contractor shall provide, at all times when any HST is required to be collected, such documents and particulars [relating to the supply] as may be required by Company to substantiate a claim for any input tax credits as may be permitted pursuant to the *Excise Tax Act* (Canada) in respect of such HST. Without limiting the foregoing, Contractor shall include on all Contractor Invoices issued pursuant to this Article 13 all of the following particulars:

- (i) HST registration number of Contractor;
- (ii) the subtotal of all taxable supplies;
- (iii) the applicable HST rate(s) and the amount of HST charged on such taxable supplies; and



(iv) a subtotal of any amounts charged for any "exempt" or "zero-rated" supplies as defined in Part IX of the *Excise Tax Act* (Canada).

13.14

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

13.15

[REDACTED]

**ARTICLE 14**  
**TAXES**

14.1 Contractor agrees to prepare and to file in a timely manner all Tax returns or declarations in connection with the Project of the Work Contractor is required to file by any applicable Authority or Applicable Laws having jurisdiction over this Agreement or any portion thereof. Contractor shall lawfully discharge its Tax obligations in arising out of or in connection with the Work.

14.2 Subject to the obligation of Company to pay HST pursuant to Article 13.13(a), Contractor shall pay all Tax which may be lawfully assessed upon Contractor arising out of or in connection with the Project.

14.3 Contractor has on or prior to the Effective Date provided to Company a declaration of residency in the form set forth in Exhibit 10 – Declaration of Residency representing that Contractor is a resident of Canada for the purposes of Canadian income tax legislation. Contractor shall advise Company of any change to its tax residency status.

14.4 Reserved.

14.5 Reserved.

14.6 Subject to the obligation of Company to pay HST pursuant to Article 13.13(a), Contractor shall be responsible for all Taxes which Contractor is obliged pursuant to Applicable Laws to pay and does pay: (i) measured in whole or in part by Contractor's net income, gain or net worth; (ii) with respect to payroll taxes and business taxes measured by wages paid to Contractor's employees; (iii) with respect to Taxes on Contractor's purchases of Contractor's Items which are not permanently incorporated into the Project and which either remain the property of Contractor or are consumed or exhausted in the performance of the Work; (iv) for the purchase, sale, importation and exportation of the Work, or Contractor's Items, or personal property of any member of Contractor Group; and (v) with respect to all Taxes attributable to Contractor's construction equipment, temporary buildings, and other property used by Contractor in its performance of this Agreement and which are not permanently incorporated into the Project.

14.7 For greater certainty, Contractor and Company acknowledge that, notwithstanding any other provision of this Agreement, any amounts payable by Contractor to Company pursuant to this Agreement are exclusive of any HST payable pursuant to the *Excise Tax Act* (Canada) or any other Taxes exigible in respect of such amounts payable. If Company is

required to collect from Contractor an amount of HST with respect to any such amounts payable pursuant to this Agreement, then Contractor shall pay the amount of such HST to Company. If the amounts payable by Contractor to Company pursuant to this Agreement are deemed by any Applicable Laws to include an amount of HST, the amount otherwise payable pursuant to this Agreement shall be increased to the extent necessary so that the amount payable to Company, net of such HST, is equal to the amount that would have been payable to Company if such HST were not deemed to have been included in such amount.

14.8 Reserved.

14.9 For greater certainty, Company shall not be responsible for any withholding taxes on payments Contractor makes to Subcontractors.

14.10 Subject to Contractor's right to claim an Equitable Adjustment due to a Change in Applicable Law, anti-dumping duties, countervailing duties and the like shall, in all cases, be borne by Contractor. Should any such duties become payable by Company, Contractor shall be liable for and defend, protect, release, indemnify and hold Company harmless from and against any such duties, together with any interest, penalties and costs related thereto.

**ARTICLE 15**  
**AUDIT AND REVIEW OF RECORDS**

15.1



15.2

**ARTICLE 16**

**HEALTH, SAFETY AND ENVIRONMENTAL PROTECTION**

16.1 Contractor shall be responsible for ensuring the health and safety of all Contractor's Personnel who are engaged in the performance of the Work, and shall also be responsible for environmental management in the performance of the Work. Without limiting the foregoing, Contractor shall:

(a) ensure that all Contractor's Items and equipment within Contractor's control are maintained in safe, sound and proper condition and capable of performing the function for which each is intended and meets all industry standards and Applicable Laws;

(b) cease all activities in the area of any identified health, safety or environmental problem until such problem is resolved;

(c) forthwith report to Company all health, safety and environmental problems and hazards;

(d) at its own expense and in accordance with Applicable Laws, supply and maintain Contractor's Personnel with adequate protective clothing which shall be worn and used on all occasions as indicated by notices, instructions, good practice or as required by risk assessment;

(e) conduct such drills and tests of Contractor's Items, equipment, Personnel and procedures to ensure that they are available, trained and in place, respectively, for immediate and effective action in the event of an emergency;

(f) comply with Company's emergency response requirements as described in Exhibit 20 – Health, Safety and Security Requirements;

(g) cooperate fully and comply with any directions given by Authorities, including the police, safety and environment regulatory officials, and fire authorities;

(h) ensure all of Contractor's Personnel and Subcontractors undertaking Work in North America comply with all federal, provincial and municipal health, safety and environmental statutes, regulations, policies, guidelines and all health, safety and environmental rules as prescribed by Company;

(i) report to Company monthly training compliance and safety and environmental statistics as identified by Company; and

(j) ensure that all Contractor's Personnel and Subcontractors working at any System Site have been properly trained on the Global Harmonized System (GHS) Workplace Hazardous Materials Information System 2015 (WHMIS-2015) prior to the commencement of the Work.

16.2 Prior to the commencement of the Work, Contractor agrees to conduct a presentation for Company outlining its safety and environmental practices and standards and demonstrating the compliance of such standards with those outlined in this Agreement. At the request of Company, Contractor agrees to provide all information related to the safety and environmental performance of Contractor, each Major Subcontractor and each other Subcontractor performing Work at any System Site, as applicable. Prior to commencement of the Work, Contractor and each Subcontractor that will be working on any System Site shall provide evidence to Company that it is enrolled in the ISN safety network.

16.3 Contractor shall develop and submit, for Company's Approval, prior to the commencement of the Work, a detailed, site-specific health, safety and security plan for the Work which demonstrates that, in connection with Contractor's performance of the Work, Contractor has identified risks pertaining to the health, safety and security of Contractor's Personnel and Subcontractors working at any System Site, and that effective controls are implemented to prevent accidents and health and safety threats. Contractor's health, safety and security plan shall:

(a) satisfy the requirements of Exhibit 20 – Health, Safety and Security Requirements.

(b) be structured in accordance with various elements within the Work such as fabrication, transportation, installation and commissioning; and

(c) include measurable, achievable targets for health, safety and security performance, including, but not limited to: lost time frequency; total recordable frequency; injury severity data; and first aid cases.

16.4 Contractor shall develop and submit to Company for Approval, prior to the commencement of the Work, a detailed environmental protection plan for the Work which demonstrates that, in connection with Contractor's performance of the Work, Contractor has identified risks pertaining to the environment and that effective controls are implemented to prevent threats and damage to the environment. Contractor's environmental protection plan shall:

(a) satisfy the requirements of Exhibit 21 – Environmental Requirements;

(b) be structured in accordance with various elements within the Work such as fabrication, transportation and commissioning; and

(c) include measurable, achievable targets for environmental performance, including: performance criteria for environmental emissions and waste, and hazardous materials.

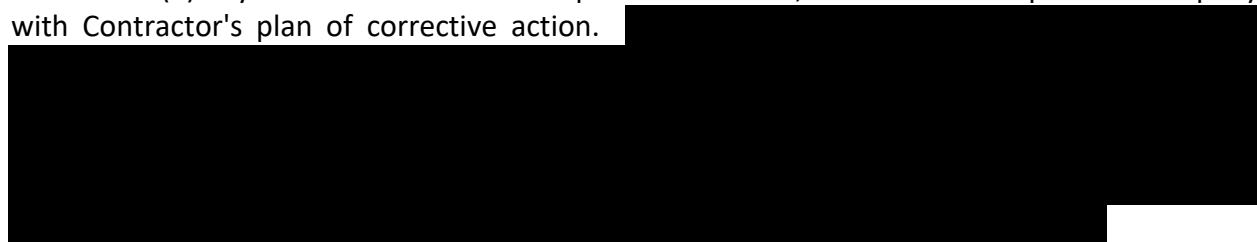
16.5 Company shall accept Contractor's plans required by Articles 16.3 and 16.4 provided the plans comply with (i) this Agreement and Applicable Laws, and (ii) any other requirements of Company, including Company's environmental protection plan minimum requirements, [referenced] in Exhibit 5 – Company Supplied Data. If Company, in its sole discretion, determines that Contractor's plans required by Articles 16.3 and 16.4 do not meet the requirements of this Article 16.3 or Article 16.4, as applicable, Contractor shall work diligently to rectify such deficiency within ten (10) business days of notice of such deficiency by Company.

16.6 Contractor shall comply with all such standards and the provisions of its health, safety and security and environmental protection plans, along with any changes to such standards as Company may (but is not required to) Notify Contractor of from time to time, Exhibit 21 – Environmental Requirements, and all Applicable Laws relating to occupational health, safety and environmental protection. Contractor shall ensure that all Contractor's Personnel and all Subcontractors performing Work at any System Site involved in the performance of the Work comply with the provisions of Contractor's health, safety and security and environmental protection plans, Exhibit 20 – Health, Safety and Security Requirements, Exhibit 21 – Environmental Requirements, and all Applicable Laws relating to occupational health, safety, quality and environmental protection. Contractor shall appoint a safety officer who shall assist Contractor in safety matters relating to Contractor's Personnel and Subcontractors.

16.7 Contractor shall promptly investigate and report to Company and all Authorities having jurisdiction any near miss incidents or accidents resulting in injury, death or illness to any of Contractor's Personnel or Subcontractors engaged in the performance of the Work at any System Site, any criminal acts in the course of performing the Work that the Contractor has knowledge of, damage to property in the course of performing the Work, and any adverse impact on the environment and any release of substances hazardous to the environment at or adjacent to a System Site.

16.8 Contractor shall submit to Company, for Company's Approval, Contractor's drug and alcohol policy. Contractor shall ensure that Contractor's Personnel and Subcontractors who are engaged in the performance of the Work at any System Site, are familiar with, and comply with, Contractor's drug and alcohol policy.

16.9 If Contractor is in violation of the requirements of this Article 16, or if Contractor's safety or environmental performance is deemed unacceptable to Company, Company shall provide written notice to Contractor of such determination, and shall have the right to suspend the performance of the Work for as long as necessary to prevent or stop any violation of this Article 16, or as long as Contractor's safety or environmental performance remains unacceptable. During such period of suspension, no portion of the Price shall be payable to Contractor by Company and Contractor shall not be entitled to payment for any costs it incurs as a result of the suspension. Upon receipt of the notice from Company, Contractor shall commence immediate, continuous and diligent corrective action. Further, within two (2) days after Contractor's receipt of such notice, Contractor shall provide Company with Contractor's plan of corrective action.



16.10 Company reserves the right to audit and inspect each System Site to verify compliance with this Agreement, which audits and inspections may be performed by Company or such other third party as Company may direct.

16.11 Notwithstanding Article 37.6, Contractor shall immediately comply with any verbal instruction (which shall thereafter be confirmed in writing within twenty-four (24) hours) from the Project Director, Project Manager or a Company Representative regarding any matter of imminent danger:

- (a) to the health and safety of any person; or

(b) of pollution of or damage to the environment.

16.12 Contractor shall support and participate in any health, safety and security or environmental protection initiative requested by Company with the aim of improving the performance of the Work.

16.13 Contractor shall exercise all diligence to conduct operations under this Agreement in a manner that will prevent seepage, pollution or discharge of debris, and Contractor warrants that it shall comply with all Applicable Laws and Company's procedures and guidelines regarding seepage, pollution or discharge of debris. No trash or other pollutants shall be discharged or allowed to escape from Contractor's Items or other equipment used by Contractor in the performance of the Work. Contractor shall instruct Contractor's Personnel and Subcontractors working at any System Site in matters relating to pollution and take all measures to prevent seepage and pollution and the discharge or escape of pollutants or debris. Contractor shall, at its own expense, clean up any pollution, seepage or discharge or escape of pollutants or debris from Contractor's Items or other equipment used by Contractor in the performance of the Work and promptly take such measures as are necessary in the circumstances to prevent or mitigate any damage resulting from such seepage or pollution or discharge or escape of pollutants and in any event take such measures that Contractor or Company is under instructions to take from any Authority having jurisdiction to so instruct.

## **ARTICLE 17**

### **ACCESS; QUALITY; INSPECTION AND TESTING**

17.1 (a) Company shall, in accordance with this Article 17.1, have the right to send Personnel of any of Company Group to each System Site to monitor the progress of the Work.

(b) Personnel of any of Company Group shall, at all times during the term of this Agreement, be granted an unrestricted right of access to inspect the Work, and monitor all the Work in progress and to inspect the manufacturing and construction process and to inspect Contractor's Items utilized in connection with the creation or construction of the Work, in each case, for the purpose of determining that the Work is being created or constructed in accordance with this Agreement. Where any test or inspection provided for in this Agreement is to be conducted on the premises of Contractor or of any Major Subcontractor, Contractor shall provide free of charge such assistance and temporary office accommodation for use by the representatives of Company as Company may reasonably require. Company shall inform Personnel of Company Group entering any System Site of Contractor's health and safety protocols applicable to such System Site that have been provided to Company and require such Personnel of Company Group to comply with such health and safety protocols.



(c) Company, Lender and their respective representatives shall, as set forth in the Inspection and Test Plan, be entitled to observe inspections, examinations and testing on Contractor's premises, on the System Sites, or at such other premises as expressly contemplated in the Inspection and Test Plan, of equipment and materials to be supplied under this Agreement. Company, Lender and their respective representatives shall, when entering any such premises or any System Site, comply with all health and safety protocols applicable thereto. If Company, Lender or their respective representatives desire to observe such inspections, examinations and testing, Company shall Notify Contractor in accordance with the timing and procedures set forth in the Inspection and Test Plan. Contractor shall, in any event, provide reasonable advance notice of, in accordance with the timing and procedures set forth in the Inspection and Test Plan, and an opportunity for Company, Lender and their respective representatives to inspect, the manufacturing processes, inspections, examinations and testing specified in Exhibit 1 – Scope of Work. Company's, Lender's or their respective representatives observation of such inspections, examinations or tests shall not release Contractor from any obligation under this Agreement. Company shall be responsible for any delay or material interference in the prosecution of the Work or material damage directly caused by the negligence or willful misconduct of it or its representatives in connection with its actions under this Article 17.1 or otherwise while it or its representatives are conducting inspections at a System Site or the facilities of Contractor or its Subcontractors. If it is determined that such delay, interference or damage has occurred, Contractor shall be entitled to seek an Equitable Adjustment.

(d) Contractor may, while at a System Site, impose on Personnel of Company Group, and each such Person shall accept, safety and security measures, including as set forth in the Inspection and Test Plan. Contractor shall also promptly provide information reasonably requested by Personnel of Company Group, or requested by Authorities or any of their representatives in connection with the inspections and tests contemplated in the Inspection and Test Plan.

(e) No inspection, review, approval, or examination by any Personnel of Company Group hereunder shall relieve Contractor Group of any of its obligations or liabilities under this Agreement or operate as a waiver or release of the same.

(f) Commencing on the Effective Date and throughout the term of this Agreement, Contractor shall maintain a Quality Plan, which shall be subject to Company's Approval, in respect of every aspect of the Work in accordance with Exhibit 24 – Quality Requirements.

17.2 (a) Notwithstanding any Company, Authority or other third party inspection, testing or witnessing, Contractor shall be responsible for quality control, quality surveillance/inspection, testing and quality assurance of the Work to verify and be able to

demonstrate substantive compliance with the requirements of this Agreement. Contractor shall carry out its quality management activities in accordance with Exhibit 24 – Quality Requirements.

(b) Contractor shall conduct tests on the Work, including all equipment, in accordance and in compliance with the provisions of Exhibit 1 – Scope of Work, Exhibit 6 – Commissioning and Acceptance Testing, the Quality Plan, Contractor's quality management system, the Inspection and Test Plan, Company Supplied Data and Applicable Laws. Company, Lenders and their respective representatives shall have the right to witness any test on the Work as contemplated in the Inspection and Test Plan; provided, however, Contractor may not carry out any tests to be carried out on the Work that are to be witnessed by Company and its representatives pursuant to the Inspection and Test Plan, unless the prior written notice required by the Inspection and Test Plan of the applicable test has been provided to Company or written permission to proceed with the test in Company's absence has been obtained from Company. If any portion of the Work is closed or covered by Contractor before Company has been given the opportunity to witness any such test by being given prior written notice of such test as required by the Inspection and Test Plan, if requested by Company, Contractor shall reopen or uncover such portion of the Work at Contractor's expense and without extension to the Key Dates.<sup>1</sup>

(c) Contractor shall rectify, at Contractor's sole cost, any failure to comply with the requirements of Exhibit 1 – Scope of Work and Applicable Laws that are identified during testing, commissioning and inspection of the Work.

(d) Upon the request of Company and at Contractor's cost, Contractor shall re-test the Work, including the equipment, that has not met the requirements of this Agreement in any previous test conducted. Company may further require Contractor to re-test, at Contractor's cost, all the Work similar to that Work which originally failed such test, including any equipment, prior to transportation from the relevant manufacturing location.

17.3

[REDACTED]

[REDACTED]

[REDACTED]

17.4

[REDACTED]

**ARTICLE 18**  
**WARRANTY PROVISIONS**

18.1 The warranty period applicable to each System (and any Work that achieves Substantial Completion therewith) shall commence on the Substantial Completion Date of such System and expire [REDACTED] following the Substantial Completion Date of such System (each such period a "Warranty Period").

18.2 For the duration of the Warranty Period applicable to each System (and any Work that achieves Substantial Completion therewith), Contractor warrants:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

18.3 Reserved.

18.4

[REDACTED]

[REDACTED]

18.5

[REDACTED]

18.6 During the period that Warranty Work is being performed, Contractor shall continue to cooperate with Company's Other Contractors and Personnel of Company in accordance with Article 4.8.

[REDACTED]

18.7 Contractor shall not substitute any materials in performing Warranty Work unless such materials are of equivalent performance, functionality and quality and otherwise satisfy the requirements of this Agreement.

18.8

18.9 Subject to compliance with System Site safety requirements (including lock out/tag out procedures) Company shall promptly provide Contractor in a controlled and coordinated manner access to a System that is required by the Contractor for the purpose of carrying out Warranty Work. Contractor acknowledges that Warranty Work, at the request of Company, must be coordinated with the ongoing operations of the applicable System to assure, among other things, that Company will be able to fulfill its obligations with respect to such System, and Contractor will perform Warranty Work at such times and in such manner so as to minimize any disruption to the System.

18.10 If a Serial Defect is identified during the Warranty Period of a System, Contractor shall,

18.11 All Warranty Work shall itself be guaranteed by Contractor on terms identical, with only such changes as may be necessary, to those specified above in this Article 18, provided that Warranty Period for any BESS Enclosures required to be re-performed, repaired, corrected or replaced following discovery of a Defect or other breach of the warranties set forth in this Article 18 during the Warranty Period shall continue until

[REDACTED]

18.12 During the Warranty Period applicable to a System and unless otherwise instructed by Company, Contractor shall remove from the applicable System Site and dispose of any parts or equipment of that System that have been replaced, and Contractor shall be solely responsible for all costs associated with such removal and disposal. Company shall have the right, to be exercised at its discretion, to have a Company representative observe any removal or replacement of parts or equipment and to observe any testing or analysis of any such removed parts or equipment.

18.13 Company shall Notify Contractor [REDACTED] of any Defect in respect of which Contractor shall be obliged pursuant to this Article 18 to perform Warranty Work. [REDACTED]

18.14 Company may, at its sole discretion, retain independent third parties to inspect, test, review and/or observe the Warranty Work for compliance with this Agreement. Contractor, upon reasonable notice, and consistent with Article 17, shall provide access to the Warranty Work to permit the independent third parties to perform their duties.

18.15 The warranties provided by Contractor under this Agreement are exclusive and in lieu of all other warranties, whether statutory, express or implied (including all warranties of merchantability, fitness for use, and fitness for a particular purpose and all warranties arising from course of dealing and usage of trade), all of which are expressly waived by Company. The foregoing sentence is not intended to disclaim any other obligations of Contractor set forth in this Agreement.

**ARTICLE 19**  
**LIQUIDATED DAMAGES**

19.1 Timely Completion

[REDACTED]

[REDACTED]

19.2 Liquidated Damages

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



19.3 All Liquidated Damages payable by Contractor shall be invoiced by Company to Contractor on a weekly basis, [REDACTED]

19.4 Contractor acknowledges and agrees that: [REDACTED]

(b) the Liquidated Damages represent a genuine pre-estimate of damages resulting from the failure by Contractor to complete the relevant portion of the Work on the dates specified therein; and (c) such provisions represent a reasonable endeavor on the part of Contractor and Company to estimate fair and reasonable compensation as Liquidated Damages for the damages sustained in those circumstances and do not constitute a penalty imposed on Contractor. Such Liquidated Damages shall be the sole and exclusive remedy of Company for the failure of Contractor to achieve [REDACTED]

19.5 Any Liquidated Damages payments made pursuant to Article 19.2 shall constitute an adjustment of the Price for tax purposes and shall be treated as such by Contractor and Company on their tax returns, except to the extent such treatment is not permitted by Applicable Laws.

19.6 Contractor's liability for Liquidated Damages due to delay shall under no circumstances:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**ARTICLE 20**  
**CONTRACTOR INSURANCE**

20.1 Contractor shall procure and maintain or cause to be procured and maintained in full force and effect for the duration of the Work those insurances specified in this Article 20 in accordance with the requirements of this Article 20.

20.2 Contractor will procure insurance policies in accordance with the requirements of this Article 20 from a financially sound insurance company with a minimum [REDACTED]. If Contractor fails to procure such policies, fails to provide certificates of insurance confirming such coverage in a form and with content acceptable to Company within the time set forth in Article 20.3, or if any insurance is cancelled and not replaced with comparable insurance to the satisfaction of Company, then Company may at any time (i) procure such policies at Contractor's cost, or (ii) by Notice to Contractor, terminate this Agreement.

20.3 Within thirty (30) days prior to the commencement of the Work, Contractor shall submit to Company certificates of insurance evidencing the insurance required by Article 20.4. Failure of Company to advise Contractor of any insurance deficiencies shall not relieve Contractor of any liability related to its obligations under this Article 20. On written request by Company to Contractor, Contractor shall provide certificates of insurance policies obtained by Contractor in accordance with this Article 20.

20.4 Contractor will obtain and maintain, and Contractor shall cause its Subcontractors to obtain and maintain (to the extent relevant to such Subcontractors' scope of work), at their own expense, during the continuance of this Agreement and as otherwise noted,

the following insurance coverages with limits not less than those specified herein. The cost of insurance procured by Contractor, including, but not limited to, deductibles or self-insurance or policy retentions, shall be for the sole account of Contractor:

(a) Workers' Compensation

(i) Workers' compensation coverage for all of its Personnel engaged in the Work in accordance with the Applicable Laws of the jurisdictions in which the Work is performed. Contractor shall at all times pay, or cause to be paid, any assessment or contribution required to be paid pursuant to Applicable Laws relating to workers' compensation in respect of Contractor's Personnel and, upon failure to do so, authorizes Company, in addition to any other rights of Company under this Agreement, to withhold and remit on behalf of Contractor an amount equal to such assessment or contribution, including any interest and penalty assessed thereon. Contractor shall further ensure that non-residents are fully covered by workers' compensation insurance and employer's liability insurance with such coverage including an extraterritorial benefits extension providing benefits at least equal to those provided by the jurisdiction in which the Work is performed.

(ii) Upon completion of Subcontract work, each Subcontractor having worked at the applicable System Site shall deliver to Company a clearance letter from the Workers' Compensation Board of Nova Scotia.

(iii) Upon completion of the Work, Contractor and all Subcontractors having worked at the applicable System Site which have not previously provided evidence of compliance with Article 20.4(a)(ii) above shall deliver to Company a clearance letter from the Workers' Compensation Board of Nova Scotia.

(b) Reserved.

(c) Comprehensive General Liability

In no event duplicative of project liability insurance provided for in Article 21, and solely as it relates to liability arising outside of the Work, comprehensive general liability insurance with limits of not less than [REDACTED] per occurrence and in annual aggregate for bodily injury and/or property damage including contractual liability covering the indemnity

obligations included in this Agreement, sudden and accidental pollution liability, broad form property coverage, personal injury, contractor's protective liability, completed operations, contingent employer's liability and incidental medical malpractice. While an occurrence based insurance policy is preferred, in the event that any coverage is maintained in a "claims-made" policy, such coverage shall be maintained for [REDACTED] following the termination of this Agreement, and provided that if a "claims-made" policy is maintained, the retroactive date must precede the Effective Date.

(d) Automobile Liability Insurance

Contractor shall obtain and maintain in effect automobile liability insurance covering all licensed vehicles whether owned, non-owned, leased or hired. Such insurance will provide a minimum combined single limit of liability for bodily injury and property damage of not less than [REDACTED] per occurrence. Non-owned automobile liability policy may be provide for within the automobile policy, on a standalone basis or as part of the above noted general liability insurance.

(e) Reserved.

(f) Property

"All risks" property insurance covering all real and personal property which Contractor owns, leases or has in its care, custody or control and which is not otherwise insured pursuant to Article 21.

(g) Professional Liability

Except to the extent provided by Subcontractors, Contractor shall ensure professional liability insurance, on the basis noted below is procured and maintained by architects and engineers of every tier performing Work under this Agreement and including coverage of each insured's interest in joint ventures (if applicable), punitive damages coverage (where not prohibited by law) and limited contractual liability. Contractor's own professional liability insurance shall include a design build endorsement (if applicable), shall be retroactive to no later than the start of Work and shall include an extended reporting period of twenty four (24) months. Coverage shall include minimum limits [REDACTED]

(h) Major Subcontractors

Contractor is required to ensure that each of the Major Subcontractors provide insurance policies [REDACTED]

[REDACTED]

When requested to do so by Company, Contractor shall provide or cause to be provided to Company certificates of insurance confirming such Major Subcontractor insurance policies, or such other evidence of insurance acceptable in form and content acceptable to Company, acting reasonably. Contractor Group shall not perform Work during any period when any required policy of insurance is not in effect.

20.5 In addition to the insurance coverage specified in this Article 20, Contractor shall carry such other insurance policies and in such amounts as may be required in order to comply with Applicable Laws.

20.6 [REDACTED]

20.7 All policies obtained by Contractor in accordance with Article 20.4 shall be further endorsed to provide Company thirty (30) days prior written notice of cancellation or any material change in coverage.

20.8 If requested by the other Party, a Party shall advise the other Party in writing of the final resolution of any insurance claims.

20.9 Company may reduce or waive all or any portion of these insurance requirements at its own discretion. Such reduction or waiver shall be obtained in writing and shall in no way reduce or waive Contractor's responsibility or liability for Work performed hereunder.

20.10 [REDACTED]

**ARTICLE 21**  
**PROJECT INSURANCE**

21.1 Contractor shall procure and maintain or cause to be procured and maintained in full force and effect for the duration of the Work those insurances specified in this Article 21 in accordance with the requirements of this Article 21 and Exhibit 18 – Project Insurance. Separate policies for each System and System Site shall be procured for the construction all risk insurance and wrap up liability insurance. Policies will (i) cover all participants in the Project as their interests and/or liabilities may appear and (ii) meet the minimum requirements set forth in Exhibit 18 – Project Insurance:

(a) Construction All Risk Insurance

Construction all risk insurance up to a limit equivalent to the replacement cost value of applicable System, and includes, storage, installation, testing, commissioning, and start-up, during the insured construction period..

(i) Insurance for material damage against "All Risks" of physical loss or damage, including testing, commissioning and start up to materials and equipment which will enter into and form part of the completed permanent facilities. The insurance will cover such materials and equipment while in storage at the premises of Contractor and Subcontractors awaiting shipment to a System Site, or while at fabrication, lay-down areas or marshaling yards., .

(ii) The insurance noted in Article 21.1(a) shall include the interests of Contractor and Subcontractors in the loss of or damage to material and equipment to be installed or consumed/used in the installation Work by Contractor, including temporary structures, tools, equipment and apparatus or other property that is to become a part of the completed Project,

regardless of initial ownership, the value of which is included in the estimated replacement cost value of the Project, other than amounts recoverable under Contractor's insurance required under Article 20.

(iii) Deductibles on the policy not to exceed [REDACTED]

(iv) The "All Risks" insurance will be subject to the exclusions usually applicable to such policies and will exclude, among others, the cost of making good any faulty workmanship, material, construction or design but not exclude physical damage otherwise insured which results from such faulty workmanship, material, construction or design.

(b) Marine Insurance

(i) Marine cargo or transit insurance may be placed to a limit of at least [REDACTED] any one conveyance (including loading, unloading and storage during the course of transit/marine cargo) against "All Risks" of physical damage to the materials and equipment noted in Article 21.1(a)(i) above while in transit or storage during the course of transit beginning at the time the materials and equipment leave the originating warehouse, store or other location for the commencement of the transit until such material and equipment is received at the approved fabrication or lay-down yard or on a System Site as the case may be, except as provided in Article 20 The coverage in this Article 21.1(b) shall be subject to exclusions usually applicable to such coverage.

Contractor will be required to arrange load and stow and discharge surveys on all shipments that are either:

- (1) oversized or heavy lift; and/or
- (2) shipped on deck (other than containerized cargo).

21.2 Wrap Up Liability Insurance

(a) Wrap up liability insurance during any pre-Work and construction period, or such other period as Company determines appropriate. The wrap up liability insurance shall include a limit of no less than [REDACTED] and shall

include as insureds Company, Contractor and Subcontractors, , and their respective employees, agents and representatives, as the case may be, while carrying out any services, installation or other work relating to the System on the System Site.

Including but not limited to the following:

- coverage;
- (i) [REDACTED] completed operations
  - (ii) Sudden & accidental pollution; and
  - (iii) No explosion, collapse and underground exclusion.

21.3 In the event of any loss in respect of which any of the insurances above applies, Company will cooperate with Contractor, who will work with the insurer on the claim(s) preparation and loss adjustment.

21.4 Reserved.

21.5 Insurance policies required by this Article 21 shall:

[REDACTED]

[REDACTED]

[REDACTED]

21.6 Company will be provided with a summary of insurance for all policies listed on Article 21. Among others, the summary should include information on limits, sublimits, and deductibles.



21.7 The insurance policies required by Article 21.1 shall be in place and shall be maintained until the Milestone Completion Certificate delivered by Contractor in respect of Final Completion has been Approved, with any completed operations coverage to continue during the Warranty Period as set out in the policy.

**ARTICLE 22**  
**LIABILITY AND INDEMNIFICATION**

22.1

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

22.2 [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

22.4

[REDACTED]

22.5

[REDACTED]

[REDACTED]

22.6

[REDACTED]

22.7

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**ARTICLE 23**  
**CONTRACTOR'S REPRESENTATIONS AND WARRANTIES**

23.1 Contractor represents and warrants as of the Effective Date and during the term of this Agreement that:

(a) Contractor is a corporation duly organized and validly existing in good standing under the laws of Canada. Contractor has all necessary power and authority to carry on its business as presently conducted, to own or hold under lease its properties and to enter into and perform its obligations under this Agreement. Contractor is duly qualified, registered and licensed to do business in the Province of Nova Scotia and in all other jurisdictions wherein the nature of its business and operations or the character of the properties owned or leased by it makes such qualification or licensing necessary and where the failure to be so qualified or licensed would impair its ability to perform its obligations under this Agreement or would result in a liability to or would have an adverse effect on its financial condition, business, operations or prospects. All Contractor's Personnel involved in carrying out any of the Work have the qualifications, training and experience, and hold such valid licenses and certificates of competence, as are required to carry out their duties in relation to the Work

(including visas and work permits). With respect to engineering work that is required by Applicable Laws to be performed by a professional engineer licensed by the Province of Nova Scotia: (i) Contractor shall arrange to have such Work performed by such a licensed engineer directly employed by it or it will engage such a licensed engineer or engineering firm as a Subcontractor to provide the engineering work, (ii) such engineering work shall in fact be performed by such engineer or engineering firm licensed in Nova Scotia as required by Applicable Laws and (iii) such licensed engineer or engineering firm shall be obligated to exercise its professional judgment in connection with the performance of its engineering work. Contractor shall nevertheless be responsible for the performance of Work or exercise of judgment by such engineer or engineering firm in accordance with Article 7 and the other provisions of this Agreement.

(b) Contractor has all necessary power and authority to execute, deliver and perform its obligations under this Agreement, and each of the execution, delivery and performance by Contractor of this Agreement has been duly authorized by all necessary action on the part of Contractor, does not require any approval, except as has been heretofore obtained, of the board of directors (or equivalent) of Contractor or any consent of or approval from any trustee, lessor or holder of any indebtedness or other obligation of Contractor, except for such as have been duly obtained, and does not contravene or constitute a default under the certificate of formation, limited liability company agreement, bylaws or certification of incorporation, as applicable, of Contractor, or any provision of Applicable Laws or any agreement, judgment, injunction, order, decree or other instrument binding upon Contractor, or subject the Project or any component part thereof or any System Site or any portion thereof to any lien; and Contractor is in compliance with all Applicable Laws (i) which govern its ability to perform its obligations under this Agreement, or (ii) the noncompliance with which would have an adverse effect on its ability to perform its obligations under this Agreement.

(c) Neither the execution and delivery by Contractor of this Agreement, nor the consummation by Contractor of any of the transactions contemplated hereby, requires the consent or approval of, the giving of notice to, the registration with, the recording or filing of any document with, or the taking of any other action in respect of any Authority, except such as are not yet required, and Contractor has no reason to believe that the same will not be readily obtainable in the ordinary course of business upon due application therefor, or which have been duly obtained and are in full force and effect.

(d) Contractor has duly and validly executed and delivered this Agreement, and this Agreement constitutes a legal, valid and binding obligation of Contractor enforceable against it in accordance with its terms, except as (i) such enforceability may be limited by applicable bankruptcy, insolvency, reorganization, liquidation, moratorium or similar laws affecting creditors, or lessors' rights generally and (ii) the application of general equitable principles may limit the availability of certain remedies.

(e) There is no action, suit or proceeding, at law or in equity, or official investigation before or by any Authority, arbitral tribunal or other body pending or, to the best knowledge of Contractor, threatened against or affecting either Contractor or any of its properties, rights or assets, which could reasonably be expected to result in an adverse effect on Contractor's ability to perform its obligations under this Agreement or on the validity or enforceability of this Agreement.

(f) Contractor has the required skills, experience, facilities, equipment and capacity to perform the Work in a timely manner and in accordance with the terms of this Agreement and to the Standard of a Prudent Contractor.

(g) Contractor has knowledge of all of the legal requirements and business practices which must be followed in performing the Work.

(h) Each of Contractor's Items is of good quality, in good working condition, is in compliance with all Applicable Laws and is fit for its intended use as contemplated in this Agreement.

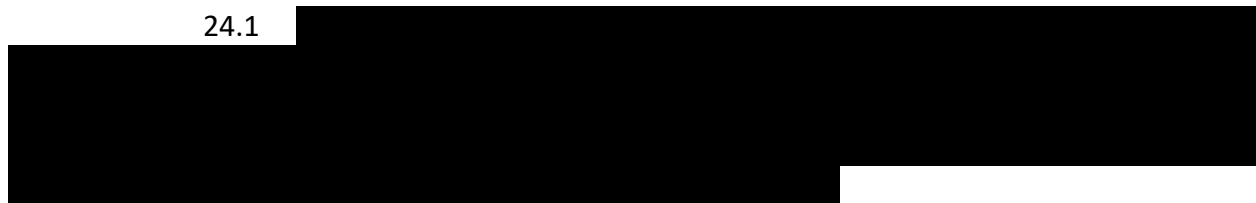
(i) Neither Contractor nor its representatives have made any payment or given anything of value to any government official (including any officer or employee of any Authority) to influence his, her or its decision or to gain any other advantage for Company or Contractor in connection with the Work to be performed hereunder.

(j) Contractor has the full right, power, and authority to grant all of the rights, licenses and interest in, to and under all intellectual property rights granted by it to Company under this Agreement.

(k) Contractor is financially solvent, able to pay its debts as they come due, and possessed of sufficient working capital to complete its obligations under this Agreement.

**ARTICLE 24**  
**TITLE AND RISK**

24.1





24.2



24.3 Reserved.

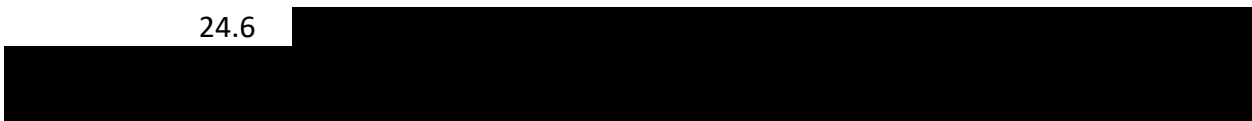
24.4



24.5



24.6



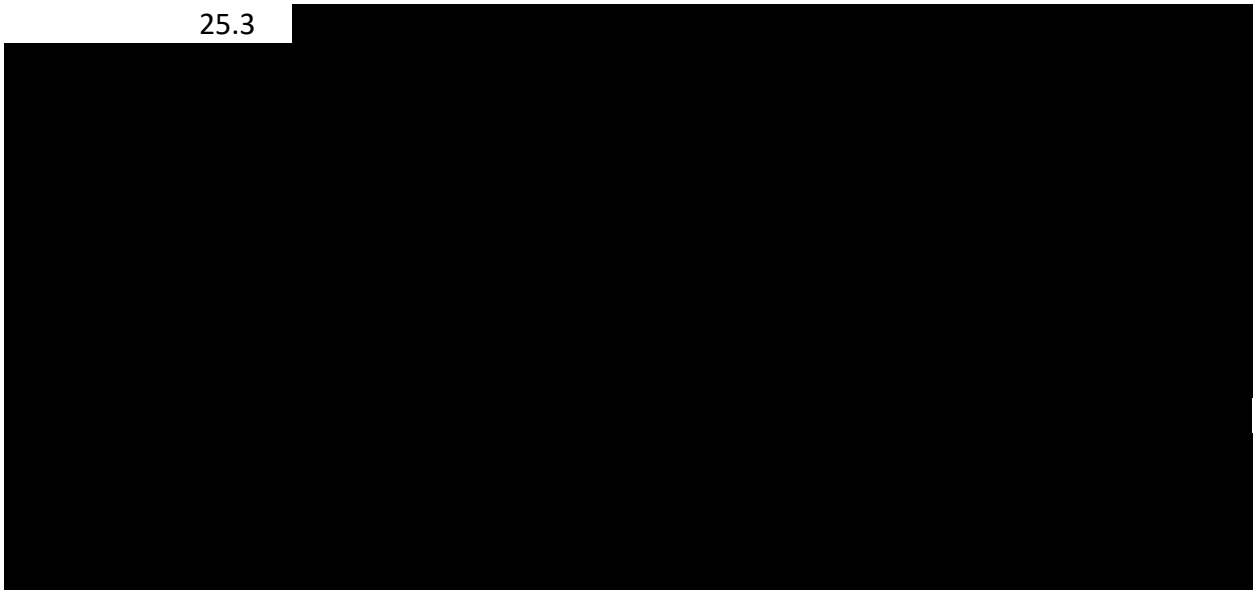


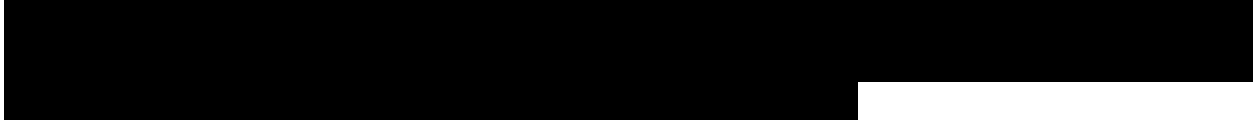
**ARTICLE 25**  
**PROJECT SCHEDULE AND PROGRESS**

25.1 The Work shall be completed and Delivered to Company in accordance with the Project Schedule.

25.2 If at any time Contractor determines that it is necessary or advantageous to change the sequence of the Work set forth in the Project Schedule, and no adjustment to the Price, Payment Milestone Schedule, the Key Dates, or other terms of this Agreement is required, Contractor shall submit the proposed revision to Company and Company may approve such change. No change shall be made in the sequence in which the Work activities are performed unless Company has provided prior written approval of such change, which approval shall not be unreasonably withheld. If any such change in sequence would require an adjustment to the Price, the Payment Milestone Schedule, the Key Dates, or other terms of this Agreement, such request shall be addressed in accordance with Article 13.6 and Article 27.

25.3





**ARTICLE 26**

**INTERIM MILESTONES; COMMISSIONING AND TESTING; SUBSTANTIAL COMPLETION; FINAL COMPLETION**

26.1 Interim Milestones.

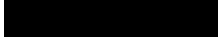


26.2 Commissioning and Acceptance Testing.

(a) Contractor shall develop a Commissioning Plan and shall provide a draft Commissioning Plan, for Company's review and approval, as soon as reasonably practicable after the NTP Date (but in no event later than ninety (90) days prior to the commencement of Commissioning of the initial System). Company shall have forty-five (45) days from the date it receives the Commissioning Plan to review and provide comments to Contractor. Contractor shall incorporate all of Company's reasonable comments in the Commissioning Plan within five (5) Business Days of receipt of such comments, which revised Commissioning Plan shall be approved by Company (such approval not to be unreasonably

withheld). Contractor shall perform its commissioning activities in accordance with the final approved Commissioning Plan.

(b) Following Mechanical Completion of each System, Contractor shall, in accordance with the approved Commissioning Plan, schedule and conduct with Company a complete review, commissioning, demonstration, start-up and operational shakedown of the System and Work associated with such System to determine that they are in accordance with the requirements of this Agreement ("Commissioning"). As part of the Commissioning, Contractor shall ensure that all adjustments or corrections required so that the Work performs in accordance with this Agreement have been made and that all equipment and systems have been balanced and perform as required by this Agreement. If necessary or requested by Company, Contractor shall require the Major Subcontractor(s) responsible for any equipment or component system included as part of the Work to participate in the review and/or to perform the adjustments, corrections or balancing required by the approved Commissioning Plan. In connection with the Commissioning of each System, Contractor shall provide the testing and Commissioning reports identified in the approved Commissioning Plan.

(c) As part of the obligation to achieve Substantial Completion of each System, Contractor shall perform Acceptance Tests on the System. 



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(d) The Company Representative is entitled to be involved at all stages of performing the Acceptance Tests. Company shall perform the Acceptance Tests and any rerun thereof required hereunder, including any rerun to comply with the requirements of any Authority in connection with the issuance of any Permit, in accordance with all Applicable Laws. Contractor shall provide all services necessary at the System Site for the installation, start-up, commissioning and check-out of the System installed at such System Site and running or rerunning of the Acceptance Tests in accordance with the requirements of Exhibit 6 – Commissioning and Acceptance Testing. Contractor recognizes that during the period the Acceptance Tests are being performed, it will be necessary for Contractor's Personnel to be available as needed by Company. Contractor shall, in any event, furnish Company with reasonable advance notices before and test reports after all Acceptance Tests, including unsuccessful tests and re-tests.

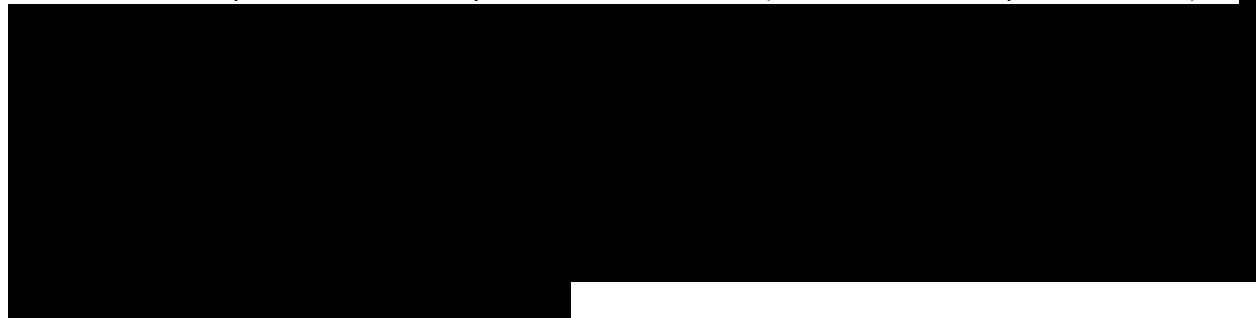
26.3 Substantial Completion.

(a) When Contractor believes it has achieved Substantial Completion of a System, it shall Notify Company and submit a Milestone Completion Certificate. The Notice shall contain



(b) Within [REDACTED] after receipt of Contractor's Notice and Milestone Completion Certificate, Company shall inspect the System, and if Company determines that the requirements for Substantial Completion have been satisfied, shall return to Contractor the Milestone Completion Certificate signed by Company. If Company determines that the requirements of Substantial Completion of the applicable System have not been satisfied, then Company shall so state within the same time period and shall give the reasons therefor, in which event, Contractor shall perform such additional Work as will cause the System to achieve Substantial Completion, subject to Contractor's right under Article 41 to dispute said determination and upon resolution of such dispute in Contractor's favor, to seek an Equitable Adjustment pursuant to Article 27 for the resultant costs and delays. Thereafter, Contractor shall have the right to issue another Notice of Substantial Completion. The foregoing procedure shall be repeated until Contractor causes the System to meet the requirements for Substantial Completion and Substantial Completion has been achieved.

(c) The date of Substantial Completion of a System shall be the date of Contractor's properly delivered Notice as subsequently acknowledged by Company that Substantial Completion of that System has occurred ("Substantial Completion Date").

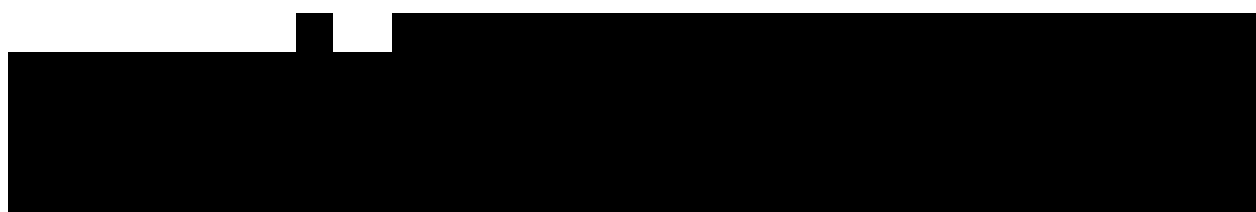


(d) Substantial Completion of a System shall be regarded as having been achieved notwithstanding that some minor amount of work, such as the finish of painting, remains to be completed, or that some minor deficiency requires correction as agreed by Company, provided that such outstanding work or minor deficiency does not affect the safe and reliable operation of any unit, system or component. Any outstanding parts of the Work shall be recorded on the Punch List submitted with Contractor's Notice of achievement of Substantial Completion of the applicable System.

(e) The achievement of Substantial Completion of a System shall not relieve Contractor of its other obligations under this Agreement, including its obligation to achieve in a timely manner Final Completion of that System and carry out the Warranty Work.

#### 26.4 Capacity Shortfall.

(a) If during a Successfully Run Capacity Test of a System, the Target Capacity Level of such System has not been demonstrated, Contractor shall inspect the System to determine the reason for the failure to achieve the Target Capacity Level. Following such inspection, Contractor shall undertake all reasonable remedial measures to remedy the failure to achieve the Target Capacity Level. Following completion of the remedial measures, Contractor shall schedule with Company repeat Acceptance Tests and the values of the latest conducted Acceptance Tests may be selected for the purposes of demonstrating achievement of the criteria for passing the Acceptance Tests including meeting the Target Capacity Level during a Successfully Run Capacity Test.

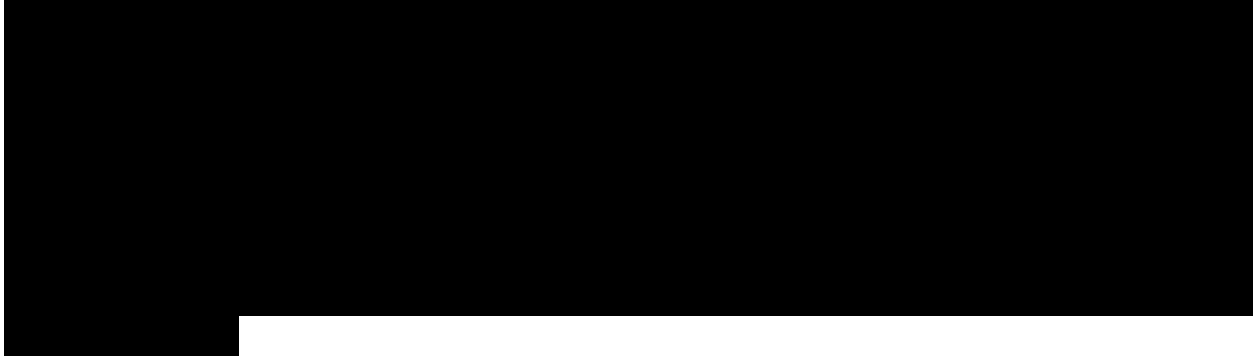


[REDACTED]

[REDACTED]

[REDACTED]

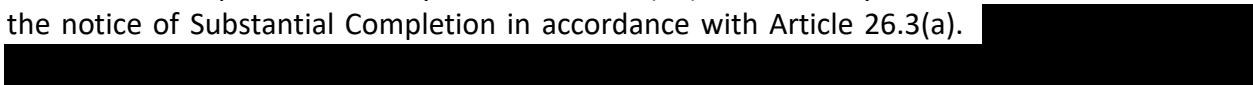
[REDACTED]



26.5 Drawings and Designs; Punch Lists

(a) Except as required as a condition to the achievement of Substantial Completion of a System, within sixty (60) days following Substantial Completion of each System, Contractor shall submit to Company such drawings, electrical one line drawings, and control diagrams as are identified in Exhibit 1 – Scope of Work for a System and required by Company in connection with the operation of the System. Except as required as a condition to the achievement of Substantial Completion, within sixty (60) days following Substantial Completion, Contractor shall submit to Company such drawings, electrical one line drawings, and control diagrams as are identified in Exhibit 1 – Scope of Work and required by Company in connection with the operation of the System.

(b) On each date Contractor submits a Notice to Company under Article 26.3(a), Contractor shall provide Company with a proposed draft of a punch list of (i) administrative items and other items requiring completion or correction in respect of a System and any other Work achieving Substantial Completion with such System and (ii) any remaining administrative items and other items requiring completion or correction in respect of the Work following Substantial Completion of each System (each a "Punch List"). Within five (5) Business Days after Contractor provides Company with its proposed draft of each Punch List, Company shall provide Contractor with its proposed draft Punch List. Each Punch List will be prepared by Company and Contractor based upon the proposed drafts and will be subject to the agreement of the Parties. Company and Contractor will use their best efforts to agree upon (i) the Punch List for a System within ten (10) Business Days of Contractor's submittal of the notice of Substantial Completion in accordance with Article 26.3(a) and (ii) the Punch List of remaining items to be completed for the System within ten (10) Business Days of Contractor's submittal of the notice of Substantial Completion in accordance with Article 26.3(a).





[REDACTED]

(c) Contractor shall diligently perform the Work on each Punch List developed according to Article 26.5(b) above. Company shall provide Contractor with reasonable access to each System Site to the extent necessary for the purpose of performing such Work. The Parties shall close Punch List items as they are completed. [REDACTED]

[REDACTED]

26.6 Final Completion.

(a) When Contractor believes it has achieved Final Completion of a System, it shall Notify Company, stating in detail its basis for this conclusion, and deliver a Milestone Completion Certificate. Within [REDACTED] thereafter, Company shall Notify Contractor whether Company concur that the conditions to Final Completion have been satisfied or which conditions Company believes Contractor has failed to satisfy. If Company concur with Contractor's assertion, Company shall return the Milestone Completion Certificate signed by Company. The date of Final Completion shall be the date of Contractor's properly delivered Notice as subsequently acknowledged by Company that Final Completion has occurred.

(b) If Company does not initially concur that the conditions to Final Completion have been satisfied, Contractor will perform such additional Work as will cause such System to achieve Final Completion, subject to Contractor's right under Article 41 to dispute said determination. Thereafter, Contractor shall have the right to issue another Notice of Final Completion. The foregoing procedure shall be repeated until Contractor causes the System to meet the requirements for Final Completion and Final Completion has been achieved. At such time as all failures to satisfy the conditions to Final Completion are corrected, Company shall give written confirmation that the System has achieved Final Completion and Final Completion shall be deemed to have occurred as of the date the Milestone Completion Certificate in respect of Final Completion is countersigned by Company. The achievement of Final Completion shall not relieve Contractor of its other obligations under this Agreement, including its Warranty obligations.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(e) Contractor shall achieve Final Completion no later than [REDACTED] after having achieved Substantial Completion.

(f) Company's Approval of the Milestone Completion Certificate in respect of Final Completion shall not release Contractor from the provisions of this Agreement which expressly or by their nature extend beyond the expiration or any termination of this Agreement.

**ARTICLE 27**  
**CHANGES TO THE WORK; EQUITABLE ADJUSTMENTS**

27.1 Company Requested Changes.

(a) Company shall have the authority to order minor instructions in respect of the Work, or changes to the Work, or any part thereof, within the general scope of this Agreement, which are not inconsistent with the intent of this Agreement. If Contractor agrees and acknowledges in writing that such changes do not require any adjustment to the Price, Project Schedule or other terms of this Agreement, such changes shall be carried out promptly by Contractor without Equitable Adjustment. If Contractor does not so agree, such changes will be addressed pursuant to Article 27.1(b).

(b) Company may at any time require additions, deletions or modifications to the Work not covered by clause Article 27.1(a) (a "Change"), and shall do so by Notice to Contractor designated as a "Change Order". Upon receipt of the Notice of Change Order from Company, Contractor shall promptly and in any event within no more than [REDACTED] submit a proposal in writing to the Project Director and the Project Manager setting forth an estimate (i) of any increase or decrease in the cost to Contractor of performing the Work as a result of the Change either based on lump sum pricing or unit pricing, with any such unit pricing broken down to the extent possible into individual items and amounts, and (ii) any other Equitable Adjustment which Contractor reasonably believes will be necessary as a result of the Change, including any changes to the Payment Milestone Schedule, Project Schedule or the Key Dates. Each Change Order which is executed by Company and Contractor shall constitute an amendment to this Agreement and shall, if applicable, result in an amendment to the Payment Milestone Schedule and/or the Key Dates, to reflect such Change Order.

(c) An Equitable Adjustment shall be made as the result of a Change Order only if, prior to Contractor's performance of the reduced, additional or modified Work, Company and Contractor have both executed the Change Order. [REDACTED]

[REDACTED]

27.2 Adjustments Due to Change Order.

(a)

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

27.3

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

27.4 Equitable Adjustment; Notice of Claim.

[REDACTED]

[REDACTED]

27.5 Determination of Equitable Adjustment.

[REDACTED]

[REDACTED]

[REDACTED]

27.6

[REDACTED]

**ARTICLE 28**  
**PUBLIC COMMUNICATIONS**

28.1 Contractor agrees that all public relations matters arising out of or in connection with the Work shall be the sole responsibility of Company. Contractor shall refer to Company any enquiries from the media or public concerning the Work, this Agreement, the Project or Company's business and activities.

28.2 Contractor shall obtain Company's prior Approval of the text of any announcement, publication or other type of communication concerning the Work or the Project.

28.3 Contractor or any member of Contractor's Group shall not advertise or issue any information, publication, document or article (including photographs or film) for publication or media releases or other publicity relating to the Work, this Agreement, the Project or Company's business and activities without the prior Approval of Company, except as may be required by Applicable Laws. Contractor shall promptly Notify Company in advance of any such advertisement, issuance or publication that may be required by Applicable Laws.

28.4



28.5 Notwithstanding anything set forth in Article 28.3 to the contrary, Contractor shall work with Company to create a promotional video regarding the Project.

**ARTICLE 29**  
**CONFIDENTIALITY**

29.1 The term "Confidential Information" shall mean all information and data, including photographs of activities of Company, in whatever form, which a Receiving Party directly or indirectly acquires from the other Party or from the performance of the Work (including events witnessed by either Party, its respective Group and the Personnel of each of the foregoing in connection with the performance of the Work) and includes without limitation, Contractor's Proprietary Information. Confidential Information does not include information which:

(a) prior to the time of disclosure or acquisition is lawfully in the public domain through no fault of the Receiving Party or its Personnel;

(b) after disclosure or acquisition becomes part of the public domain, through no act or omission on the part of a Party;

(c) prior to disclosure or acquisition was already lawfully in a Party's possession without limitation on disclosure to others;

(d) was obtained by the Receiving Party from a third party who is lawfully in possession of such information and is not subject to a contractual or fiduciary relationship with the other Party with respect to such information; or

(e) was independently developed by the Receiving Party without the use or consideration of Confidential Information.

29.2 Contractor shall not disclose Company's Confidential Information to any third party nor use any Company's Confidential Information, other than (i) to its Affiliates, and their respective directors, officers, employees, Subcontractors, counsel, consultants and advisors, in each case as required to enable Contractor to perform its obligations hereunder, (ii) if required by Applicable Laws on Company's behalf in accordance with the terms of this Agreement, or (iii) otherwise with the Approval of Company. Notwithstanding the foregoing, Contractor may disclose Company's Confidential Information if required by Applicable Laws in accordance with the terms of Article 29.6 below. Contractor shall promptly Notify Company in advance of any such intended disclosure. Contractor shall adopt and follow precautionary measures with respect to Company's Confidential Information to ensure that it is not disclosed to third parties by Contractor's Personnel or Subcontractors, without the prior written Approval of Company. Contractor shall cause each of the permitted recipients of Company's Confidential Information under this Article 29.2 to abide by substantially similar terms of this Article 29 and Contractor shall be liable for the unauthorized disclosure by such recipients in violation of any confidentiality restrictions herein as is disclosed by Contractor. Any Approval given by Company shall apply only to the specific request for Approval made by Contractor.

29.3 Company may disclose Contractor's Confidential Information to its Affiliates, Lenders, Company's and/or its Affiliates' bankers and financial or insurance institutions from whom Company and/or its Affiliates may seek financing or insurance coverage for the Project and to Company's and its Affiliate's directors, officers, employees, contractors, subcontractors, counsel, consultants and advisors (the "Receiving Party") to whom disclosure is required to enable Company to perform its obligations hereunder or to enable Company to perform its obligations with respect to the construction, operation and maintenance of any other portion of the Project or the work conducted with respect to either, or if required by Applicable Laws or in connection with the use, operation and maintenance of any property resulting from the performance of the Work and for the purposes of interfacing the Work with its own equipment or equipment supplied by third parties, provided Company has taken such reasonable and necessary precautions to prevent any of the foregoing parties from disclosing such information to any third party.

29.4 To the extent Company is subject to the provisions of the Privacy Law, all documents and other records in the custody of or under the control of Company and its Affiliates, and in relation to the Work in the custody of or under the control of Contractor, will



be subject to the Privacy Law. Subject to the limitations of the Privacy Law and to the extent it applies to Company or its Affiliates, the confidentiality obligations contained in this Agreement shall apply.

29.5 Each Party who discloses Confidential Information of another Party to its Personnel shall ensure that any such Personnel are informed of the confidential nature of the information disclosed and that such Personnel comply with the Party's obligations under this Article 29.

29.6 This Article 29 does not apply to the disclosure of information by a Party in order to comply with any Applicable Laws or legally binding order of any Court, Authority or rule of any recognized stock exchange on which it or any of its Affiliate(s) is listed, as long as prior to such disclosure the disclosing Party gives Notice to the other Party with full particulars of the proposed disclosure. In connection with any compelled disclosure hereunder, the disclosing Party shall cooperate with the other Party to make reasonable efforts to obtain from the party to whom disclosure is made written assurance that confidential treatment will be accorded to such portion of the Confidential Information as is disclosed, and in the case of disclosure compelled by legally binding order of any Court, Authority or rule of any recognized stock exchange on which a Party or any of its Affiliate(s) is listed, or in the course of administrative or judicial proceedings, Contractor shall promptly Notify Company of the requirement to disclose such information and the terms thereof and shall cooperate to the maximum extent practicable to preserve the confidential nature of the information and to minimize the disclosure, including, but not limited to, cooperating with Company so that an appropriate protective order or other appropriate remedy may be sought by Company to prevent the disclosure. Further, in the case of Company, this Article 29 will not apply to the disclosure of information by Company to an Authority if Company is requested or required by such Authority to disclose Confidential Information provided to Company in accordance with the terms hereunder; provided, that Company shall use reasonable efforts to obtain from the party to whom disclosure is made written assurance that confidential treatment will be accorded to such portion of the Confidential Information as is disclosed.

29.7 If requested by Company, whether prior to or after the expiry or earlier termination of this Agreement, Contractor shall promptly, but in any event no later than fifteen (15) days after receiving such request, deliver to Company all Confidential Information provided by Company that is in the custody, possession or control of Contractor or any of its Personnel, along with a certificate, in a form reasonably acceptable to Company, certifying that it has delivered to Company all such Confidential Information, or, if requested by Company in writing, Contractor shall destroy all such Confidential Information and deliver to Company a certificate, in a form reasonably acceptable to Company, certifying that it has destroyed such Confidential Information.

29.8 Contractor shall ensure that Subcontractors comply with Contractor's obligations set forth in this Article 29.

29.9 The breach of any of the conditions contained in this Article 29 will be deemed to be a material breach of this Agreement.

29.10 The terms of this Article 29 shall survive the expiration or any termination of this Agreement.

29.11 This Agreement constitutes the entire agreement and supersedes all prior agreements and understandings between the Parties with respect to matters related to confidentiality.

**ARTICLE 30**  
**INTELLECTUAL PROPERTY**

[REDACTED]

[REDACTED]

[REDACTED]

30.4 Reserved

30.5 Reserved

[REDACTED]

[REDACTED]

**ARTICLE 31**  
**ASSIGNMENT; CHANGE OF CONTROL**

31.1

[REDACTED]

31.2

[REDACTED]

31.3 Reserved.

31.4

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

31.5

[REDACTED]

**ARTICLE 32**  
**FORCE MAJEURE**

32.1

[REDACTED]

32.2

[REDACTED]

32.3

[REDACTED]

[REDACTED]

32.4

[REDACTED]

**ARTICLE 33**  
**DEFAULT AND TERMINATION**

33.1 Termination by Company for Cause

(a) Company may, without prejudice to any other right or remedy that it may have against Contractor:

(i) in the event that Contractor:

[REDACTED]

[REDACTED]

[REDACTED]

or warranties under this Agreement and has not commenced to cure

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



[REDACTED]

[REDACTED]

**33.2 Termination by Contractor for Cause**

Should Company fail to make any payment when due to Contractor pursuant to this Agreement (other than a reasonably disputed payment) and Company does not make such payment within [REDACTED] after Notice by Contractor that such payment is past due, Contractor may, without prejudice to any other right or remedy that it may have against Company, terminate this Agreement. Should Contractor so terminate this Agreement, it shall be compensated as provided in and subject to the terms and conditions of Article 33.6.

**33.3 Remedies Following Termination by Company for Cause.**

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

33.7 Reserved.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**ARTICLE 34**  
**BANKRUPTCY, INSOLVENCY AND RECEIVERSHIP**

34.1

[REDACTED]

34.2

[REDACTED]

[REDACTED]

34.3

[REDACTED]

**ARTICLE 35**  
**SUSPENSION**

35.1

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

35.7

[REDACTED]

**ARTICLE 36**  
**LABOUR RELATIONS**

36.1 Contractor acknowledges that some or all of Company's Other Contractors and their Subcontractors may be union or non-union and that Company requires Contractor to ensure that labour peace shall be maintained. Contractor shall take all necessary precautions to avoid labour disputes and to minimize the disruption in the event of any dispute.

36.2 Contractor confirms that it and its Subcontractors, if unionized, have written agreements with the unions representing the workers employed by them that include provisions that non-affiliation rights in any collective agreement or pursuant to any statutory right will not be exercised in connection with the Work.

[REDACTED]

[REDACTED]

[REDACTED]

**ARTICLE 37**  
**NOTICES**

37.1 Unless otherwise specified in this Agreement, any Notice given or made pursuant to this Agreement shall:

- (a) be in writing;
- (b) be marked to the attention of the Contractor's Representative, in the case of Contractor, or to the Project Director, in the case of Company;
- (c) where given by Company, be signed or authorized by either the Project Director, an officer, a director or company secretary of Company, or a duly authorized representative of Company; and
- (d) where given by Contractor, be signed or authorized by either Contractor's Representative, an officer, a director or company secretary of Contractor, or a duly authorized representative of Contractor.



37.2 A Notice will be taken to be duly given:

(a) in the case of delivery by hand, when delivered;

(b) in the case of delivery by post, ten (10) Business Days after the date of posting (if posted to an address in the same country) or twenty (20) Business Days after the date of posting (if posted to an address in another country);

(c) in the case of delivery by email, upon confirmation of delivery of such email in the form of a “read receipt”.

37.3 Any Notice given or made under this Agreement shall be delivered to the intended recipient by hand, post or email to the addresses below or the addresses last notified by the intended recipient to the sender pursuant to Article 37.7:

(a) to Company:

Nova Scotia Power Inc.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Attention:

E-mail:

With a copy to:

Attention: Project Director

E-mail:

(b) to Contractor:

Attention:

E-mail:

37.4 Reserved

37.5 Any technical communications pertaining to the Work shall be between Contractor's Representative and Company Representative. Such representative of each Party shall, subject to the terms of this Agreement, be authorized to act on behalf of such Party in all technical matters concerning the Work but not to commit or bind a Party to a Change or amendment to this Agreement.

37.6 Except where expressly provided otherwise in this Agreement, verbal communications will not constitute formal communication or Notice under this Agreement and neither Party has any obligation to act on any verbal communication or instruction unless and until it is confirmed in writing.

37.7 A Party may, from time to time, give Notice to the other Party of any change to its address in the manner specified in Article 37.2.

**ARTICLE 38**  
**ENTIRETY OF AGREEMENT, NON WAIVER**

38.1 This Agreement, as executed by authorized representatives of Company and Contractor, constitutes the entire agreement between the Parties with respect to the matters dealt with herein. This Agreement replaces and supersedes all prior agreements, documents, writings and verbal understandings between the Parties in respect of the Work and there are no oral or written understandings, representations or commitments of any kind, express or implied, which are not expressly set forth herein.

38.2 No modification of this Agreement by Contractor or Company, either before or after the execution of this Agreement, shall be of any force or effect unless such modification is in writing, is expressly stated to be a modification of this Agreement and is signed by duly authorized representatives of each of the Parties, with the exception of Exhibits where changes to same may be issued solely by Company.

38.3 No waiver of any provision of this Agreement shall be of any force unless such waiver is in writing, is expressly stated to be a waiver of a specified provision of this Agreement and is signed by the Party to be bound thereby. Either Party's waiver of any breach of, or failure to enforce, any of the covenants, conditions or other provisions of this Agreement, at any time, shall not in any way affect or limit that Party's right thereafter to enforce or compel strict compliance with every covenant, condition or other provision hereof.

**ARTICLE 39**  
**SEVERABILITY**

39.1 The illegality or unenforceability of any provision of this Agreement shall in no way affect the legality or enforceability of any other provision hereof. Any illegal or unenforceable provision shall be deemed severed from this Agreement and the remainder of this Agreement shall be construed and enforced as if this Agreement did not contain such illegal or unenforceable provision.

**ARTICLE 40**  
**SURVIVAL OF PROVISIONS**

40.1

[REDACTED]

**ARTICLE 41**  
**DISPUTE RESOLUTION**

41.1 If any dispute, controversy, claim, question or difference of opinion arises between the Parties under this Agreement including the interpretation, enforceability, performance, breach, termination or validity of this Agreement ("Dispute"), the Party raising the Dispute shall give Notice to the other Party in writing

[REDACTED]

All Disputes will be addressed in accordance with this Article 41.

41.2 Within [REDACTED] Parties shall, acting in good faith and a commercially reasonable manner, attempt to resolve the Dispute in the following manner:

(a) At a meeting of the senior project managers for each of Company and Contractor; and

[REDACTED]

(b) if not resolved by the senior project managers, representative vice presidents for each of Company and Contractor will meet [REDACTED]

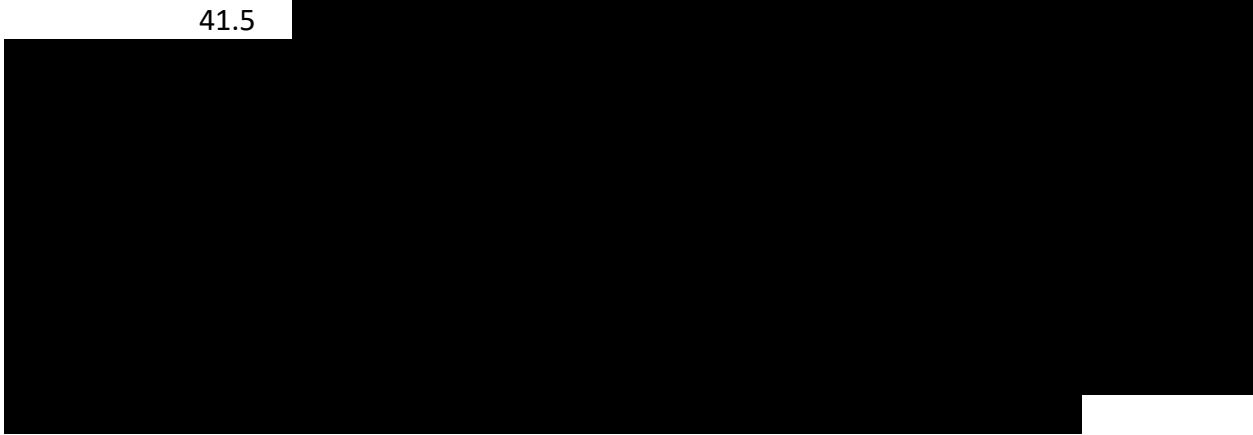
41.3 If the Dispute is not resolved by the Parties within [REDACTED], the Parties agree to submit the dispute to final and binding arbitration administered by the International Chamber of Commerce ("ICC") in accordance with its Rules of Arbitration then in effect ("Rules"), except as modified herein.

[REDACTED]

41.4

[REDACTED]

41.5



41.6



**ARTICLE 42**  
**GOVERNING LAW AND JURISDICTION**

42.1 This Agreement shall be construed and the relations between the Parties determined in accordance with the Applicable Laws of Nova Scotia and Canada, including any limitation periods, and reference to such Applicable Laws shall not, by application of conflict of laws rules or otherwise, require the application of the Applicable Laws in force in any jurisdiction other than Nova Scotia.

42.2 Any legal action or proceeding to compel arbitration or for provisional or other relief in aid of arbitration with respect to this Agreement and any action for enforcement of any arbitral award rendered hereunder shall be brought in the courts of the Province of Nova Scotia or the federal courts of Canada, and, by execution and delivery of this Agreement, each Party hereby accepts for itself and in respect of its property, generally and unconditionally, the non-exclusive jurisdiction of the aforesaid courts, except that any arbitral award rendered pursuant to this Article 42 may be entered and enforced in any court having jurisdiction. Contractor irrevocably designates and appoints [\_\_\_] as its authorized agent to receive for and on its behalf service of process arising out of any of the aforementioned courts in any such action or proceeding. In addition, each Party irrevocably consents to the service of process of any of the aforementioned courts in any such action or proceeding by the mailing of copies thereof by registered or certified mail, postage prepaid, to such Party at its address as specified

in Article 37. Each Party hereby irrevocably waives any objection which it may now or hereafter have to the laying of venue of any of the aforesaid actions or proceedings arising out of or in connection with this Agreement brought in the courts referred to above and hereby further irrevocably waives and agrees not to plead or claim in any such court that any such action or proceeding brought in any such court has been brought in an inconvenient forum.

**ARTICLE 43**  
**COMPLIANCE WITH PROJECT DOCUMENTS, ETC.**

43.1 Contractor hereby acknowledges that it has received and reviewed the Project Documents. Contractor agrees to comply with all conditions, requirements and provisions of the Project Documents which relate to the scope of the Work or otherwise to the performance of Contractor's obligations hereunder. Contractor shall not, for the avoidance of doubt, be required to comply with provisions of the Project Documents which are inapplicable to the Work or Contractor's obligations.

43.2 From time to time following the Effective Date, Company may by Notice to Contractor, designate agreements or documents relating to the development, construction, financing or operation of the Project as Additional Project Documents and promptly provide copies of such documents to Contractor. In addition, after the Effective Date, to the extent that Company becomes aware of a material change in the terms of any existing Project Document with which Contractor will be required to comply (a "Change in Project Document"), Company shall provide Notice to Contractor of such change.

43.3 To the extent compliance with the requirements of any Additional Project Document or any Change in Project Document is inconsistent with Contractor's existing obligations under this Agreement, would not have been reasonably foreseeable by a contractor acting in accordance with the Standards of a Prudent Contractor and adversely affects Contractor's cost and/or time to perform the Work, Contractor shall be entitled to make a claim for a Change Order in respect of the same pursuant to Article 27.

**ARTICLE 44**  
**LIENS AND CLAIMS**

44.1 Reserved.

44.2 To the extent payment has been made by Company in accordance with Article 13 and except for liens or encumbrances created with the prior written Approval of Company voluntarily in favour of financial organizations in connection with Contractor's

obtaining financing for the performance of the Work, Contractor shall keep Contractor's Items, Company's property, each System Site and the Work free and clear of all liens, charges, claims, encumbrances, assessments or attachments suffered, created, or committed by any of Contractor Group and shall prevent the imposition of any liens, charges, claims, encumbrances, assessments or attachments by or on behalf of any third party against the Work and Company's property (including any System Site), wherever located, or any portion thereof and any liens or attachments which nevertheless are imposed shall be promptly vacated and removed from title by Contractor, at Contractor's sole cost, and Contractor shall indemnify, defend and hold the Company Indemnified Parties harmless from and against the same. If Contractor does not promptly, and in any event within [REDACTED] satisfy or discharge such nonpermitted lien(s) or attachments (or, where permitted, fails to provide a bond in lieu thereof), Company shall have the right, at its option, to pay or discharge such lien(s) or attachments and Contractor shall, [REDACTED], reimburse Company for all reasonable out of pocket costs actually incurred by Company to discharge such lien(s) or attachments, including administrative costs, reasonable attorneys' fees and other expenses.

44.3 Notwithstanding the efforts of Contractor hereunder, if Company suffers costs or expenses or becomes liable for payment as a result of the imposition of such liens or attachments, then without prejudice to any other rights or remedies available to Company, Company shall have the right to withhold and set-off an amount equal to any such costs, expenses or payments incurred or made by Company from any payments due to Contractor hereunder.

**ARTICLE 45**  
**ENUREMENT**

45.1 This Agreement shall be binding upon and enure to the benefit of the Parties, their permitted assignees and successors.

**ARTICLE 46**  
**COUNTERPARTS**

46.1 This Agreement may be executed in any number of counterparts and any Party may transmit by email in portable document format, or by other means of electronic signature (such as *DocuSign*) to the other Party a copy of this Agreement executed by that Party, the receipt of which shall have the same force and effect as if the original thereof had in fact been delivered at the same time.

46.2 Any original, electronic format or photocopy of this Agreement bearing one or more signatures on behalf of a Party shall be admissible against that Party in any legal proceeding as evidence of the execution and delivery of this Agreement by that Party and without the requirement to produce an executed original of this Agreement.

46.3 Each person signing this Agreement as an authorized officer of a Party hereby represents and warrants that he or she is duly authorized to sign this Agreement for that Party and that this Agreement will, upon having been so executed, be binding on that Party in accordance with its terms.



Executed as an Agreement:

**For and on behalf of NOVA SCOTIA POWER INC.**

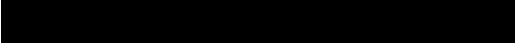
\_\_\_\_\_  
Signature of Authorized Officer

\_\_\_\_\_  
*Signature of Authorized Officer*

\_\_\_\_\_  
Name of Authorized Officer

\_\_\_\_\_  
*Name of Authorized Officer*

**For and on behalf of**



\_\_\_\_\_  
Signature of Authorized Officer

\_\_\_\_\_  
*Signature of Authorized Officer*

\_\_\_\_\_  
Name of Authorized Officer

\_\_\_\_\_  
*Name of Authorized Officer*

































































































































































































































**Exhibit 2  
Compensation**

[Attached]

**EXHIBIT 2**

**COMPENSATION**

**TABLE OF CONTENTS**

**1.0 GENERAL .....3**  
**2.0 CHANGES TO THE WORK; EQUITABLE ADJUSTMENTS .....4**

/



**1.0 GENERAL**

**1.1** In consideration for the Price, Contractor shall perform the Work, in accordance with the provisions of the Agreement. Subject to any additional compensation payable pursuant to a Change Order entered into by Contractor and Company to reflect an Equitable Adjustment or Change on a lump sum or reimbursable basis in accordance with Article 27 of the Agreement, the amount of compensation payable to Contractor for the Work is limited to the lump sum Price set forth in Appendix A.

**1.2** The unit pricing, lump sum prices, cost reimbursable estimates, labour rates and equipment rates set out in Appendix A for the Work shall be fully inclusive of all direct and indirect amounts and shall be deemed to include, without limitation:

- (i) Contractor's costs for all matters relating to and associated with the performance of Work including Contractor's Items, Deliverables, Drawings and surface and subsurface System Site conditions (other than System Site conditions constituting an Equitable Adjustment Event);
- (ii) Contractor's corporate staff activities or any other corporate activities associated with the Work, or any part thereof;
- (iii) All of Contractor's costs for Personnel and Taxes (except as set forth in Article 13.13(a) of the Agreement) including all costs and charges associated with overtime, holiday or premium hours. Contractor shall be responsible for all Taxes (except as set forth in Article 13.13(a), Article 14.10 and Article 27 of the Agreement), fees, dues, or any other charges, that may be levied by Authorities, related to the Work;
- (iv) Contractor's costs associated with premiums, renewals or liabilities which Contractor is obligated to pay or bear liability for in accordance with the insurance and indemnity provisions stated in the Agreement; and
- (v) Contractor's overhead and profit.

**1.3** None of the Price, the force account rates, unit pricing, the cost reimbursable estimates, the lump sum prices, the labour rates or the equipment rates shall be subject to escalation for inflation or any other reason, and the Price, prices, amounts and rates shall only be adjusted in accordance with the terms of the Agreement.

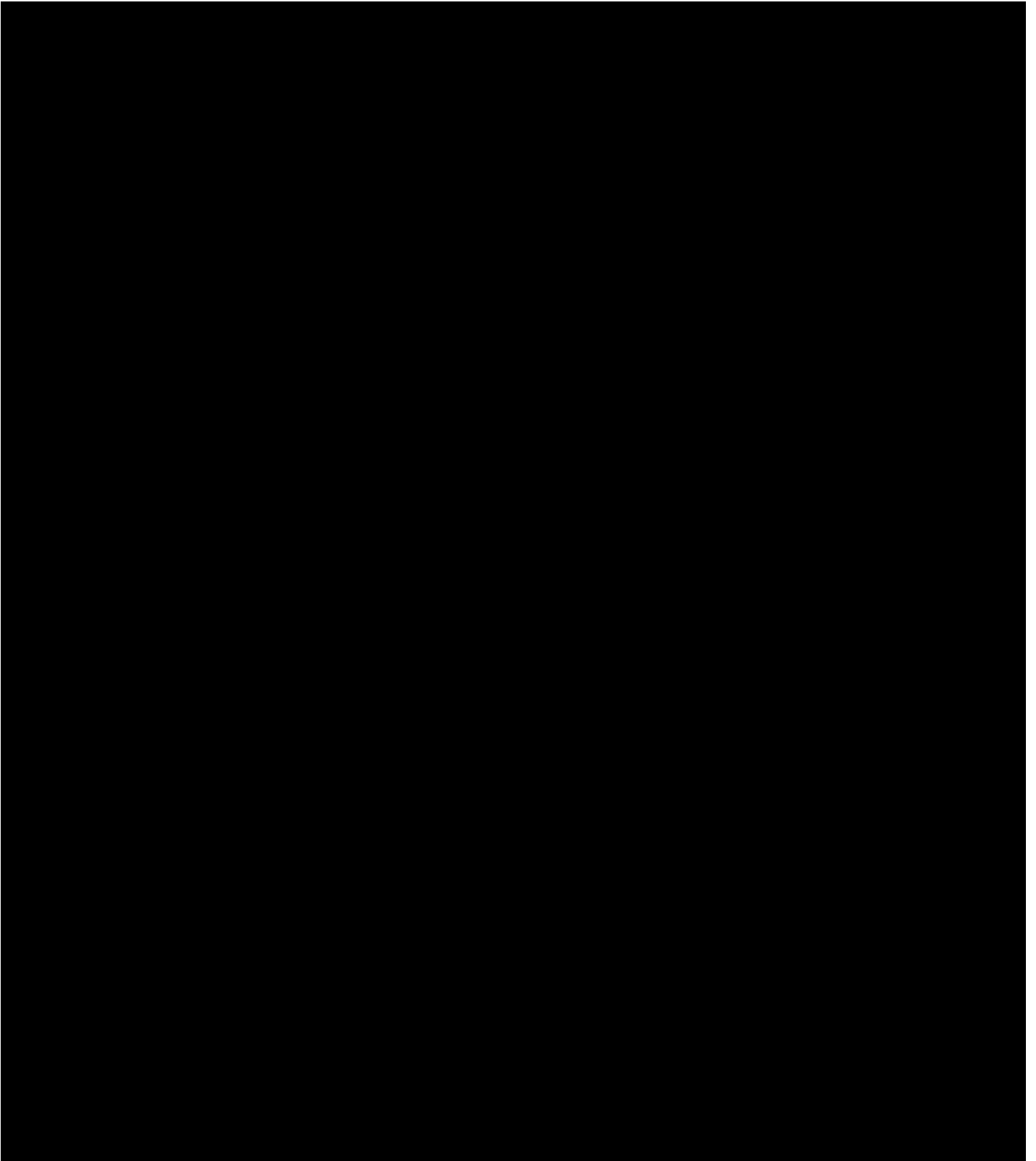
**1.4** All downtime required for maintenance, or caused by a breakdown or loss of use of or damage to Contractor's facilities and equipment, Contractor's Items or Contractor

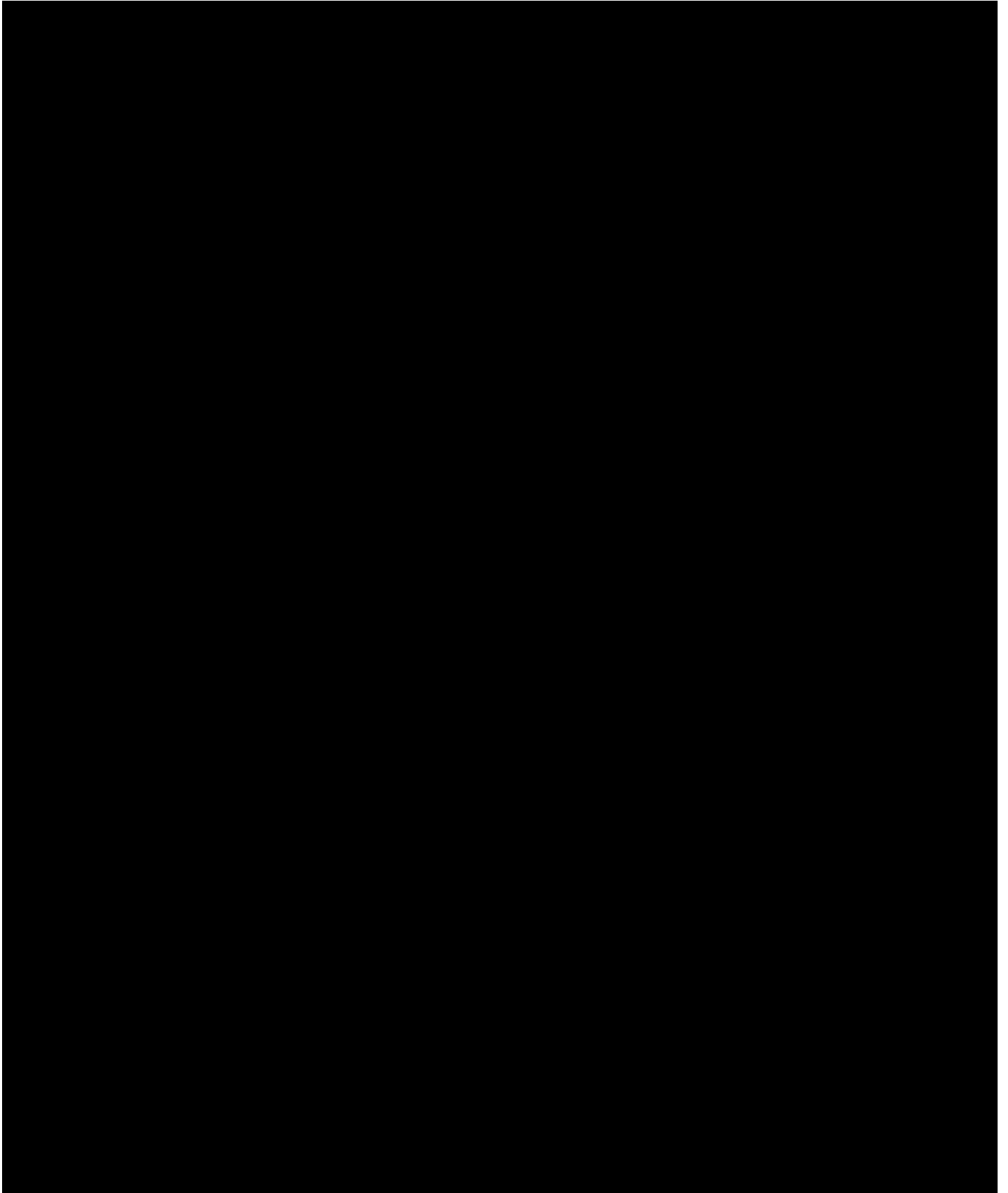
Group's property shall be deemed fully included in the applicable unit pricing or lump sum price.

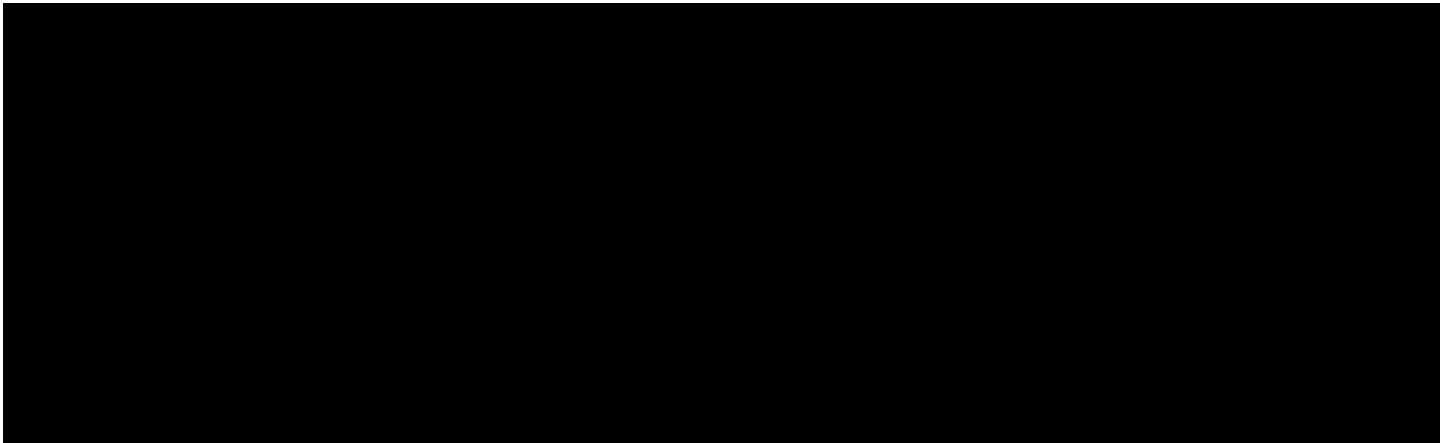
- 1.5 The Price, force account rate, unit pricing, cost reimbursable amounts, lump sum prices, labour rates and equipment rates shall be in Canadian Dollars (CAD).
- 1.6 Invoices shall be issued by Contractor on a monthly basis in accordance with Article 13 of the Agreement, this Exhibit 2 – Compensation, and Exhibit 4 – Coordination Procedures.
- 1.7 For the purposes of this Exhibit 2 – Compensation, "UOM" shall mean unit of measure.
- 1.8 For the purposes of this Exhibit 2 – Compensation, "unit pricing" shall be understood to include "per day rate" as set out in Appendix A.
- 1.9 For Changes and Equitable Adjustments, the unit prices, cost reimbursable amounts, force account rates and lump sum prices, and labour rates outlined in this Exhibit 2 – Compensation will apply for both increases and decreases in the Work.

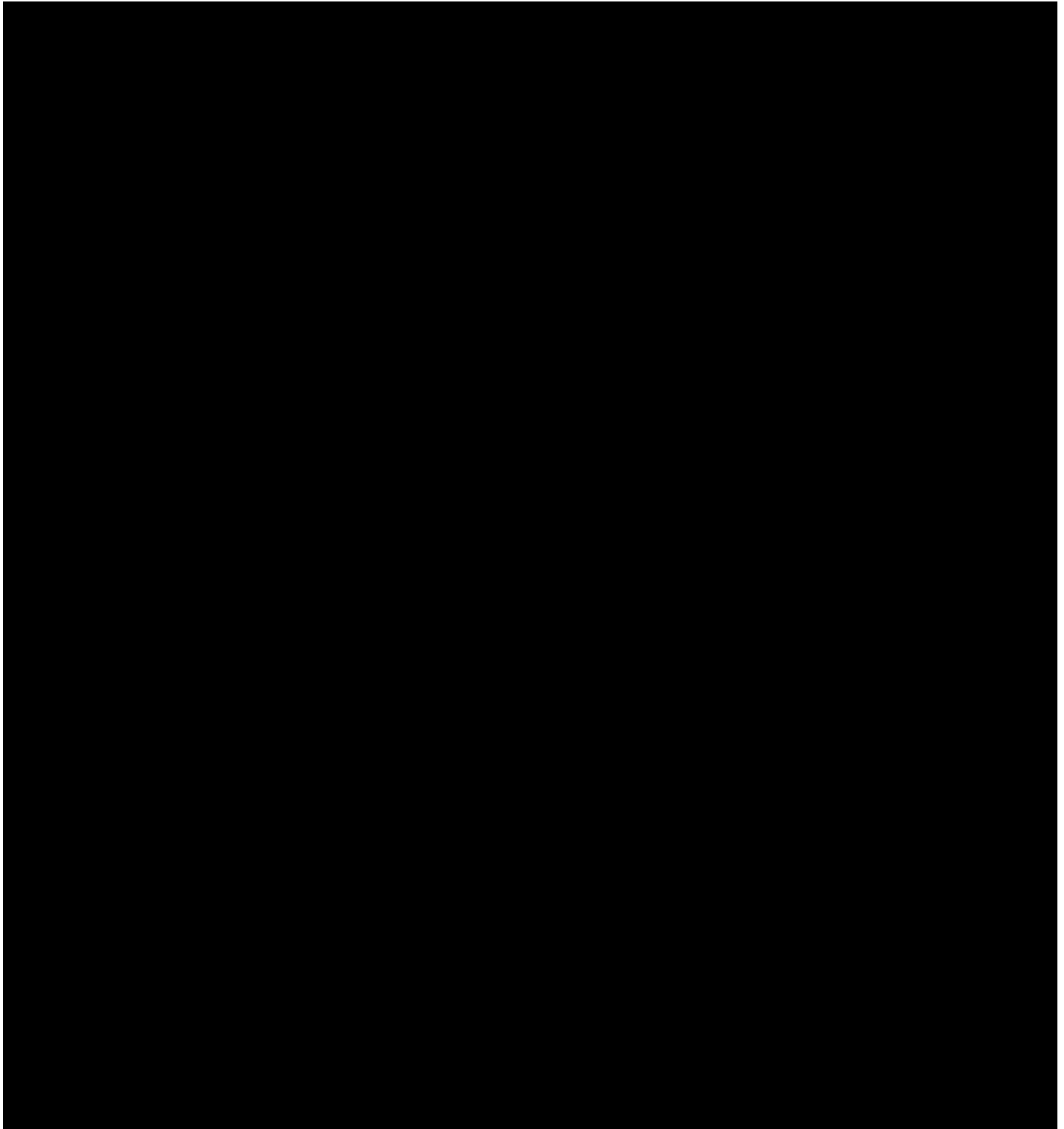
2.0 [REDACTED]

[REDACTED]









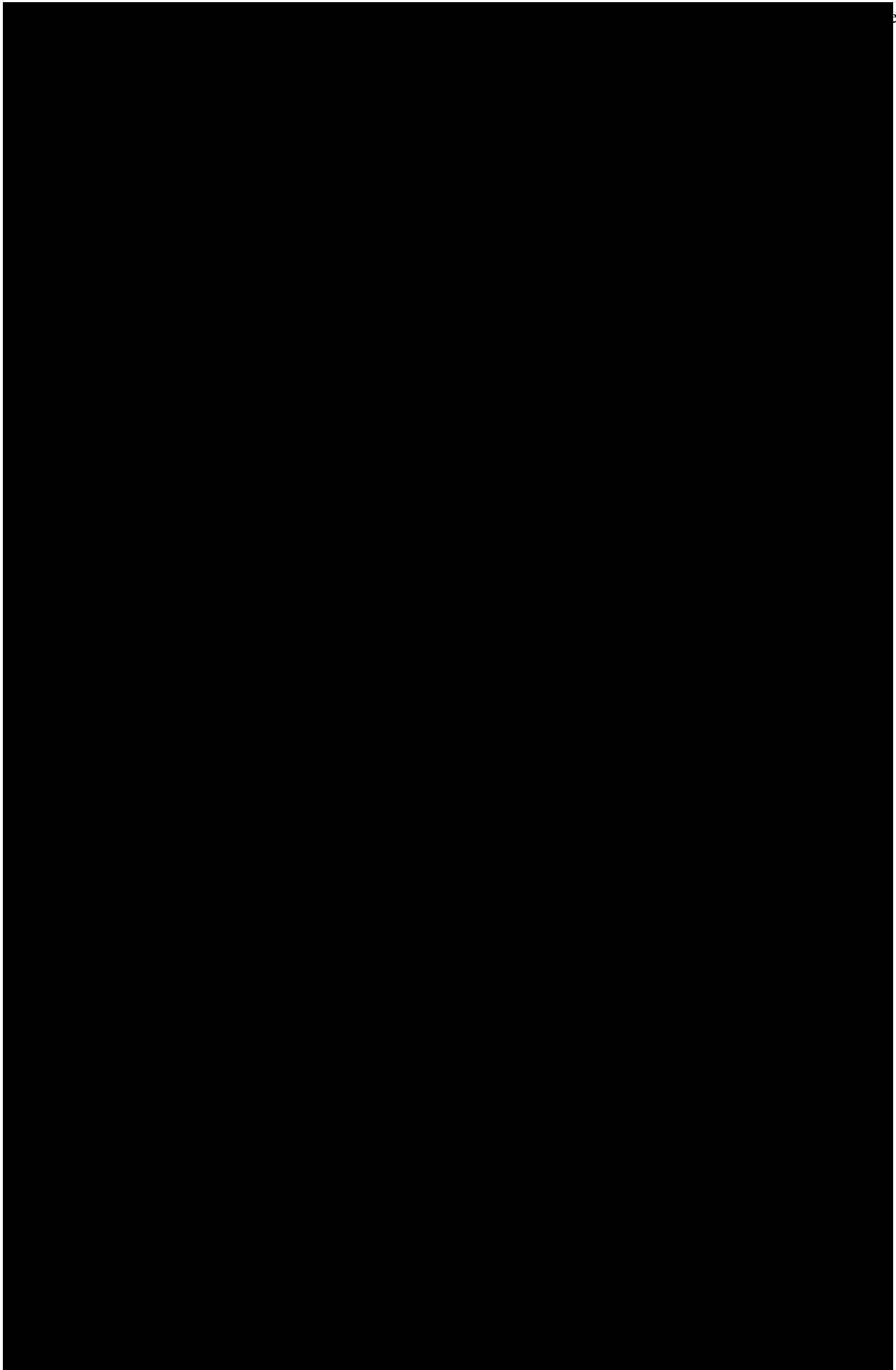
**Exhibit 3**  
**Major Subcontractors**

[Attached]

**Schedule 13 – Subcontractors**

Subcontractor	Scope
[REDACTED]	Battery Enclosure Supply
[REDACTED]	Medium Voltage Power Stations
[REDACTED]	Controls Equipment Supply and Commissioning
[REDACTED]	Balance of Plant Main Contractor







**Exhibit 4**  
**Coordination Procedures**

[To be finalized]

**Exhibit 5**  
**Company Supplied Data**

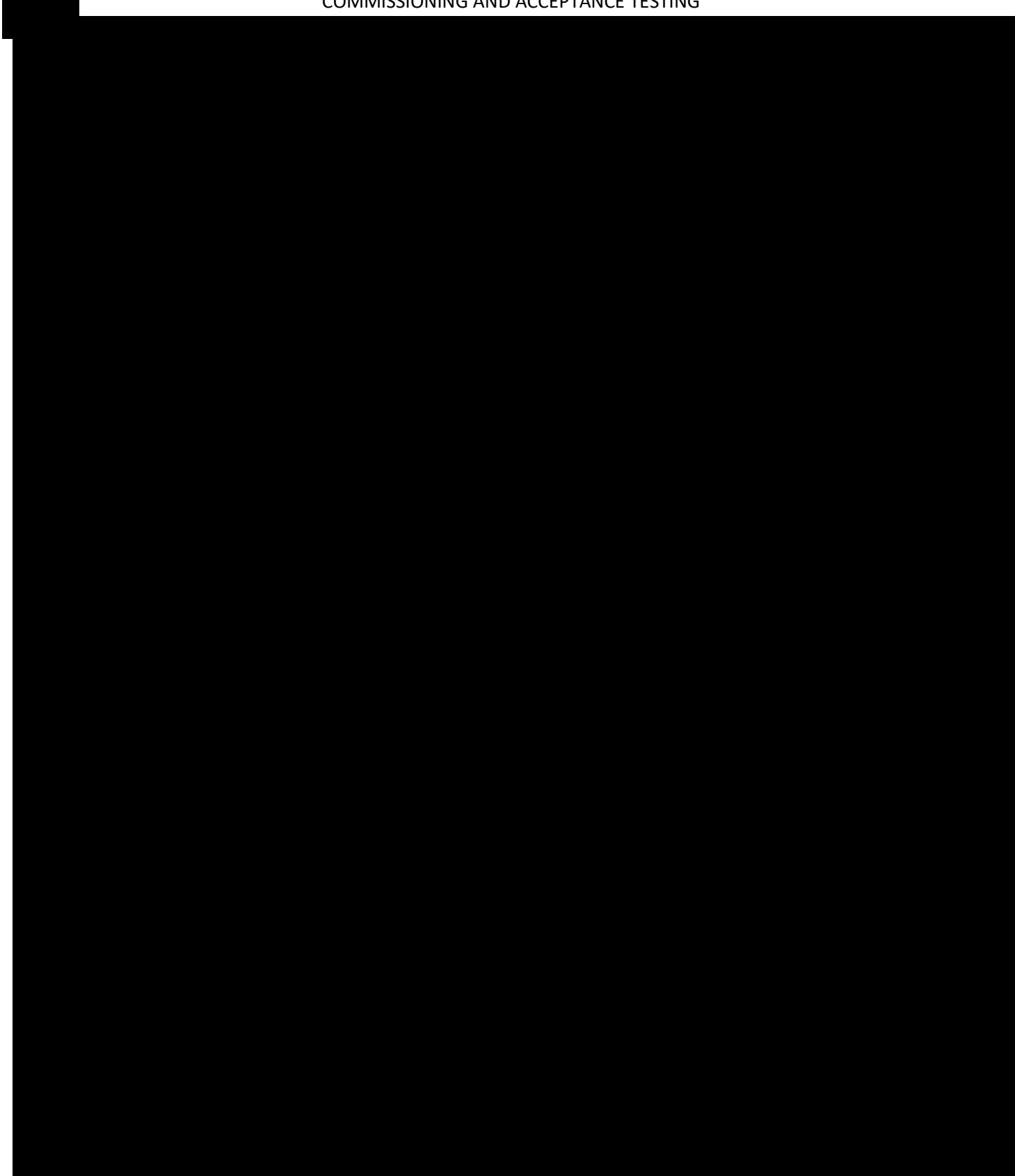
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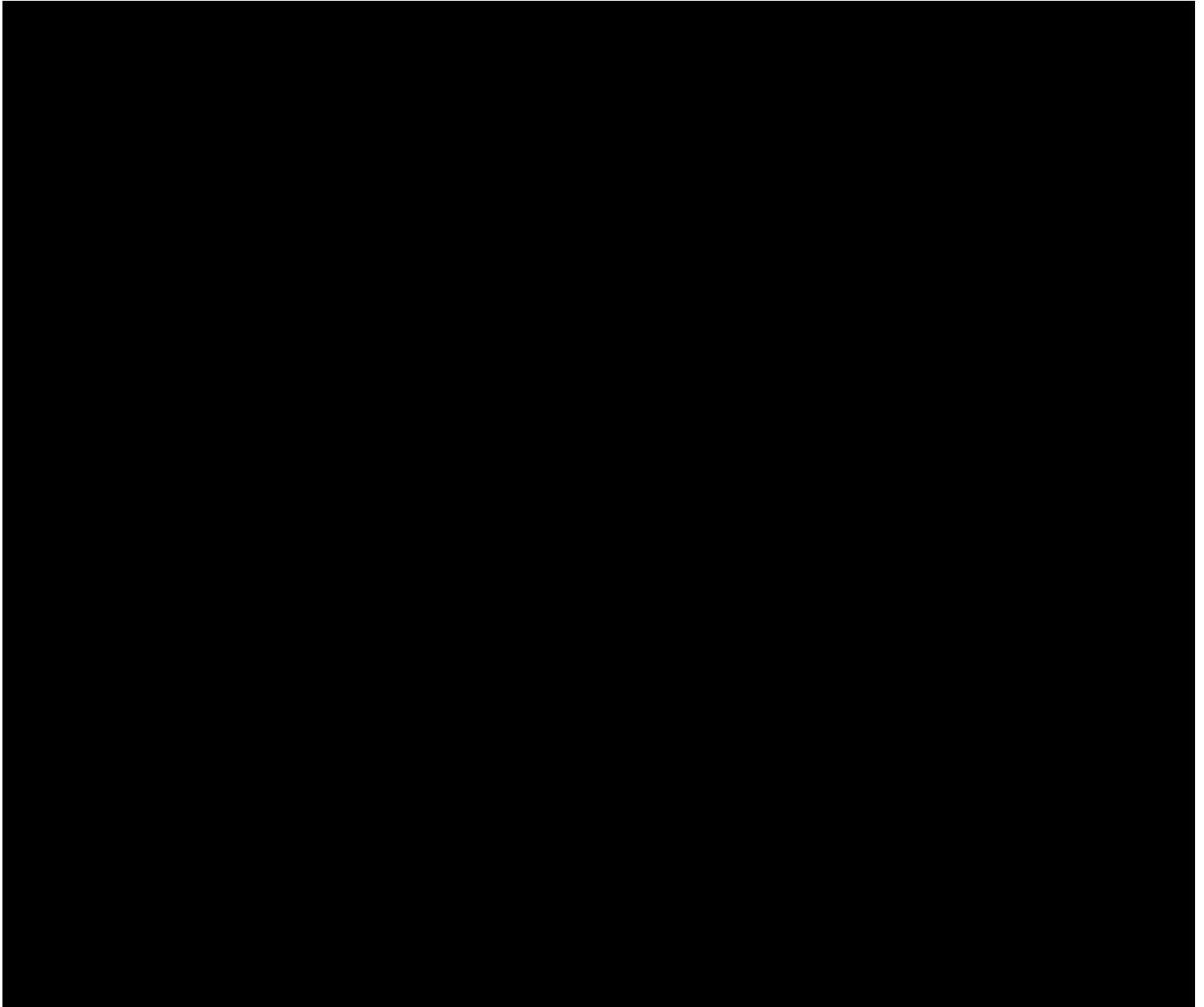
**Exhibit 6**  
**Commissioning and Acceptance Testing**

[Attached]

**EXHIBIT 6**

COMMISSIONING AND ACCEPTANCE TESTING























































































**Exhibit 7**  
**Deliverables List**

[To be finalized]

**Exhibit 8**  
**Nova Scotia Diversity and Inclusion Requirements**

[To be finalized]

**Exhibit 9**  
**Performance Security**

[Attached]



































**Exhibit 10**  
**Declaration of Residency**

[To be finalized]

**Exhibit 11**  
**Payment Milestone Schedule**

[Attached]

**Exhibit 11 - Payment Milestone Schedule**

**Payment Milestones**

Set out below are the Payment Milestones payable by Company in accordance with Article 13 of the Agreement following Contractor meeting the criteria for achievement of each such Payment Milestone set out below. Each Payment Milestone is applied to each System.

Payment Milestone No.	Payment Milestone	Percentage of the System Price of each System	Cumulative%
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

[REDACTED]

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[REDACTED]

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[REDACTED]

[REDACTED]



**Exhibit 12**  
**Form of Construction Lien Statutory Declaration**

[To be finalized]

**Exhibit 13**  
**Reserved**

**Exhibit 14**  
**Company Supplied Permits**

[To be finalized]

**Exhibit 15**  
**Project Documents**

[To be finalized]

**Exhibit 16**  
**Warranty Response Plan**

[To be finalized]



**Exhibit 17**  
**Contractor's Personnel**

[To be finalized]

**Exhibit 18**  
**Project Insurance**

[Attached]

**Exhibit 18 - Project Insurance**

The Contractor shall procure and maintain, or cause to be procured and maintained, in full force and effect the minimum insurance coverages, at its sole expense, set forth in Article 21.1 of the Agreement and that meets the requirements of Article 21 of the Agreement. The construction all risks insurance required to be procured pursuant to Article 21(a) of the Agreement shall be in accordance with the below terms and conditions.

**Parties Qualifying as Insureds:** All owners, all contractors and subcontractors of every tier, and

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[Redacted]	[Redacted]

**Exhibit 19**  
**Consent to Assignment**

[To be finalized]

**Exhibit 20**  
**Health, Safety, and Security Requirements**

[To be finalized]

**Exhibit 21**  
**Environmental Requirements**

[To be finalized]



[REDACTED]

**Exhibit 23**  
**Key Dates**

[Attached]



**Exhibit 24**  
**Quality Requirements**

[To be finalized]

**Exhibit 25**  
**Reserved**

**Exhibit 26**  
**Form of Subcontractor Consent and Agreement**

[To be finalized]

**Exhibit 27**  
**Interim Milestones**

[Attached]

**Exhibit 27 – Interim Milestones**

The following milestones required to be achieved in performance of the Work for each System shall be the “Interim Milestones” as defined in the Agreement.



The Scheduled Interim Milestone Completion Dates for each Interim Milestone shall be as set out in Exhibit 23 – Key Dates.



**Exhibit 28**  
**Liquidated Damages**

[Attached]

Exhibit 28 – Liquidated Damages

[REDACTED]

[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

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[REDACTED]

[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]



**Exhibit 29**  
**Project Schedule**

[Attached]





















**Exhibit 30**  
**Inspection and Test Plan**

[To be finalized]

**Exhibit 31**  
**Major Equipment Warranties**

[To be finalized]



**Exhibit 32**  
**Ethical Standards Requirements**

[To be finalized]

**Exhibit 33**  
**Cybersecurity Requirements**

[To be finalized]

**Exhibit 34**  
**Contractor's Code of Conduct**

[To be finalized]

Schedule 2

LNTP Scope of Work

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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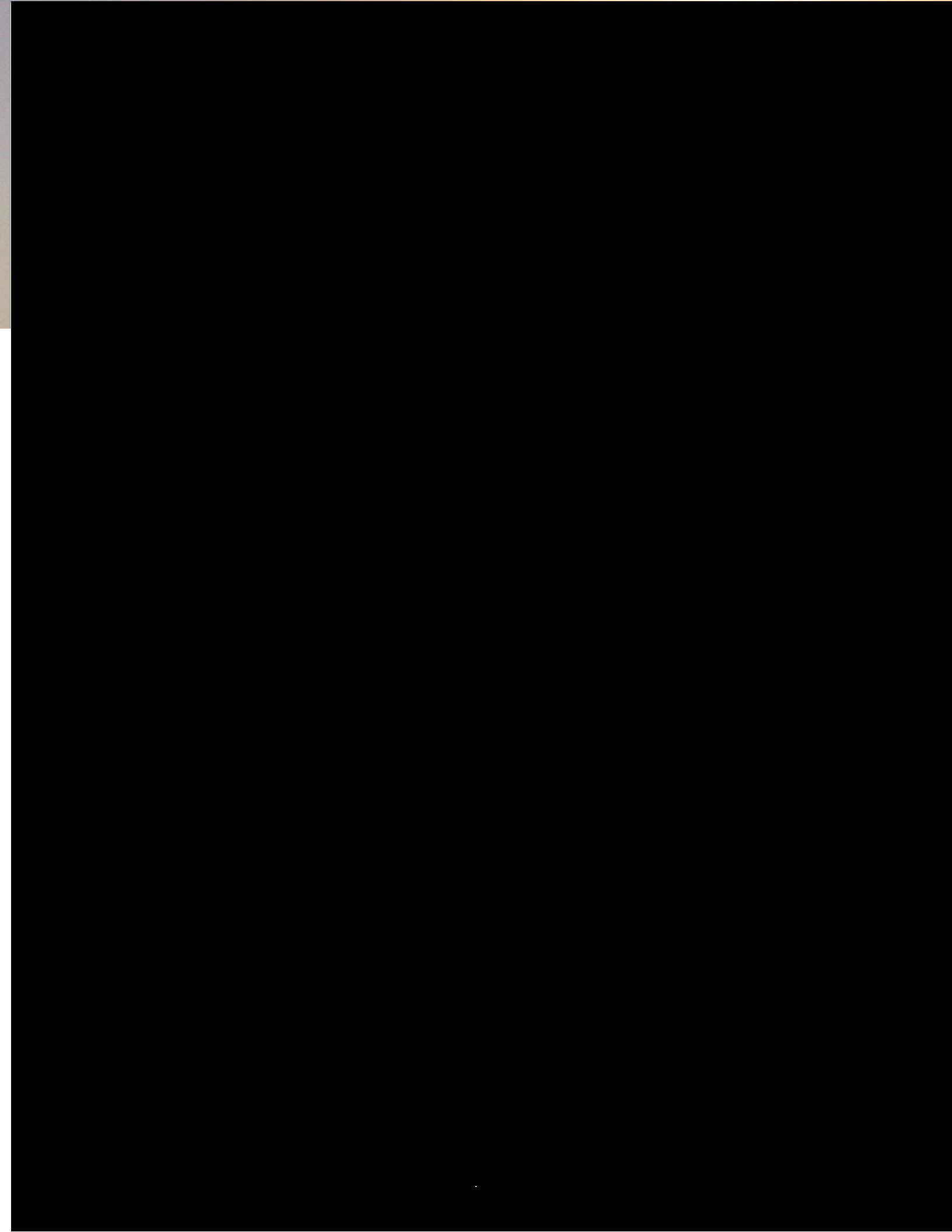
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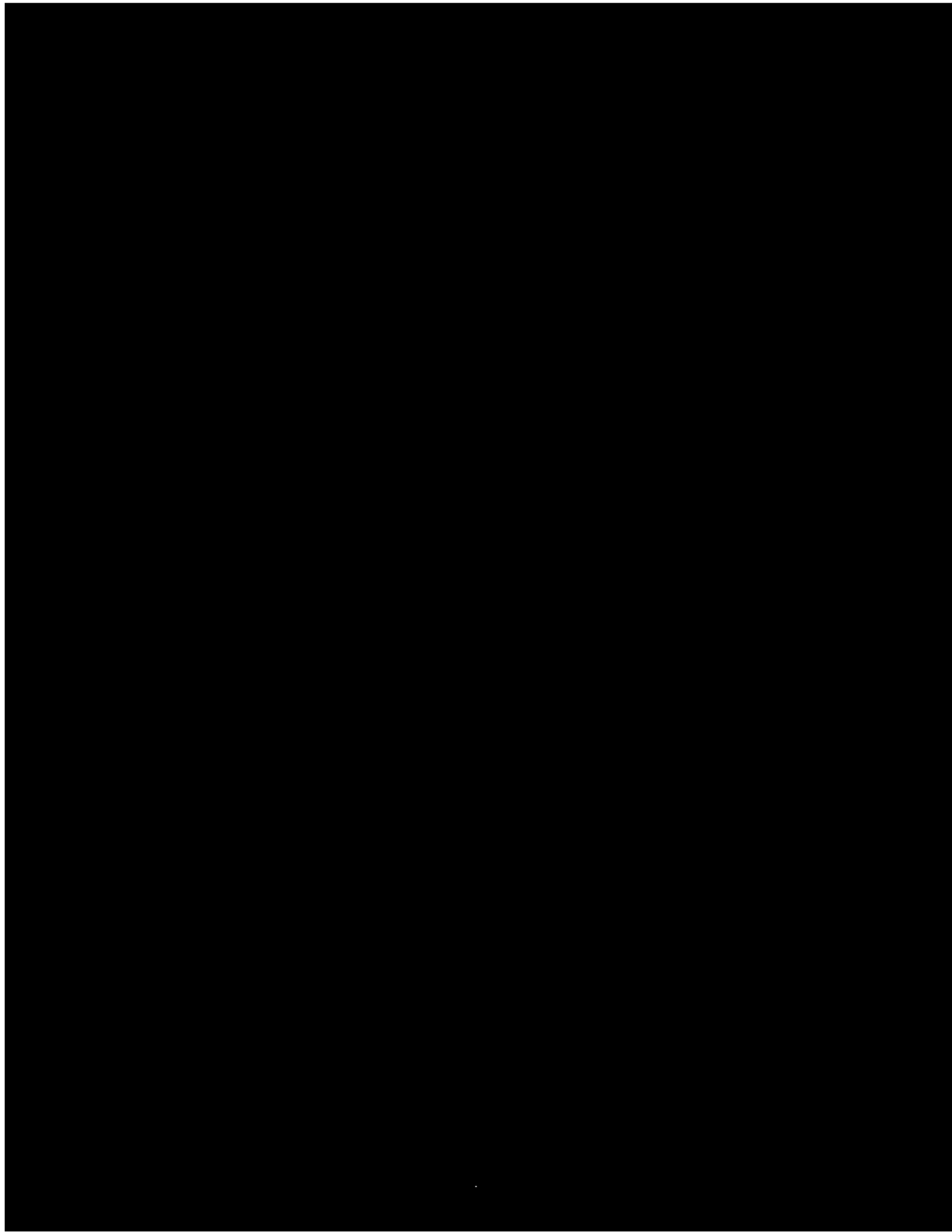
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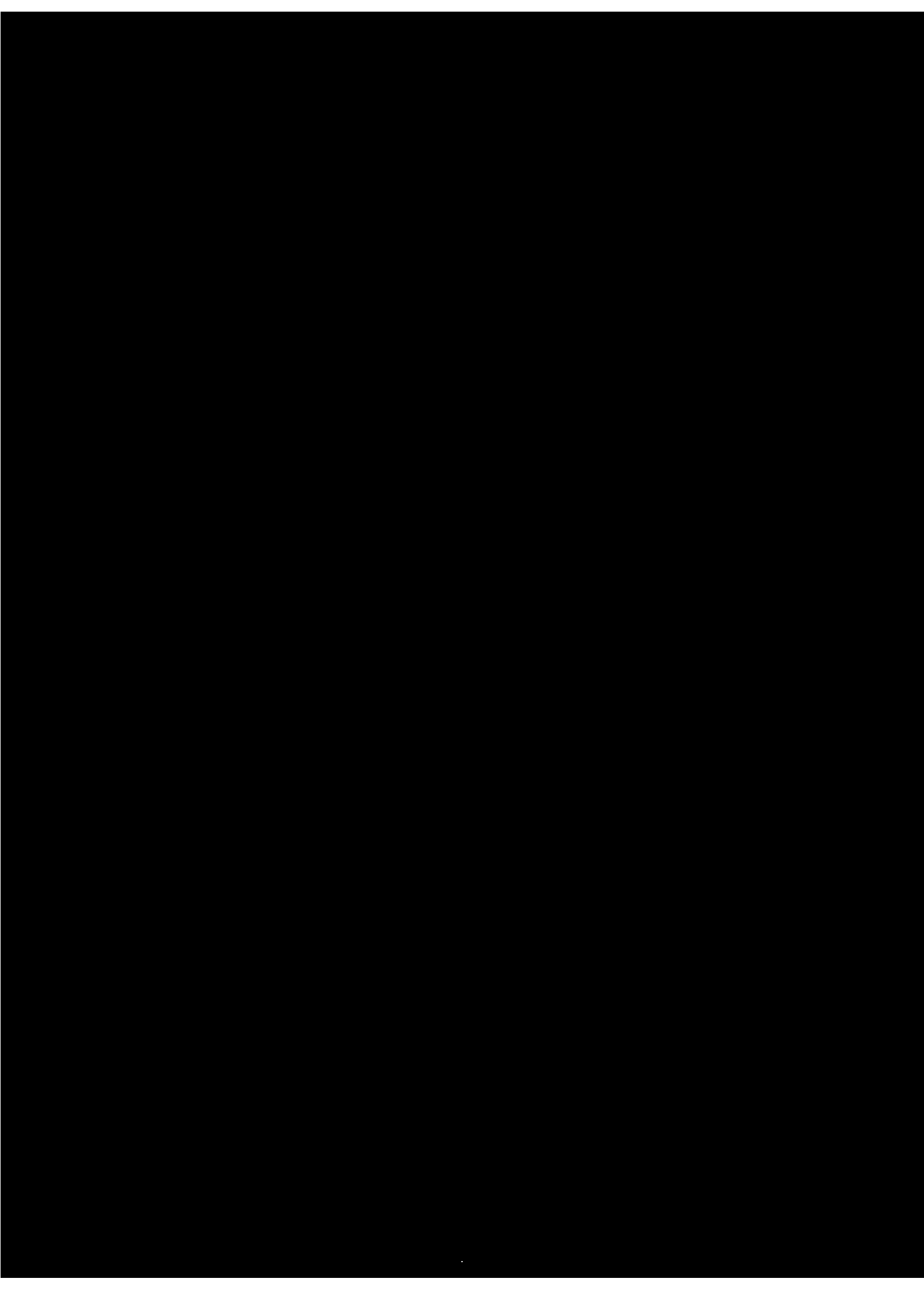
[REDACTED]

Annex A – [REDACTED] Datasheet (BESS Enclosure)

Annex B – [REDACTED] PCS Datasheet

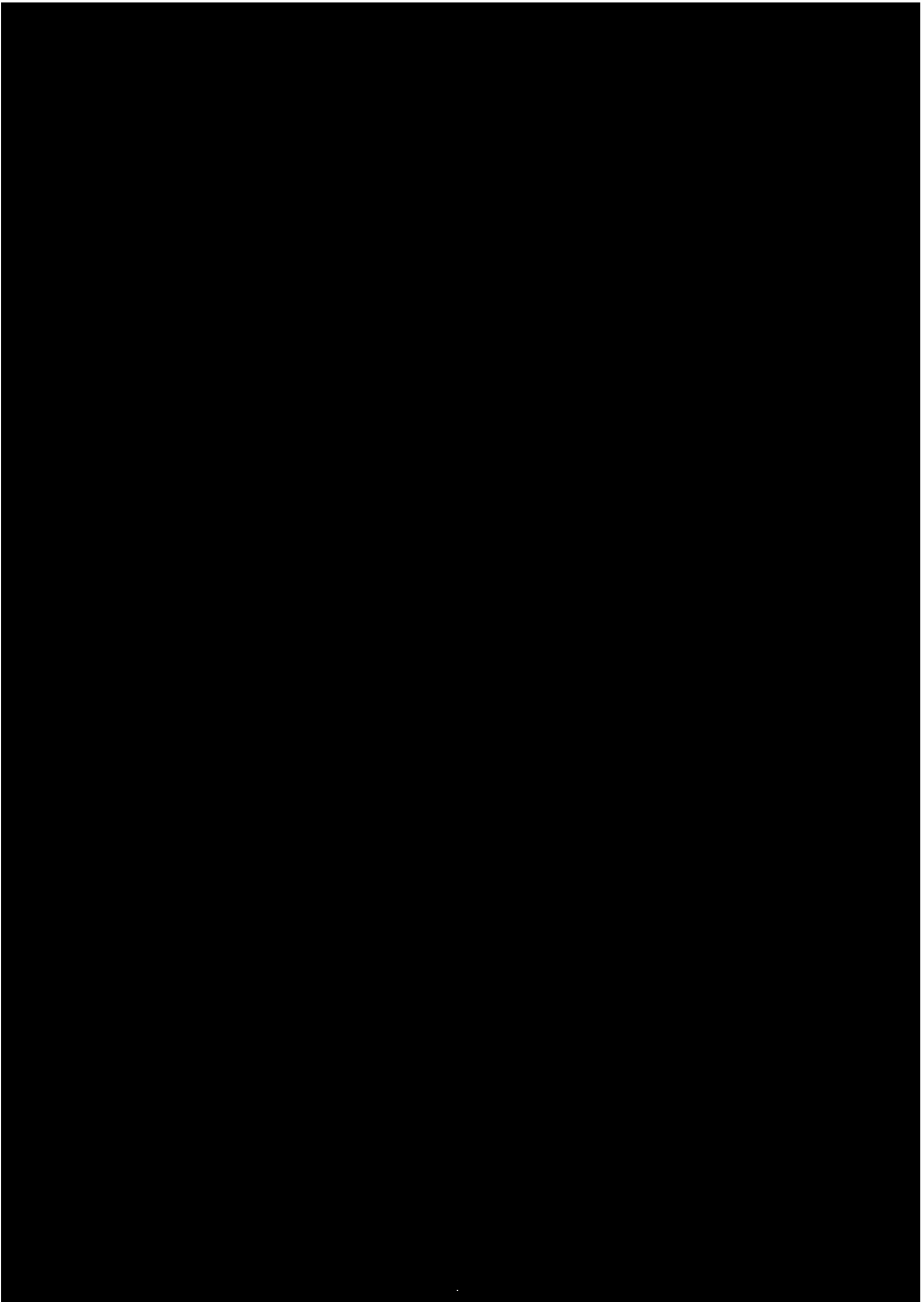


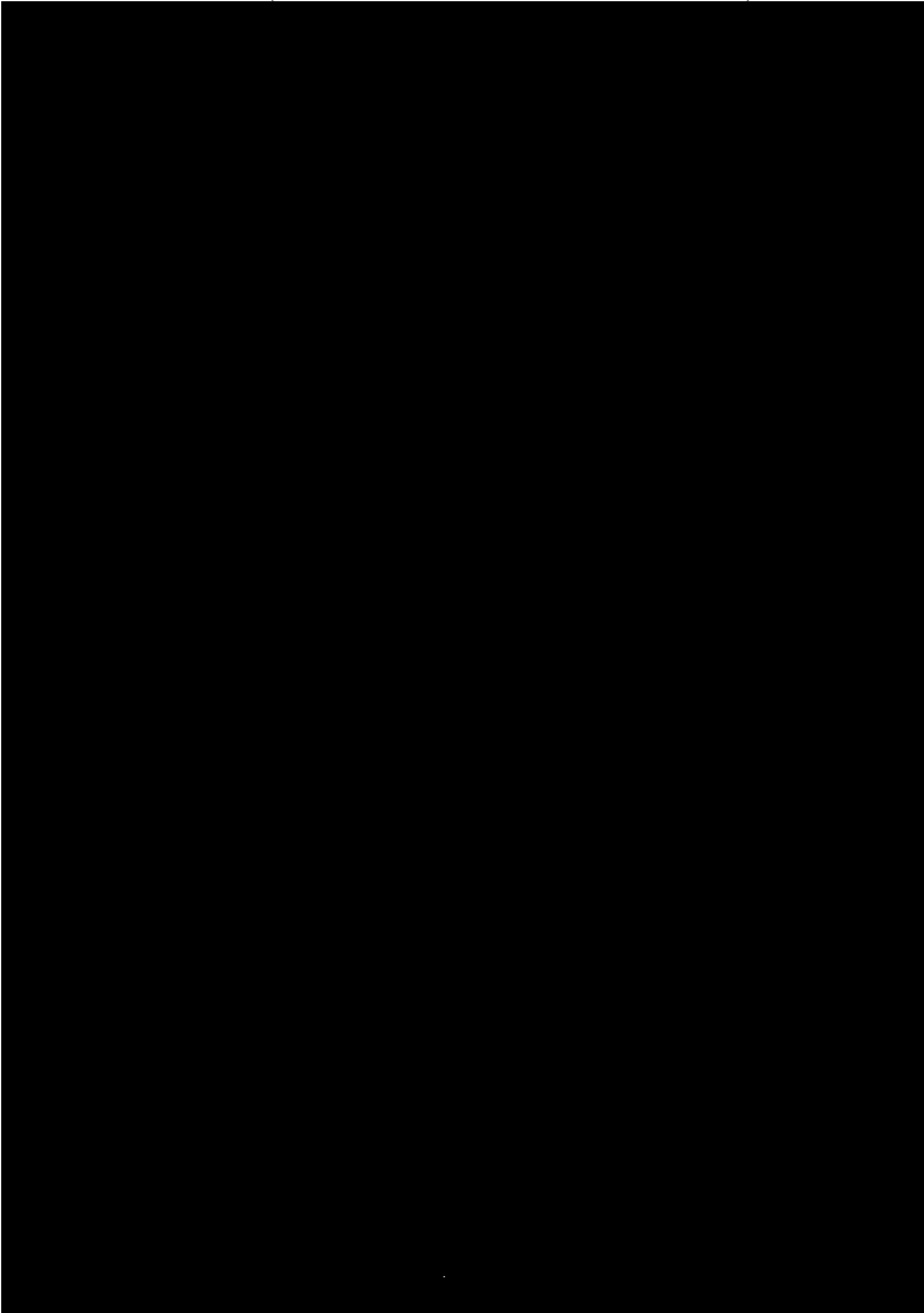












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[REDACTED]

[REDACTED]  
[REDACTED]

**NOVA SCOTIA POWER INCORPORATED**

**and**

**[REDACTED]**

**PURCHASE AGREEMENT  
for  
Power Transformers for Battery Project  
Agreement No. [REDACTED]**

**DATED AS OF June 30, 2023**

**TABLE OF CONTENTS**

1.0 Interpretation ..... 1  
2.0 Seller’s Obligations ..... 5  
3.0 Instructions And Orders Of Engineer..... 7  
4.0 Completion and Delivery ..... 8  
5.0 Title and Risk..... 10  
6.0 Technical Assistance ..... 10  
7.0 Access, Inspection and Testing ..... 11  
8.0 Origin of Goods..... 13  
9.0 Subcontracts ..... 14  
10.0 Liens and Claims ..... 14  
11.0 Performance Security ..... 14  
12.0 Standards of Business Conduct ..... 14  
13.0 Changes ..... 16  
14.0 Compensation and Terms of Payment ..... 16  
15.0 Taxes and Duties..... 18  
16.0 Audit and Records ..... 19  
17.0 Warranties ..... 20  
18.0 Liability and Indemnification ..... 21  
19.0 Insurance ..... 22  
20.0 Intellectual Property and Confidentiality ..... 24  
21.0 Suspension of Work..... 25  
22.0 Force Majeure ..... 25  
23.0 Term of Agreement ..... 26  
24.0 Termination for Default..... 27  
25.0 Termination for Convenience..... 28  
26.0 Dispute Resolution ..... 28  
27.0 General Provisions..... 31

- Schedule A - Scope of Supply & Technical Specification
- Schedule B - Delivery Schedule
- Schedule C - Pricing and Payment
- Schedule D - Performance Standards
- Schedule E - Confidentiality Schedule
- Schedule F - Certificate of Insurance
- Schedule G - Buyer Policies and Procedures
- Schedule H - Cybersecurity Requirements

**PURCHASE AGREEMENT**

**THIS AGREEMENT**

BETWEEN:

**NOVA SCOTIA POWER INCORPORATED**, a company incorporated under the laws of the Province of Nova Scotia and having its head office at the City of Halifax, Nova Scotia, Canada (herein called "**Buyer**")

- and -

**[REDACTED]** a corporation incorporated under the laws of **[REDACTED]** and having its head office at **[REDACTED]** (herein called "**Seller**").

**WHEREAS:**

- A. Buyer has selected Seller to provide the Goods and Work as hereinafter defined; and
- B. the Parties (as hereinafter defined) wish to set out the terms and conditions of the purchase of the Goods and Work by Buyer from Seller;

**NOW THEREFORE**, in consideration of the mutual covenants contained in this Agreement, the Parties, intending to be legally bound, hereby agree as follows:

**1.0 INTERPRETATION**

1.1 **Definitions.** In this Agreement, unless otherwise provided or the context otherwise requires:

**"Affiliate"** means, with respect to any Person, any other Person who, directly or indirectly, Controls, is Controlled by, or is under common Control with, such Person; **"Control"** of a Person means the possession, direct or indirect, of the power to elect or appoint a majority of such Person's board of directors or similar governing body, or to direct or cause the direction of the management, business and/or policies of such Person, whether through ownership of voting shares, by contract or otherwise (and the terms **"Controlled by"** and **"under common Control with"** have correlative meanings);

**"Agreement"** means this purchase agreement between Buyer and Seller, including all Schedules and other documents attached hereto or specifically incorporated herein and all Purchase Orders, as it may be modified, amended, supplemented or restated by written agreement between the Parties;

**"Applicable Laws"** means all laws, statutes, regulations, standards, codes, orders, directives or other rules enacted or issued from time to time by any Governmental Authority having jurisdiction over Seller or Buyer or the activities carried out under this Agreement, including



safety, occupational health, customs and excise, taxation, workers' compensation, labour and environmental protection laws, statutes, regulations, standards, codes, orders, directives and other rules;

**"Business Day"** means a day other than a Saturday, Sunday, or a federal, provincial, or civic holiday within the Province of Nova Scotia;

**"Change Order"** means a change order issued by Buyer pursuant to **Section 13.1**;

**"Claim"** means any and all liabilities, losses, damages, injuries, judgments, settlements, awards, expenses, legal fees on a solicitor-client basis, claims, demands, actions, suits, remedies, debts, proceedings and causes of action whatsoever, without limitation, whether based upon breach of contract, breach of warranty, failure to meet performance guarantees, tort (including negligence), strict liability, equity or any other legal theory;

**"Contractor Information Management System"** means ISNetworld, any successor thereof or any other entity appointed or designated from time to time by Buyer.

**"Contract Price"** means the amount of compensation to be paid by Buyer for the Goods and Work as specified in **Section 14.1** and **Schedule C**;

**"Contract Time"** means the time period within or date by which Seller is required to (i) complete Delivery of the Goods as specified in **Section 4.1** and **Schedule B**, and (ii) fulfill other obligations of Seller under this Agreement;

**"Delivery"** means the time at which Seller has delivered the Goods to the location specified in the Purchase Order;

**"Effective Date"** means the date specified on the cover page of this Agreement, and is the date upon which this Agreement becomes effective;

**"Engineer"** has the meaning given to it in Section 3.2;

**"Encumbrance"** means any mortgage, lien, pledge, judgment, execution, charge, security interest, restriction, claim or encumbrance of any nature whatsoever;

**"Goods"** means the goods to be provided by Seller to Buyer under this Agreement as described in **Schedule A**, including all associated documentation and other deliverables;

**"Governmental Authority"** means any government or government department or agency, municipality, local government authority or council, or other statutory regulatory authority;

**"HST"** means all amounts exigible pursuant to Part IX of the *Excise Tax Act* (Canada), including, for greater certainty, the Taxes commonly referred to as the goods and services tax (GST) and the harmonized sales tax (HST);

**"Notice"** means a written notice or other communication that is required to be delivered in accordance with **Section 27.1**;

“**Party**” means Buyer or Seller, and “**Parties**” means Buyer and Seller;

“**Person**” includes an individual, a partnership, a corporation, a company, a trust, a joint venture, an unincorporated organization, a union, a Governmental Authority and the heirs, executors, administrators or other legal representatives of an individual;

“**Prime Rate**” means the variable rate of interest per annum expressed on the basis of a year of 365 or 366 days, as the case may be, established from time to time by Royal Bank of Canada, or any successor thereto, as its reference rate for the determination of interest rates that it will charge on commercial loans in Canadian dollars made in Canada;

“**Purchase Order**” or “**PO**” means any purchase order form, letter, instruction or other document duly authorized and issued by Buyer to Seller in writing, or by other secure and verifiable means (including electronic data interchange), as Buyer may determine from time to time, for the purpose of allowing for multiple Deliveries of Goods over a specified period of time;

“**Subcontract**” means an agreement entered into between Seller and a Subcontractor in the manner and to the extent permitted under this Agreement.

“**Subcontractor**” means a contractor or supplier to which Buyer has permitted Seller to subcontract a portion of the Work pursuant to the terms of this Agreement;

“**Successful Completion**” happens upon the successful completion of unit assembly and successful manufacturer testing on site for all the units where such assembly and testing meets all the technical specifications set forth in **Schedule A**, as approved by Buyer, including the dew point results, oil processing results, oil analysis results, polarization index, sweep frequency response, transformer turns ratio, winding resistance, control cabinet functional testing and any other industry standard approved by Buyer;

“**Tax**” or “**Taxes**” means any tax, fee, levy, rental, duty (including, for greater certainty, all customs duties, anti-dumping duties and countervailing duties), charge, royalty or similar charge including, for greater certainty, any federal, state, provincial, municipal, local, aboriginal, foreign or other assessment, governmental charge, imposition or tariff wherever imposed, assessed or collected, and whether based on or measured by gross receipts, income, profits, sales, use and occupation or otherwise, and including any income tax, capital gains tax, payroll tax, fuel tax, capital tax, goods and services tax, harmonized sales tax, value added tax, sales tax, withholding tax, property tax, business tax, ad valorem tax, transfer tax, franchise tax or excise tax, together with all interest, penalties, fines or additions imposed, assessed or collected with respect to any such amounts;

“**Term**” means the term of this Agreement as set out in **Section 23.1**;

“**Work**” means all plant, materials, equipment, components, supplies, labour, services and acts required to be furnished, performed or done by Seller to provide the Goods and fulfill the other obligations of Seller under this Agreement; and

other capitalized terms have the meanings given to them in the body of this Agreement or in a Schedule hereto.

1.2 **Schedules.** The following Schedules are attached to and form an integral part of this Agreement:

- Schedule A - Scope of Supply & Technical Specification
- Schedule B - Delivery Schedule
- Schedule C - Pricing and Payment
- Schedule D - Performance Standards
- Schedule E - Confidentiality Schedule
- Schedule F - Certificate of Insurance
- Schedule G - Buyer Policies and Procedures
- Schedule H - Cybersecurity Requirements

1.3 **Rules of interpretation.** In this Agreement:

- (a) the words “herein”, “hereof”, “hereunder” and other words of similar import refer to this Agreement as a whole and not to any particular section, subsection or other subdivision of this Agreement;
- (b) the headings are for convenience only and do not form a part of this Agreement and are not intended to interpret, define or limit the scope, extent or intent of this Agreement or any of its provisions;
- (c) the singular of any term includes the plural, and vice versa, the use of any term is generally applicable to any gender and where applicable, a corporation, and the word “including” is not limiting whether or not non-limiting language (such as “without limitation” or “but not limited to” or words of similar import) is used with reference thereto;
- (d) any reference to any agreement (including this Agreement), or other instrument in writing, or permit, licence or approval is a reference to such agreement or instrument, or permit, licence or approval as amended, modified or replaced from time to time;
- (e) any reference to a Party’s obligations, unless otherwise expressly stated, refers to the Party’s obligations under this Agreement;
- (f) any reference to a statute includes and is a reference to such statute and to the regulations made pursuant thereto, with all amendments made thereto and in force from time to time, and to any statute or regulations that may be passed which supplement or supersede such statute or such regulations;

- (g) all references to “day” or “days”, other than Business Days, means calendar days;
- (h) unless otherwise expressly stated, all dollar amounts refer to Canadian dollars; and
- (i) the Parties acknowledge having had full opportunity to consider their rights and obligations as provided herein and agree that any rule of construction to the effect that an ambiguity is to be resolved against the drafting Party shall not be applicable in the interpretation of this Agreement.

1.4 **Priority of Documents.** If there is any inconsistency, ambiguity or conflict between the wording of any documents listed below, the wording of the document that first appears on the list has priority over the wording of any document that subsequently appears on the list:

1. Articles 1.0 to 27.0 of this Agreement;
2. any Change Orders issued by Buyer;
3. Schedule C - Pricing and Payment
4. Schedule B - Delivery Schedule
5. Schedule D - Performance Standards
6. Schedule A - Scope of Supply & Technical Specification
7. Schedule E - Confidentiality Schedule
8. Schedule F - Certificate of Insurance
9. Schedule G - Buyer Policies and Procedures
10. Schedule H - Cybersecurity Requirements

1.5 **Governing Law/Attornment.** This Agreement shall be deemed to have been made in and shall be governed by, construed and interpreted in accordance with the laws of the Province of Nova Scotia and the federal laws of Canada, as applicable therein. Subject to final and binding arbitration as provided by **Article 26.0**, the Parties attorn to the exclusive jurisdiction of the courts of the Province of Nova Scotia. The Parties expressly exclude the application of the United Nations Convention on Contracts for the International Sale of Goods and further exclude the application of the *International Sale of Goods Contracts Convention Act, S.C. 1990-91, c. 13*.

## 2.0 SELLER’S OBLIGATIONS

2.1 **Supply of Goods.** Seller shall:

- (a) perform the Work and provide the Goods as specified in **Schedule A**, subject to and in accordance with Purchase Orders issued by Buyer to Seller;

- (b) deliver, and off-load to the pad, the Goods (including off-loading the insulating oil and accessories) to the substation specified in the Purchase Order. Notwithstanding the forgoing, the Buyer may require the Goods (including insulating oil and accessories) be delivered to an alternative location; and
- (c) fulfill every obligation of Seller set forth in or imposed by this Agreement.

Seller will not be entitled to compensation for Work in connection with Goods or for Goods delivered unless and until Seller has received a Purchase Order for such Goods. Notwithstanding Buyer's use of a Purchase Order, any standard, pre-printed or other terms and conditions contained on any Purchase Order of Buyer which conflict with, vary or add to the terms of this Agreement are of no effect.

2.2 **Documentation.** Seller shall make available to Buyer all manuals, instructions, specifications, product data sheets, material safety data sheets and similar information regarding the Goods in electronic media in a form useable to Company with recognized industry standard applications. If applicable, Seller shall also provide the technical documentation specified in **Schedule A**.

2.3 **Representations, Warranties and Covenants of Seller.** Seller represents, warrants, covenants and agrees with Buyer that Seller:

- (a) has all requisite corporate capacity and authority to execute, deliver and perform its obligations under this Agreement;
- (b) shall furnish and perform all Work necessary to provide the Goods, unless otherwise provided herein;
- (c) has all required authority, skills, expertise, resources and capacity to perform its obligations in accordance with the terms of this Agreement;
- (d) prior to commencing any Work, shall obtain and provide to Buyer, and shall maintain during the Term, all permits, licences, authorizations and notices as expressly stipulated by this Agreement or otherwise required for the performance of the Work and Delivery of the Goods;
- (e) shall comply with all Applicable Laws pertaining to the Goods and the Work performed by or on behalf of Seller, and shall be responsible for ensuring similar compliance by any Subcontractors; and
- (f) is not a non-resident of Canada for the purposes of the *Income Tax Act* (Canada).

2.4 **Quantities of Goods.** Seller acknowledges and agrees that, unless minimum or maximum quantities are specified in **Schedule A**, the quantities of Goods indicated in **Schedule A** are estimates only and are not guaranteed by Buyer, and that the quantities purchased will be determined by Buyer's actual requirements. Unless expressly provided in **Schedule A**, Seller

will not be entitled to an adjustment of unit prices or to claim other compensation for any variation in actual quantities from estimated quantities.

- 2.5 **Understanding of the Work.** Seller acknowledges that it has received, reviewed, understood and verified the details contained in **Schedule A**, and that it has a full knowledge and understanding of the nature and the scope of the supply of Goods required under this Agreement. Seller shall advise Buyer of any errors, omissions and inconsistencies in Schedule A and shall not proceed with any part of its obligations under this Agreement affected thereby until resolved by the Engineer.
- 2.6 **Site Conditions and Investigations.** Seller shall have a personal knowledge of the location of the proposed Work and shall be deemed to have made a careful examination of the site of the Work so as to satisfy itself as to the working conditions, the nature and extent of the Work to be done, the special risks, if any, associated therewith, the obstacles or difficulties likely to be encountered, and any other matters and things which are necessary or desirable to gain a proper understanding of the Work and the conditions under which it shall be performed. Seller shall be solely responsible for any errors, omissions or misunderstandings resulting from its failure to have made a thorough examination of the site. Seller shall obtain all required information and shall not claim at any time after the execution of this Agreement that there was any misunderstanding with regard to the conditions imposed in this Agreement.
- 2.7 **Non-Exclusivity.** Notwithstanding anything contained herein, this Agreement in no way creates an exclusive arrangement between Buyer and Seller for the supply of goods the same as or similar to the Goods. In particular, but without limiting the foregoing, Buyer reserves the right to purchase the same or similar goods from other suppliers if Buyer determines in its sole discretion that the provision of the Goods by Seller is not competitive in terms of any one of cost, quality, technology, timely delivery or reliability.
- 2.8 **Cybersecurity.** The Seller covenants and agrees that it shall maintain a high threshold of cyber security in all Goods and Work provided to the Buyer under the Agreement and further covenants to strictly comply with industry standards and protocols as laid out in Schedule “H” of the Agreement (“Cybersecurity Requirements”).

**3.0 INSTRUCTIONS AND ORDERS OF ENGINEER**

- 3.1 **Engagement of Seller.** Subject to the provisions of this Agreement, Buyer agrees to engage Seller to supply the Goods in accordance with the terms of this Agreement.
- 3.2 **Engineer's Authority.** Buyer shall designate in writing an individual or individuals with authority to represent and make decisions binding on Buyer pursuant to this Agreement (each an “**Engineer**”). Buyer may change an Engineer at any time at its sole discretion by Notice to Seller. Notwithstanding the foregoing, the Engineer will not have authority to amend, waive or modify any of the terms or conditions of this Agreement.
- 3.3 **Instructions and Orders.** During the execution of the Work, the Engineer shall decide on interpretation of drawings and specifications, shall judge quality and quantity of Work and

materials and shall make decisions and give instructions and orders, where required, within a reasonable time. Seller acknowledges and agrees that Buyer makes no representations or warranties in relation to the fullness or accuracy of such instructions or orders.

- 3.4 **Compliance by Seller.** Seller shall proceed with the Work in accordance with Schedule A (“Scope of Supply & Technical Specifications”) and the general conditions in Schedule A-1, and all decisions, instructions, and orders given by the Engineer, provided always that if Seller shall, without undue delay, after being given any decision, instruction, or order otherwise than in writing, require it to be confirmed in writing, such decision, instruction, or order shall not be effective until written confirmation thereof has been received by Seller. All written decisions, instructions and orders of the Engineer will be final and binding upon Seller unless, by Notice to Buyer given within 7 days after the date of receipt of a written confirmation thereof, Seller expressly states that it disputes such decision, instruction or order, giving Seller’s reasons for so doing, but such a Notice will not relieve Seller of its obligations to proceed with the Work in accordance with the decisions, instructions, or orders in respect of which the Notice has been given.
- 3.5 Seller, having given Notice of a Dispute or question in accordance with Section 3.4 shall have the right to raise the matter in any subsequent proceedings between the Parties and to claim in respect thereof, and shall be at liberty in such proceedings to rely on reasons additional to the reasons stated in the said notice.
- 3.6 In case of misunderstanding or Dispute, verbal agreements will not be accepted as bearing on the terms of settlement, and Seller shall advance no claim in such case in the absence of documentary evidence as above provided, and shall not attempt to use any conversation with any parties as evidence in prosecuting any claim against Buyer.

#### **4.0 COMPLETION AND DELIVERY**

4.1 **Delivery Schedule.** Seller shall complete Delivery of the Goods:

- (a) by the delivery dates set out in **Schedule B** (as revised pursuant to Section 4.3) or the applicable Purchase Order; or
- (b) for Goods delivered pursuant to a Change Order, the delivery dates specified in that Change Order,

(the “**Contract Time**”).

4.2 **Manner and Costs of Delivery.** Seller shall effect Delivery of the Goods in the manner specified in **Schedule A** and **Schedule C** or in the applicable Purchase Order. Except as specified otherwise in this Agreement, Seller shall be responsible for and bear the costs of packaging, loading and carriage of the Goods to the specified delivery location specified in **Schedule B** or in the applicable Purchase Order. Seller shall prepare all Goods for shipment and storage in such a manner as to protect them from damage or deterioration, and shall be responsible for and make good any and all damage due to improper preparation for loading, transporting and unloading. Every Good and/or its shipping container shall be marked with a

reference number or symbol to agree with parts numbering system on drawings and parts lists. All shipping packages shall be marked with the Buyer's Purchase Order number and addressed to the Seller's agent at site. All field assembly pieces shall be factory preassembled and match marked prior to shipment. All parts shall be carefully boxed, or otherwise suitably prepared for shipment, to ensure that no damage will be caused during shipment. All openings in the Goods shall be tightly closed before shipment. Seller shall take appropriate action to protect all parts for outdoor storage at the site. Small components, if so noted, may be marked for indoor heated, or unheated storage, as required. The Engineer shall be notified no less than seven (7) working days in advance of each shipment of the beginning date of each shipment, method, dimensions and weights of each shipment and anticipated date of arrival at site. Each crate shall be labeled with its contents and any special handling instructions. No Goods will be received on a Friday, weekend or holiday.

- 4.3 **Scheduling.** Seller shall resubmit for approval within thirty (30) working days after the execution of this Agreement, an updated schedule incorporating any revision made subsequent to the execution of this Agreement. Such updated schedule shall include a complete detailed schedule of all activities necessary for Delivery of the Goods and performance of the Work in a bar chart/Gantt format, including design, engineering, procurement of materials and components, fabrication and assembly, including hold points, inspection and testing, and Delivery to Buyer. The revised schedule once approved by Buyer shall become the Contract Time required pursuant to **Section 4.1** and shall not be further revised without Buyer's approval. Approval by Buyer of the Seller's schedule shall not relieve Seller of any of its duties or responsibilities under the terms of this Agreement.
- 4.4 **Delays.** Seller shall promptly notify Buyer, in writing, of any delays in the progress of the Work or Delivery of the Goods and shall use all reasonable efforts to rectify the event or circumstance giving rise to the delay.
- 4.5 **Recovery of Schedule.** Should Buyer have reason to believe that the Goods will not be delivered within the Contract Time, or if Seller fails to complete any portion of the Work within the Contract Time, other than as a result of Force Majeure or acts or omissions of Buyer, then, without limiting any other remedy of Buyer hereunder, Seller shall provide a recovery plan and perform at its sole cost whatever acts are required by Buyer (including working overtime, engaging additional personnel and providing additional equipment) to make up the lost time and to avoid any further delay in performance.
- 4.6 **Expedited Delivery.** Where Seller is responsible under this Agreement for any delay in delivering any portion of the Goods, Buyer may direct Seller, at Seller's cost, to expedite Delivery of the Goods through use of the most expedient method of delivery (including air transportation) as reasonably determined by Buyer.
- 4.7 **Seller's Delivery Responsibilities.** Seller shall be responsible for determining the limitations and regulations that apply to delivering the Goods via marine vessel (including barge), rail, wharf and highway facilities. Seller shall also be responsible for obtaining, at its sole expense, all permits from any Governmental Authority in advance of moving overweight or oversized Goods. All costs related to the terms and conditions contained in such permits, including but



not limited to traffic management plans, structural analyses, escorts, raising of wires and overtime premiums, shall be deemed to be included in the Contract Price.

**4.8 Liquidated Damages.** Seller agrees that:

(a) [REDACTED]

(b) [REDACTED]

[REDACTED]

**4.9 Contractors on Location.** Other contractors may be performing services at the specified delivery locations during the performance of the Work and/or Delivery of the Goods. The Seller shall ensure its personnel and Subcontractors perform the Work as part of an overall team, and cooperate with all other contractors.

**5.0 TITLE AND RISK**

**5.1 Warranty of Good Title.** Seller warrants good title to all Goods and other items furnished by it under this Agreement and that they are free from any Encumbrances in favour of third parties.

**5.2 Passing of Title and Risk.** Unless otherwise stated in this Agreement, title to the Goods and risk of loss shall pass from Seller to Buyer upon Delivery of the Goods by Buyer at the delivery point specified in the applicable Purchase Order.

**6.0 TECHNICAL ASSISTANCE**

**6.1 Applicability.** This Article 6.0 applies if Schedule A includes a requirement for Seller to provide technical assistance or supervision.

**6.2 Technical Personnel.** Technical personnel of Seller shall consist of qualified professionals capable of advising in respect of, and supervising, the installation, erection, testing, start-up, commissioning and trouble shooting in respect of the Goods. The selection and assignment of technical personnel will be subject to prior approval by Buyer. Buyer may, acting

reasonably, request the removal or replacement of any technical personnel and any such removal or replacement shall be at Seller's cost.

6.3 **Compensation.** Technical assistance shall be compensated on the basis set out in **Schedule C**.

6.4 **Compliance with Laws and Policies.** Seller shall cause the technical personnel of Seller to:

- (a) comply with all Applicable Laws;
- (b) perform services and all other acts in compliance with Buyer's health, safety, security, environmental and other policies and procedures as set out in **Schedule G**, as updated from time to time;
- (c) in addition to the requirements set out in Section 6.4(a) above, Seller shall maintain at its sole expense a subscription with the Contractor Information Management System during the Term of this Agreement and any renewal or extension thereof. Seller shall maintain a rating of B or better for the Contractor Information Management System during the Term of this Agreement and any extension or renewal thereof; and
- (d) perform services in a manner to avoid endangerment to health, bodily harm and damage to property or the environment.

6.5 **Supervision - General.** Pricing stated in Schedule C shall be for the Work performed by an erection supervisor on an as-required basis. Pricing shall be for time spent only at the site and shall include local travel and living expenses. All travel is included. The Parties shall agree on the commencement date for each of the supervisory personnel supplied by Seller. Seller's personnel will be expected to be on the site for whatever hours per day and days per week are required to assist Buyer's personnel during the installation or commissioning of the Goods.

6.6 **Supervision - Erection.** Seller shall provide competent personnel at the site to supervise the erection of the Goods supplied under this Agreement as outlined in Schedule C. The erection supervisor shall be utilized for direction and input related to all testing, erection, and commissioning activities with the Goods and shall sign-off the verification indicating that the Goods are authorized to be put into service.

## **7.0 ACCESS, INSPECTION, TESTING AND LIQUIDATED DAMAGES**

7.1 **Inspection by Buyer.** Buyer shall, at all times during the Term, be granted unrestricted access to Seller's premises during normal business hours to inspect the Goods for the purpose of determining that the Goods are being created or manufactured in accordance with this Agreement. No inspection, representation or action of Buyer will relieve Seller from, or operate as a waiver or release of, any of Seller's obligations or liabilities under this Agreement.

- 7.2 **Quality Assurance.** Notwithstanding any inspection or testing by or on behalf of Buyer, Seller shall be responsible for quality control, testing and quality assurance to verify and be able to demonstrate that the Goods comply with the requirements of this Agreement. Without limiting the foregoing, Seller shall, where required under and in accordance with the provisions of **Schedule A**:
- (a) carry out quality management activities;
  - (b) conduct tests on the Goods, and Buyer and third party consultants and representatives authorized by Buyer may witness any test on the Goods contemplated by this **Section 7.2**;
  - (c) give Buyer not less than 10 Business Days' prior Notice of any test or hold point, and not proceed with the test in the absence of Buyer's personnel unless Buyer has expressly advised Seller in writing to proceed;
  - (d) correct, at Seller's sole cost, any defects and any other failure to comply with the requirements of **Schedule A** and Applicable Laws identified during inspection or testing of the Goods; and
  - (e) upon completion of Work under **Section 7.2(d)**, re-test the Goods at Seller's sole cost to confirm the requirements of this Agreement are met, and Buyer may require Seller to re-test, at Seller's cost, all goods similar to the Goods that originally failed the test.
- 7.3 **Rejection of Goods.** Buyer may reject any Goods that do not conform to this Agreement. Seller shall, at its sole cost, promptly remove any Goods so rejected and shall repair or replace them, and shall carry out such further inspections or tests on other parts of the Goods as Buyer may require to ensure that there are no similar Goods that fail to conform with this Agreement.
- 7.4 **Performance Measurement.** Seller's performance under this Agreement will be measured in accordance with the performance criteria and other requirements described in **Schedule D**. If Seller fails to meet any performance requirements set forth in **Schedule D** and if the failure is not remedied to the satisfaction of Buyer within 10 days after delivery of Notice by Buyer to Seller specifying the failure, Buyer may terminate this Agreement immediately on Notice to Seller, and the provisions of **Section 24.3** will apply.
- 7.5 **Tests on completion.** Upon completion of the Work, Seller shall give the Engineer seven (7) days' Notice of its readiness to carry out any final tests described in the Schedule A. Interim tests may, at the option of the Engineer, be carried out on completion of any unit section of the Work.
- 7.6 **Evaluation of Transformer Losses.** Transformer no load and load losses shall be evaluated at rated voltage and at the ONAN rating. The no load losses and the load losses shall be evaluated at as per data sheet for each transformer. If the no load and/or load losses as guaranteed by Seller are exceeded at the time of test, such that the individual load and no-load evaluated cost of losses using tested loss values and the dollar values set out in Schedule

A exceed the individual evaluated cost of losses using the guaranteed loss values and the dollar values set out in Schedule A, then the incremental cost difference shall apply as liquidated damages. The liquidated damages amount shall be deducted from the Contract Price. These damages are in addition to any damages for delay pursuant to Section 4.8.

7.7 **Nameplate Information Omission.** In the event that Seller omits any required information of the transformer nameplate, a new nameplate, including the addition of the omissions shall be supplied at no cost to Buyer.

7.8 **PCB In Oil Content.** Seller shall guarantee a "PCB in oil content" of two (2) parts per million or less at time of shipment of the transformer. The guaranteed amount must be shown on the transformer nameplate.

## 8.0 **ORIGIN OF GOODS**

8.1 **Goods Not Restricted.** Seller warrants that neither Goods nor any part thereof have any attribute that would cause their sale, export, transit or input to be in breach of an embargo, a boycott or other import restrictions or sanctions of any Governmental Authority.

8.2 **Origin or Content Requirements.** Where this Agreement requires the Goods or any part thereof to meet certain criteria as to origin or content, Seller (i) warrants that the Goods meet all such requirements, and (ii) shall provide evidence of compliance and such other documentation and information as may reasonably be required by Buyer.

8.3 **Intentionally Deleted.**

8.4 **Counterfeit, Fraudulent and Suspect Items.**

(a) Seller is hereby notified that the delivery or use of suspect and/or counterfeit, fraudulent, and substandard items ("**CFSIs**") is of special concern to Buyer. If any parts covered by this Agreement are described using a manufacturer part number or using a product description and/or specified using an industry standard, Seller shall be responsible to assure that the replacement parts supplied by Seller meet all requirements of the latest version of the applicable manufacturer data sheet, description and/or industry standard.

(b) If Seller is not the manufacturer of the Goods, Seller shall make reasonable efforts to ensure that the parts and components supplied under this Agreement or used to manufacture the Goods are made by the Original Equipment Manufacturer (OEM) and meet the applicable manufacturer data sheet or industry standard.

(c) Should Seller desire to supply or use a part that may not meet the requirements of this **Section 8.4**, Seller shall notify Buyer of any exceptions and receive Buyer's written approval prior to shipment or use of the replacement parts to Buyer.

- (d) If suspect and/or CFSI parts are furnished under this Agreement or are found in any of the Goods delivered hereunder, such items will be dispositioned by Buyer and may be returned to Seller. Seller shall promptly replace such suspect and/or CFSI parts with parts acceptable to Buyer and Seller shall be liable for all costs, including Buyer's internal and external costs, relating to the removal and replacement of such parts.

## **9.0 SUBCONTRACTS**

9.1 **Consent for Subcontracting.** Neither the whole nor any part of the Work nor the supply of the Goods may be subcontracted by Seller without the prior written consent of Buyer, except that Seller:

- (a) is not required to obtain consent for subcontracts specifically authorized in **Schedule A**;
- (b) may, without the consent of Buyer, (i) purchase "off-the-shelf" items and any standard articles and materials that are ordinarily produced by manufacturers in the normal course of business, and (ii) subcontract any incidental services that would ordinarily be subcontracted in performing the Work.

9.2 **Responsibility for Subcontractors.** Any subcontracting permitted under this **Article 9.0** shall not relieve Seller of any of its duties, obligations, warranties, liabilities or responsibilities under this Agreement. Seller shall be as fully responsible to Buyer for the acts and omissions of Subcontractors, and of persons directly or indirectly employed by them, as if they were acts and omissions of persons directly employed by Seller. Nothing contained in this Agreement or any Subcontract with a Subcontractor shall create a contractual relationship between a Subcontractor and Buyer.

## **10.0 LIENS AND CLAIMS**

10.1 **Liens on Goods.** Seller shall prevent the imposition of any Encumbrances by or on behalf of any third party against the Goods, wherever located, or any portion thereof and any Encumbrances which nevertheless are imposed shall be promptly settled by Seller and Seller shall defend, protect, release, indemnify and hold Buyer harmless from and against the same.

10.2 **Liens on Buyer's Property.** Seller shall not permit any Encumbrance to attach to any of Buyer's property or premises. If an Encumbrance is attached, Seller shall promptly procure its release, and hold Buyer harmless from all loss, cost, damage or expense incidental thereto.

## **11.0 INTENTIONALLY DELETED.**

## **12.0 STANDARDS OF BUSINESS CONDUCT**

12.1 **Ethical Standards.** Seller shall perform its obligations under this Agreement in accordance with the highest of ethical standards and in compliance with the provisions of this **Article 12.0**. These obligations shall apply to the activities of Seller, its employees, Subcontractors,

agents and representatives and its Affiliates to the extent the activities of such Affiliates relate in any way to the performance of Seller's obligations under this Agreement.

12.2 **Conflict of Interest.** Seller shall establish and maintain appropriate business standards, procedures and controls necessary to avoid any real or apparent impropriety or adverse impacts on the interests of Buyer or its Affiliates. Buyer may review such standards and procedures at any time during the Term, and may terminate this Agreement for cause if Buyer is not satisfied, acting reasonably, that such standards and procedures ensure compliance with the ethical standards required by this **Article 12.0**.

12.3 **No Bribes.** Seller shall:

- (a) comply with all applicable anti-bribery, anti-corruption or integrity laws and regulations of Canada and any other country in which Seller does business in any way related to the performance of its obligations under this Agreement, including the *Canadian Corruption of Foreign Public Officials Act*, the *Criminal Code of Canada*, and the *United States Foreign Corrupt Practices Act of 1977*;
- (b) not authorize, offer, promise, pay or give money or anything else of value, either directly or indirectly, to or for the benefit of any person that is, or may reasonably appear to be, for the purpose of inducing, influencing, securing or rewarding the improper or corrupt performance by any public official of any function or activity, or directly or indirectly consent to, or connive in, aid or abet, counsel or procure such prohibited payments and benefits;
- (c) not solicit, request, agree to receive or accept money or anything else of value, either directly or indirectly, that is (or may reasonably appear to be) for the purpose of inducing, securing or rewarding the improper performance by Seller of any function or activity which contravenes or aids and abets the contravention of any applicable anti-bribery, anti-corruption or integrity laws and regulations;
- (d) take reasonable measures to prevent its employees, Subcontractors, agents and representatives from engaging in the activities described in **Sections 12.3(b)** and **12.3(c)**; and
- (e) not retain or enter into a Subcontract with a Person (an "**Agent**") in connection with this Agreement or to act on its or Buyer's behalf in a particular country, if Seller is not satisfied based on personal knowledge, available credible information and reasonable diligent inquiry that the prospective Agent may be reasonably relied upon to act in compliance with all applicable anti-bribery, anti-corruption or integrity laws and regulations.

12.4 **Reporting of Violations.** Seller shall immediately report to Buyer any attempt or perceived attempt by any employee, agent or representative of Buyer, to obtain a personal benefit of any kind from Seller.

12.5 **Provision of Information.** To the extent that it relates to the performance of its obligations under this Agreement, Seller shall promptly provide information or evidence, where reasonably required by Buyer, to properly address matters which Buyer, in its sole discretion, deems contrary to appropriate business standards or anti-bribery, anti-corruption or integrity laws and regulations of any country.

### 13.0 CHANGES

13.1 **Buyer's Right to Make Changes.** Buyer may, without invalidating this Agreement, make changes in the Work or the Goods, consisting of additions, deletions, or other revisions to the Work or the Goods ("**Changes**"). Seller shall implement all Changes required by Buyer. When a Change is proposed or required, Buyer will provide Seller with a written description of the Change and:

- (a) Seller shall promptly present for approval, in a form acceptable to Buyer and with supporting documentation, a proposed method of adjustment or an amount of adjustment of the Contract Price, if any, and the adjustment in the Contract Time, if any, for the proposed Change (a "**Change Proposal**");
- (b) to the extent applicable to the proposed Change, unless otherwise agreed by Buyer in writing, the rates and prices in **Schedule C** shall form the basis of any change in the Contract Price; and
- (c) Buyer shall review the Change Proposal, and if acceptable to Buyer, Buyer shall issue a Change Order amending the Contract Price and Contract Time as appropriate.

13.2 **Effect of Changes.** Except to the extent expressly provided in a Change Order, no Changes shall be deemed to amend or constitute a waiver of any provision of this Agreement. All Changes shall be governed by all the provisions of this Agreement.

13.3 **Payment for Changes.** The value of Work performed in a Change Order shall be included for payment, unless otherwise provided in the Change Order, with the regular payment due in accordance with **Schedule C**. Seller will not be entitled to claim any damages for any decrease in the quantity of the Goods or deletion of any part of the Goods.

13.4 **Disputes.** If the Parties fail to reach agreement on the adjustment of the Contract Price or the Contract Time with respect to a Change, Seller shall continue to execute the Change as directed in writing by Buyer and the Dispute will be resolved in accordance with **Article 26.0**.

13.5 **Unauthorized Work.** Unless Buyer has issued an order in writing in respect of the Change prior to issuance of the Change Order, any Work performed by Seller in respect of a Change prior to issuance of a Change Order by Buyer shall be at the risk and expense of Seller.

### 14.0 COMPENSATION AND TERMS OF PAYMENT

14.1 **Payment of Contract Price.** Subject to the terms of this Agreement, Buyer agrees to pay Seller the amounts when due for the Goods in accordance with the pricing provisions specified in

**Schedule C** (the “**Contract Price**”). Payment will be made by electronic funds transfer in the manner specified in **Schedule C**.

- 14.2 **Inclusive Price.** Subject to Sections 15.4 and 15.6, the Contract Price includes all costs for the Work and the Goods specified along with Seller’s overhead and profit and any other costs detailed or implied in this Agreement, including all Taxes, except HST.
- 14.3 **Invoicing Instructions.** Invoices shall be prepared in a format acceptable to Buyer and be submitted to Buyer in accordance with the invoicing instructions set out in **Schedule C**.
- 14.4 **Support for Invoices.** Invoices shall be accompanied by all relevant supporting documentation as Buyer may reasonably require to verify delivery of Goods that comply with the requirements of this Agreement and the accuracy of all amounts claimed by Seller. Buyer is not required to pay any invoice from Seller until a correct invoice and complete supporting documentation have been provided to Buyer.
- 14.5 **Time for Payment.** Subject to **Section 14.6**, payment shall be made net 35 days from receipt of invoice by Buyer.
- 14.6 **Withholding from Payments.** Buyer may, upon Notice to Seller, withhold or deduct from amounts otherwise due to Seller under this Agreement:
- (a) invoiced amounts reasonably disputed by Buyer;
  - (b) the holdback, if any, required to be maintained under applicable mechanics’ or builders’ lien legislation;
  - (c) withholding Tax amounts, in accordance with Section 15.3, where such amounts are required to be withheld under Applicable Laws;
  - (d) the full value plus estimated or required security for costs of any Encumbrances filed against the Goods or any property on or in respect of which Work is performed, plus any costs, including reasonable legal fees on a solicitor-client basis, incurred by Buyer to have such Encumbrances removed;
  - (e) any other monetary claims against Seller which are enforceable against Buyer, including garnishment orders;
  - (f) security for any actual liability to third parties for costs, damages or expenses to the extent resulting from Seller’s performance of the Work; and
  - (g) any amount necessary to reasonably protect Buyer from actual or anticipated loss, damage, claim, cost or expense to the extent arising from:
    - (i) defective Goods or deficient Work not remedied within any time period allowed under this Agreement;



(ii) the failure of Seller to pay promptly any amounts justly due and owing by Seller to its Subcontractors or any other third party in connection with the Goods or the performance of the Work; or

(iii) any other breach or default of Seller’s obligations.

14.7 **Set-off.** Without restricting any existing right of set-off in law or equity, and in addition to Buyer’s rights under **Section 14.6**, Buyer may set off against any amount payable to Seller under this Agreement, any amount payable to Buyer by Seller under this Agreement or under any other current contract. Buyer may, when making a payment pursuant to this Agreement, deduct from the amount payable to Seller any such amount payable to Buyer by Seller which, by virtue of the right of set-off, may be retained by Buyer.

14.8 **Delayed Payments.**

[REDACTED]

14.9 **Effect of Payment.** A payment by Buyer shall not be construed as evidence that the Goods or any part thereof are complete, are satisfactory or are in accordance with this Agreement and shall not be considered as final acceptance of any Goods or release Seller from any obligations under this Agreement.

14.10 **Release by Seller.** The acceptance by Seller of final payment shall be and shall operate as a release of Buyer of all claims and all liabilities to Seller for all things done or furnished in connection with this Agreement and for every act and neglect of Buyer and others relating to or arising out of this Agreement, other than detailed claims stated in writing prior to such payment.

14.11 [REDACTED]

15.0 **TAXES AND DUTIES**

15.1 **Harmonized Sales Tax.** Payments on account of the Contract Price shall be subject to HST. No additional Taxes shall apply.

15.2 **Support for Input Tax Credits.** Seller shall provide, at all times when any HST is required to be collected, such documents and particulars relating to the supply as may be required by

Buyer to substantiate a claim for any input tax credits as may be permitted pursuant to the *Excise Tax Act (Canada)* in respect of such HST.

- 15.3 **Withholding Tax.** If applicable, Buyer will withhold from payments to Seller any amounts required to be withheld under Applicable Laws and treaties in respect of services rendered in Canada by a non-resident and may remit them to the relevant Governmental Authority, and any such amounts paid by Buyer to a Governmental Authority pursuant to such Applicable Laws shall, to the extent of such payment, be credited against and deducted from amounts otherwise owing to Seller hereunder. Where available, statutory withholding may be waived if Seller delivers to Buyer a formal waiver of the withholding requirement issued by Canada Revenue Agency. The Parties shall cooperate at all times to ensure that all proper withholdings are deducted from payments and if any withholdings are overlooked then such withholdings may be deducted from later payments. If any required withholdings are not withheld and there are no further payments to be made by Buyer, Seller shall forthwith pay to Buyer any such withholding amount which Buyer shall remit to the relevant Governmental Authority as required.
- 15.4 **Importer of Record.** Buyer shall be the importer of record for all Goods provided under this Agreement that are not of Canadian origin. Buyer will be required to pay the Goods and Services Tax (GST) to Canada Customs at the time of entry into Canada.
- 15.5 **Customs Documentation.** Buyer reserves the right to review any and all customs documentation respecting imported Goods. Seller shall provide all such documentation to Buyer in a timely manner.
- 15.6 **Customs Duty.** When requested by Buyer, Seller shall advise Buyer of the amount of Canadian customs duty for the Goods and Canada Customs Tariff Schedule number if applicable. For greater certainty, any applicable Canadian customs duty is to be paid by Buyer to Canada Border Services Agency.
- 15.7 **Harmonized Tariff Schedule.** All Goods must be coded by using the Harmonized Tariff Schedule. For all foreign shipments being imported into Canada the Canada Customs Tariff Schedule must be used.

## **16.0 AUDIT AND RECORDS**

- 16.1 **Seller's Records.** While this Agreement is in effect and for a period of at least 36 months after the later of (i) termination or expiry of the Term, and (ii) the completion of the Work, Seller shall keep accurate records of all Work performed and Goods supplied to Buyer, as necessary to determine the cost of the Goods and that the Work and the Goods were provided in accordance with the terms and conditions of this Agreement.
- 16.2 **Buyer's Right of Audit.** Buyer and its authorized representatives shall have the right, at any time during normal business hours and upon reasonable Notice, to inspect and audit all Work and Goods and all information available to Seller related to the Work and the Goods for purposes of validating compliance by Seller with the terms and conditions of this Agreement, and to make copies, including electronic copies, of all documents and records referred to in

**Section 16.1.** Seller agrees to provide to Buyer reasonable access to Seller’s property and personnel for the purposes of allowing Buyer and its authorized representatives to inspect and audit in accordance with this Agreement.

**17.0 WARRANTIES**

17.1 **Warranties on Goods.** Seller warrants that the Goods and Work shall:

- (a) be new and free from defects in design, material and workmanship;
- (b) be fit for purpose, as specified in **Schedule A**, and where no purpose is specified, fit for their intended use; and
- (c) comply with the performance requirements, if any, specified in the attached schedules.

Seller shall provide additional warranties as described in **Schedule A**, if any.

17.2 **Correction of Defects.** Seller shall promptly correct, repair or replace, at its expense, all defects and deficiencies in the Goods and Work which appear prior to and during the period of [REDACTED] from the date of completion of the Delivery of the Goods, or such longer periods as may be specified herein (the “**Warranty Period**”). Such correction, repair or replacement shall be at the convenience of and without charge to Buyer, at a location and on a schedule that meets the operating requirements of Buyer as determined by Buyer in its sole discretion. If the Goods are returned to Seller for repair or replacement Seller shall pay all transportation charges both ways between Seller’s factory or repair depot and Buyer’s site.

17.3 **Liability after Warranty Period.** Seller shall have no liability for defects or deficiencies in the Goods which appear after the Warranty Period.

17.4 **Damage Caused by Corrective Work.** Seller shall correct at its expense and shall pay for damage caused during the performance of corrective work in compliance with the requirements of this Agreement.

17.5 [REDACTED]

17.6 **Warranty on Corrected Goods.** The warranty provided in **Sections 17.1** and **17.2** applies to any part of the Goods or Work corrected, repaired, replaced or otherwise made good pursuant to this **Article 17.0**, for the greater of:

- (a) [REDACTED]
- (b) [REDACTED]

17.7 **Subcontractor Warranties.** Without limiting Seller’s warranty obligations, Seller shall obtain warranties available from any Subcontractors and suppliers of Seller that are assignable to Buyer without consent. All such warranties shall, at the request and direction of Buyer, be unconditionally assigned to Buyer upon default by Seller or termination or expiration of this Agreement.

17.8 **Buyer’s Right to Correct or Replace.** If Seller fails to comply with the warranty obligations in this Agreement, Buyer shall have the right to perform or have performed the correction, repair, or replacement and all costs incurred by Buyer in performing such work shall be paid to Buyer by Seller. In the event that any warranty work must be carried out immediately due to urgent circumstances, and Seller is not able to immediately respond and to carry out the urgently required work, then Buyer shall perform such warranty work at the expense of Seller. In no event shall the performance of warranty work by Buyer under this **Section 17.8** void or affect Seller’s warranty obligations herein, and such warranty obligations shall remain in full force and effect.

17.9 **Exclusion of Other Warranties.** The warranties set forth in this Agreement are exclusive, and no other warranties of any kind, whether express or implied, including the implied conditions of merchantability and fitness for particular purpose and all warranties and conditions arising from course of dealing or usage of trade and any conditions or warranties arising under the Nova Scotia *Sale of Goods Act* or any similar legislation of any jurisdiction, shall apply.

17.10 **Intentionally Deleted**

**18.0 LIABILITY AND INDEMNIFICATION**

18.1 [REDACTED]

18.2 [REDACTED]

18.3 **Consequential Losses and Damages.**

(a) [REDACTED]

[REDACTED]

(b) [REDACTED]

(c) [REDACTED]

18.4 [REDACTED]

18.5 Intentionally Deleted.

18.6 [REDACTED]

(a) [REDACTED]

(b) [REDACTED]

(c) [REDACTED]

(d) [REDACTED]

(e) [REDACTED]

(f) [REDACTED]

**19.0 INSURANCE**

19.1 Seller's Insurance. Seller shall obtain, maintain and pay for, during the continuance of this Agreement or if applicable, the entire Term, or as otherwise provided, all insurance coverage

as follows, with insurance carriers that have a minimum of either AM Best rating of A- or Standard & Poor's rating of BBB:

- (a) \$2,000,000 Automobile Liability including coverage for all licensed motor vehicles owned, rented or leased (non-owned) and used in connection with the Work covering bodily injury and property damage liability and mandatory accident benefits;
- (b) \$2,000,000 each occurrence and in the annual aggregate Commercial General Liability including death, bodily injury, personal injury, and property damage, including loss of use thereof. Coverage shall specifically include at a minimum, but not be limited to the following:
  - (i) Products & Completed Operations and Personal Injury;
  - (ii) Broad Form Property Damage;
  - (iii) Contingent Employer's Liability;
  - (iv) Cross Liability and Severability of Interest;
  - (v) Blanket Contractual Liability; and
  - (vi) Sudden & Accidental Pollution.
- (c) Up to the time of Delivery of the Goods to Buyer, Seller shall fully insure the Goods against loss or damage from any cause whatsoever in the names of Seller and Buyer, as their interests may appear; and
- (d) Seller shall insure the Goods during transportation from Seller's plant, factory or distribution centre to the delivery location.

19.2 **Waiver of Subrogation and Additional Insured.** All insurance policies required by **Section 19.1** shall be endorsed to waive insurer's rights of subrogation against Buyer, its Affiliates, and their respective directors, officers, employees, consultants and agents. Seller agrees that Buyer shall be shown as an additional insured on the Commercial General Liability policy, and such insurance shall not be cancelled or altered without 30 days' prior Notice to Buyer.

19.3 **Proof of Insurance.** Proof of insurance shall be completed by the respective insurance brokers or insurers and Seller agrees to provide proof of insurance to Buyer prior to the commencement of any Work, in the form attached hereto at **Schedule F**.

19.4 **Failure to Maintain Insurance.** If Seller fails to effect or keep in force any of the foregoing insurances, Buyer may, without prejudice to any other right or remedy, effect such insurance and pay the premiums due and recover the same from Seller either as a deduction from any other monies due to Seller under this Agreement or otherwise on demand by Buyer.

19.5 **Workers' Compensation Coverage.** Seller shall maintain, and shall ensure that its Subcontractors maintain, workers' compensation coverage for all personnel engaged in the Work in accordance with Applicable Laws of the jurisdiction in which the Work is performed. Prior to starting any Work on Buyer's premises and at such other times as Buyer may require,

Seller shall submit to Buyer a letter from the Workers' Compensation Board of Nova Scotia as to its status and that of its Subcontractors. Seller shall ensure that non-residents are fully covered by workers' compensation insurance and employer's liability insurance with such coverage including an extraterritorial benefits extension providing benefits at least equal to those provided by the jurisdiction in which the Work is performed.

**20.0 INTELLECTUAL PROPERTY AND CONFIDENTIALITY**

20.1 [REDACTED]

20.2 [REDACTED]

20.3 [REDACTED]

20.4 [REDACTED]

20.5 [REDACTED]

[REDACTED]

**21.0 SUSPENSION OF WORK**

21.1 **Buyer's Right to Suspend Delivery.** Buyer may suspend performance of the Work and Delivery of Goods by giving five Business Days' Notice to Seller identifying the reason for the suspension and the expected length of the suspension. Such suspension shall be effective upon the expiry of the five Business Day notice period.

21.2 **Resumption of Work.** Seller, upon Notice from Buyer, shall resume the performance of Work and Delivery of the Goods in accordance with this Agreement.

21.3 **Costs of Suspension.** Unless the suspension was due to Seller's failure to perform its obligations under this Agreement, Buyer shall reimburse Seller for its reasonable costs (which Seller shall use its best efforts to mitigate) incurred in compliance with any Notice of suspension and associated resumption Notice. Seller will not be entitled to any compensation for loss of profits, loss of revenue, consequential losses or indirect damages caused by such suspension or resumption.

**22.0 FORCE MAJEURE**

22.1 [REDACTED]

(a) [REDACTED]

(b) [REDACTED]

(c) [REDACTED]

(d) [REDACTED]

(e) [REDACTED]

(f) [REDACTED]

(g) [REDACTED]



22.2 [REDACTED]

22.3 [REDACTED]

22.4 [REDACTED]

22.5 [REDACTED]

22.6 [REDACTED]

22.7 [REDACTED]

22.8 [REDACTED]

22.9 [REDACTED]

**23.0 TERM OF AGREEMENT**

23.1 **Effective Date and Term.** The term of this Agreement (the “**Term**”) is from the Effective Date to **Successful Completion**, subject to earlier termination in accordance with the terms of this Agreement or extension upon mutual agreement of the Parties.

**24.0 TERMINATION FOR DEFAULT**

24.1 **Default in Delivery.** Notwithstanding any provision in this Agreement, Buyer may terminate any Purchase Order or may terminate this Agreement, effective immediately upon Notice to Seller if Seller fails to Deliver the Goods within the applicable Contract Time.

24.2 **Other Causes for Termination.** Notwithstanding any provision in this Agreement, a Party may at any time terminate this Agreement effective immediately upon Notice to the other Party upon the happening of any one or more of the following:

- (a) a breach of any term or condition of this Agreement by the other Party which is not cured within 30 days after such Party receives Notice of such breach;
- (b) any representation or warranty made by the other Party shall prove to be untrue when made in any material respect;
- (c) the sale, transfer or relinquishment, voluntary or involuntary, by operation of law or otherwise, of legal control of the business of other Party, except as permitted under **Section 27.3**;
- (d) the sale, transfer or assignment of all or substantially all of the assets of the other Party, except as permitted under **Section 27.3**; or
- (e) any proceedings under any bankruptcy, insolvency, or creditor's protection legislation are commenced, a temporary or permanent receiver, trustee or other officer having similar powers is appointed in respect of the other Party, its business or assets, the other Party makes an assignment for the benefit of its creditors or otherwise acknowledges its insolvency, or if a bankruptcy or receiving order is made against the other Party.

24.3 **Buyer's Rights on Termination.** If Buyer terminates this Agreement pursuant to this **Article 24.0**, Buyer shall be entitled to:

- (a) take possession of the Goods, and, subject to the rights of third parties, utilize Seller's equipment at the site of the Work, if applicable, and finish the Work by whatever reasonable method Buyer may consider expedient;
- (b) withhold further payment to Seller and deduct from amounts otherwise payable to Seller any amounts owing to Buyer under the provisions of this Agreement or any other agreement between Buyer and Seller;
- (c) charge Seller, and Seller shall be liable for, the amount by which the full cost of finishing the Work or obtaining goods in substitution for the Goods, including costs of any additional consultant services and any allowance to cover the cost of corrections to Work performed by Seller that may be required, exceeds the unpaid balance of the Contract Price;

- (d) if, as a result of such termination, there is a delay to the Delivery of the Goods by the Contract Time, charge Seller and Seller shall be liable for the losses incurred by Buyer as a result of such delay; and
- (e) if, subsequent to exercise by Buyer of its rights pursuant to this **Article 24.0**, there remains any amount owing by Seller to Buyer, including any amounts otherwise payable by Seller pursuant to this Agreement, Buyer shall notify Seller in writing of such amount and Seller shall pay such amount to Buyer within 10 Business Days of notification.

24.4 **Cumulative Remedies.** The right of either Party to terminate this Agreement shall be in addition to any other rights and remedies available pursuant to this Agreement, at law or in equity. All rights and remedies of a Party upon default or breach by the other Party under this Agreement shall be cumulative and not alternative.

**25.0 TERMINATION FOR CONVENIENCE**

25.1 **Buyer Right to Terminate.** Buyer may terminate this Agreement at any time, including any Purchase Order, in whole or in part, for any reason. Seller is not entitled to any compensation or damages for any direct or indirect damage, loss, prospective or anticipated profits, economic loss or incidental or consequential damages as a result of such termination.

25.2 [REDACTED]

25.3 **Continuing Obligations.** Such termination by Buyer does not relieve Buyer or Seller from any of its obligations under this Agreement for Goods provided up to the date of termination.

**26.0 DISPUTE RESOLUTION**

26.1 **Definition.** In this Agreement, “**Dispute**” means any difference, controversy or dispute between the Parties as to any matter arising out of or related to this Agreement, including without limitation, the validity, interpretation, application, administration, enforcement or termination of this Agreement, the rights or liabilities of the Parties hereunder, any failure to agree where agreement between the Parties is called for, or any claim whatsoever arising out of any alleged failure to perform or breach of obligations under this Agreement.

- 26.2 **Notice of Dispute.** If a Party considers that there is a Dispute, that Party shall give Notice of the Dispute to the other Party and such Notice shall provide all relevant particulars of the Dispute. Except with respect to an action for injunctive relief, if available under Applicable Laws, to restrain or prevent the improper use, disposition, transfer or misappropriation of Confidential Information (as defined in the Schedule E), the Parties must comply with this **Article 26.0** with respect to a Dispute related to this Agreement.
- 26.3 **Negotiation and Escalation of Dispute.** If Notice of a Dispute is given, the respective appropriate senior managers of the Parties responsible for the administration of this Agreement (the “**Managers**”) shall promptly meet to discuss and attempt to resolve the Dispute within 14 days after the date of the Notice. If the Dispute is not resolved by written agreement of the Parties within such 14-day period, the Dispute shall be escalated to the respective appropriate executive officers of the Parties, who shall promptly meet to discuss and attempt to resolve the Dispute within a further 30 days. If the Dispute is not resolved by written agreement of the Parties within such 30 day period, either Party may refer the Dispute to arbitration pursuant to **Section 26.5**.
- 26.4 **Continued Performance.** Despite any Dispute, Seller shall continue to perform its obligations under this Agreement, without prejudice to Seller’s position in respect of the Dispute. There will be no extension to the date for Delivery of Goods by reason that a Dispute has been referred to the dispute resolution process in this **Article 26.0**.
- 26.5 **Arbitration.** In the event resolution cannot be achieved within the time stipulated by **Section 26.3** or such further time as mutually agreed by the Parties, then either Party may by Notice to the other Party refer such Dispute to final and binding arbitration in accordance with the *Commercial Arbitration Act* (Nova Scotia) (the “**Act**”). Neither Party shall commence any proceedings relating to a Dispute in any jurisdiction, other than in accordance with the terms of this Agreement and this Agreement shall constitute a complete bar to any such proceedings. The arbitration shall be conducted by a single arbitrator agreed upon by the Parties. If the single arbitrator cannot be agreed upon within 10 Business Days of referral of a Dispute, either Party may apply under the Act for judicial appointment of the single arbitrator. In respect of any arbitration to be conducted pursuant to this **Section 26.5**, the following rules shall apply:
- (a) the arbitration shall be conducted in English;
  - (b) the arbitration shall be conducted in the City of Halifax, Nova Scotia;
  - (c) such arbitrator shall not have previously been employed by either Party and shall not have a direct or indirect interest in either Party or the subject matter of the arbitration;
  - (d) the costs of the arbitration, excluding a Party’s legal fees and disbursements shall, unless otherwise ordered by the arbitrator, be borne equally by the Parties;
  - (e) The arbitration hearing shall be completed within 120 days after the selection or appointment of the arbitrator. In order to facilitate the arbitration hearing in an

expedited manner and in the absence of an agreement of the Parties to the contrary, the following procedures shall be followed by the arbitrator and the Parties:

- (i) Within 10 Business Days after the selection or appointment of the arbitrator, the claimant shall send a written statement to the respondent and the arbitrator outlining the facts supporting the claimant's claim, the points at issue and the relief or remedy sought;
  - (ii) Within 10 Business Days after the respondent receives the claimant's statement, the respondent shall send a written statement to the claimant and the arbitrator outlining the respondent's defence, and a written statement of the respondent's counterclaim, if any, outlining the facts supporting the counterclaim, the points at issue, and the relief or remedy sought;
  - (iii) The claimant may respond to a counterclaim by sending a written statement to the respondent and the arbitrator outlining the claimant's defence to the counterclaim within 10 Business Days after the claimant receives the counterclaim; and
  - (iv) Each Party shall submit with the Party's statements a list of the documents upon which the Party intends to rely, which shall specify the document type, date, author, recipient and subject-matter;
- (f) The arbitrator shall deliver his or her award within 30 days after completion of the hearing or within such other time as the Parties may agree;
  - (g) Subject to subsection 49(1) of the Act, the award of the arbitrator shall be final and binding upon the Parties and shall be enforceable by them in any court of competent jurisdiction; and
  - (h) Notwithstanding any provision contained herein to the contrary, the Parties agree that the arbitration procedure set forth in this **Section 26.5** shall not apply in circumstances where (i) the claimant is seeking a temporary restraining order or other immediate injunctive relief, (ii) a third party has brought a claim, except with the consent of such third party, and (iii) the Dispute relates to Claims in respect of intellectual property rights, whether initiated by third parties or by a Party.

26.6 **Dispute Resolution in Subcontracts.** Seller shall include dispute resolution provisions in its subcontracts in the same terms as provided above, and, in addition, the following provisions:

- (a) In respect of any Dispute under a Subcontract which is related to a Dispute which is the subject of an arbitration between Seller and Buyer, if Buyer so requires in its sole discretion, the Subcontractor shall agree to the consolidation of the arbitration of its Dispute with Seller with the arbitration between Buyer and Seller and shall be fully bound as a party to such arbitration and accordingly by the applicable rules and any arbitral order or award therein; and

- (b) Whether or not a Dispute exists between a Subcontractor and Seller, if either Buyer or Seller so requires in its sole discretion, subject to the jurisdiction of the arbitrator and the applicable arbitral rules, the Subcontractor shall cooperate in the provision of information, documentary or otherwise, statements and/or witness testimony in any arbitration between Seller and Buyer. In such case, the Subcontractor shall be reimbursed by the party requiring such participation for its reasonable and verifiable expenses incurred and the Subcontractor agrees that it shall maintain the confidentiality of such proceedings.

**27.0 GENERAL PROVISIONS**

27.1 **Notices.** All Notices to be given to either Party under this Agreement shall be written and addressed to Buyer and to Seller as follows:

To Buyer:

Nova Scotia Power Incorporated  
1223 Lower Water Street  
PO Box 910  
Halifax, NS, B3J 3S8  
Attention: Legal Services  
Facsimile: (902) 428-4006  
Email: [legalservices@nspower.ca](mailto:legalservices@nspower.ca)

To Seller:

[REDACTED]

All Notices may be sent by facsimile, a nationally recognized overnight courier service, first class mail or hand delivered. A courtesy copy of the notice may be sent by email provided the sender shall thereafter follow up with a notice by facsimile, overnight courier, first class mail or hand delivery. Notice shall be given when received by the addressee on a Business Day. In the absence of proof of the actual receipt date, the following presumptions will apply:

- (a) Notices sent by facsimile shall be presumed to have been received upon the sending Party's receipt of its facsimile machine's confirmation of successful transmission. If the day on which such facsimile is received is not a Business Day or is after 5:00 p.m. (local time for the recipient) on a Business Day, then such facsimile shall be deemed to have been received on the next following Business Day;

- (b) Notice by overnight courier shall be presumed to have been received on the next Business Day after it was sent; and
- (c) Notice by first class mail shall be presumed delivered five Business Days after mailing.
- (d) A notice given under or in connection with this Agreement is not valid if sent by email only.

27.2 **Independent Contractors.** The Parties expressly acknowledge that they are independent contractors. None of the persons employed by either Party shall be considered employees, agents or authorized representatives of the other Party for any purpose. Nothing in this Agreement nor any action of a Party shall create or be deemed to create a relationship of partner, joint venturer, fiduciary, principal and agent or any other relationship or association between the Parties.

27.3 **Assignment.**

- (a) Seller shall not assign any of its interest in this Agreement without the prior written consent of Buyer, which may be withheld by Buyer in its sole discretion. Such consent shall not release or relieve Seller from any representation or warranty given by Seller or any obligation to be performed on the part of Seller under this Agreement.
- (b) Buyer may, without the consent of Seller, assign this Agreement, or any part thereof, to (i) any Affiliate of Buyer, (ii) any successor to Buyer in connection with any merger, consolidation or other reorganization of Buyer or transfer of all or any part of Buyer's assets, or (iii) any entity that has provided financing to Buyer or its Affiliates or successors. Seller acknowledges and agrees that the upon any such assignment by Buyer the assignee will be the sole obligor for all past and any future obligations and liabilities of Buyer under this Agreement in the same manner and to the same extent as if it was the sole obligor and original party hereto in the place and stead of Buyer under this Agreement, all without any further action, approval, notice or document being taken, obtained, sent or executed by or to any of the Parties at any time.

27.4 **Publicity.** All public relations matters arising out of or in connection with this Agreement will be the sole responsibility of Buyer. Seller shall not advertise or issue any information, publication, document or article for publication or media releases or other publicity relating to the Goods, this Agreement or Buyer's business and activities without the prior written consent of Buyer, except as may be required by Applicable Laws. Seller shall obtain Buyer's approval of the text of any announcement, publication or other type of communication.

27.5 **Entire Agreement.** This Agreement is the entire agreement between the Parties with respect to the subject matter hereof and shall not be modified, varied or amended except as agreed in writing signed by the Parties. Without limiting the foregoing, no terms and conditions of Buyer or Seller communicated verbally or in writing between the Parties at any time in respect of Buyer's purchase of the Goods, whether in the form of standard terms of purchase and sale of either Party or otherwise, shall apply to and form part of this Agreement unless the

Parties have otherwise specifically agreed in a document signed by the Parties or provided expressly herein.

- 27.6 **Survival of provisions.** Any terms or conditions of this Agreement by which obligations of either Party are expressed to be applicable or which extend or may extend beyond termination of this Agreement, shall survive and continue to full force and effect except to the extent expressly set out herein.
- 27.7 **Severability.** If any provision of this Agreement is held to be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provisions will not in any way be affected or impaired thereby, and such provision will be deemed to be restated to reflect the Parties' original intentions as nearly as possible in accordance with Applicable Laws.
- 27.8 **Waiver.** No waiver of any provision of this Agreement shall be of any force unless it is in writing, is expressly stated to be a waiver of a specified provision of this Agreement, and is signed by the Party to be bound thereby. No consent or waiver, express or implied, by either Party of any breach or default by the other Party in the performance of its obligations or of any of the terms, covenants or conditions of this Agreement shall be deemed or construed to be a consent or waiver of any subsequent or continuing breach or default in such Party's performance.
- 27.9 **No Third Party Beneficiaries.** Except as expressly provided herein, nothing contained in this Agreement is intended for the benefit of third parties and no third party may claim for damages or otherwise to enforce any such benefit.
- 27.10 **Further Assurances.** Seller shall execute or cause to be made, done and executed all further acts, deeds, assurances, agreements, instruments or other documents as may be reasonably required to ensure fulfillment of the terms of this Agreement.
- 27.11 **Successors and Assigns.** This Agreement is binding upon and enures to the benefit of the Parties and their respective successors and permitted assigns.
- 27.12 **Time of the Essence.** Time is of the essence of this Agreement with respect to the dates for Delivery of Goods.
- 27.13 **Language of Agreement.** The Parties confirm that it is their wish that this Agreement, as well as all other documents relating hereto, including all Notices, have been and shall be drawn up in the English language only. Les parties aux présentes confirment leur volonté que cette convention, de même que tous les documents, y compris tout avis, qui s'y rattachent, soient rédigés en langue anglaise.
- 27.14 **Counterparts.** This Agreement may be executed by the Parties in counterparts, each of which when so executed and delivered shall be deemed to be an original and when taken together shall be deemed to be one and the same instrument.



- 27.15 **Electronic Delivery.** Transmission of a copy of the executed signature page of this Agreement by one Party to the other Party by facsimile transmission or email in PDF format shall be as effective as delivery to such other Party of an original manually executed counterpart hereof.


*[Remainder of page left blank intentionally]*

The Parties have duly executed this Agreement effective as of the Effective Date.

**NOVA SCOTIA POWER INCORPORATED**

By:  \_\_\_\_\_

Name: Peter Gregg  
Title: President & CEO

By:  \_\_\_\_\_

Name: Dave Pickles  
Title: Chief Operating Officer

We have authority to bind the company.



I have authority to bind the company.

**SCHEDULE A**

**SCOPE OF SUPPLY & TECHNICAL SPECIFICATION**

**NOTE: Items to be covered include, as applicable:**

- **Description of Goods - 2.1(a)**
  - Seller will supply, deliver, install, and commission Power Transformers as itemized in **Schedule C**, in accordance with the general conditions set forth in **Schedule A-1**, and meeting the specifications set out in the documents listed in **Appendix A** attached to this **Schedule A** (the “**Data Sheets**”).
  - Only technical information on attached Data Sheets are applicable. All other notes on pricing, lead time, payment schedules shall be governed as per the terms of the Agreement.
  - The Buyer reserves the right to add other related products, spares or alternative products within this category during the Term of the contract.
- **Technical documentation requirements - 2.2**
  - Seller will provide to Buyer all technical documentation for maintenance, repair and list of spares at no additional cost.
- **Quantities of Goods - 2.4**
  - Estimated quantities of Goods included in **Appendix A**. The quantities given are estimates only as per Section 2.4.
- **Price adjustment if quantities change - 2.3**
  - Seller will pass along additional savings from additional quantities where feasible.
- **Delivery location - 4.2**
  - Seller will deliver the Goods to the Buyer’s facility specified in each Purchase Order.
- **Requirements for technical assistance - 6.1**
  - At the request of the Buyer, Seller will periodically participate in meetings with procurement, operations, and/or engineering to review current practices and specifications for the purpose of identifying operational and design cost savings opportunities.
- **Requirements for:**
  - **quality management activities - 7.2(a)**
    - Seller will meet the standards for quality management as stated in the specification documents in **Appendix A**.
  - **testing - 7.2(b)**

- Seller will meet the standards for testing as stated in the specification documents in **Appendix A**.
- **test or hold points - 7.2(c)**
- Seller will meet the standards for test or hold points as stated in the specification documents in **Appendix A**.
- 
- **Approved Subcontractors - 9.1(a)**
  - Any Subcontractor providing services on site must be in good standing with Buyer on ISN at time of installation with a rating of A.
  - The Seller will only supply approved Subcontractors and as agreed upon in writing with the Buyer.
- **Purpose of Goods - 17.1(b)**
  - Seller will meet the standards as stated in the specification documents in **Appendix A**.
- **Performance requirements - 17.1(c)**
  - Seller will meet the standards for test or hold points as stated in the specification documents in **Appendix A**.

**Appendix "A":  
Specification and Data Sheet**

Specification SE-59 2022.pdf

SE-59 -2022 – BESS Step-Up Transformer – Data Sheet

DATA SHEET	
Standard Specification	SE-59.1-2022
BESS Step-up Transformers, Conservator Tank	Scenario 1: Transformer C

### BESS Transformers

Specified	Proponent	UOM	Value
<b>SE-38.2-2021 Technical Response ("Schedule I")</b>			
<b>1.0 TRANSFORMER RATING</b>			
1.1 Manufacturer			
1.2 No. of Phases & Frequency	3 phase, 60Hz		3 phase, 60Hz
1.3 Rated Capacity @ 65 degrees C	36	MVA /	36
	48	MVA /	48
	60	MVA	60
1.4 Cooling	ONAN	MVA /	ONAN
	ONAF	MVA /	ONAF
	ONAF	MVA	ONAF
1.5 H Winding Voltage	138	kV	138
1.6 H Winding Connection	Wye-gnd		Wye-gnd
1.7 H Winding BIL Line End	650	kV	650
1.8 H Winding BIL Neutral End	650	kV	200
1.9 X Winding Voltage	34.5	kV	34.5
1.10 X Winding Connection	Wye-gnd		Wye-gnd
1.11 X Winding BIL Line End	150	kV	200
1.12 X Windnig BIL Neutral End	150	kV	200
1.13 Angular Displacement	per CSA C88 (HV lead LV)		As per CSA C88 (HV lead LV)
1.14			Partially Buried - Two Bushing Corner, Y3-1, Y3-2
Stabilizing Winding	ushing Corner, Y3-1, Y3-2		
1.15 Y Winding Voltage	13.2	kV	13.2
1.16 Y Winding Connection	Delta		Delta
1.17 Y Winding BIL Line End	95	kV	95
1.18 Y Windnig BIL Neutral End	-	kV	NA
1.19 Regulation @ 0.80 PF	-		4.78
1.20 Estimated Hot Spot Temp Rise	-	degrees C	<80
1.21 Exciting Current at Rated Voltage	-	A	1.3@LV SIDE
1.22 Magnetizing kVA at Rated Voltage	-	kVA	76.9

# REDACTED (CONFIDENTIAL INFORMATION REMOVED)

1.23 Cost of Load Losses	\$1,541.00	\$/kW	
1.24 Cost of No-Load Losses	\$8,818.00	\$/kW	
1.25 Guaranteed No Load Loss	-	kW	32
1.26 Guaranteed Load Loss @ ONAN	-	kW	100
1.27 Total Losses @ Max Rating	-	kW	278@60MVA
1.28 Auxiliary Losses @ Max Rating	-	kW	6

1.24 System X/R (138kV)	-		
1.25 System X0/X1	-		
1.26 Impedance H-X	7.50	%	7.5
1.27 Zero Sequence Impedance H-X	-		6.6

1.28 Compliance to Standards (CSA C88)	-		YES
1.29 Compliance to Standards (other)	-		IEEE C57.12.00
1.30 Noise Rating	10 dB below CSA C88	Standard	10dB below C88 Standard
1.31 Exterior Paint	ANSI Grey 70		ANSI GREY 70

## 2.0 TAPS

### 2.1 Load Tap Changer

2.1.1 Manufacturer	-		N/A
2.1.2 Model	-		N/A
2.1.3 Type (Resistor, Reactor)	-		N/A
2.1.4 Range	-	%	N/A
2.1.5 No. of Steps	-		N/A
2.1.6 Location	-		N/A
2.1.7 Rated Voltage	-	kV	N/A
2.1.8 Rated Current	-	A	N/A
2.1.9 Rated BIL	-	kV	N/A
2.1.10 Temperature Rise @ Rated Current	-	degrees C	N/A
2.1.11 No. of Operations @ Rated Current	-		N/A
2.1.12 Motor Voltage	-	V	N/A
Motor Phase	-	Phase	N/A
2.1.13 Voltage Regulating Relay Type	-		N/A
2.1.14 Oil Mass	-	kg	N/A
Oil Volume	-	L	N/A
2.1.15 Oil Manufacturer	-		N/A
Oil Type	-		N/A

### 2.2 Off Circuit Tap Changer

2.2.1 Manufacturer	Reinhausen		Reinhausen
2.2.2 Model	DEETAP DU III		DU III 400-72.5-12 09 0Y,
2.2.3 Range	±10	%	±10
2.2.4 No. of Steps	8		8
2.2.5 Location	HV		HV
2.2.6 Rated Voltage	138	kV	138

2.2.7 Rated Current	300	A	<b>300</b>
2.2.8 Rated BIL	650	kV	<b>650</b>
2.2.9 Temperature Rise @ Rated Current	-	degrees C	<b>65</b>

**3.0 TRANSFORMER CONSTRUCTION**

3.1 Type (i.e. sealed, conservator)	SEALED		<b>Conservator</b>
3.2 H Winding Material	COPPER		<b>Copper</b>
3.3 X Winding Material	COPPER		<b>Copper</b>
3.4 Core Type (i.e. shell, core)	CORE		<b>Core</b>
3.5 Flux Density @ Rated Voltage			<b>1.54</b>
3.6 Flux Density @ 115% Rated Voltage	-		<b>1.77</b>
3.7 Mass of Core and Coils	-	kg	<b>51600</b>
3.8 Mass of Tank and Fittings	-	kg	<b>12900</b>
3.9 Oil Mass	-	kg	<b>31100</b>
Oil Volume	-	L	<b>34530</b>
3.10 Oil Manufacturer	-		<b>Luminol Tri</b>
Oil Type	-		<b>Type II</b>
3.11 Total Mass	-	kg	<b>106200</b>
3.12 Shipping Mass (heaviest)	-	kg	<b>66500</b>
3.13 Noise Level @ ONAN Rating	-	dB	<b>&lt; 66</b>
3.14 Noise Level @ Max Rating	-	dB	<b>&lt; 69</b>
3.15 No. of Colling Fans per stage	-		<b>4</b>
3.16 Fan Motor Rating	-	W	<b>232</b>
3.17 Fan Motor Voltage	200/208	V	<b>120/240</b>
Fan Motor Phase	1	Phase	<b>1</b>
3.18 Fan Motor Current FLA		A	<b>4.02</b>
Fan Motor Current LRA	-	A	<b>1.06</b>

**4.0 TRANSFORMER BUSHINGS**

4.1 H Bushing Location	Cover Mounted		<b>Cover Mounted</b>
4.2 H Bushing Manufacturer	-		<b>PCORE</b>
4.3 H Bushing Type/Model	-		<b>POC</b>
4.4 H Bushing BIL	650	kV	<b>650</b>
4.5 H Bushing Current Rating	600	A	<b>600</b>
4.6 H Bushing Creepage	2760	mm	<b>2760</b>
4.7 X Bushing Location	Cable Compartment		<b>Cable Compartment</b>
4.8 X Bushing Manufacturer	-		<b>PCORE</b>
4.9 X Bushing Type/Model	-		<b>PRC</b>
4.10 X Bushing BIL	<b>200</b>	kV	<b>200</b>
4.11 X Bushing Current Rating	<b>1200</b>	A	<b>1200</b>
4.12 X Bushing Creepage	<b>700</b>	mm	<b>700</b>
4.13 Y Bushing Location	Cover Mounted		<b>Cover Mounted</b>
4.14 Y Bushing Manufacturer	-		<b>PCORE</b>
4.15 Y Bushing Type/Model	-		<b>PRC</b>



# REDACTED (CONFIDENTIAL INFORMATION REMOVED)

4.16 Y Bushing BIL	110	kV	110
4.17 Y Bushing Current Rating	1200	A	1200
4.18 Y Bushing Creepage	300	mm	300

4.19 Ho Bushing Location	Cover Mounted		Cover Mounted
4.20 Ho Bushing Manufacturer	-		PCORE
4.21 Ho Bushing Type/Model	-		PRC
4.22 Ho Bushing BIL	650	kV	200
4.23 Ho Bushing Current Rating	600	A	1200
4.24 Ho Bushing Creepage	2760	mm	700

4.25 Xo Bushing Location	Cable Compartment		Cable Compartment
4.26 Xo Bushing Manufacturer	-		PCORE
4.27 Xo Bushing Type/Model	-		POC
4.28 Xo Bushing BIL	110	kV	110
4.29 Xo Bushing Current Rating	3000	A	3000
4.30 Xo Bushing Creepage	300	mm	300

## 5.0 CURRENT TRANSFORMERS

5.1 H (Location A)	3	Quantity	3
	600:5 MR	Ratio	600:5 MR
	C400	Accuracy	C400
5.2 H (Location B)	3	Quantity	3
	600:5 MR	Ratio	600:5 MR
	C400	Accuracy	C400
5.3 H (Location C)	3	Quantity	3
	600:5 MR	Ratio	600:5 MR
	C400	Accuracy	C400
5.4 H (Location D)		Quantity	
		Ratio	
		Accuracy	

5.5 X (Location A)	3	Quantity	3
	1200:5 MR	Ratio	1200:5 MR
	C400	Accuracy	C400
5.6 X (Location B)	3	Quantity	3
	1200:5 MR	Ratio	1200:5 MR
	C400	Accuracy	C400
5.7 X (Location C)	3	Quantity	3
	1200:5 MR	Ratio	1200:5 MR
	C400	Accuracy	C400
5.8 X (Location D)		Quantity	
		Ratio	
		Accuracy	
5.9 X (Location E)		Quantity	
		Ratio	

# REDACTED (CONFIDENTIAL INFORMATION REMOVED)

		Accuracy	
5.10 LDC (On X1 Bushing)		Quantity	
		Ratio	
		Accuracy	
5.11 Winding Temperature Indicator (On X2)	1	Quantity	
		Ratio	
		Accuracy	
5.12 Ho (Location A)	1	Quantity	1
	600:5 MR	Ratio	600:5 MR
	C400	Accuracy	C400
5.13 Ho (Location B)	1	Quantity	1
	600:5 MR	Ratio	600:5 MR
	C400	Accuracy	C400
5.14 Ho (Location C)		Quantity	
		Ratio	
		Accuracy	
5.15 Ho (Location D)		Quantity	
		Ratio	
		Accuracy	
5.16 Xo (Location A)	1	Quantity	1
	1200:5 MR	Ratio	1200:5 MR
	C400	Accuracy	C400
5.17 Xo (Location B)	1	Quantity	1
	1200:5 MR	Ratio	1200:5 MR
	C400	Accuracy	C400
5.18 Y (Location A)		Quantity	
		Ratio	
		Accuracy	
5.19 Y (Location B)		Quantity	
		Ratio	
		Accuracy	
5.20 Y (Location C)		Quantity	
		Ratio	
		Accuracy	
5.21 Y (Location D)		Quantity	
		Ratio	
		Accuracy	
5.22 LDC (On Y1 Bushing)		Quantity	
		Ratio	
		Accuracy	
5.23 Winding Temperature Indicator (On Y2 Bushing)		Quantity	

**REDACTED (CONFIDENTIAL INFORMATION REMOVED)**

	-	Ratio	
	-	Accuracy	
5.24 Y3-1 (Location A)	1	Quantity	1
	1200:5 MR	Ratio	1200:5 MR
	C400	Accuracy	C400
5.25 Y3-1 (Location B)		Quantity	
		Ratio	
		Accuracy	
5.26 Y3-1 (Location C)		Quantity	
		Ratio	
		Accuracy	
5.27 Y3-1 (Location D)		Quantity	
		Ratio	
		Accuracy	
5.28 Y3-2 (Location A)	1	Quantity	1
	1200:5 MR	Ratio	1200:5 MR
	C400	Accuracy	C400
5.29 Y3-2 (Location B)		Quantity	
		Ratio	
		Accuracy	
5.30 Y3-2 (Location C)		Quantity	
		Ratio	
		Accuracy	
5.31 Y3-2 (Location D)		Quantity	
		Ratio	
		Accuracy	
5.32 CW (Neutral End)		Quantity	
		Ratio	
		Accuracy	
5.33 CWN2 (Neutral End WTI)		Quantity	
		Ratio	
		Accuracy	
5.34 YG1 (Stabalizing Delta Grounding Point)		Quantity	
		Ratio	
		Accuracy	
5.35 YG2 (Stabalizing Delta Grounding Point)		Quantity	
		Ratio	
		Accuracy	
5.36 TG1/TG2	-		

**6.0 ACCESSORIES**

6.1 Electronic Temperature Gauge	YES	Yes/No	YES
6.2 Tank Ground Protection	NO	Yes/No	NO
6.3 Galvanized Radiators	YES	Yes/No	YES
6.4 HV Surge Arrester Mounting Bracket	YES	Yes/No	YES
6.5 XV Surge Arrester Mounting Bracket	NO	Yes/No	NO
6.6 Asset Condition Monitoring (SEL-2414)	YES	Yes/No	YES
6.7 Online Gas Monitor	YES	Yes/No	YES

Option 1: Hitachi Coresense M10


**7.0 TRANSFORMER TESTS**

Indicate whether or not the following tests, as specified in Section 29 of the Specification, are included:

7.1 Winding Resistance	Yes/No	YES
7.2 Ratio	Yes/No	YES
7.3 Polarity and Phase Relationships	Yes/No	YES
7.4 Excitation Current	Yes/No	YES
7.5 Excitation Loss	Yes/No	YES
7.6 One Hour Excitation	Yes/No	YES
7.7 Positive Sequence Impedance	Yes/No	YES
7.8 Zero Sequence Impedance	Yes/No	YES
7.9 Load Loss	Yes/No	YES
7.10 Temperature Rise	Yes/No	YES
7.11 Gas in Oil Analysis (Before and After Temp Rise)	Yes/No	YES
7.12 Induced Potential Test	Yes/No	YES
7.13 Partial Discharge	Yes/No	YES
7.14.1 Lightning Impulse (Full Wave)	Yes/No	YES
7.14.2 Lightning Impulse (Chopped Wave) (data sheet spec'd)	Yes/No	YES
7.15 Core Insulation	Yes/No	YES
7.16 Insulation Power Factor	Yes/No	YES
7.17 Bushing Power Factor	Yes/No	YES
7.18 Pressure (Hot Oil)	Yes/No	YES
7.19 Vacuum	Yes/No	YES
7.20 Sound Level (data sheet spec'd)	Yes/No	YES
7.21 CT's (ratio, polarity, saturation, insulation, & DC resist)	Yes/No	YES
7.22 Winding Temperature (indication calibration)	Yes/No	YES
7.23 Functional Tests (cooling, control, indication, etc)	Yes/No	YES
7.24 OLTC (functional testing)	Yes/No	YES
7.25 Control Wiring Insulation	Yes/No	YES
7.26 Paint Thickness	Yes/No	YES

**8.0 LOCATION OF MANUFACTURE AND QUALITY ASSURANCE PROGRAM LEVEL ESTABLISHED**

If the QA program in the plant(s) complies with the standards of an organization other than the CSA, please state it

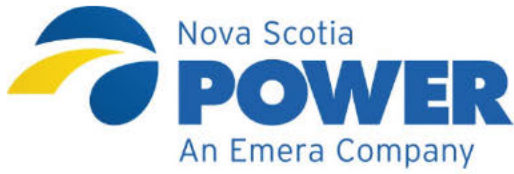
8.1 Tank	Location	
----------	----------	---

	QA Level	ANSI/IEEE
8.2 Welding (Tank)	Location	[REDACTED]
	QA Level	ANSI/IEEE
8.3 Radiators	Location	INDIA
	QA Level	DIN&BSEN
8.4 Fans/Pumps	Location	USA
	QA Level	ANSI/IEEE
8.5 Core	Location	JAPAN
	QA Level	23ZDKH80
8.6 Winding	Location	[REDACTED]
	QA Level	ANSI/IEEE
8.7 Instrument Transformers	Location	[REDACTED]
	QA Level	ANSI/IEEE
8.8 Tap Changer	Location	ITALY
	QA Level	ANSI/IEEE
8.9 Bushings	Location	USA
	QA Level	ANSI/IEEE
8.10 Final Assembly	Location	[REDACTED]
	QA Level	ANSI/IEEE
8.11 Welding (Cover)	Location	[REDACTED]
	QA Level	ANSI/IEEE
8.12 Testing	Location	[REDACTED]
	QA Level	ANSI/IEEE

**SE-38.3-2010 Timings (Schedule "B")**

**1.0 SCHEDULE OF DELIVERY**




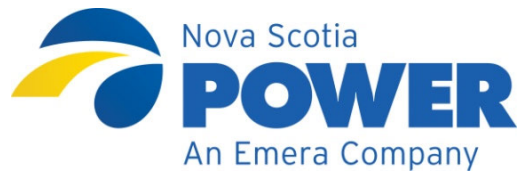


# T&D ENGINEERING SPECIFICATION

NUMBER: SE-59

**POWER TRANSFORMERS  
BATTERY ENERGY STORAGE SYSTEM STEP-UP, CONSERVATOR TANK**

<b>Prepared by:</b>	_____ Name (PRINT)	
	_____ Signature	
<b>Approved by:</b>	_____ M Stewart Name (PRINT)	<b>Seal:</b> 
<b>Previously Issued:</b>	03/06/2022	
<b>Revised:</b>		



# T&D ENGINEERING SPECIFICATION

NUMBER: SE-59

## CONTENTS

- |                                |                                   |
|--------------------------------|-----------------------------------|
| 1. Scope                       | 20. Bushings                      |
| 2. Reference Standards         | 21. Internal Current Transformers |
| 3. Quality Assurance           | 22. Core                          |
| 4. Service Conditions          | 23. Windings                      |
| 5. General                     | 24. Off Circuit Taps              |
| 6. Performance                 | 25. On-Load Tap Changer (OLTC)    |
| 7. Sound Pressure Level        | 26. Control Cabinet(s)            |
| 8. Loss Evaluation             | 27. Accessories                   |
| 9. Non-Conformance             | 28. Rating Plate                  |
| 10. Pressure Vacuum Capability | 29. Tests                         |
| 11. Forced Cooling             | 30. Test Report                   |
| 12. Transformer Tank           | 31. Drawings                      |
| 13. Moving Facilities          | 32. Instruction Manuals           |
| 14. Personnel Safety Features  | 33. Shipment                      |
| 15. Paint Finish               | 34. Asset Condition Monitoring    |
| 16. Radiators                  |                                   |
| 17. Valves and Pipes           | Appendix of Tables & Figures      |
| 18. Conservator Volume(s)      |                                   |
| 19. Miscellaneous              |                                   |

**1.0 SCOPE**

This Specification covers the standard technical requirements for the supply of two or more winding, liquid-filled power transformers with a base rating of 30 MVA and above, and a high voltage winding of 138 kV and above. The transformer must be suitable for use at an inverter-based energy plant (i.e. BESS – Battery Energy Storage System).

**2.0 REFERENCE STANDARDS**

2.1 All requirements, definitions and tests, except as specifically covered in this Specification shall be in accordance with the latest issue of standards listed below:

**2.1.1 CSA Standards**

- C88 Power Transformers & Reactors
- C88.1 Power Transformer & Reactor Bushings
- C50 Insulating Oil, Electrical, for Transformers and Switches
- C22.1 Canadian Electrical Code Part I
- C22.2 #94 Special Purpose Enclosures 2, 3, 4, and 5
- W47.1 Certification of companies for fusion welding of steel structures
- W59 Welded steel construction (Metal-Arc Welding)

**2.1.2 IEEE Standards**

- C57.12.10 Standard Requirements for Liquid-Immersed Power Transformers
- C57.12.90 Test Code for Liquid-Immersed Distribution, Power and Regulating Transformers and Shunt Reactors
- C57.13 IEEE Standard Requirements for Instrument Transformers
- C57.91 Guide for Loading Mineral-Oil-Immersed Transformers

**2.1.3 ASME Standards**

- Boiler and Pressure Vessel Code Section VIII Rules for Const. of Pressure Vessels Div. 1
- Boiler and Pressure Vessel Code Section IX Welding and Brazing Qualifications

2.2 In the event of a conflict between the reference standards and this Specification, requirements of this Specification shall govern. Requirements stated in the Data Sheet at the time of inquiry shall take precedence over this Specification.

**3.0 QUALITY ASSURANCE**

3.1 The manufacturer shall provide evidence that a manufacturing quality program, in accordance with ISO 9001, has been established and is being maintained.



- 3.2 The utility reserves the right to appoint an outside inspector to verify the manufacturer's quality assurance program.
- 3.3 The Supplier shall have been pre-qualified in accordance with NSPI QA-1.0.

**4.0 SERVICE CONDITIONS**

- 4.1 The transformer, complete with all accessories, shall be suitable for operation in a temperature range of -35°C to +40°C and withstand winds up to 120 km/h.
- 4.2 The transformer will be installed in a sea-coast marine, high humidity environment containing corrosive sulphur and salt elements. The manufacturer shall give due consideration to this in the selection of material for hardware, components and anti-corrosion coatings.
- 4.3 The Transformer shall be suitable for the loading profile of a 50MW, 200MWh, Battery Energy Storage System (BESS) with no impact on the service life of the transformer.

**5.0 GENERAL**

- 5.1 The transformer shall be an "Air Breathing" design employing a conservator type expansion tank and using a de-hydrating filter to remove humidity from all air entering the transformer.
- 5.2 The transformer shall be supplied with insulating oil containing an oxidation inhibitor conforming to or exceeding the requirements of CSA C50 Class "A", Type II & EEMAC B6.1.
- 5.3 The insulating oil shall contain 0 ppm of PCB's.
- 5.4 The bushings shall be arranged such that the H2 and X2 bushings share the same centerline and with the H1/X1 and H3/X3 bushings symmetrically arranged on either side of this centerline, as illustrated in Figure #1A. Where possible, the H2/X2 centerline shall, preferably align with the corresponding centerline of the main tank.
- 5.5 An H0 bushing, if required, shall preferably be located adjacent to either the H1 or H3 bushings. If there is insufficient space, the H0 bushing may be located adjacent to either the X1 or X3 bushing. An X0 bushing, if required, shall be located adjacent to either the X1 or X3 bushing.
- 5.6 The preferred radiator location is on the HV face of the tank. If additional radiators are required, they may be located on the LV face. Refer to Figure #1A for radiator locations.
- 5.7 The external conservator tank, shall be located toward the side of the main tank in the direction of either the H1/X1 or the H3/X3 bushings, as indicated on the data sheet.

5.8 An in-tank OLTC shall be located between the core and coils and the HV or LV side of the tank, depending on which winding is tapped.

Alternatively, an in-tank OLTC may be placed to the side of the core and coils. If an external conservator tank is also required, both the in-tank OLTC and external conservator tank shall be located in the same direction relative to the main tank centerline.

5.9 An on-tank OLTC shall be located on either side face of the main tank, with the control cabinet located on the opposite side face or the LV face.

**6.0 PERFORMANCE**

6.1 All transformers including those with forced-directed oil cooling shall be designed for an average winding temperature rise of 65°C above the ambient.

6.2 Ancillary equipment such as bushings, tap changer, bushing current transformers, winding leads, etc., as well as any other current carrying metallic parts, shall not restrict the transformer loading to levels below those permitted by the winding conductor.

6.3 NSP system fault capacity (three-phase, symmetrical) is as listed below:

**SYSTEM FAULT LEVEL**

<b>Nominal Voltage [kV]</b>	<b>Max Operating Voltage [kV]</b>	<b>Fault Level [MVA]</b>
12.47	13.2	200
25.94	26.4	350
69	72.5	3500
138	145	5000
230	245	10000
345	362	15000

The fault level values are based on the nominal voltage as 1.0 PU. For nominal voltages not listed above refer to CSA C88 for system fault capacity.

6.4 The short circuit design of the transformer shall be based on solid neutral grounding

6.5 The impedance shall be as specified on the data sheet.

6.6 The short circuit withstand capability of the transformer designs for 245 kV and 362 kV must consider that the 245 kV and 362 kV terminals of power transformers may be subjected to a single shot, high speed, single phase, trip and reclose.

6.7 The transformer manufacturer shall provide the following data for transformers with an HV rating of 230 kV and above.

- a) Calculated air core reactance for energization from all terminals, with other terminals open.
- b) Calculated B-H curve for terminal with lowest air core reactance.
- c) Calculated positive and zero sequence impedance, terminal-oriented matrix as a function of frequency. The format for each matrix element should be an impedance curve, as a function of frequency from 60 Hz to 200 kHz, in two parts: real and imaginary. The purpose of this data is to determine the location of internal resonances (in the frequency domain) for the purpose of transient modelling.

## **7.0 SOUND PRESSURE LEVEL**

Sound pressure level of the transformer shall be 10 dB below the standard sound pressure level values listed in CSA C88 Table 8 unless specified otherwise at the time of inquiry.

## **8.0 LOSS EVALUATION**

8.1 The Supplier shall guarantee the following losses for each transformer:

- a) No-Load loss in kilowatts at rated voltage and rated frequency.
- b) Total losses in kilowatts at rated output, rated voltage and rated frequency.
- c) Auxiliary losses.

8.2 Load losses will be evaluated on the ONAN, 65°C rise rating for each transformer. Transformer load losses determined under tests shall be corrected to an 85°C average winding temperature.

8.3 Transformer no load losses shall not be temperature corrected.

8.4 For comparison of responses, the transformer cost will be evaluated as follows:

$$\text{Evaluated Cost} = P + [A \cdot E] + [B \cdot L]$$

where	P	=	Transformer Price
	A	=	Evaluated Cost of excitation loss per kW
	B	=	Evaluated Cost of load loss per kW
	E	=	Excitation loss in kW
	L	=	Load loss in kW

The cost of losses will be specified in the data sheets at the time of inquiry.

**9.0 NON-CONFORMANCE**

- 9.1 If the measured excitation loss exceeds the guaranteed value by more than 7.5% (tolerance permitted by CSA C88), then the incremental cost of no-load loss evaluation shall apply as liquidated damages.
- 9.2 If the total measured loss exceeds the guaranteed value by more than 5% (tolerance permitted by CSA C88), then the incremental cost of total loss evaluation shall apply as liquidated damages.
- 9.3 Cooling and auxiliary losses shall not exceed the guaranteed values.
- 9.4 If a transformer exceeds the 65°C temperature rise during tests at rated load, resulting in a de-rating of capacity, then 1.5% of the transformer purchase price for each °C by which the temperature rise is exceeded shall apply as liquidated damages.
- 9.5 If the maximum, measured sound pressure level value exceeds the guaranteed sound pressure level value, then 1% of the transformer purchase price for each dB by which the sound pressure level value is exceeded shall apply as liquidated damages.
- 9.6 There will be no credit or payment of premium if actual values are better than the guaranteed values.
- 9.7 If the transformer's performance in the temperature rise test allows for the removal of one or more radiator units, the Purchaser reserves the right to have these radiator units remain with the transformer at a unit cost per radiator provided previously by the manufacturer.

**10.0 PRESSURE/VACUUM CAPABILITY**

- 10.1 The complete transformer assembly, including tank and radiators, shall be capable of withstanding full vacuum (zero absolute pressure).
- 10.2 The transformer tank shall withstand a minimum positive pressure of 70 kPa (10 psig).
- 10.3 When installed as a separate, externally mounted device, the diverter switch compartment on a load-tap-changing transformer shall be capable of withstanding full vacuum with normal pressure in the main tank and vice versa.

**11.0 FORCED COOLING**

**11.1 General**

- 11.1.1 Each successive fan stage shall increase the ONAN capacity by one-third (i.e. 100%, 133.3% and 166.7% respectively) unless otherwise specified.

11.1.2 Transformers with forced oil cooling shall be designed with internal baffles and ducts to force the cooling oil through the principal winding.

## 11.2 **Cooling Control**

11.2.1 All protective devices, control switches and contactors, etc., required for the control of fans shall be located in the transformer control cabinet.

11.2.2 Automatic control of the fans shall be actuated by a winding temperature indicator - calibrated to simulate the hottest spot temperature in the winding(s). As a back up to the winding temperature indicator signal, automatic control of the fans shall also be actuated by an oil temperature indicator.

11.2.3 The cooling control circuit shall include an “Auto/Manual” control switch and a “Start/Stop” manual control switch for each stage of cooling. There shall not be any “remote control” position.

11.2.4 An alarm relay shall be provided for each stage of fan and/or pump failure, generally in accordance with Figures #9 and #10.

11.2.5 Fan and pump numbers shall be included on the control schematic, and this fan numbering shall also be illustrated on the Layout drawing.

11.2.6 The fans and pumps associated with each stage of cooling shall be identified as a group on the layout drawing.

11.2.7 Flow switches with DPDT contacts (Qualitrol 92-35 Series, or equivalent) shall be mounted in each oil pump system to indicate direction of oil flow and to provide supervising alarm contacts for abnormal flow or incorrect flow direction. (See Fig. #10, re: ANSI type 80 device contacts (80-P#), associated with the 62-P# alarm relays.)

## 11.3 **Fans**

11.3.1 Fans shall be appropriate Krenz Vent model.

11.3.2 Fan guards shall be galvanized and meet OSHA requirements.

11.3.3 Fans shall not be located under radiators where they may become blocked by snow. Fans shall also not be located on top of the radiators.

11.3.4 Fans shall not be mounted directly on the radiators to prevent damage to the radiator paint finish and to facilitate possible future radiator replacement. Fans shall be mounted on a removable framework built from hot dipped galvanized steel angles and channels bolted to the transformer tank.

11.3.5 Fan motors shall be totally enclosed and weatherproof with sealed ball bearings.

11.3.6 Each fan motor shall have internal built-in overload protection.

11.3.7 The wiring to the fans shall be run radially from junction points and not daisy chained from fan to fan.

#### **11.4 Pumps**

11.4.1 Forced oil cooling shall include sufficient pumps so that loss of any one pump will still provide 100% capacity to circulate the oil through the radiators or coolers at rated kVA.

11.4.2 All pumps and their respective radiator groups, if applicable, shall be sized, laid out and controlled in the same manner and be readily removable for replacement without taking the transformer out of service.

11.4.3 Each pump and motor shall be completely enclosed in the oil circulating system so that both stator and rotor windings are submerged, and the bearings are continuously lubricated.

11.4.4 Each pump motor shall be individually protected.

11.4.5 Each pump shall be rated to pump cold oil continuously. The pump system shall be so designed that starting of a pump does not initiate an oil pressure surge (i.e. rapid pressure rise) trip.

#### **12.0 TRANSFORMER TANK**

12.1 The tank shall be of welded, sheet-steel construction, free from distortion and provided with a channel or I beam structural steel base to permit rolling and skidding of the transformer in any direction.

12.2 All welding shall conform to the requirements of CSA W59. The welders shall be qualified in accordance with CSA W47.1.

12.3 The tank cover shall be peaked or sloped to prevent water accumulation.

12.4 The tank cover shall be welded to the tank using flanges to facilitate removal. Manholes shall be provided to permit removal or installation of bushings, inspection of core and windings, tap changer mechanism and similar components. All manholes, bushing and other major openings in the cover shall have flanges of 10 mm minimum elevation around the edges to prevent entry of water when the cover is removed.

12.5 Manholes shall be circular with a minimum of 23" diameter

- 12.6 Hand holes shall be circular with a minimum 16” diameter
- 12.7 Joints sealed with a gasket shall be designed with stops to limit and maintain an even and effective pressure to ensure oil tightness without over stressing the gasket.

These stops shall be designed such that the collection of water/moisture on the exterior side of the gasket is inhibited. This is to minimize the possible development of creeping corrosion of the metal under or above the gasket; and hence the development of a leak.
- 12.8 The preferred gasket material is Nitrile rubber.
- 12.9 Bushing turrets shall be water-tight and condensation proof.
- 12.10 The bottom plate of the transformer tank shall be at least 3 mm thicker than that required by design strength requirements to allow for possible rusting.
- 12.11 Four (4) tank grounding pads with two-hole NEMA standard spacing shall be provided at - one near each corner, approximately 150 mm above the bottom of the tank, as typically illustrated in Figure #1B.
- 12.12 Additional grounding pads, associated with surge arrester grounding, shall be provided, as per Section 27.6, specifically Clause 27.6.4, as typically illustrated in Figure #1B.
- 12.13 Insulator support brackets, as typically illustrated in Figure #1B, shall be welded to the tank wall near each neutral or normally grounded bushing. Post insulators, type TR-205 or approved equivalent, and the copper down lead bus bar from each of these bushings shall also be supplied.
- 12.14 For any tertiary bushing requiring a resistance grounding connection, the resistor, grounding transformer, resistor monitor probe, etc. will normally be installed adjacent to the that bushing. All such equipment will be supplied, if so specified on the data sheet. See Clause 27.11.

### **13.0 MOVING FACILITIES**

- 13.1 Hook-type lifting lugs shall be supplied with rounded edges and drilled for a shackle of sufficient size to lift the completely assembled and filled transformer.
- 13.2 Jacking steps shall be attached to the tank at each corner at a height not less than 300 mm and not more than 480 mm from the bottom of the transformer base. The jacking surface shall be not less than 200 mm x 250 mm, both unobstructed and level.
- 13.3 Pulling eyes, with a minimum of 50 mm in diameter, shall be provided on the transformer base, two per side, to permit pulling the transformer in any horizontal direction. The pulling eyes shall be braced to withstand a pull up to 15° vertically from the horizontal.

- 13.4 The transformer base shall be reinforced to permit moving the assembled and filled transformer on rollers in any direction.
- 13.5 The location of the "shipping" and "dressed" centre of gravity shall be painted on all four sides of the tank.
- 13.6 The location of the two "Plan View" centrelines of the transformer shall be painted on all four sides of the tank near the bottom.

#### **14.0 PERSONNEL SAFETY FEATURES**

- 14.1 Anti-skid paint shall be applied to the top of the transformer tank.
- 14.2 Manhole covers and hand-hole covers shall be provided with (hand hold) handles.
- 14.3 A permanently mounted ladder is not required. However, space shall be reserved on the transformer for positioning and securing a temporary portable ladder. Suitable anchors shall be provided at the top of the tank to set the position of the ladder, to restrain the top of the ladder from moving side to side and to allow the top of the ladder to be secured by tying, as typically illustrated in Figure #2.
- 14.4 For fall arrest, Nova Scotia Power uses Unique Concepts Ltd., Advanced Safety Systems, available in Canada through the company Capital Safety. This system utilizes a portable fall arrest anchor post which attaches to a welded on base plate, as typically illustrated in Fig. #2.

The base plate(s) shall be Capital Safety Part # 85-17412, which accommodates the Capital Safety post # 85-16691; which will be supplied by the purchaser.

At least one welded on base plate shall be provided and positioned such that:

- 1) The maximum distance to the edge of the transformer cover is less than 1,800 mm,
- 2) The maximum distance to the inside edge of any manhole allowing confined space entry is less than 900 mm, to allow use of the optional davit arm accessory for the anchor post.

If these maximum distance requirements cannot be met by one base, additional bases are required.

The baseplate shall be positioned and oriented such that the securing pin for the mast can be installed when the transformer is fully assembled (i.e. bushings installed, etc.).

- 14.5 If the transformer manufacturer, in its production facility, utilizes a fence-based fall arrest system attached to the transformer, technical details and dimensional specifications pertaining to the posts, rigid or flexible rails and toe kicks that are used shall be provided in the instruction manual to facilitate the Purchaser procuring compatible fencing materials that would utilize the fence attachments on the transformer.



**15.0 PAINT FINISH**

- 15.1 The exterior paint colour shall be light gray, ANSI 70, unless otherwise specified on the data sheet.
- 15.2 The corrosion resistance of the paint surface shall conform to ANSI C57.12.28, latest revision, except the salt spray acceptance criteria shall be 1,500 hours. The painted panel used for the salt spray test shall conform to ANSI C57.12.29. The scribe through the paint for evaluation shall be at right angles to the weld bead. The painted panel test samples shall be made using normal production, welded material and equipment."
- 15.3 Total dry film paint thickness shall be not less than 0.127 mm (5 mils).
- 15.4 All large, non-metallic components which are not grey in colour, shall also be painted (i.e. PVC or ABS explosion vent piping).
- 15.5 A suitable quantity of primer and finish paint shall be supplied with the equipment for touch-up purposes.
- 15.6 As per Clause 14.1, anti-skid paint shall be applied to the top of the transformer tank.
- 15.7 For skid-base transformers, the tank base and underside of the tank shall be coated with asphalt mastic or a coal tar epoxy-polyamide paint system. One suggested product is Intertuf JBA016 black high build, available from International Paints (Canada) Limited.
- 15.8 The interior of the transformer tank shall be painted white using a paint which will not react with, or contaminate, the transformer oil - to facilitate internal inspections and to better display an internal flash over to the tank.
- 15.9 The interior of the control cabinet shall be painted white.
- 15.10 Unless unpainted galvanized radiators are specified (Clause 16.6), radiators shall be painted by the flow coating process and inverted following the application of each coat.

**16.0 RADIATORS**

- 16.1 All units shall be equipped with tank mounted, detachable radiators.
- 16.2 Attachment to the main tank shall be by means of oil tight isolating valves. Valves shall be positive indicating with butterfly welded to shaft and turning handle pinned or welded to shaft. Valve should be securable in both the open and closed positions. The type of valve provided shall be Keystone HILOK High Performance Butterfly Valve (Figure 360/362) with reinforced Teflon seat. The Keystone valve selected shall be designed for use with transformer oil. Blanking plates for all openings shall be supplied.
- 16.3 Radiators shall not be positioned over manholes, hand-holes or inspection covers.

- 16.4 Radiators shall have lifting eyes and be equipped with drain valves (ball valve type) and non-corrodible brass plugs at both the bottom and top.
- 16.5 The design and construction of the headers and fins shall be such as to inhibit the collection and retention of moisture.
- 16.6 Unpainted, hot dip, galvanised radiators shall be supplied.
- 16.7 The distance between horizontal braces shall be a maximum of 500 mm on both sides of the radiators, and tack welded to each panel. Diagonal bracing shall be provided between each horizontal brace on both sides of the radiator. When looking at the radiator, the diagonal bracing shall start from the left at the bottom of the radiator, and then alternate direction with each successive horizontal brace (zig zag pattern). When looking at the diagonal bracing for the other side of the radiator it shall also start from the left at the bottom of the radiator, and then alternate direction with each successive horizontal brace (zig zag pattern). Horizontal and diagonal braces shall be of the same width and thickness of material.
- 16.8 A radiator drawing has been provided, illustrating the radiators, including overall radiator dimensions, fin spacing, top and bottom mounting flange centreline distance, flange details (i.e. bolt hole dimensions and placement, inside dimension of header pipe, gasket groves, etc.), radiator spacing, bracing details and bracing attachment details, etc.

**17.0 VALVES AND PIPES**

- 17.1 All valves shall be non-corrodible and equipped with non-corrodible plugs.
- 17.2 The valves shall be installed by using rust proof fittings and hardware.
- 17.3 All valves sizes shall be in Imperial units (i.e. inches). Metric size valves are not acceptable.
- 17.4 All valves shall be of superior quality and of a type and size indicated in Figures #3A & B.
- 17.5 Pipe joints and fittings shall be "VICTAULIC" or NSP approved equal.
- 17.6 All elevated drain valves shall be piped to approximately 1,500 mm above the base of the transformer.
- 17.7 All piping shall be adequately braced to prevent vibration when the transformer is in service.
- 17.8 The transformer tank shall be provided with valves and fittings, in accordance with Figure #3A.

17.9 When an on-tank OLTC is provided it shall have valves and fittings in accordance with Figure #3A. When an in-tank OLTC is provided it shall have valves and fittings in accordance with Figure #3B.

17.10 OLTC's of other designs, if accepted by the Purchaser, shall be provided with the appropriate connections and valves to permit filtering of the tap changer oil.

## **18.0 CONSERVATOR VOLUME(S)**

18.1 All conservator volumes shall have sufficient capacity to ensure that oil will not be below the low oil alarm level at an ambient temperature of -35°C and will not overflow at an ambient temperature of +40°C with transformer loaded 133% above its nameplate rating.

18.2 A "main tank oil" expansion space accommodated within a separate, externally mounted conservator tank is assumed in this specification. This conservator tank shall be free breathing without use of a diaphragm (i.e. bladder system). A maintenance free dehydrating breather shall be installed to minimize the entry of humid air.

18.3 If an OLTC requires a separate, elevated conservator tank, then such a tank shall be provided. This conservator tank is assumed to be free breathing without use of a diaphragm. A maintenance free dehydrating breather shall be installed to minimize the entry of humid air.

18.4 An OLTC conservator shall be sloped 1° to assist in draining; and shall be provided with a drain pipe brought to 1,500 mm above the base of the transformer and clamped to the main tank for support.

18.5 The connecting pipe between the conservator and its associated main oil volume shall protrude 25 mm into the conservator tank to prevent sludge pickup.

18.6 If applicable, a manhole shall be located at the lower end of the conservator tank for cleaning and inspection purposes.

If two conservator volumes share a common physical tank, a manhole shall be located at the lower end of the main tank conservator volume, and on the physically opposite end for the OLTC conservator volume.

## **19.0 MISCELLANEOUS**

19.1 All nuts and bolts ½" in diameter and smaller shall be stainless steel or silicon bronze. Nuts and bolts over ½" shall be stainless steel or hot dipped galvanized. Plated fasteners are not acceptable.

19.2 Wiring on the exterior of the transformer shall be protected by rigid aluminum conduit. EMT is not acceptable.

Alternatively, liquid tight, flexible conduit suitable for outdoor application, with protective coating unaffected by oil, sunlight, or other agents may be used.

19.3 All conduit installed wiring shall comply with the Canadian Electrical Code, Part I (CSA C22.1) with regard to maximum permitted, percentage conduit fill (Table 8) and de-rated conductor ampacity (Table 5C).

19.4 All conduit installed wiring shall be Meggered after installation to verify that the electrical insulation was undamaged during installation.

19.5 Flexible cables (Tech type) or conduit suitable for outdoor application may be used for short runs to devices (i.e. from junction boxes to fan and pump motors, etc.).

19.6 Connections to fans shall be hard wired. Plugs are not acceptable.

## **20.0 BUSHINGS**

20.1 Bushings must conform to standard CSA C88.1

20.2 Openings in the cover must not be less than the dimensions shown in CSA C88.1, tables 3 and 4, column 9.

20.3 High voltage bushings shall be oil-filled condenser type, equipped with voltage tap, test tap, oil sampling port and a liquid level indicator readable from ground level. Alternatively, dry condenser type bushings are acceptable up to 72kV. High voltage bushings shall be draw-lead type whenever practicable for the rating and be equipped with universal clamp-type connectors on the air terminal. Bushings weather sheds shall be porcelain with ANSI Gray No. 70 glazing.

20.4 Installation of bushings must be such that it does not require large quantities of oil to be removed from the transformer.

20.5 Low voltage bushings shall be cover mounted, unless located in a secondary cable compartment. All bushings installed in a secondary cable compartment must be of solid core construction. The neutral bushing shall be of the same size and rating as the phase bushings. Each bushing shall have a spade type pad with four-hole NEMA spacing. Bushings weather sheds shall be polymer or porcelain with ANSI Gray No. 70 glazing.

20.6 Bushing porcelains shall be one piece without any joints and gaskets.

20.7 The bushing's inner conductor and top cap-nut shall be made of materials such that galvanic corrosion between dissimilar metals is prevented.

- 20.8 Bushing draw leads shall be adequately tied for shipping, but release of the tie shall be readily accomplished through the bushing portal.
- 20.9 The minimum mounting height for all bushings shall be 3,000 mm above the base of the transformer, except for oil to SF6 bushings and bushings located in a secondary cable compartment.
- 20.10 The minimum metal to metal clearance between the live parts of bushings in air shall be as per tabulated below:

<b>Voltage Class [kV]</b>	<b>Clearance (Phase-Phase) [mm]</b>
15	450
27.5	450
35	500
72.5	800
145	1650
245	2410
362	3100

- 20.11 The strike distance between live parts of the bushing and grounded parts in the area of the transformer cover shall not be less than the line-ground strike distance for the bushing itself.
- 20.12 The minimum clearance between the live parts of bushings and surge arresters and any components of the transformer that may be serviced (e.g. gas detector relay, valves, gauges, etc.) shall be as tabulated below:

<b>Voltage Class [kV]</b>	<b>Limit of Approach [mm]</b>
Up to 35	1200
72.5	1500
145	1800
245	2300
362	2900

- 20.13 The minimum leakage distance of the bushings shall be as tabulated below unless specified otherwise in the data sheet.

<b>Voltage Class [kV]</b>	<b>Leakage Distance [mm]</b>
15	300
27.5	500
35	700
72.5	1380
145	2760
245	4600
362	6900

**21.0 CURRENT TRANSFORMERS**

**21.1 General**

- 21.1.1 Bushing current transformers shall be supplied in quantities, locations and ratios as specified in the Data Sheet; and as typically illustrated in Figure #5.
- 21.1.2 The continuous thermal current-rating factor for bushing current transformers shall be 2.0.
- 21.1.3 The secondary terminals of external current transformers shall be wired to terminals blocks in the transformer control cabinet, labelled as per Figure #5.
- 21.1.4 All current transformers shall have fully distributed windings on all taps and be removable without removing the tank cover. This may be done by suitable sizing and access through tank cover manholes or by providing detachable CT bushing pockets.

**21.2 Internal Current Transformers**

- 21.2.1 When the bushing current transformers (BCT's) are housed in turrets, the secondary leads shall be brought out at the turrets.
- 21.2.2 When the BCT's are located inside the transformer tank and suspended from the tank cover, the secondary leads shall be carried through eyelets welded to the tank cover. Spacing between the eyelets shall not exceed 600 mm.
- 21.2.3 All current leads passing through the tank wall shall employ bolted through-type bushings. Plug-in receptacle-type connections shall not be used.
- 21.2.4 The inner diameter of the BCT's must not be less than the dimensions shown in CSA C88.1, tables 3 and 4, column 9.

**21.3 External Current Transformers**

- 21.3.1 Current transformers installed on external leads operating at ground potential shall be rated 600V; and shall be suitable for outdoor use, including weather proof secondary junction box.
- 21.3.2 Details associated with window type current transformers used for the tank ground protection option are provided in Section 27.9 of this specification.
- 21.3.1 Bushing mounted, slip on current transformers shall not be provided unless specifically requested on the data sheet.

**22.0 CORE**

- 22.1 The core shall, preferably, have an approximated circular cross-section.
- 22.2 Core clamps shall be insulated from the core and electrically connected to the tank. Clamps shall be painted white.
- 22.3 Bolts through the core shall not be used for core assembly.

22.4 The core and windings shall be braced to prevent displacement or distortion during short circuit. Temporary blocking, if any, shall be marked in red to facilitate identification for removal; and noted in the installation instructions.

22.5 The electrical grounding of the transformer core to the tank shall be via an insulated ground lead extending through the tank cover or wall via a bushing with a minimum rating of 5 kV. A removable connection shall be made from the bushing to the outside of the tank to allow testing.

The bushing and ground connection shall be housed in a weather tight, condensation proof box.

22.6 The core ground lead, lead connections, exit bushing and grounding connection shall be of sufficient cross-sectional area to withstand a fault current of 20 kA RMS for one second without fusing.

22.7 Grounding from the bushing shall be through a 250-ohm resistor of 25-watt (minimum) rating with a single insulated lead.

## 23.0 WINDINGS

23.1 The windings shall be circular. Rectangular coils are not acceptable.

23.2 The winding material shall be copper.

23.3 Sheet type windings are unacceptable.

23.4 Coil clamping rings shall be of one-piece construction and provide clamping to 100% of the winding's circumference.

23.5 Vapor phase dry out is the only acceptable means of removing moisture from the transformer cellulose insulation. Moisture content shall be <0.5%.

23.6 For dual or multiple voltage winding combinations, the series-parallel connections shall be by an off-circuit selector switch or a manual tap board, as specified in the Data Sheet.

23.7 The handle of a selector changer should preferably be located on the side of the tank and shall be lock able with a padlock having a 10 mm diameter shackle.

23.8 The selector switch or tap board shall be accessible through a hand hole in the cover of the transformer and shall require the removal of little or no oil from the main tank.

23.9 A delta connected tertiary (i.e. stabilizing) winding, if specified, may be partially buried with one corner brought out or fully brought out, as indicated on the Data Sheet.

23.10 In the case of a fully brought out, delta connected tertiary winding, metal phase barriers bonded to the transformer tank shall be installed between the bushings - so as to minimize the probability of a phase to phase fault.

23.11 Delta connected, tertiary (i.e. stabilizing) windings shall be provided with a facility to open the winding loop for test purposes. This may be provided in one of two ways, as specified on the Data Sheet:

- 1) The winding shall be provided with a link, readily accessible through a hand hole in the cover, to allow opening of the delta winding

- 2) The winding shall have one corner connection made externally, by bringing the two windings ends out, each through a bushing, and connecting together the live parts of these bushings. (See Figure #5) This connection may also be requested to be housed in an oil filled box. The grounding bond to this external, corner connection may pass through one or more externally mounted, outdoor rated, 600V insulated CT's.

**24.0 OFF-CIRCUIT TAPS**

- 24.1 Either an off-circuit tap switch or a manual tap board, shall be supplied on the high voltage winding as specified in the Data Sheet.
- 24.2 The handle of a tap changer should preferably be located on the side of the tank and shall be lock able with a padlock having a 10 mm diameter shackle.
- 24.3 The tap change switch or tap board shall be accessible through a hand hole in the cover of the transformer and shall require the removal of little or no oil from the main tank.
- 24.4 All taps shall have full load capacity.

**25.0 ON-LOAD Tap changer (OLTC)**

**25.1 General**

- 25.1.1 When specified on the data sheet, a motor operated, on-load tap changer shall be supplied.
- 25.1.2 The voltage range and number of steps shall be stated on the data sheet.
- 25.1.3 If not specified on the data sheet, as a minimum, the tap changer shall have a rated current not less than two times the current flow of the winding in which it is installed, with the transformer loaded to the ONAN rating and operating on the nominal voltage tap.
- 25.1.4 The OLTC shall be a high-speed resistance or vacuum reactance type.
- 25.1.5 The transformer shall be capable of carrying full MVA capacity on all tap positions.
- 25.1.6 Unless specified otherwise, the transformer shall be designed assuming the following:
  - a) that power flow will be from the HV to the LV terminals; and
  - b) that the transformer will be operated such that the LV terminals are maintained at a constant voltage.

This mode of operating shall be independent of the winding location of the OLTC.

**25.2 Construction**

- 25.2.1 Arcing/diverter switches shall be installed in a sealed tank with an oil system completely separate from the main tank oil.



- 25.2.2 Free breathing diverter compartments are to be equipped with a maintenance free dehydrating breather.
- 25.2.3 Design of the diverter switch shall be such that it will not stop between steps if the motor supply is interrupted before the step is completed.
- 25.2.4 The diverter switch contacts shall be rated for at least 200,000 transitions at its rated current, before requiring replacement; and the contacts shall be easily accessible.
- 25.2.5 Taps shall be so arranged that for a fixed primary voltage, the lowest numbered tap gives the lowest secondary voltage; and successive increasing tap numbers give increasing voltage steps.
- 25.2.6 The tap changer mechanism shall cause the tap changer to move only one step per operation.
- 25.2.7 An operations counter shall be provided.

**25.3 Control and Indication**

- 25.3.1 Control and indication of the OLTC has been provided in accordance with the simplified schematics illustrated in Fig's #12A and #12B.
- 25.3.2 A complete control and indication schematic for the OLTC system shall be provided. This schematic will include and incorporate a simplified illustration of the schematic provided by the OLTC manufacturer.

Interface terminals shall be clearly indicated for wiring connections between the main transformer control cabinet and the OLTC mechanism cabinet.

Interface terminals shall be clearly indicated for the wiring connections to be made by the Purchaser.

- 25.3.3 The following control equipment shall be provided in the OLTC control cabinet:
  - a) Switch for "Local" and "Remote" control functions ("Off" position optional)
  - b) Manual Raise/Lower Controls
  - c) Operations Counter
  - d) Tap Position Indicator with Drag Hands
  - e) Tap position indication equipment c/w analogue output transducer
  - f) Terminal blocks for cable connections by others
- 25.3.4 The following control equipment shall be provided in the main control cabinet:
  - a) Switch for "Local Manual", "Local Auto" and "Remote" control functions
  - b) Manual Raise/Lower Controls
  - c) Automatic voltage control equipment
  - d) Terminal blocks for cable connections for remote control by others
- 25.3.5 The OLTC drive motor shall have thermal overload protection; and a means shall be provided for isolating the motor from the supply. Supply voltage and number of phases will be as specified in the Data Sheet.

- 25.3.6 The tap position indication equipment shall be a slide-wire potentiometer comprising 1 W resistors (number of resistors same as the number of steps in the OLTC). Total resistance of the potentiometer shall not exceed 2,000 ohms. The three terminals of the potentiometer shall be wired to terminal blocks in the main control cabinet.
- 25.3.7 A slide wire transducer with a 0 to 1 mA output, compatible with the potentiometer resistance shall be installed in the control cabinet.
- The power connection shall be 129VDC. The input power connection to the device shall be run through a two fuse holder (see Clause 26.14) and then be connected to terminals in the control cabinet. The powering connection is illustrated in Fig. #8.
- 25.3.8 A tapchange auxiliary contact, closed during tap changer travel, shall be wired to terminals in control cabinet for a "tapchange-in-progress" indication.
- 25.3.9 Control cabinet for the load tap changer shall be near and on the same side as the transformer control cabinet. Alternatively, the two cabinets may be combined.
- 25.3.10 In the event of two control cabinets, the interconnecting wiring shall be via terminal blocks in the main control cabinet. Direct connections to devices within the main control cabinet are not acceptable. It is assumed that interconnection terminal blocks have been provided in the OLTC control cabinet by the manufacturer of the OLTC.
- 25.3.11 The diverter switch compartment shall have a magnetic oil level indication with a minimum of two normally open electrical contacts. The "Low Level" contact will be used either for alarm or to initiate oil containment equipment. The "Low Low Level" contact will be used to de-energize the transformer for a loss of OLTC oil.
- 25.3.12 The "Low Level" contact must be duplicated through the use of a relay. The coil of this relay shall be operable from either 120VAC or 129VDC. The relay shall be rail mounted Phoenix Contact Type EMG 22-REL/KSR-120/21-21 or approved equivalent. A typical connection diagram is illustrated in Figure #8.

## 25.4 **Automatic Voltage Control**

25.4.1 Automatic voltage control shall consist of the following:

- 1) A voltage regulating relay to automatically control the operation of the load tap changer, equipped with facilities for setting any voltage between 110 and 130 V; with a band width adjustable from + 1 to + 3 V.
- 2) A time delay relay adjustable from 10 to 90 seconds.
- 3) An OLTC backup control relay shall be provided to prevent a defective tap changer control from running the voltage outside the upper and lower limits.
- 4) Test terminals shall be provided for adjustment of the voltage relay, reading of output voltage and for testing and calibration from an external power source.

- 5) The external 120VAC potential supply will be furnished by the Purchaser.

## 25.5 Load Drop Compensation (LDC)

- 25.5.1 If specified on the data sheet, a line drop compensator shall be supplied with reverse reactance polarity switch; and the required current transformer installed in the X1 bushing.

## 25.6 Parallel Operation

- 25.6.1 If a requirement for parallel operation is specified in the data sheets, all equipment necessary for future parallel operation with a similar transformer using the circulating current method shall be supplied. The control arrangement shall be generally in accordance with Figure #12B.
- 25.6.2 The required current transformer installed in the X1 bushing, if an LDC CT is not already specified.
- 25.6.3 If parallel operation is required with an existing unit, data will be supplied in the data sheet.

## 26.0 CONTROL CABINET(S)

- 26.1 The control cabinet shall be a NEMA Type 3 enclosure in accordance with CSA C22.2 No. 94 and made of stainless steel with a minimum No. 10 gauge thickness. The top of the cabinet shall be sloped to prevent water accumulation. A drip shield shall be provided above the cabinet door. The bottom shall be located approximately 700 mm above the transformer base. It shall be rigidly braced and secured to avoid amplifying transformer sound level.
- 26.2 The cabinet shall be equipped with an exterior hinged and pad lockable door (10 mm shackle) capable of being latched open or closed. The inside pocket on the door shall contain one copy of the instruction manual. All hinges, latches, pins, etc. shall be made of stainless steel. Piano type hinges are not acceptable.
- 26.3 All external cables, piping, etc., shall enter the control cabinet from the bottom of the cabinet only. Top entry is not permitted.
- 26.4 A pre-set, thermostatically controlled heater shall be provided in the cabinet for anti-condensation. A safety guard shall be provided in front of this heater for personnel safety.
- 26.5 The cabinet shall preferably be insulated with non-combustible insulation.
- 26.6 Screened vents, with filters shall be provided in the cabinet for air circulation.
- 26.7 All devices shall be identified with suitable nameplates in the English language.
- 26.8 All terminal blocks shall be numbered.

- 26.9 Sufficient space and clearances shall be provided at the bottom of the cabinet to facilitate cable entry and termination by others.
- 26.10 The cabinet shall be provided with a grounding bar for individual grounding of current transformers and a minimum of 25 control cable shields, etc.
- 26.11 All current transformer secondary wiring shall be minimum #10 AWG copper and all other wiring shall be a minimum #12 AWG copper and sized to the required current rating as per the Canadian Electrical Code, Part I (CSA C22.1) Table 2.
- 26.12 Terminal blocks used in the control circuit shall be as follows:
- a) Current Transformer Circuits - Phoenix Contact Type URK-ND2 or NSP approved equal.
  - b) Other Circuits - Phoenix Contact type UK16 or NSP approved equal.
- Terminal blocks shall be supplied complete with required blanking plates, insulating plates and tags.
- A minimum of 10% spare terminal blocks shall be supplied on each terminal strip.
- 26.13 Insulated wire connectors shall be used for terminating wires on the device terminals.
- 26.14 All fuse blocks shall be dead-front GEC "Red Spot" or approved equal.
- 26.15 All terminal blocks with voltages operating above 120 V shall be fitted with insulating covers to prevent accidental contact.
- 26.16 The cabinet shall be equipped with a switched light.
- 26.17 A 120 Volt, 15 Amp weatherproof convenience duplex receptacle shall be provided on the exterior of the control cabinet. A moulded case circuit breaker c/w ground fault shall be provided inside the cabinet protection for this receptacle.
- 26.18 A 120 Volt, 15 Amp, moulded case circuit breaker c/w ground fault shall be provided inside the cabinet protection, wired out to terminals, for use by the purchaser to power an on-line gas monitor (as per Fig #8). Alarm and indication terminals shall also be provided as per Fig #9.
- 26.19 A 120 Volt, 15 Amp, moulded case circuit breaker c/w ground fault shall be provided inside the cabinet protection, wired out to terminals, for use by the purchaser to power oil containment equipment (as per Fig #8). Associated alarm terminals shall also be provided as per Fig #9.
- 26.18 Space shall be provided inside the control cabinet for installation of a standard, socket base, glass jar housed, "kWhr / kVA demand", revenue style meter, c/w test switch - for the purpose of measuring power flow through the transformer for statistical record purposes.

The meter will be supplied and field installed by the Purchaser.

The transformer manufacturer shall provide the following material and wiring, in accordance with Figure # 11, to accommodate the meter:

100A, 13 jaw socket, c/w enclosure (if required),  
10 pole test switch (Measurina #9809511, or approved equivalent).

To facilitate both reading and “plugging in” and “unplugging” of the meter, the socket shall be mounted on the back plate of the control cabinet

If insufficient space is available in the control cabinet to accommodate the meter, as an option and with the approval of the Purchaser, the meter base (c/w a weather proof enclosure) may be mounted on an exterior side of the control cabinet.

**27.0 ACCESSORIES**

All standard accessories in accordance with CSA C88 shall be supplied, with modifications and additional requirements as listed below. All auxiliary contacts from the various devices shall be wired to the terminal blocks in the control cabinet.

**27.1 Temperature Indication**

27.1.1 Temperature control and indication for both oil and winding temperature shall be provided and wired directly to the SEL-2414 Transformer Monitor relay (refer to section 34 Asset Condition Monitoring).

27.1.2 With regard to the winding temperature simulation heater circuit, the heater wires and the winding temperature (WTI) current transformer leads shall first be brought out to suitable terminals in the transformer control cabinet, as per the typical circuit illustrated in Figure #7. This is to facilitate the trouble shooting of problems.

27.1.3 The SEL-2414 shall be programmed to operate as follows:

<b>Description</b>	<b>Oil Temperature</b>	<b>Winding Temperature</b>
First Stage Cooling	45°C	70°C
Second Stage Cooling	50°C	75°C
Alarm	80°C	105°C
Trip	95°C	120°C

**27.2 Oil Level Indicators**

27.2.1 MESSKO style MTO magnetic oil level indicators shall be supplied with the transformer and installed as described in this section.

27.2.2 Dials shall indicate the “Min” “25°C” and “Max” oil levels and must be easily viewable from ground level.

27.2.3 Each indicator shall be provided with two, electrically isolated, single pole, double throw contacts wired to the control cabinet. The contacts that close on low oil level shall be indicated on the drawings.

27.2.4 The intended function of the indicators is as described below and is illustrated in Fig #4.

**27.2.5 Oil Level Indicator (Measures conservator volume in External Tank or in main tank)**

The oil level indicator shall be mounted on the transformer tank wall. One contact will be used for remote low oil level alarm indication. The other contact will operate at a lower oil level and it will be dedicated for use in conjunction with oil containment equipment.

#### 27.2.6 **Oil Level Indicator (Measures oil volume inside main tank)**

The oil level indicator shall be mounted on the transformer tank wall. One contact shall close just before the oil level in the transformer tank falls to a level that will expose the core and coils. This contact will be used to de-energize the transformer. The other contact shall open at a higher oil level. It will be dedicated for use in conjunction with vacuum filling equipment.

### 27.3 **Pressure Relief and Regulation**

#### 27.3.1 **Pressure Relief Device**

27.3.1.1 A MESSKO MPreC pressure relief device complete with SPDT alarm contacts shall be mounted on the tank cover, and shall be equipped with an oil directed cover to direct oil downwards. It shall also include a saphamore for visual indication of device operation. Any oil discharged from the device shall be directed away from areas normally frequented for routine maintenance or inspection.

27.3.1.2 “Pressure Relief Valve” shall be stamped on the device.

27.3.1.3 The SPDT contacts shall be wired to terminal blocks in the control cabinet.

27.3.1.4 A functionally similar device with one normally open electrical contact shall be installed on any OLTC tank.

### 27.4 **Gas Detection/Protection**

27.4.1 All free breathing conservator type transformers shall be equipped with a Gas Detector relay to monitor gas accumulation and sudden pressure (ABB Model 11C) shall be provided.

27.4.2 The relay shall be of a two-element type with electrically separate DPST contacts for tripping on sudden pressure rise and for alarm on gas accumulation.

27.4.3 The DPST contacts shall be wired to terminal blocks in the control cabinet.

27.4.4 The highest point of the gas detector relay shall be below the bottom of the conservator tank, and the relay shall be located as to permit visual inspection from the ground.

27.4.5 The gas relay shall be mounted to collect all the gas evolved. All pockets or spaces which are vented to the transformer tank shall be piped to the relay with piping having a minimum 5 degrees slope upward to the relay.

- 27.4.6 A gate valve shall be provided between the transformer and the gas relay to allow free passage of gas. The valve handle shall face the direction of gas relay access.
- 27.4.7 A stainless steel or copper tube, 8 mm or larger inside diameter and secured to the side of the tank, shall run from the gas accumulation element to a sampling valve approximately 1,500 mm above ground level. The valve shall be suitably capped.

**27.5 Dehydrating Breather**

- 27.5.1 A maintenance free dehydrating breather of a design approved by the Purchaser shall be supplied (Reinhausen MTRAB Dehydrating Breather)
- 27.5.2 A maintenance free dehydrating breather shall also be supplied on a separate tap changer compartment.
- 27.5.3 Top of breathers shall be approximately 1,500 mm above the transformer base. Pipe shall be rigid 1” IPS, with threaded fittings. Tubing, EMT, etc., is not acceptable.

**27.6 Surge Arrester Mounting Brackets**

- 27.6.1 Surge arrester mounting brackets shall be supplied unless specifically not requested on the data sheet.
- 27.6.2 As a minimum, mounting brackets for the surge arresters shall be located as to provide the same phase to phase clearance as for the associated bushings.
- 27.6.3 Terminal height of arrester not to exceed that of corresponding bushing.
- 27.6.4 Grounding pads with two-hole NEMA standard spacing shall be provided on the transformer tank wall near the top, for arrester grounding - one for each arrester, as typically depicted in Figure #1B.
- 27.6.5 The surge arrester mounting bracket shall include six mounting holes sized to accept a ½" bolt, for the attachment of the surge arrester. These shall be on a 10" (254 mm) diameter bolt circle; with two holes placed on a line oriented perpendicular to the main tank and with the four remaining holes spaced 60° apart along the bolt circle, as illustrated in Figure #1B.

Other structural and design considerations include, but are not limited to, the following:

<b>Voltage Class [kV]</b>	<b>Arrester Weight [kg min.]</b>	<b>Arrester Height [mm min.]</b>	<b>Centre Line Spacing [mm min.]</b>
15	35	525	605
27.5	45	700	605
72.5	50	810	1150
145	135	1450	2075
230	275	2800	3650
345	365	3700	4100

27.7 **Surge Arresters**

27.7.1 Surge arresters shall be supplied only when specifically requested on the data sheet.

27.7.2 Surge arresters shall be completely specified on, or by a supplement to, the data sheets.

The NSP specification, "SE-20 - Surge Arresters - Station Class", will also be supplied, if necessary.

27.8 **Glanding Plate Storage Box**

27.8.1 A weather repellent box shall be provided, affixed to the transformer, for storage of the glanding plates used to cover the apertures associated with accessories removed for shipping.

27.9 **Tank Ground Protection**

When specified on the data sheet (line 6.3), the tank ground protection option shall include the following features, as typically illustrated in Figure #2:

27.9.1 Four tank ground CT's shall be supplied, as per the following:

GE Type JCP-0, 1,200-5A	Cat # 750X015005
single ratio, window type with base	
c/w secondary terminal conduit box	Cat # 9689693011

or an approved equivalent.

27.9.2 A means to mount a tank ground CT's shall be installed on at each of the four corners of the transformer tank, near the base, each close to each corresponding tank grounding pad.

27.9.3 Two tank ground CT's shall be installed at two of the four mounting locations, on diagonally opposite corners of the transformer tank.

During installation, the Purchaser will install two tank ground conductors - one through each window type CT and connect each of them to the associated grounding pad on the tank wall, as typically illustrated in Figure #2.

The two additional corner mounts are to provide flexibility in the tank ground CT mounting locations, should the transfer ever have to be relocated.

27.9.4 Two additional tank ground CT's shall be installed under the transformer control cabinet.

During installation, the Purchaser will install all protection & control, and station service power cables through these two-window type CT, as typically illustrated in Figure #2.

27.9.5 The secondary terminals of these CT's shall be wired to terminals blocks in the transformer control cabinet. The secondary conductors shall be jumpered at the terminal blocks as typically illustrated in Figure #2



27.9.6 Glanding plates for terminating cables in all high voltage cable termination cubicles shall be constructed from an insulating board material.

**27.10 Power Cable Entrance Junction Box**

27.10.1 When specified on the data sheet, a weather proof box shall be provided for the termination of power cables up to 25 kV.

27.10.2 The box shall be sufficiently spacious, as to provide the same BIL level as the associated transformer winding. This is to eliminate the requirement to cover the bolted connections to the associated bushings with electrical insulating tape to facilitate periodic, future disconnection and re-connection for maintenance testing.

27.10.3 Any requirement for internal bus bars to facilitate the support and termination of multiple cable per phase shall be specified on the data sheet.

**27.11 Tertiary Winding Grounding Provisions**

27.11.1 When specified on the data sheet, provision will be made for grounding a delta connected tertiary winding using a grounding transformer and power resistor mounted directly to the tank of the transformer. A typical mounting arrangement is illustrated in Figure #2.

27.11.2 The proposed transformer is a utility standard, oil filled, pole mounted unit; designed and built to the CSA C2 standard and usually rated 10kVA; and supplied by the Purchaser.

27.11.3 The power resistor is typically short time rated to 1 minute and enclosed in a ventilated stainless-steel enclosure.

27.11.3 Specific physical details about the transformer and resistor would be provided as a part of the drawing approval process.

27.11.3 Two #12 copper, 600V insulated conductors, shall be installed between terminals in the transformer control cabinet and a weather proof junction box near the mounting location if the power resistor. The voltage developed across the power resistor is an analogue quantity required by the protection scheme supplied by the Purchaser; and the Purchaser will extend these conductors to the terminal of the power resistor at the time of installation.

**28.0 RATING PLATE**

28.1 The name plate shall be fabricated from stainless steel, and permanently engraved with data in accordance with CSA C88.

28.2 A schematic representation of main winding and CT connections shall be shown on nameplate. Ratios and polarities shall be indicated for all current transformers.

28.3 The Purchaser's purchase order number shall be stamped on the nameplate.

28.4 Measured values of positive and zero sequence impedance shall be shown based on the ONAN rating. Positive and zero-sequence impedances between windings shall be shown H-L, H-T, L-T.

28.5 A label made of laminated plastic approx. 50 mm x 75 mm, with white background, and indicating PCB level in oil along with date of test shall be affixed near the rating plate.

28.6 When load tap changing is supplied, a separate nameplate with data in accordance with CSA C88, shall be mounted on the tap changer or the tap changer control cabinet.

29.0 **TESTS**

All transformers on a purchase order shall be tested in accordance with CSA C88 but with modifications and additions described below:

29.1 **Winding Resistance:** Resistance measurements shall be taken at all tap positions. Phase to phase and per phase resistance values shall be recorded.

29.2 **Ratio:** Ratio shall be measured at all tap positions.

29.3 **Polarity and Phase Relationships**

29.4 **Excitation Current:** Excitation current shall be measured at 100%, 105% 110% and 115% of the rated voltage at principal tap connection.

29.5 **Excitation Loss:** Excitation loss shall be measured at 100%, 105% and 110% of the rated voltage at principal tap connection.

29.6 **One Hour Excitation:** This test shall be performed on all transformers.

29.7 **Positive Sequence Impedance:** Positive Sequence Impedance tests shall be performed for maximum boost, nominal and maximum buck positions of the OLTC with off-circuit tap switch, if provided, in the nominal ratio position. For three winding transformers and autotransformers with delta tertiaries, the impedance between each pair of windings shall be measured, i.e. HV LV, HV TV, LV TV.

29.8 **Zero Sequence Impedance:** Zero Sequence Impedance tests shall be performed for maximum boost, nominal and maximum buck positions of the OLTC with off-circuit tap switch, if provided, in the nominal ratio position. For three winding transformers and autotransformers with delta tertiaries, the impedance between each pair of windings shall be measured, i.e. HV LV, HV TV, LV TV.

29.9 **Load Loss:** Load loss shall be measured at rated load and at rated voltage

29.10 **Temperature Rise:** Temperature rise test shall be performed on all transformers at maximum rated capacity.

29.11 **Gas in Oil Analysis:** Dissolved gas in oil analysis shall be performed both before and after the temperature rise test. As a pass/fail criteria, the increase in gas content during the temperature rise test shall be less than the following maximum limits:

<b>Gas</b>	<b>PPM</b>
H <sub>2</sub>	10
CH <sub>4</sub>	1
C <sub>2</sub> H <sub>6</sub>	1
C <sub>2</sub> H <sub>4</sub>	1
C <sub>2</sub> H <sub>2</sub>	0
CO	25
CO <sub>2</sub>	150

Oil samples will be taken as follows:

Test	Location	
	Top	Bottom
Before Temperature Rise Test	1	0
After Temperature Rise Test	2	2

The “Before” sample and two “After” samples, one from the top and one from the bottom, will be analysed. The remaining top and bottom samples will be retained for possible later analyses.

- 29.12 **Induced Potential Test:** The tap changer shall be set to include full winding for this test. A three phase test shall be performed. Induced potential test voltage and duration for these transformers shall be as required by CSA Std. C88.
- a) Voltage Classification up to 242 kV: Induced potential test voltage and duration for these transformers shall be as required by CSA Std. C88.
  - b) Voltage Classification 345 kV and above: For these transformers a voltage of 2.0 times maximum rating plate voltage shall be applied for 5 seconds followed by 1.5 times maximum rating plate voltage for 1 hour.
- 29.13 **Partial Discharge:** In addition to RIV, partial discharge measurements using the apparent charge method shall be recorded. Apparent charge shall not exceed 500 pC.
- 29.14 **Impulse Testing**
- 29.11.1 **Lightning Impulse Test:** Lightning Impulse tests shall be performed on all transformer terminals including neutrals.
  - 29.11.2 **Chopped Wave Test:** The chopped wave test is not a routine requirement and shall be performed only when specified on Data Sheet. Crest of the chopped wave shall be same as that of the full wave. Minimum time to flash over shall be 3 micro-seconds.
  - 29.14.3 **Switching Impulse Test:** Switching impulse test shall be performed on HV winding terminals with a voltage class of 245 kV and above. The neutral shall be grounded during this test.
- 29.15 **Core Insulation:** Core insulation tests (minimum 1,000 volt insulation tester) shall be repeated after transformer is loaded on the carrier immediately prior to shipping. Results to be shown on test report (resistance and voltage of tester).
- 29.16 **Insulation Power Factor:** Insulation power factor tests for the transformer winding shall be performed in accordance with ANSI C57.12.90 Method II (test with guard circuit). The power factor value measured at a temperature range between 20°C and 30°C and corrected to 20°C shall not exceed 0.35%.
- 29.17 **Bushing Power Factor:** Power Factor tests shall be performed for all bushings with a resulting power factor stamped on the bushing nameplate and recorded in the test results. This test shall be conducted for both the “C1” and “C2” capacitances.

- 29.18 **Pressure Test:** A pressure test on the tank and cooling system shall be made employing hot oil at 50°C and 35 kPa for a period of 24 hours. If any leaks appear, they shall be repaired and the test shall be repeated.
- 29.19 **Vacuum Test:** A vacuum test shall be performed on all tanks and cooling systems designed for vacuum filling.
- 29.20 **Sound-Level Test:** When specified on the data sheet, sound level test shall be performed.
- 29.21 **Current Transformers:** The current transformers shall be tested after installation in the power transformer from their terminals in the control cabinet. The tests shall be conducted in accordance with C57.13. The following tests are required:
- (a) Ratio Test
  - (b) Polarity Test
  - (c) Saturation Curve
  - (d) Insulation Resistance Test
  - (e) DC Resistance Test
- 29.22 **Winding Temperature:** The results of calibration tests on the winding temperature device(s) (hot spot indicator) shall be shown on the test report.
- 29.23 **Functional Tests:** The secondary circuit wiring of fans, controls, etc. shall be checked to ensure correct functioning from initiating source to actual component operation from terminals for connection by the Purchaser.
- 29.24 **OLTC Equipment:** The OLTC equipment shall be tested electrically, as well as manually, to verify correct sequencing. The motor shall be operated at 90% of it's rated voltage. The following tests are required:
- a) Operation of the tap changer over its entire range at rated voltage
  - b) Operation of the tap changer over its entire range at rated current
  - c) Operation of automatic voltage control equipment.
- 29.25 **Control Wiring Insulation Test:** The control wiring shall be tested at two times the circuit voltage plus 1,000 volts (1,500 V minimum) to ground (60 Hz) for one minute.
- 29.26 **Paint Thickness:** The thickness of the external paint coating shall be measured at 12 locations selected by the Company or its representative. Minimum acceptable thickness shall be 0.115 mm (3 mils).

30.0 **TEST REPORT**

- 30.1 The test results shall show all tests conducted in accordance with this specification.
- 30.2 Upon completion of tests, official copies of the test results shall be distributed to the purchaser, in descending order of preference, as follows:
- a) one (1) electronic copy in a ".pdf" document file format, or
  - b) three (3) paper copies.

31.0 **DRAWINGS**

The following drawings are required for approval:

**31.1 Outline and General Assembly:**

This drawing shall show transformer assembly details including mass, dimensions, location of accessories, hand holds, manholes, centre of gravity, lifting & moving details, etc.

This drawing shall indicate the distance from the underside of the top cover to the top of the oil for the Min, Max and 25°C oil levels marked on the main tank oil level dial.

A temperature compensated dip stick measurement, used to confirm a correctly installed oil amount, shall be indicated, relative to some convenient reference, such as the underside of the cover or the top of a cover flange.

**31.2 Bill of Materials.** This shall include, but not be limited to the following:

- a) Rating, type, leakage distance and manufacturer of the bushings
- b) Type, catalogue no., material and manufacturer of connectors when supplied.
- c) Type, catalogue no., manufacturer of accessories, e.g. gauges, indicators, pressure relief devices, breathers
- d) Type, catalogue no., manufacturer, size and material of valves, pipes and fittings
- e) Type, rating and manufacturer of OLTC
- f) Quantity, rating, capacity and manufacturer of fans
- g) Type, catalogue no. and manufacturer of control switches, terminal blocks, fuses, instruments and relays in the control cabinet(s)

**31.3 Nameplate diagram.**

In addition to other standard information, this drawing shall also indicate if the transformer, radiators and tap changer, if applicable, are rated for full vacuum.

**31.4 Schematic diagrams**

As a minimum, schematic diagrams shall be provided, illustrating load tap changer control, cooling (fan and pump) control, winding temperature indication and alarm and indication contacts. These schematics shall be in accordance with Fig's #7, #9, #10 and #12A & #12B.

These schematic drawing shall clearly indicate the customer connection terminals, if applicable.

Each of these schematics shall be complete and, preferably, represented on a single drawing sheet. If a schematic diagram requires more than one sheet, the interface points common to each combination of drawing sheets shall be clearly illustrated on each. Incomplete schematic representations, or partial schematic representations using wiring drawing interface points are not acceptable.

Small schematic diagrams shall not be duplicated on two or more drawings.

**31.5 Wiring Diagrams.**

**31.6 Shipping Drawing:** This drawing shall show the following information:

- a) Shipping heights, width, length and base dimensions
- b) Shipping weight

- c) Centers of gravity in shipping condition
- d) Location of jack steps, rolling areas and blocking areas.
- e) Slinging requirements and restrictions, if any, for crane off-loading of the transformer.
- f) Position of gas bottles, regulators and gauges if shipped gas filled.
- g) Details of gas shipping conditions and pressure checks to be made.
- h) Status of OLTC compartment as to whether oil or gas filled.
- i) Position of core ground, test link.
- j) Complete Bill of Materials indicating parts shipped separately.
- k) Position of impact recorders.

31.7 Drawings for approval may be submitted to the purchaser, in descending order of preference, as per the following:

- a) one (1) electronic copy in the following CAD file formats:
  - InterGraph - ".dgn" document, latest release,
  - AutoCad - ".dwg" document, one short of latest release,
- b) one (1) electronic copy in the following file formats:
  - ".dxf" document,
  - ".pdf" document,
- c) three (3) paper copies.

## 32.0 INSTRUCTION MANUALS

The instruction manual shall include the following:

- a) Instructions for receiving, storage, assembly and initial oil filling.
- b) Details of accessories supplied with the transformer.
- c) Drawings and details of the radiators supplied with the transformer, including overall dimensions, surface area, mounting flange details and centre-to-centre spacing, and weight: empty and filled.
- c) Details of motors and fans.
- d) Details of pressure/vacuum regulator.
- e) Details of de-hydrating breather(s).
- f) Details of bushing current transformers.
- g) Drawings and instructions for bushings.
- h) Details and instructions for the tap changers including control devices.
- i) Details of gaskets, including list, material, thickness and dimensional details of all gaskets.
- j) List of all valves including size, manufacturer and type number.
- k) Procedures to calibrate and adjust switches, contacts, oil level gauges, temperature indicators, etc.
- l) Procedure to test and calibrate winding hot spot temperature.

- m) Test reports.
- n) Spare parts lists complete with all reference numbers.
- o) All approved drawings.

**32.1 Other Drawings**

The instruction manuals shall include internal assembly drawings for the Purchaser's use for maintenance. These drawings may be non-dimensional and marked "Confidential" and shall include the following:

- a) Inside assembly - High voltage and low voltage (non-dimensioned) - stamped "Confidential".
- b) Inside assembly - Plan and End View (non-dimensioned) - stamped "Confidential".
- c) Connections to series - multiple terminal board, if so equipped.

In addition to, or in lieu of, high resolution photographs shall be included in the instruction book documenting various views of the finished core and coil assembly, including as a minimum, the four side views.

32.2 The instruction manuals shall be distributed to the purchaser, as per the following:

- a) one (1) electronic copy in a ".pdf" document file format to purchaser,
- b) three (3) paper copies - one (1) with transformer,  
two (2) to purchaser.

**33.0 SHIPMENT**

33.1 Transformers shall be shipped dry air filled, unless mutually agreed and specified otherwise.

33.2 For transformers shipped filled with dry air, the following shall apply:

- a) Gas pressurization shall be sufficient to keep transformer dry during shipment and for one month after arrival.
- b) Pressure gauges, valves and gas cylinder physically attached to the transformer and suitably protected from damage shall be supplied for replenishing gas pressure during transit and storage.
- c) Type of gas, initial pressure and temperature, as well as minimum pressure requirements, shall be tagged to the cylinder in a weather proof manner.
- d) Instructions shall be provided for the initial tests on arrival (pressure and moisture requirements).

33.3 The main tank containing the core and coils shall have an operational and activated deck mounted impact recorder with sufficient battery life for twice the duration of the trip. The record from the recorder shall be provided.

The Purchaser reserves the right to have its own solar powered, magnetically attached impact recorder mounted by the manufacturer without regard to the method of shipment.

33.4 When auxiliary equipment such as bushings, or radiators are shipped separately, each container shall be clearly marked with the Company Purchase Order and Serial Number

of the transformer with which it is associated. A detailed packing slip shall accompany each shipment.

- 33.5 Any auxiliary equipment not designed for indefinite outdoor storage shall be packed separately and the container clearly marked "for indoor storage." For parts requiring special precautions during storage, the details shall be shown on the outside of each container, or in a durable envelope attached to the container and labelled "Storage Instructions."
- 33.6 Before a transformer is shipped, all the necessary drawings and information relating to position of oil filling valves and vacuum pump attachments with complete oil filling instructions and special precautions must be sent to the Company. All drawings necessary for the handling and assembly of the transformer including internal arrangement shall be shipped to the Company prior to shipment of the transformer.
- 33.7 Method of oil shipment will be as specified in the Data Sheet. Arrangements for oil shipment must be confirmed with NSPI prior to shipment.
- 33.8 A spare set of gaskets for use during site assembly shall be shipped.
- 33.9 Transit bushing to be provided for facilitating SFRA testing prior to oil filling and assembly.

**34.0 ASSET CONDITION MONITORING**

34.1 Supplier shall install and commission the SEL-2414 transformer online monitoring device. The SEL-2414 shall either directly measure or communicate with other appropriate measurement devices for the purpose of monitoring and recording the following health indicators:

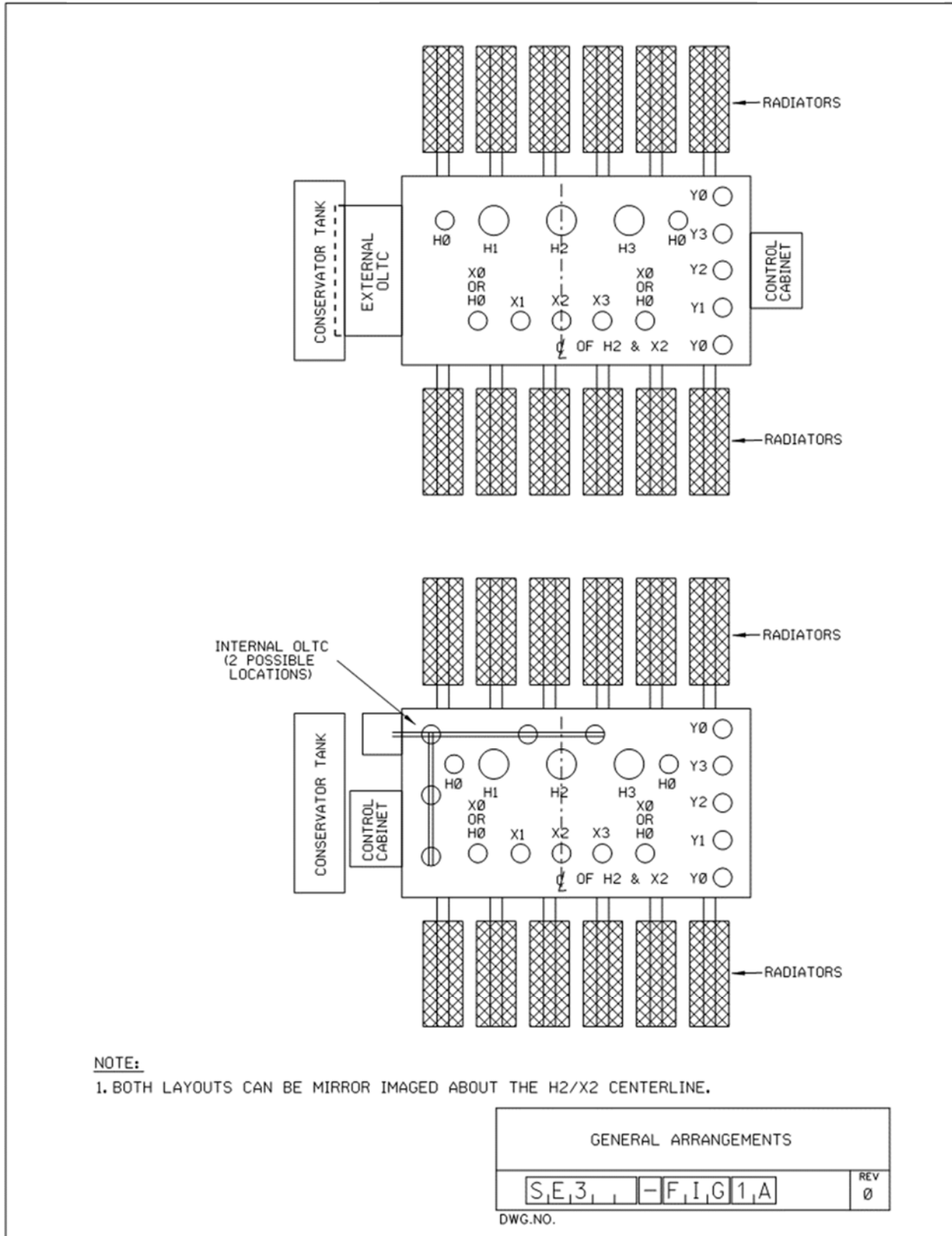
- a) Main tank top oil temperature
- b) Winding hotspot temperature
- c) LTC tank oil temperature
- d) Ambient temperature
- e) Online dissolved gas analysis. (9 gas)
- f) Online moisture-in-oil
- g) Motor current of stage 1 and stage 2 cooling systems
- h) Tap changer motor current
- i) Fan Motor Current
- j) Through Fault Current
- k) Megawatt and Mega VAR hours

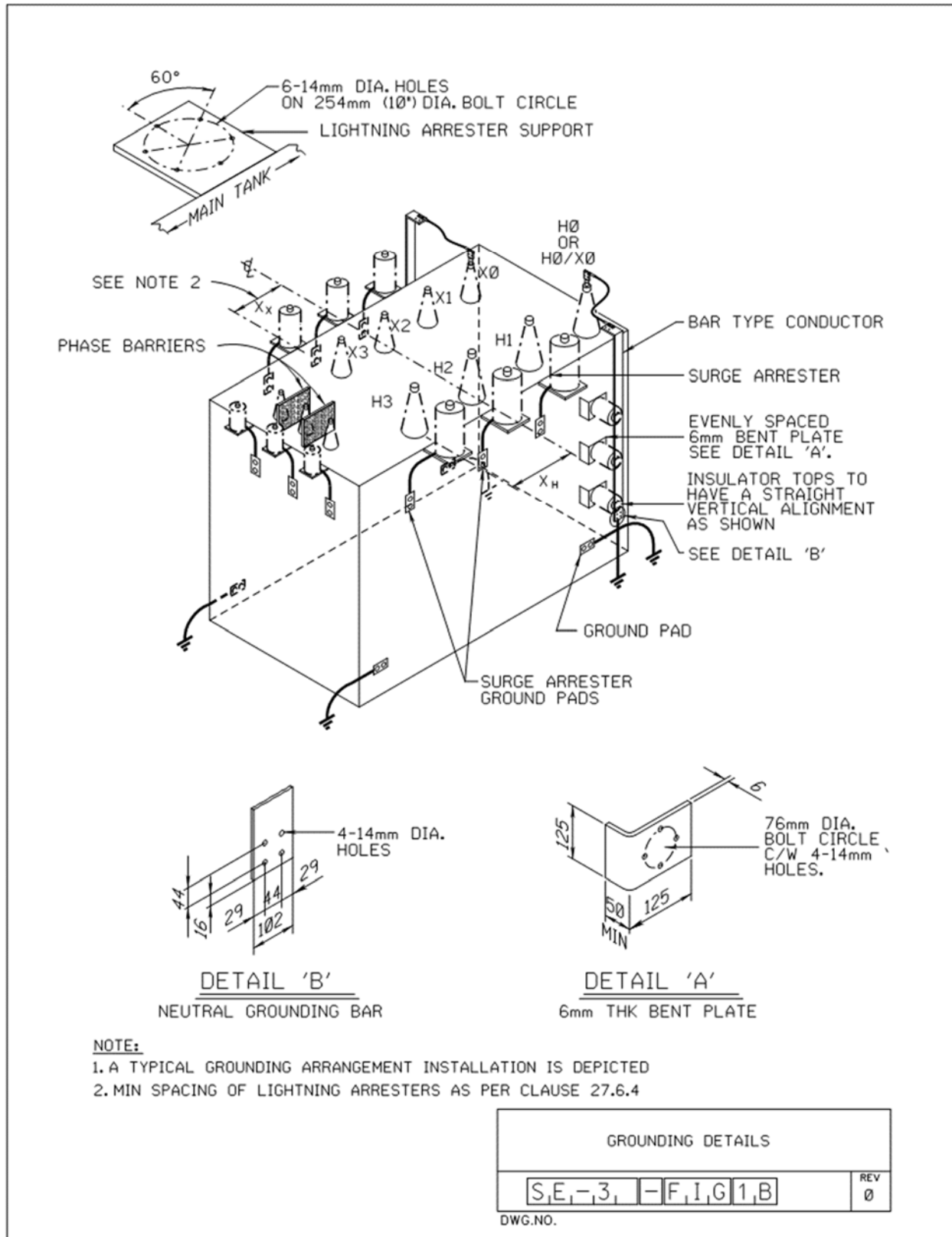
All temperature and current transducers, current transformers, wiring and other devices required to complete the full functionality of the indicators listed above shall be provided.

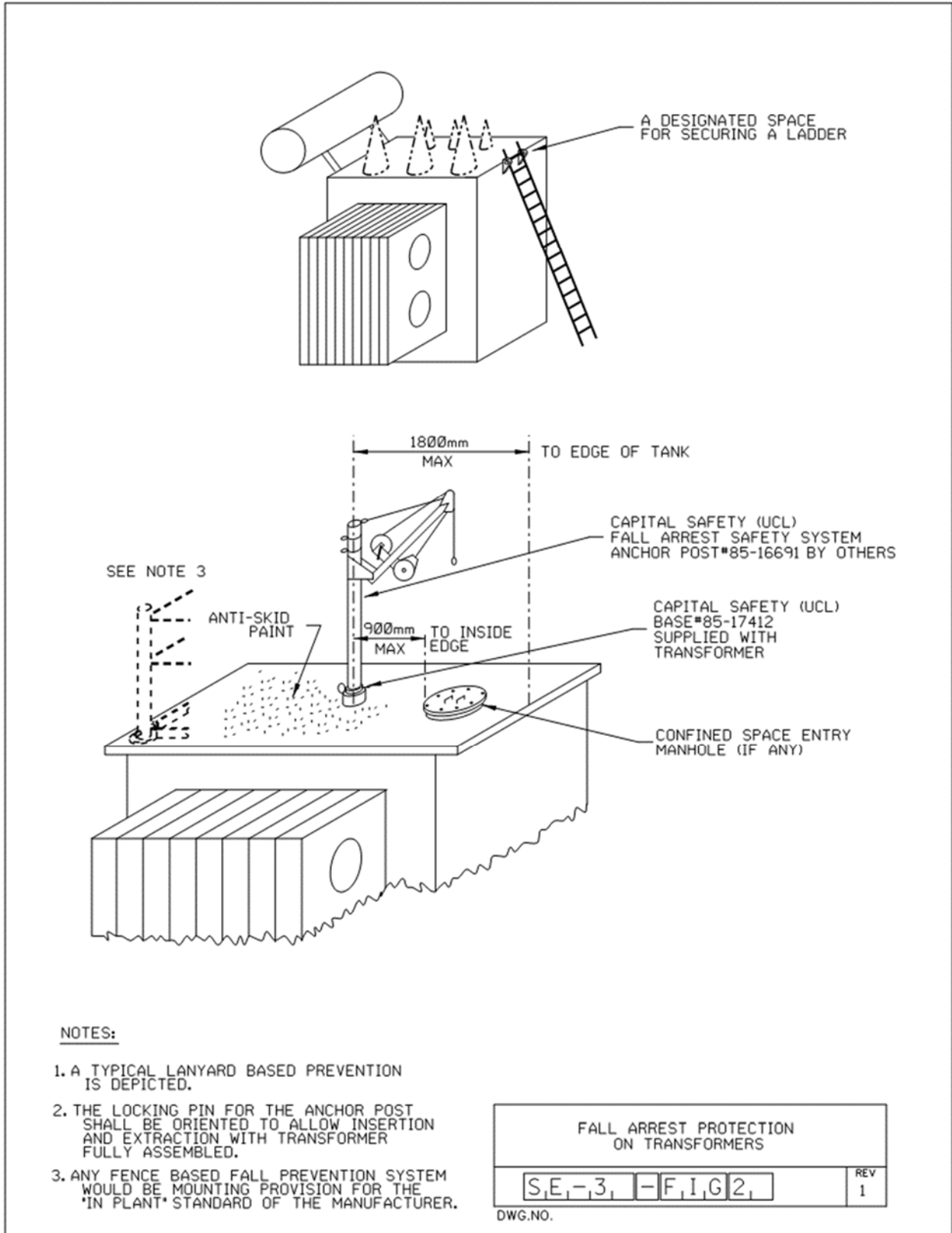
- 34.2 The device shall control the two stages of cooling as well as provide digital outputs for oil temperature alarms and winding temperature alarms. The device shall be self-monitoring and provide a failsafe digital output contact for device failure. Power supply shall be from 125 VDC unless otherwise specified. The device shall be capable of SCADA communication via DNP3.0 protocol over multi-mode fibre.
- 34.3 The SEL-2414 shall incorporate a daily exercise circuit for the transformer fans. The fans shall start every day at 9am Atlantic Standard Time and must run for 10 minutes.

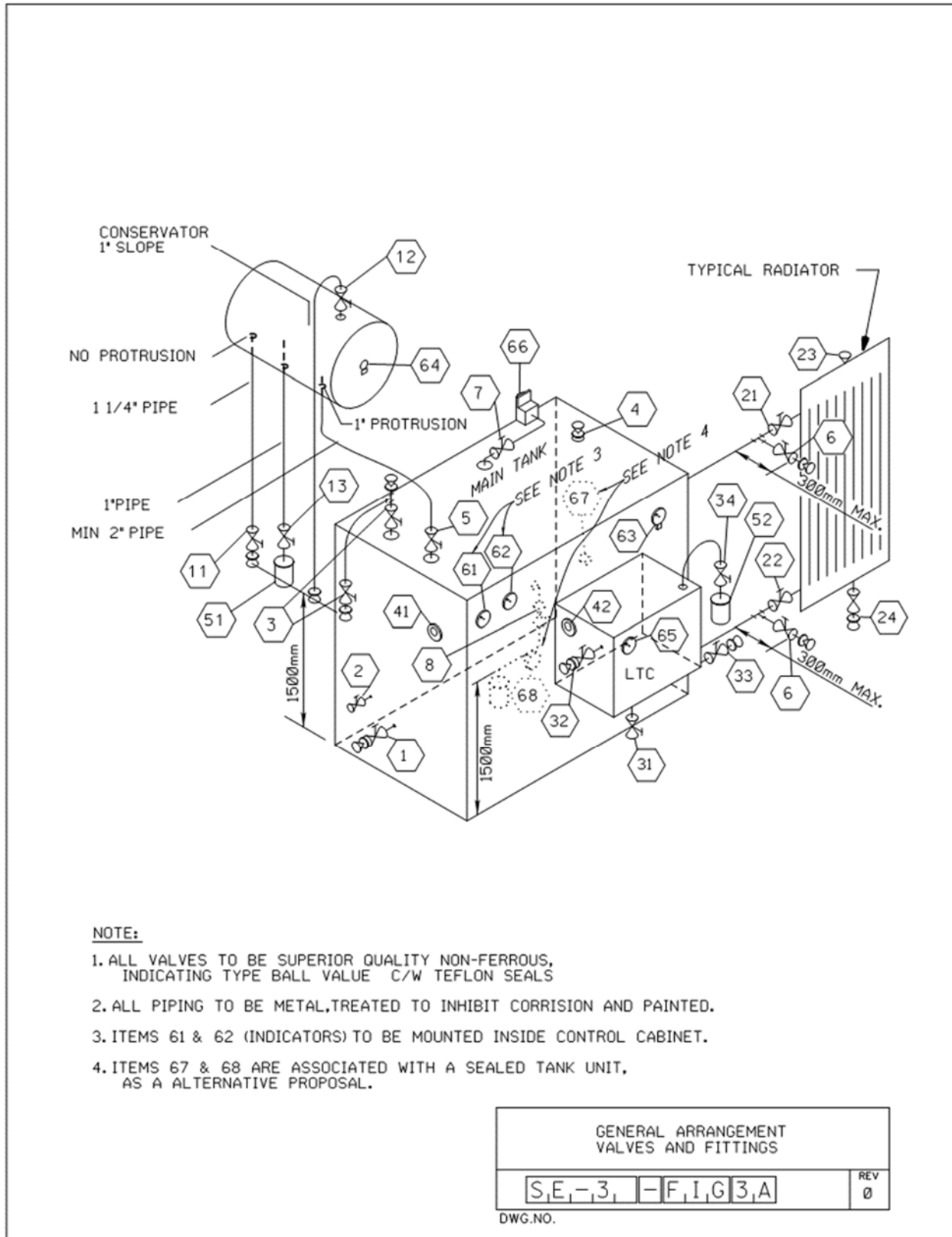


- 34.4 The SEL-2414 shall be programmed to store minimum and maximum transformer temperature history.
- 34.5 The SEL-2414 shall have three AC current and three AC voltage inputs.
- 34.6 The current and voltage inputs shall be the CT type terminals Phoenix Contact Type URK-ND2 and the voltage terminals shall be the Phoenix Contact type UK16.
- 34.7 The SEL-2414 shall preferably be mounted inside the transformer control cabinet. A separately mounted NEMA 4X stainless steel weatherproof enclosure is acceptable as an alternative. The enclosure shall be opened by hand without requiring the use of any tools.
- 34.8 An SEL-2414 wiring schematic, logic diagram and settings file shall be provided for NSPI review.









<b>MAIN TANK - Valves and Plugs</b>				
Item No.	Item	Size (ips)	Location	Function
1	Oil Drain Valve (Globe) c/w 1¼" pipe connection, and plug	2" (min)	Bottom of Tank Side Wall	Oil Drain, Oil Filtering
2	Oil Sampling Valve (Angle Needle) c/w brass plug	½"	Adjacent to Item #1  12" from tank bottom  Internal piping shall be used to ensure that the oil sample will be obtained from the tank bottom	Oil Sampling
3	Vacuum Pump Connection Valves (2) c/w 4" pipe connection to 1,500 mm  above transformer base, Gate valve at top with "T" connection to pipe (c/w plug), and Ball valve at bottom c/w plug.	4"	Top of Tank, Above Item #1	Vacuum Pump Connection
4	Vacuum Level Probe Connection Valve (Gate) c/w plug	1¼"	Top of Tank, Diametrically Opposite Item #1	Vacuum Level Probe Connection
5	Conservator Pipe Connection Valve (Ball)	2" (min)	Top of Tank, Diametrically Opposite Item #1	Conservator Tank Isolation
6	On-Line Gas Monitor Connection Isolation Valve (Gate) c/w plug (i.e. ABB CoreSense)	2"	Tank Side of the top and bottom Radiator Shut-Off Valves, 300mm max. dist. to end of valve	On-Line Gas Monitor Connections
7	Gas Relay Isolation Value (Ball)	½" (min)	Adjacent to Item #66	Gas Relay Isolation
8	Pressure/Vacuum Regulator Isolation Valve (Ball)	1"	Tank Wall, Adjacent to Item #67	Pressure/Vacuum Regulator Isolation

<b>CONSERVATOR - Valves and Plugs</b>				
Item No.	Item	Size (ips)	Location	Function
11	Oil Drain Valve (Gate) c/w 1¼" pipe connection to 1,500 mm above transf. base, Valve at bottom c/w Plug	1¼"	Bottom of Conservator Tank Lower End (i.e. sloping bottom)	Oil Drain, Oil Top Up, Oil Filtering
12	Vacuum Pulling Connection/Valve (Ball)	2" (min)	Top of Conservator Tank, Diametrically Opposite Item #6	Vacuum Pump Connection
13	De-Hydrating Breather Isolation Valve c/w 1" pipe connection to 1,500 mm above transf. base,  Ball Valve at lower end of pipe,  De-Hydrating breather on end	1"	End of Pipe, Above Item #51	Conservator Isolation

<b>RADIATORS - Valves and Plugs</b>				
Item No.	Item	Size (ips)	Location	Function
21	Oil Shut-Off – TOP  Keystone HILOK High Performance Butterfly Valve (Figure 360/362) with reinforced teflon seat	Not Spec'd	Top End of Radiator	Radiator Isolation
22	Oil Shut-Off – BOTTOM  Keystone HILOK High Performance Butterfly Valve (Figure 360/362) with reinforced teflon seat	Not Spec'd	Top End of Radiator	Radiator Isolation
23	Radiator Drain Valve (Ball) c/w Brass Plug	Not Spec'd	Top of Radiator	Vent for Oil Drain
24	Radiator Drain Valve (Ball) c/w Brass Plug	Not Spec'd	Bottom of Radiator	Oil Drain

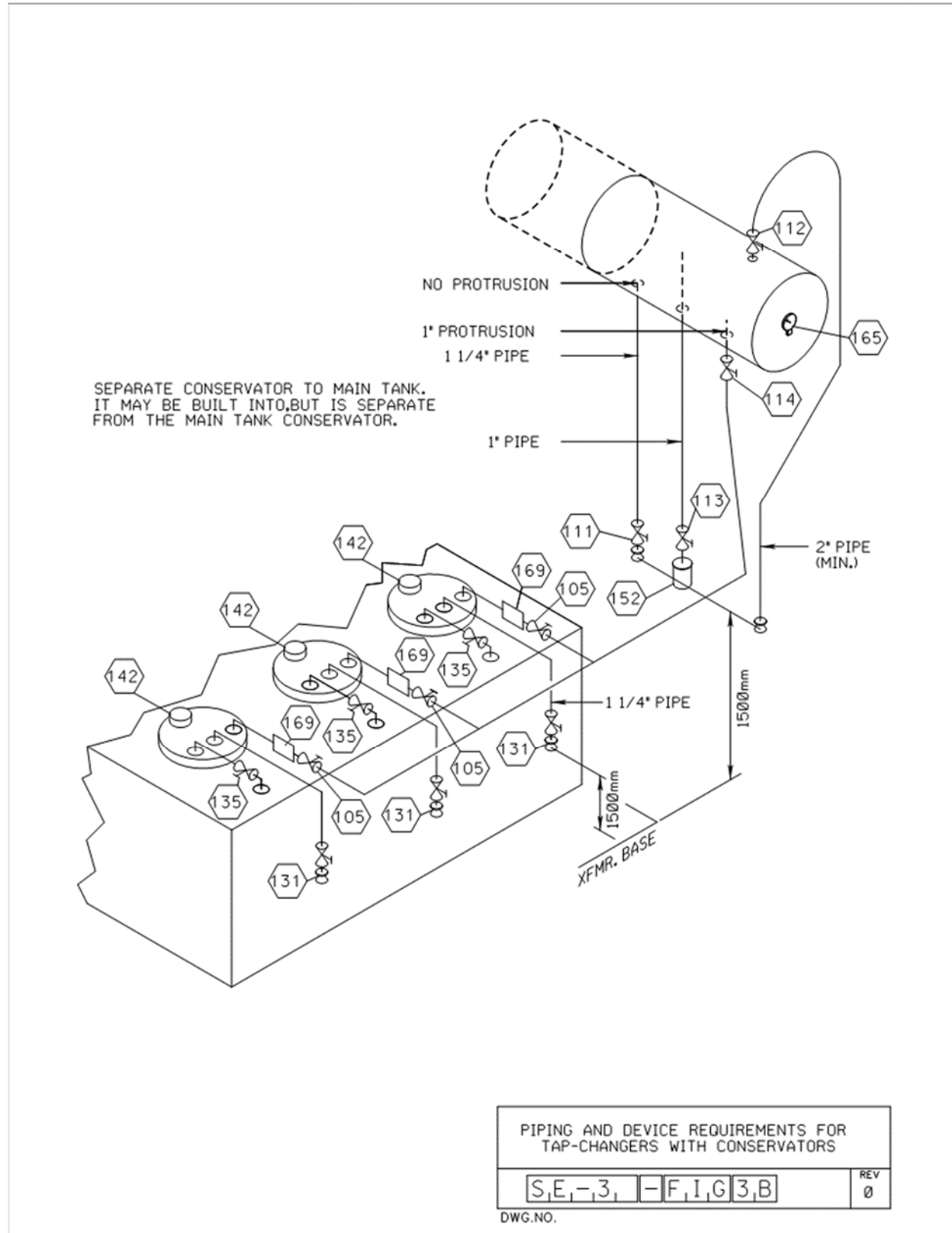
<b>ON-TANK OLTC - Valves and Plugs</b>				
Item No.	Item	Size (ips)	Location	Function
31	Oil Drain Valve c/w Plug	1¼"	Lowest Point in OLTC	Oil Drain
32	Oil Filter Connection - TOP c/w plug	1"	75 mm below top of OLTC Oil	Oil Filtering
33	Oil Filter Connection - BOTTOM c/w plug	1"	25 mm above bottom of OLTC, Diametrically Opposite Item #11	Oil Filtering
34	De-Hydrating Breather Isolation Valve c/w 1" pipe connection to 1,500 mm above transf. base, Ball Valve at lower end of pipe, De-Hydrating breather on end	1"	End of Pipe, Above Item #51	OLTC Isolation

<b>Pressure Relief</b>				
Item No.	Item	Size (ips)	Location	Function
41	Pressure Relief - Main Tank MESSKO MPreC		Main Tank Cover	Pressure Relief, Transf. Prot. Trip
42	Pressure Relief - OLTC Tank (Ext.) c/w Electrical Contacts, and Oil Deflector	Not Spec'd	Top of OLTC Tank Wall	Pressure Relief, Transf. Prot. Trip

<b>De-Hydrating Breathers</b>				
Item No.	Item	Size (ips)	Location	Function
51	De-Hydrating Breather to Main Tank Conservator	1" Pipe		
52	De-Hydrating Breather to OLTC Conservator	1" Pipe		



<b>Gauges and Indicators</b>				
Item No.	Item	Size (ips)	Location	Function
61	Oil Temperature Gauge (Not used with online temperature monitoring)		Main Tank Control Cabinet	Cooling Initiate, High Oil Temp. Alarm, High Oil Temp. Trip
62	Winding Temperature Gauge(s) (Not used with online temperature monitoring)		Main Tank Control Cabinet	Cooling Initiate, High Wind. Temp. Alarm, High wind. Temp. Trip
63	Oil Level Gauge - Main Tank MESSKO style MTO		Top of Main Tank Wall	Oil Level Indication, Oil Filling Alarm, Low Oil Prot. Trip
64	Oil Level Gauge – Main Tank Conservator MESSKO style MTO		Higher End of Conservator Tank	Oil Level Indication Oil Containment Initiate Low Oil Prot. Alarm
65	Oil Level Gauge - OLTC Conservator c/w contacts		Top of OLTC Tank	Oil Level Indication, Oil Containment Initiate, Low Oil Prot. Alarm
66	Gas Detector Relay (ABB Model 11C)		Top of Main Tank (i.e. on cover)	Gas Accum. Prot. Alarm, Gas Prot. Trip



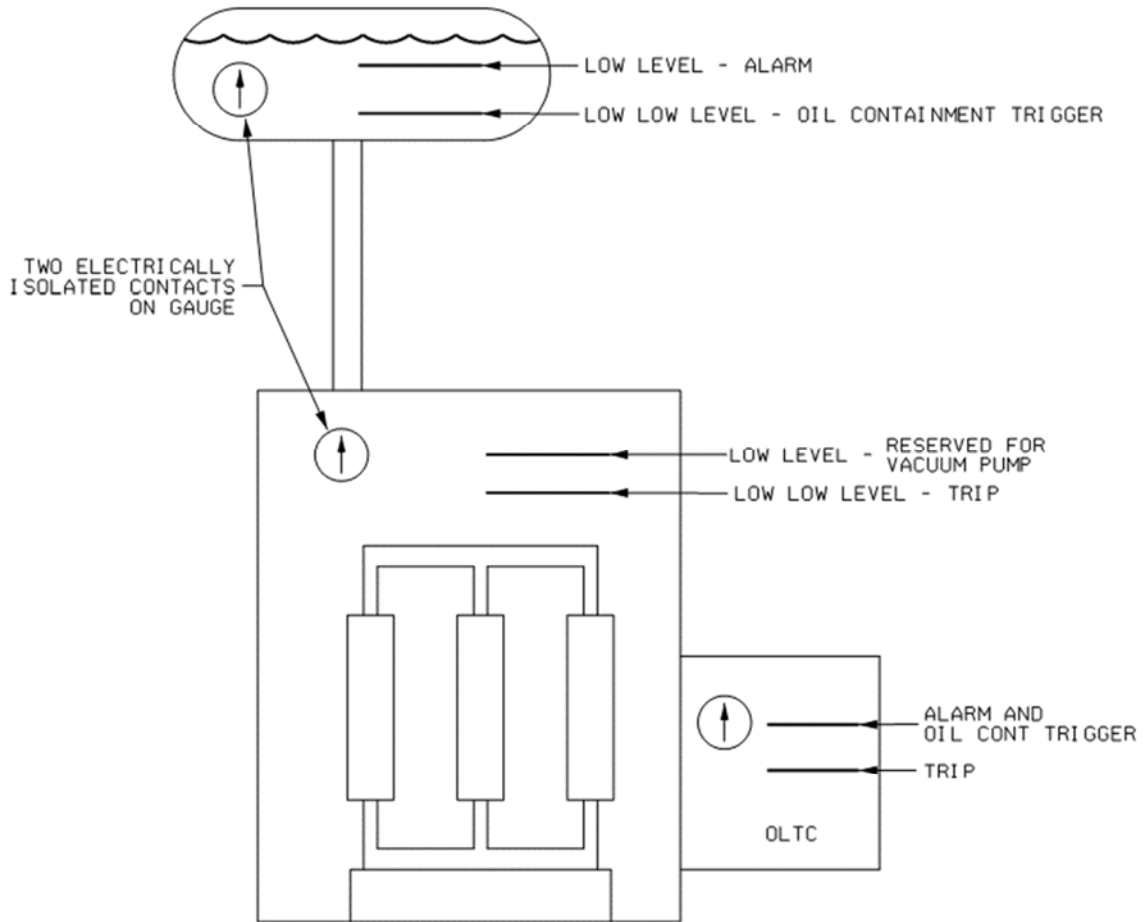
<b>OLTC CONSERVATOR - Valves and Plugs</b>				
Item No.	Item	Size (ips)	Location	Function
111	Oil Drain Valve (Gate) c/w 1¼" pipe connection to 1,500 mm above transf. base, Valve top and bottom, plug on lower valve	1¼"	Bottom of Conservator Tank, Lower End (i.e. sloping bottom)	Oil Drain, Oil Top Up, Oil Filtering
112	Vacuum Pulling Valve (Ball) c/w 2" (min) pipe connection to 1,500 mm above transf. base, Valve top and plug on bottom.	2" (min)	Top of Conservator Tank, Diametrically Opposite Item #6	Vacuum Pump Connection
113	De-Hydrating Breather Isolation Valve c/w 1" pipe connection to 1,500 mm above transf. base, Ball Valve at lower end of pipe, De-Hydrating breather on end	1"	Top of Tank, Above Item #1	Conservator Isolation
114	Conservator Pipe Connection Valve (Ball)	Not Spec'd	Bottom of Conservator Tank, Upper End (i.e. sloping bottom)	Conservator Tank Isolation

<b>IN-TANK OLTC - Valves and Plugs</b>				
Item No.	Item	Size (ips)	Location	Function
105	Conservator Pipe Connection Valve(s) (Ball)	Not Spec'd	Top of OLTC Tank(s),	OLTC Tank Isolation
131	Oil Drain Valve(s) (Gate) c/w 1¼" pipe connection to 1,500 mm above transf. base, Valve at bottom c/w plug	1¼"	Tap Changer Head	Oil Drain, Oil Sample
135	Pressure By-Pass Connection(s) (Ball) Between Main Tank and OLTC Tanks	1¼"	Tap Changer Head	Oil Filtering

<b>Pressure Relief</b>				
Item No.	Item	Size (ips)	Location	Function
142	Pressure Relief – In-Tank OLTC c/w Electrical Contacts, and Oil Deflector	Not Spec'd	Tap Changer Head	Pressure Relief

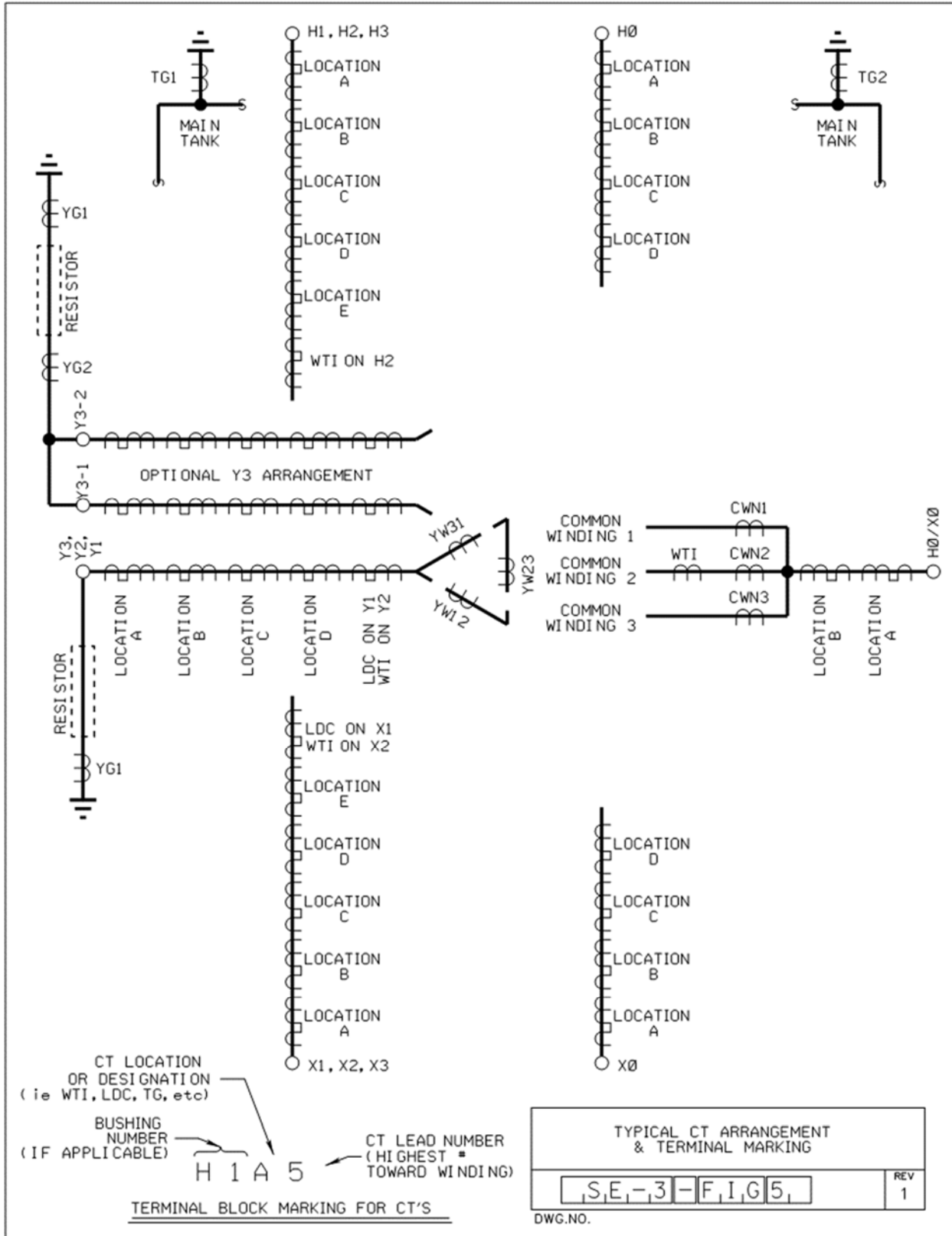
<b>De-Hydrating Breathers</b>				
Item No.	Item	Size (ips)	Location	Function
152	De-Hydrating Breather to OLTC Conservator	1" Pipe		

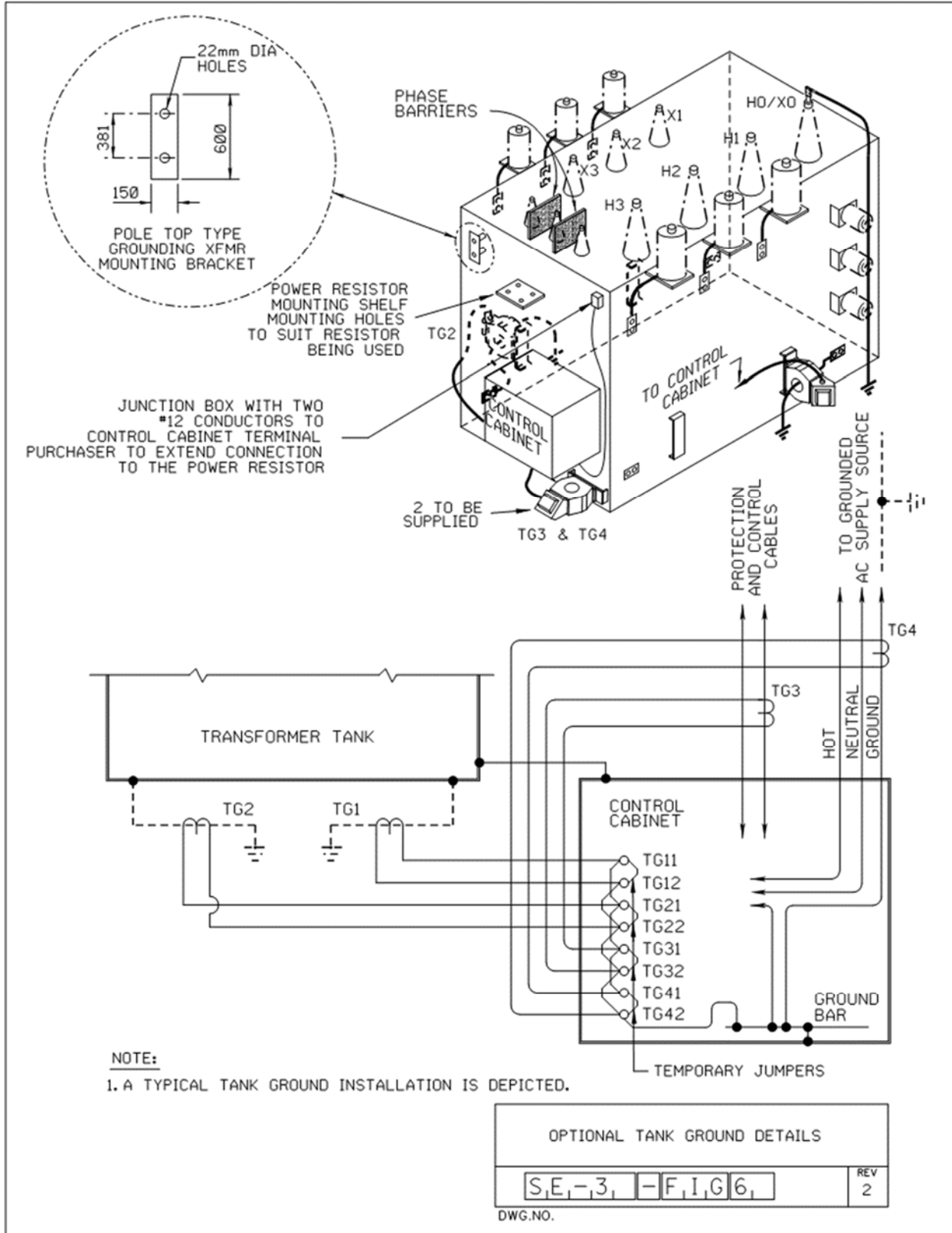
<b>Gauges and Indicators</b>				
Item No.	Item	Size (ips)	Location	Function
165	Oil Level Gauge - OLTC Conservator c/w contacts		Higher End of Conservator Tank	Oil Level Indication, Oil Containment Initiate, Low Oil Prot. Alarm
169	Reverse Flow Device	Not Spec'd	Tap Changer Head	OLTC Prot. Trip

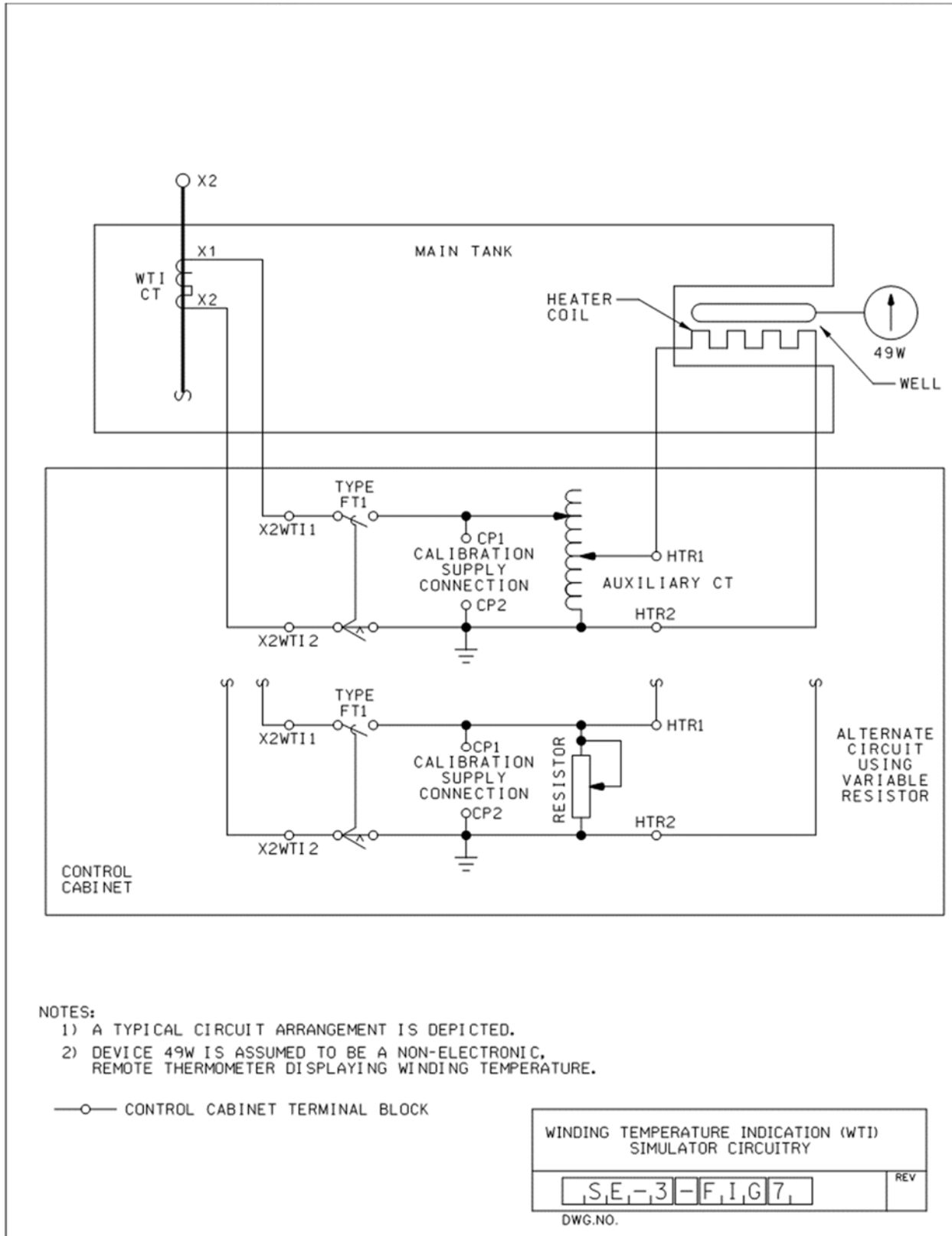


OIL LEVEL INDICATIONS	
SE-3-FIG 4	REV 0

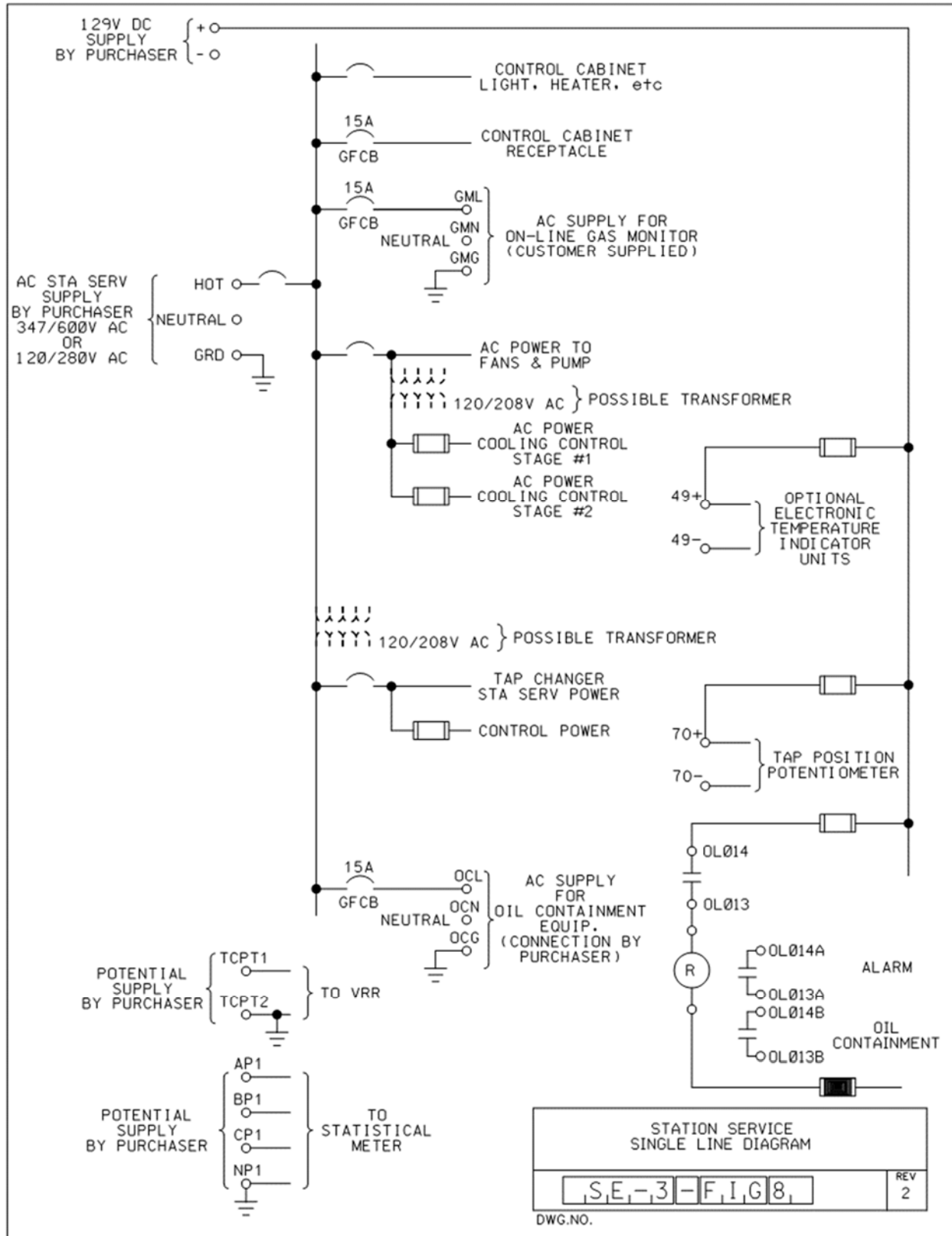
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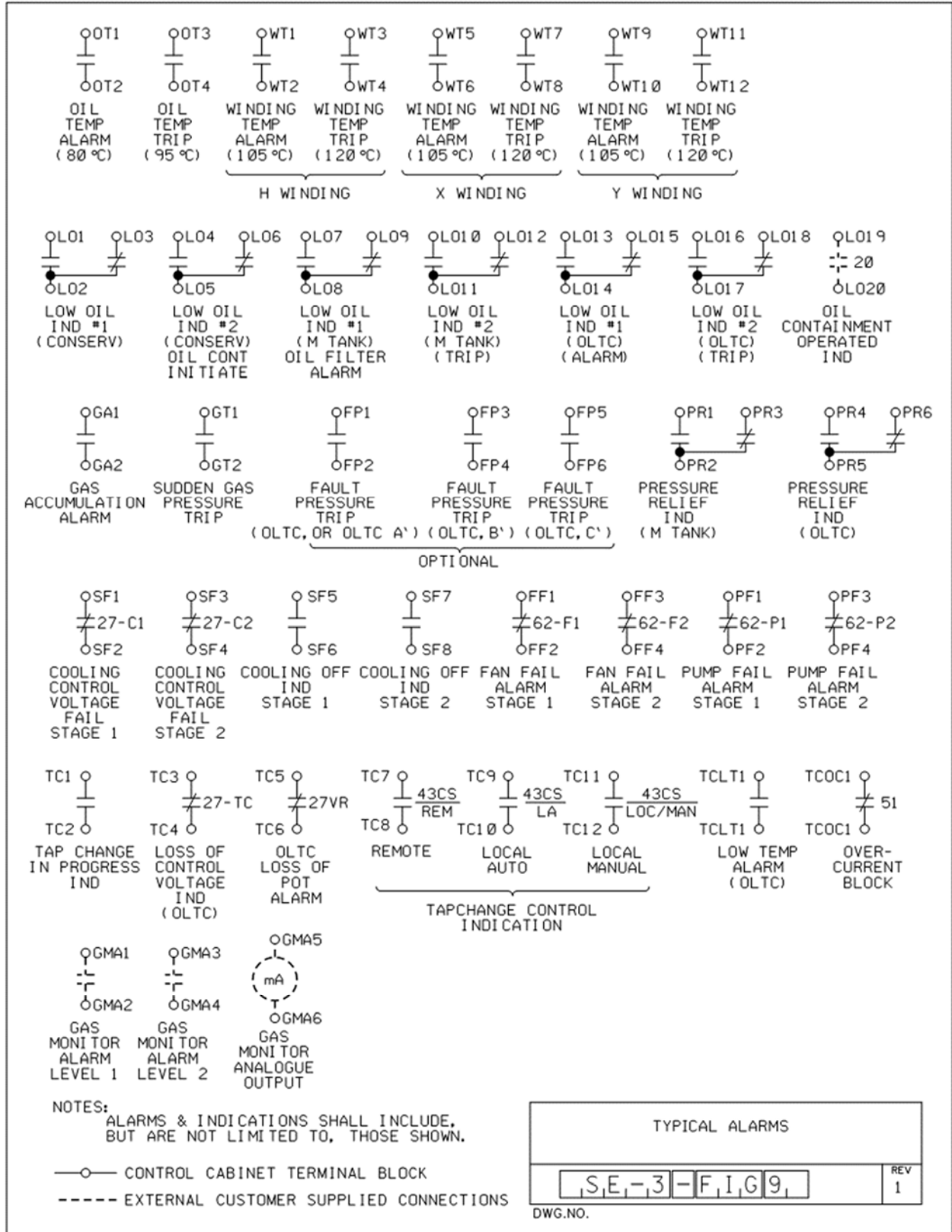


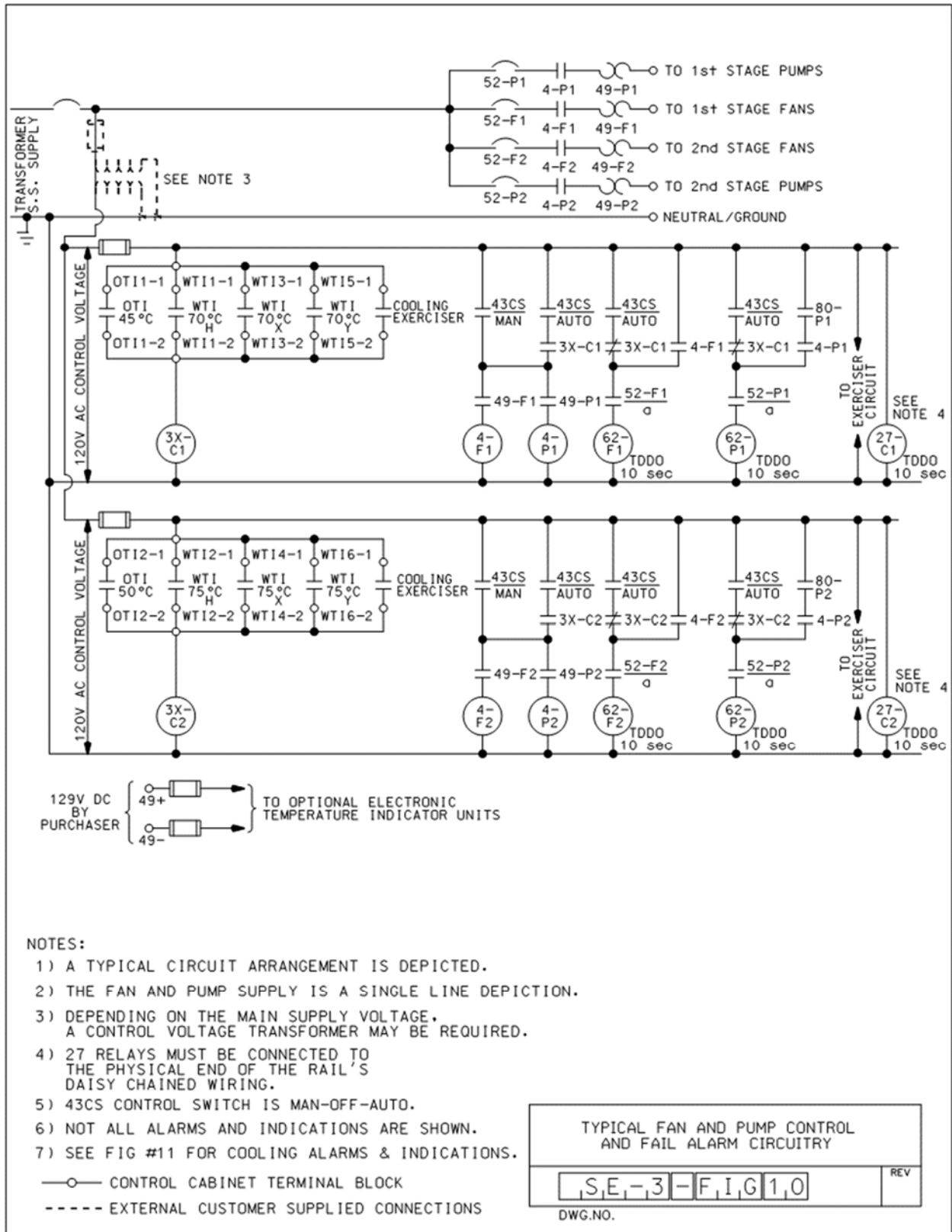


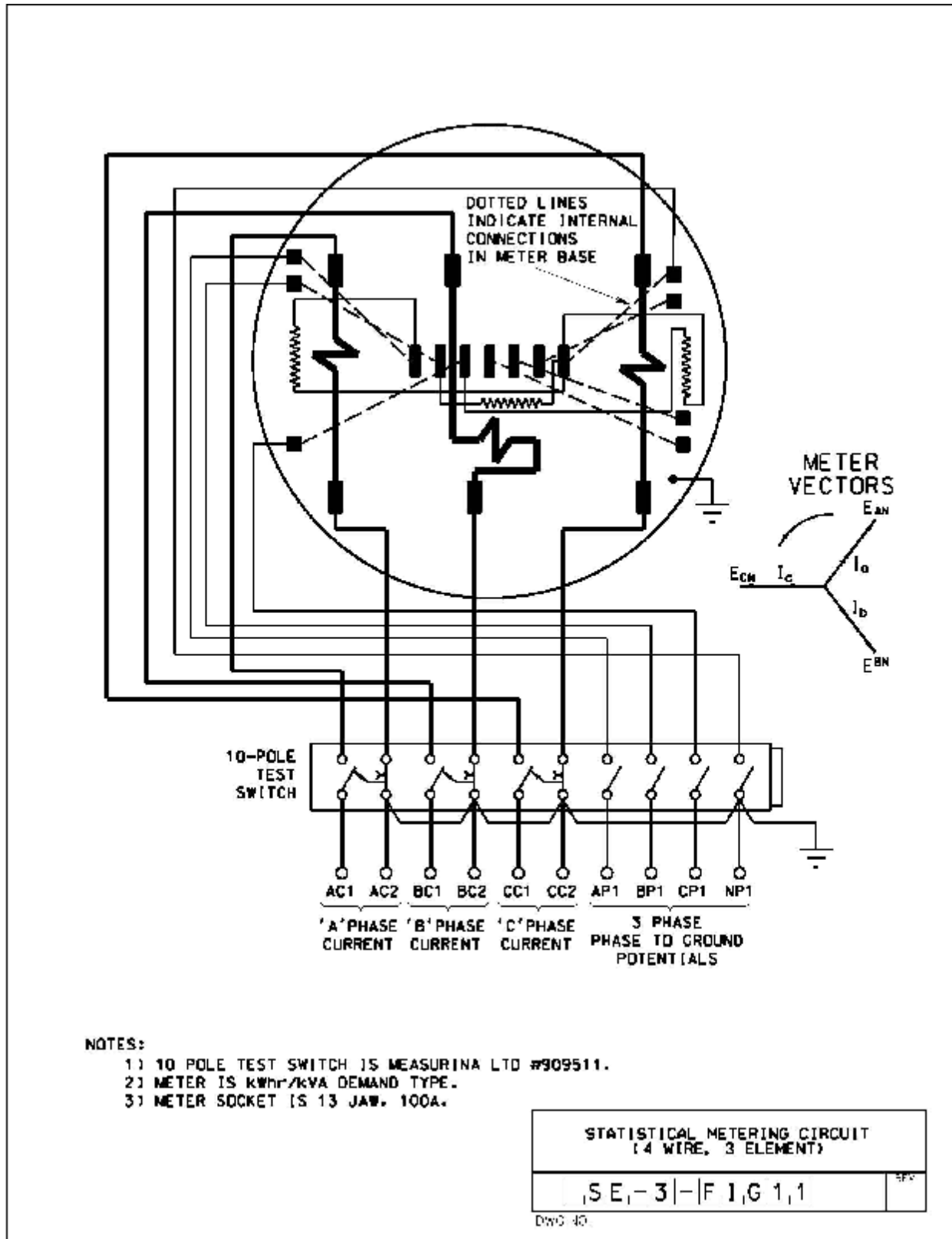


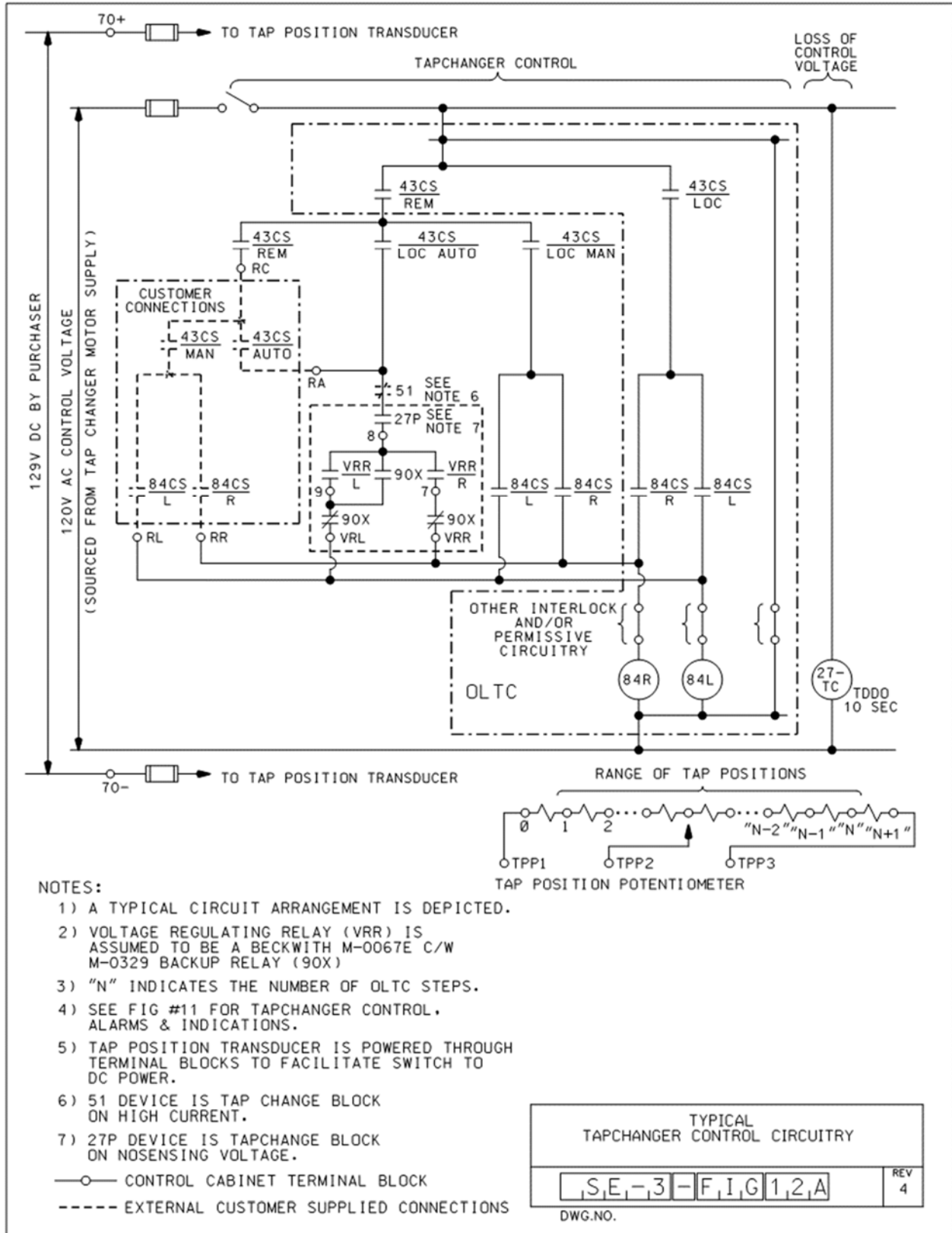


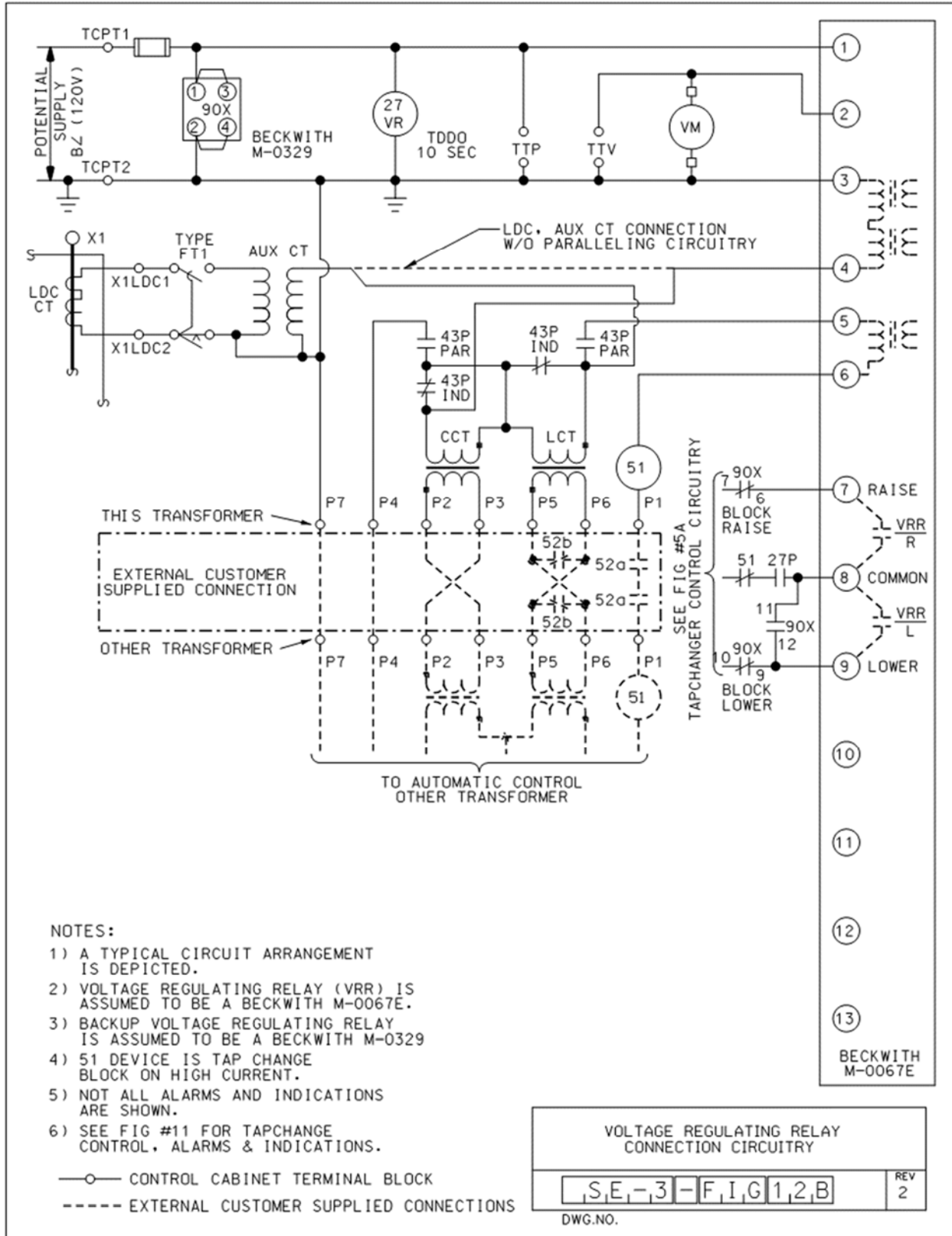












NOTES:

- 1) A TYPICAL CIRCUIT ARRANGEMENT IS DEPICTED.
- 2) VOLTAGE REGULATING RELAY (VRR) IS ASSUMED TO BE A BECKWITH M-0067E.
- 3) BACKUP VOLTAGE REGULATING RELAY IS ASSUMED TO BE A BECKWITH M-0329
- 4) 51 DEVICE IS TAP CHANGE BLOCK ON HIGH CURRENT.
- 5) NOT ALL ALARMS AND INDICATIONS ARE SHOWN.
- 6) SEE FIG #11 FOR TAPCHANGE CONTROL, ALARMS & INDICATIONS.

○ CONTROL CABINET TERMINAL BLOCK  
 - - - - - EXTERNAL CUSTOMER SUPPLIED CONNECTIONS

BECKWITH  
M-0067E

**SCHEDULE A-1  
GENERAL CONDITIONS**

**NOW THEREFORE** in consideration of the mutual covenants and agreements contained herein, the Parties agree as follows:

**1. RELEASE OF SELLER'S SUPERVISORY STAFF**

1.1 The Seller shall not release any of its supervisory staff from the Site without having obtained approval from the Buyer.

**2. REMOVAL OF SELLER'S EMPLOYEES**

2.1 The Seller shall, at the request of the Buyer, remove from the Work and replace any person employed by the Seller on the Work who, in the opinion of the Buyer, acting reasonably, is not performing any part of the work properly, is incompetent or has been otherwise conducting themselves improperly. The Seller shall not permit a person so removed to remain on Site.

**3. SUPERVISION**

3.1 **General.** The Seller and the Buyer shall agree on the commencement date for each of the supervisory personnel supplied by the Seller.

The Seller's personnel will be expected to be on the Site for whatever hours per day and days per week are required to assist the Buyer's personnel during the installation or commissioning of the Goods.

3.2 **Erection Supervision.** When requested by the Engineer, the Seller shall provide competent personnel at the location to supervise the erection of the Goods supplied under the terms of the Agreement.

The erection supervisor shall be utilized for direction and input related to all testing, erection, and commissioning activities with the transformer and shall sign-off the verification indicating that the transformer is authorized to be put in-service.

**4. QUALITY ASSURANCE**

4.1 **General.** A quality assurance program in accordance with ISO 9001 is required, prior to start of Work. Inspection and Test Plan(s) for the Work are required.

The Seller's Quality Control Department shall review all Agreement requirements and ensure that they are understood. The Quality Control Department shall review the manufacturing, testing, inspection and expediting facilities of the Seller and all Subcontractors, and ensure they are adequate for the production, inspection, expediting and testing of the Work in accordance with the Agreement requirements.

The Seller shall appoint a quality assurance representative.

The Seller shall provide all instruments, equipment and materials for any and all tests. The costs of all tests and inspections shall be borne by the Seller.

An inspection and test plan (the “**Inspection and Test Plan**”) referencing all inspection/test instructions and showing all hold/witness points shall be submitted to the Engineer for approval. All special process procedures, such as non-destructive testing, welding, heat treatment, etc., shall be submitted to the Engineer for approval prior to start of the Work. For work performed in New Brunswick, these procedures also require approval by the NB Department of Public Safety.

- 4.2 **Procurement of Equipment.** Except where otherwise specified in the specification documents listed in Appendix A to Schedule A (the “**Specifications**”), the Seller shall review all subcontracted products or services for the Work and determine which ones require a quality assurance program.

For all portions of the Work and subject to the Engineer's acceptance, the Seller shall clearly identify and justify which portions of the Work do not require a quality assurance program.

- 4.3 **Inspection and Testing.** Implementation of the Quality Assurance Program Manual shall cover but not be limited to all manufacturing, installation and commissioning activities on and off the project location.

The Inspection and Test Plan for all individual equipment, subsystems and complete systems covered under this Agreement shall be submitted to the Buyer for review within ninety calendar days after execution of the Agreement and prior to start of Work. A list of inspection and tests to be performed on major components, subsystems and systems shall be provided by Seller to Buyer.

Tests to be performed on the equipment supplied by the Seller shall be as defined in the Specifications. Additionally, all equipment furnished by the Seller shall be subjected to the manufacturer's standard factory tests regardless of whether such tests are specifically called for in the Agreement documentation.

The Seller shall submit for the Engineer's review, with the Inspection and Test Plan or at least ninety calendar days before testing, the test procedures for all individual equipment, subsystems and complete systems in the quality assurance program covered under this Agreement.

When a number of identical items are supplied, it is the Seller's responsibility to perform complete factory tests on all items unless approval of the Engineer is obtained to do otherwise or the Agreement specifies otherwise.

Materials used in the manufacture of equipment shall be subjected to CSA or ASTM standard physical and chemical tests. All parts which operate under pressure or vacuum shall be subjected to the applicable hydrostatic factory tests. In addition, where called for, radiographic examinations, ultrasonic tests, and magnetic particle inspections shall be performed. Rotating equipment shall be subjected to performance tests in accordance with the applicable ASME Power Test Codes except as otherwise specified in the Agreement documentation. Electrical equipment shall be tested in accordance with the applicable CSA and/or IEEE Tests Codes.



In the event of a test piece not complying with the requirements of the appropriate specification for the material in question, the Engineer may reject the whole of the equipment or plant for which the suspect material has been used.

Approval of part or the whole of the Work by the Engineer, or the passing of any such inspection or test will not, however, prejudice the Engineer's right to reject the Work if when completed it does not comply with the requirements of the Specifications to perform satisfactorily in service.

All structural welding shall conform to the requirement of CSA W59 - Welded Construction (Metal-Arc Welding), and the Seller shall be certified in accordance with Division 1 or Division 2 of CSA W47.1 - Certification of Companies for Fusion Welding of Steel Structures. All welders employed by the Seller shall be qualified by the Canadian Welding Bureau, or subject to the Engineer's approval, an equivalent licensing authority in the location of manufacturing.

All non-destructive testing (NDT) operators shall be certified in accordance with the requirements of the Canadian General Standards Board (CGSB).

All defects in materials and workmanship detected as a result of testing shall be repaired or replaced by the Seller at its own expense. All such repairs shall be fully documented.

Detailed descriptions, including drawings where applicable, of all non-conformance and proposed repair or rework shall be submitted to the Engineer for approval. This approval shall be obtained before any such work is undertaken.

4.4 **Quality Surveillance.** Quality surveillance includes the Buyer's continuing inspection, expediting, evaluation, analysis and verification of the Seller's records, methods, procedures, products, and services to assure that the quality requirements for the Work are met.

Inspection and expediting by the Engineer in no way relieves the Seller of its responsibility for quality control and delivery commitments.

The scope of quality surveillance by the Engineer shall be defined by the Engineer after execution of the Agreement, and before start of the Work.

The Engineer will mark up the Seller's Inspection and Test Plan to indicate the tests to be witnessed by the Engineer. The Seller shall notify the Engineer at least seven (7) days prior to commencing any test.

The quality surveillance or its waiver by the Buyer does not relieve the Seller of any obligation or responsibility to perform in accordance with all requirements of the Agreement.

The Seller shall provide proper sources of information and facilities, when requested, for all operations of inspection, control, sample selection, and testing of parts of the plant, regardless of the nature or location of test operations.

Where not all of the work covered by the Agreement is to be carried out at the shops of the Seller, the Seller shall ensure that its Subcontractors are aware of the quality surveillance requirements

of the Agreement, and shall note in its Subcontracts that equipment therein is likewise subject to quality surveillance by the Engineer.

The Buyer and the Engineer shall have access to the services of any independent testing laboratory utilized by the Seller to conduct field tests.

The Engineer can, at the Buyer's expense, request additional tests to be carried out on any of the welds. All unacceptable welds detected by these additional tests shall be removed, re-welded and re-examined by the Seller and at the Seller's expense to the Engineer's satisfaction.

The Buyer reserves the right to have non-destructive testing (NDT) performed by a third party under the direction of the Engineer, and in addition, reserves the right to perform NDT work with its own forces for the purpose of quality assurance.

4.5 **Quality Assurance Records.** Quality assurance records shall be maintained and submitted to the Buyer prior to final acceptance of the Work.

Quality assurance records shall be compiled in accordance with the requirements of the codes and standards stated in the Specifications. Any departures from the Specifications requirements for quality assurance records shall be subject to the Engineer's approval.

Quality assurance records when required shall include, but shall not be limited to, the following items:

- (a) Inspection and Test Plan
- (b) Inspection and Test Procedures
- (c) Dimensional Records
- (d) Assembly and Test Records
- (e) Concessions

All Work covered by this Agreement shall be subject to inspection and expediting by the Buyer or its authorized representative for which purpose the Seller (or Subcontractor) shall:

- (i) Allow access at all reasonable times during manufacture to:
  - i. the premises in which the Work is being carried out;
  - ii. the drawings and/or tooling involved;
  - iii. gauges, instruments, etc., required for inspecting the Work;
  - iv. the Seller's drawings, if so requested by the Engineer.
- (ii) print on the face of all orders to Subcontractors the following notation: "This order is subject to inspection and expediting at the option of the Buyer or its duly authorized representative at the Subcontractor's plant or whenever the Work is in preparation or progress"; and
- (iii) not deliver equipment until the Buyer's Engineer has been notified and release of the equipment has been obtained.

If requested by the Engineer, the Seller shall furnish to the Buyer, unpriced copies of purchase orders covering all purchased materials being acquired from others. Such purchase orders shall be forwarded to the Buyer at the time the purchase order is placed.

The Seller shall co-operate with the Buyer and shall provide production schedules, work sheets, bills of material, material specifications, procedures and other information that the Buyer requires to expedite manufacturing and delivery of material and equipment.

**5. INSTRUCTION AND MAINTENANCE MANUAL**

5.1 The Seller shall supply three (3) printed copies and three (3) electronic versions (USB thumb drive with each manual in .pdf format) of the installation, operating and maintenance manual for the transformer and labeled. These manuals shall contain, but are not limited to:

- (a) Table of contents;
- (b) Parts list with accompanying part numbers;
- (c) Copies of all drawings including accessories;
- (d) General instructions for the receiving, handling, inspection and installation start-up;
- (e) Post-installation, inspecting test procedures and start-up;
- (f) Manuals for all accessories;
- (g) Operating characteristics and technical data;
- (h) Safety notes;
- (i) Maintenance procedures with forms, etc.;
- (j) Certified factory test report.

Note: the .pdf electronic format of the manual is to be such that the entire manual is in one (1) file and not over multiple files.

The three (3) printed manuals and three (3) electronic versions of the manual shall be shipped separately from the equipment. These manuals shall be received by the Buyer two (2) weeks prior to the planned shipping date of the Goods. The manuals shall be shipped to the Engineer.

**6. DRAWINGS**

6.1 **Review.** Within ninety (90) days of receipt of a Purchase Order, the successful Seller shall submit electronic prints of all drawings for review:

The following outlines the requirements for drawings by the Seller after a Purchase Order has been delivered to the Seller by the Buyer:

- (a) Submittals of drawings, schematic diagrams, lists of equipment, motors, valves, etc., schedules, wiring diagrams, general arrangement drawings, nameplate drawings, and the like issued for review by the Engineer shall be electronic file format type .pdf.
- (b) All drawings which have been submitted for review and which require further revision must be resubmitted. The above procedures are to be

followed in this case until the drawings meet the requirements of the Engineer.

- (c) If the Seller has received approval for the substitution of materials from those specified or for the alteration of design from that shown on the Buyer's drawings, the shop drawings shall bear a note that material substitutions and design changes have been made and shall provide full details.
- (d) Amendments to any "Reviewed" drawing shall not be made without notifying the Engineer. Proposed amendments shall be reported by sending each revised drawing, as per above guidelines, to the Engineer with the review procedure being as detailed above.
- (e) One (1) copy of all drawings submitted for review will be returned to the Seller. This copy will indicate the Engineer's review or comments. Work shall not proceed on any particular phase of the Agreement until the applicable drawings have been returned and stamped as "Reviewed". Review of the drawings shall not relieve the Seller of responsibility for correctness, design and detail.
- (f) When the Seller submits drawings or other documents to the Buyer for review, reference or information, the Buyer will mark its assigned project drawing numbers on the documents prior to them being returned to the Seller. The Seller is requested to revise the originals of the documents so as to permanently incorporate these Buyers assigned numbers.
- (g) The Seller will be required to leave on location all drawings used in the erection of the Goods.
- (h) The Buyer reserves the right to request detailed or shop drawings or shop material lists of any item of equipment for the purpose of checking conformity to requirements and application. These drawings will be treated in a confidential manner by the Buyer.
- (i) All dimensions, masses and measures shall be stated in the Metric System of Units.

One (1) copy of each drawing shall be returned to the Seller signed and stamped with one (1) of the following: "Reviewed", "Reviewed As Noted" or "Resubmit". Drawing submittal continues until all drawings have received a "Reviewed" status. Only drawings not at the "Reviewed" status need to be resubmitted.

The Buyer will require two (2) weeks per drawing submittal for approval and this interval shall be allowed for and taken in account by the Seller in quoting delivery dates.

The Seller shall obtain approval of drawings prior to commencing manufacture of the equipment. The expense for rectifying any work performed prior to drawings approval shall be borne by the Seller alone and not by the Buyer.

The title block on all drawings shall include the Buyer's transformer identification number (e.g. T726).

All dimensions, weights and volumes shall be stated in the Metric System of Units.

The following drawings shall be provided: nameplate, outline, bushings, shipping, wiring, control schematics, physical drawing of the control cabinet showing device layout, panels, etc., a complete wiring diagram showing all electrical connections, terminal blocks, cooling radiator showing all dimensions especially flanges and center line between flanges. The drawing shall detail gasket arrangement and type of material used. A drawing and or sketch showing the internal core/coil assembly in relation to the tank is also required. In addition to the above drawings showing physical dimensions (internal and external) of the CT pockets are required. Drawings showing internal components of the transformers are required showing lead structures/bus connections etc.. Internal dimensions of the internal components are required with the exception of the exact details of the core and coil assembly if the Vendor does not wish to give those details.

The nameplate drawing shall show all information required per CAN/CSA-C88-16 Section 17 "Rating Plate", and the following additional information:

The MVA or kVA shall be shown for 65°C temperature rise at each of 0°C and 30°C daily average ambient temperatures.

Voltages and currents at maximum rated MVA or kVA for all tap positions.

The measured percent impedance shall be shown on the ONAN MVA base rating and at rated voltage with the tapchanger at the neutral and extreme tap positions. Both zero and positive sequence impedances shall be shown.

The nameplate must be stamped with the Buyer's transformer ID number(s) (e.g. T726).

Current transformer information shall be shown on the Rating Plate. It shall show position, number of CT's, ratio, connections and accuracy. Manufacturer's drawings of the CT's are to be provided showing physical dimensions and detailing the electrical characteristics.

The guaranteed PCB content at time of shipment is to be shown on the Rating Plate.

All data shown on Rating Plate shall be "as tested" including exact turns ratio, impedance, final masses and volume of oil.

One complete instruction manual including all drawings showing final revisions shall be supplied with the unit and located inside the transformer control cabinet.

A separate shipping drawing showing shipping weight, dimensions, method of oil shipment, and protection of the apparatus is required. This drawing will be subject to approval by the Buyer. Outline drawing with items marked "removed for shipment" is not satisfactory.

Center of gravity is to be shown on the shipping drawings, and on the as built general arrangement drawings.

Copies of all test results and calculations from the Shop Tests shall be included in the manual. The test sheets shall show the exact "turns" ratio between windings of the transformer.

6.2 **Approved for Construction Drawings.** Following receipt of "Reviewed" drawings, the Seller shall provide a complete electronic set of drawings stamped "Approved for Construction" (AFC), in both .dgn and .pdf file formats. The .pdf files shall be generated as direct outputs from the vector-based graphics software so as to preserve resolution, in ANSI 'D' size.

6.3 **As Built Drawings.** During construction of the transformer, the Seller shall make any necessary revisions to the AFC drawings to reflect any changes made in consultation with the Buyer during the course of work. The Seller shall provide a complete electronic set of drawings stamped "As Built" (AB), in both .dgn .dxf, or .dwg and .pdf file formats. The .pdf files shall be generated as direct outputs from the vector-based graphics software so as to preserve resolution, in ANSI 'D' size.

## **7. SPARE PARTS**

7.1 The spare parts schedules are on a unit basis and shall contain a description, identified quantities, unit prices and total prices for all the parts. Whether or not the Buyer purchases spare parts from the Seller or elsewhere is entirely at the Buyer's discretion.

The Agreement provides for the purchase of spare parts required for the operation and maintenance of the Goods supplied under this Agreement

Non-proprietary spare parts shall be identified by the identification name and re-order number of the part manufacturer. Spare parts which are proprietary to the Seller shall be identified by the name and re-order number of the Seller.

The Seller shall provide an up-dated recommended spare parts list upon request from the Engineer incorporating any revisions resulting from Changes to the Work.

## **8. INFORMATION REQUIRED FROM THE SELLER**

8.1 The Seller shall also supply the following information:

- (a) Magnetization impedance at 100% voltage - as viewed from the high voltage terminals;
- (b) Air core reactance - as viewed both from the high voltage terminals as well as viewed from the low voltage terminals. It is understood that the air core reactance is calculated by treating the windings in question as a

simple inductor without any core except air. It is calculated using the coil mean diameter, radial built height and number of turns, thus strictly a physical problem. It represents the magnetizing impedance of the transformer winding on its system under high voltage at power frequency. It is used for network analysis of the system under power frequency voltage transients;

- (c) The detailed calculation shall be shown in the test report;
- (d) Interwinding reactances (positive and zero sequence) H-X where H is high voltage winding and X is low voltage winding, H-Y where Y is tertiary voltage winding and X-Y;
- (e) Zero sequence as viewed from the low voltage terminals.

NOTE: All impedances shall be in percent (%) on ONAN rating and indicated so.

**9. NAMEPLATE INFORMATION OMISSION**

9.1 In the event that the Seller omits any required information on the transformer nameplate, a new nameplate, including the addition of the omissions, shall be supplied at no cost to the Buyer.

**10. PCB IN OIL CONTENT**

10.1 The transformer manufacturer must guarantee a "PCB in oil content" of two (2) parts per million or less at time of shipment of the transformer. The guaranteed amount must be shown on the transformer nameplate.

**SCHEDULE B  
DELIVERY SCHEDULE**

<b>Unit</b>	<b>Delivery Date</b>
Transformer A	August 31, 2024
Transformer B	November 24, 2024
Transformer C	May 24, 2025

**LOCATION OF DELIVERY**

Transformer A	99W Bridgewater - 1627 King St., Bridgewater, NS B4V 1C4
Transformer B	Spider lake – 1046 Waverly Rd, Waverley, NS B2R 1W2
Transformer C	White Rock, 1107 White Rock Road, White Rock, NS B4P 2R2



SCHEDULE C  
PRICING AND PAYMENT

Pricing

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**Invoices**

Invoices shall be prepared in duplicate and in a format acceptable to the Buyer and shall show:

1. Buyer's Purchase Order Number;
2. Buyer's Agreement Name and Agreement Number;
3. Date of the invoice;
4. Period covered by the invoice and invoice number;
5. Percent complete or completed quantities, as applicable, for each pay item or fixed price breakdown item;
6. Contract price;
7. Total amount claimed on the invoice;
8. Amount of Harmonized Sales Tax on the invoiced amount;
9. Total amount to be paid.

The Seller's invoices shall show separately the applicable Harmonized Sales Tax (HST) on the value of Work to be paid. The Seller shall show its HST registration number on all invoices.

Invoices shall be sent to:

Nova Scotia Power Incorporated  
PO Box 910  
1223 Lower Water Street  
Halifax, NS, B3J 2W5  
**Email: [invoices@nspower.ca](mailto:invoices@nspower.ca)**  
ATTENTION: Accounts Payable

Payments made hereunder, including final payment, shall not relieve the Seller from any of its obligations or liabilities under the Agreement.

Acceptance by the Seller of the final payment shall constitute a waiver of all claims by the Seller against the Buyer except those previously made in writing in accordance with the Agreement and still unsettled.

**SCHEDULE D  
PERFORMANCE STANDARDS**

1. The Performance Measurement Criteria has been approved and defined as noted below, any changes and additions will need to be approved by both Parties (the "Performance Measurement Criteria").
  - 1.1 Performance Measurement Criteria Definitions
    - (a). On time Delivery (OTD) is measured by achieving the contractual lead time tracked from the time the purchase order goes to the Seller to when the product arrives at the Buyers facility, as noted on the purchase order.
  - 1.2 The Performance Measurement Criteria will be reviewed in Annual Performance Reviews with the Seller. All performance will be tracked against the acceptable score provided below.

Area	Key performance indicator (KPI)	Performance target	Acceptable score (%)
Quality			
	Compliant to specification	Goods are provided as per approved manufacturer and part number contracted 100% of time	100%
Delivery	On time	100% of Goods are provided at Buyer’s site on date/time required	100%

2. The Performance Measurement Criteria shall satisfy Buyer's requirement to monitor Seller's commitment to safety, quality of Goods, and service. As a minimum, the Performance Measurement Criteria shall include:
  - (a) Safety:
    - All employees' lost time accidents and injury frequency statistics;
    - Any accident or high potential incident related to the product quality reports by any of Seller's customers; and
    - Any incident of an employee exercising their right to refuse unsafe work.
  - (b) Quality:
    - Product quality measurement shall provide the means to analyze and improve Seller's processes needed to ensure conformity of the product to Buyer's specifications including but not limited to:
      - Seller's internal non-conformance analysis and corrective actions related to Buyer's Goods;
      - The corrective action requests from Buyer; and
      - Buyer concessions to the product specifications.

- (c) Service:
- Measurement of order accuracy and timing, emergency requests, to be mutually agreed upon in advance by Buyer and Seller, will be excluded from this measurement.
  - Service delivery shall include measures to demonstrate compliance with Buyer's requirements for pre- and post-delivery activities. Lead times, order fulfillment accuracy, invoicing, and responsiveness to Buyer requests shall be included in the measurement.
3. Seller, by means of performance measurement reports using the Performance Measurement Criteria, shall monitor performance. Seller shall provide performance measurement reports to Buyer during the Term at the following frequency:
    - (a) Safety- Annually
    - (b) Quality- Annually
    - (c) Service- Quarterly.
  4. Performance will be assessed based on the Performance Measurement Criteria using a balanced scorecard developed by Seller and approved by Buyer ("the "Balanced Scorecard").
  5. It is the intention of Buyer and Seller to work together for ongoing continuous improvement and mutual benefit. However, unacceptable ratings on the Balanced Scorecard and an unwillingness or inability for Seller to improve will result in progressive action, which without limitation may include termination of the Agreement by Buyer.
  6. Price competitiveness in the market is a key requirement for the Buyer. The Seller shall establish benchmarks and provide a means to measure continuous improvement efforts on product cost and total cost of ownership.
  7. As part of ongoing contract management efforts, the Buyer reserves the right to make improvements based on the results of these quarterly reviews. Such improvements may affect seasonal variances and method of delivery.

**SCHEDULE E**

**CONFIDENTIALITY SCHEDULE**

**NOW THEREFORE** in consideration of the mutual covenants and agreements contained herein, the Parties agree as follows:

1. **Definitions.** In this Schedule the following terms have the following meanings:
  - (a) **“Confidential Information”** means all information, regardless of the form in which it is communicated or maintained and prepared by the Disclosing Party as defined herein, and is disclosed directly or indirectly to the Receiving Party as defined herein, in connection with the Agreement. Confidential Information includes, but is not limited to the following: all reports, analyses, notes, memoranda, correspondence, spreadsheets, drawings, survey plans, maps, contracts, commercial arrangements, intellectual property, trade secrets, corporate strategies, business plans or other information that is based on, contain or reflect any Confidential Information;
  - (b) **“Disclosing Party”** means the Party or Parties that disclose Confidential Information to the Receiving Party, as defined herein;
  - (c) **“Receiving Party”** means the Party that receives the Confidential Information; and
  - (d) **“Representatives”** means any of the Receiving Party’s Affiliates, directors, officers, employees, consultants, subcontractors and agents.
  
2. **Nondisclosure and Use of Confidential Information.** The Receiving Party shall keep the Confidential Information in the same manner that the Receiving Party keeps its own Confidential Information or to a standard of no less than reasonable care, whatever standard is higher. The Confidential Information may be disclosed to Receiving Party’s Representatives but only if such Representatives require the Confidential Information in connection with the Agreement. The Confidential Information shall not be used by the Receiving Party or its Representatives for any purpose other than in connection with the Agreement. It is understood as follows:
  - (a) Representatives will be informed by the Receiving Party of the confidential nature of the Confidential Information. The Receiving Party shall require the Representatives to adhere to the terms of this Schedule.
  - (b) In any event, the Receiving Party shall be responsible for any breach of the terms of this Schedule by any of its Representatives.
  - (c) The Receiving Party shall not use, reveal, release, disclose or divulge the Confidential Information in any form whatsoever to any Person other than as permitted herein

unless the Receiving Party has received the prior written consent of the Disclosing Party. The Receiving Party shall safeguard the Confidential Information from unauthorized disclosure.

- (d) Any information furnished to the Receiving Party by a director, officer, employee, stockholder, partner, co-venturer, consultant, agent, or representative of Disclosing Party will be deemed furnished by Disclosing Party.
- (e) [Confidential Information of Buyer in any form shall not be removed from or kept outside Canada without Buyer's prior written consent.]

3. **Permitted Disclosure.** The obligations set forth in **Sections 1 and 2** above shall not in any way restrict or impair the right of the Receiving Party to disclose and use the following information:

- (a) information that is publicly available at the time of disclosure or becomes publicly available other than as a result of the violation of the terms of this Schedule;
- (b) information that is or becomes available on a non-confidential basis from a source who, after due inquiry, is not known to the Receiving Party to be prohibited from disclosing such information pursuant to a legal, contractual or fiduciary obligation;
- (c) information that the Receiving Party can demonstrate was legally in its possession prior to disclosure by Disclosing Party and is not subject to a confidentiality obligation;
- (d) information developed by the Receiving Party independently of any Confidential Information received under this Agreement without reference to, or consideration of the Confidential Information, or breach of this Agreement, as demonstrable by the Receiving Party; or
- (e) information required to be disclosed by any law, order of a court of competent jurisdiction, or regulatory body with regulatory responsibilities over the Receiving Party.

Any specific Confidential Information or any combination of features comprising the same, will not be deemed to fall within **Sections 3(a) to 3(e)** inclusive, simply because the Confidential Information is contained within more general information or individual features that are included in **Sections 3(a) to 3(e)**.

4. **Notice Preceding Compelled Disclosure.** If the Receiving Party is requested or required by oral question, interrogatories, requests for information or documents, subpoena, civil investigative demand, or similar process to disclose any Confidential Information, the Receiving Party shall promptly notify the Disclosing Party in writing of such request or requirement so that the Disclosing Party may seek an appropriate protective order or waive, in whole or in part, compliance with the terms of this Schedule. If, in the absence of a protective order or the receipt of a waiver hereunder, the Receiving Party is compelled to

disclose the Confidential Information or else stand liable for contempt or suffer other censure or penalty if the Receiving Party or its Representatives do not disclose the Confidential Information, the Receiving Party or its Representatives may disclose only such portion of the Confidential Information to the party compelling disclosure as is required by law. The Receiving Party will provide reasonable cooperation to the Disclosing Party and its legal counsel with respect to performance of the above-noted covenants.

5. **Return of Confidential Information.** The Confidential Information will remain the property of the Disclosing Party. Upon request, at the option and instruction of the Disclosing Party, the written Confidential Information, or any copies thereof, will be returned to the Disclosing Party promptly. No copies of the Confidential Information will be retained by the Receiving Party, unless the Parties agree otherwise in writing with the exception of one legal file copy that may be retained in the custody of the Receiving Party's legal counsel solely for the determination of its legal obligations under this Schedule. Any Confidential Information that may be found in drafts, notes, compilations, studies, synopses, or summaries thereof, or other documents prepared by or for the Receiving Party, and written Confidential Information not so requested to be returned, will be held by the Receiving Party subject to the terms of this Schedule, or destroyed. Notwithstanding the foregoing, the Receiving Party shall not be obligated to erase or destroy Confidential Information that is contained in an archived computer system back up system. Such information shall be destroyed in accordance with the Receiving Party's standard security or disaster recovery procedures provided that such information is not readily accessible and no attempts are made to recover such Confidential Information. Notwithstanding the return or destruction of material, information and documents containing Confidential Information the terms and conditions of this Schedule remain in force and effect. The Receiving Party is responsible for retrieving all Confidential Information from its Representatives other than those who have entered into a confidentiality agreement with the Disclosing Party.
6. **No Waiver.** No failure or delay in exercising any right, power or privilege hereunder will operate as a waiver thereof. No single or partial exercise of any rights hereof will preclude any other or further exercise of any other right, power, or privilege hereunder.
7. **Remedies.** The Receiving Party acknowledges and agrees that monetary damages would not be a sufficient remedy for any breach of this Schedule and that any breach or violation of the terms of this Schedule by the Receiving Party will result in immediate and irreparable harm to the Disclosing Party. The Disclosing Party will be entitled to specific performance and injunctive relief as remedies for any such breach. Such remedies will not be deemed to be the exclusive remedies for a breach of the terms of this Schedule by the Receiving Party but will be in addition to all other remedies available at law or in equity to Disclosing Party.
8. **No Representations.** The Parties do not make any representation or warranty, express or implied, as to the accuracy or completeness of any Confidential Information provided hereunder. The Parties agree to assume full responsibility for all conclusions that each derives from its review of the Confidential Information.
9. **Notices.** All notices to be given to a Party as set out in Section 27.1 of the Agreement.



**SCHEDULE F  
CERTIFICATE OF INSURANCE**

This Certificate of Insurance has to be completed by a licensed Insurance Representative or Insurer(s)

Certificate Holder: \_\_\_\_\_ Agreement #: \_\_\_\_\_

Broker Name & Address: \_\_\_\_\_

Seller's Company Legal Name & Address: \_\_\_\_\_

This document confirms that the following policies along with indicated coverage are in force covering the operation of the insured in connection with the above noted Agreement.

<b>Type(s) of Insurance</b>	<b>Limits of Liability</b>	<b>Required</b>	<b>Insurer(s) &amp; Policy Number</b>	<b>Effective / Expiry Dates</b>
<b>Commercial General Liability including:</b>	\$2,000,000 per occurrence & \$2,000,000 annual aggregate	X		
*Products & Completed Operations and Personal Injury	As per policy limit	X		
*Broad Form Property Damage	As per policy limit	X		
*Contingent Employer's Liability	As per policy limit	X		
*Cross liability and Severability of Interest	As per policy limit	X		
*Contractual Liability	As per policy limit	X		
*Sudden & Accidental pollution	As per policy limit	X		
*Non Owned Auto Liability	\$2,000,000	X		

<b>Automobile Third Party Liability</b> covering all vehicles owned, operated, or leased to the Named Insured	\$2,000,000			
<b>Environmental Impairment Liability</b>	\$2,000,000 per occurrence & annual aggregate			
<b>Professional Liability</b>	\$2,000,000 per occurrence & annual aggregate			
<b>Transportation</b>				

The insurer will endeavour to notify Nova Scotia Power Incorporated in writing, 30 days prior to cancellation or material change of any policy except in the event of non-payment, where policy conditions dealing with termination will apply.

**Upon execution of the above noted Agreement, Nova Scotia Power Incorporated will be added as Additional Insured under the Seller's Commercial General Liability policy.**

Name of Insurer's Officer or Authorized Representative: \_\_\_\_\_

Insurance Representative: (Please print) \_\_\_\_\_

Insurance Representative: Signature: \_\_\_\_\_ Date \_\_\_\_\_

Phone #: \_\_\_\_\_ Email \_\_\_\_\_

Address: \_\_\_\_\_

**SCHEDULE G**

**BUYER POLICIES AND PROCEDURES**

**Nova Scotia Power - Policies and Procedures**

To the extent applicable, the Seller shall comply with the following safety and environmental policies available at <http://www.emera.com/policies>:

- EMA 1 – Occupational Health and Safety Policy;
- EMA 2 – Environmental Policy;
- EMA 3 – Respectful Workplace Policy;
- EMA 5 – Smoke-Free Workplace Policy;
- EMA 8 – Alcohol and Drug Policy;
- Alcohol & Drug – Statement of Expectations for Contractors;
- Contractor Environmental Requirements; and
- Contractor Safety Program.

SCHEDULE H

**CYBERSECURITY REQUIREMENTS**

This Schedule H is part of that Purchase Agreement by and between [REDACTED] (referred to herein as “**Seller**”) and Nova Scotia Power Incorporated (referred to herein as “**Buyer**”) (the “**Agreement**”). This forms part of the Agreement, and in the event of a conflict with the Agreement, this Schedule H will govern.

1. **Definitions.** The following definitions apply only to the terms and conditions in this Schedule.

- a. “**CEII**” means Critical Energy Infrastructure Information and/or Critical Electric Infrastructure Information.
- b. “**Disclosed**” means any circumstance when the security, integrity, or confidentiality of any Buyer Information has been compromised, including but not limited to incidents where Buyer Information has been damaged, lost, corrupted, destroyed, or accessed, acquired, modified, used, or disclosed by any unauthorized person, by any person in an unauthorized manner, or for any unauthorized purpose.
- c. “**Buyer Information**” means for purposes of these terms and conditions, any and all information concerning Buyer and its business in any form, including, without limitation, the Goods provided under the Agreement that is disclosed to or otherwise learned by Seller during the performance of the Agreement.
- d. “**PII**” means Personally Identifiable Information.
- e. “**Security Incident**” means any circumstance when (i) Seller knows or reasonably believes that Buyer Information hosted or stored by the Seller has been Disclosed; (ii) Seller knows or reasonably believes that an act or omission has compromised or may reasonably compromise the cybersecurity of the Goods provided to Buyer by Seller or the physical, technical, administrative, or organizational safeguards protecting Contractor's systems or Buyer's systems storing or hosting Buyer Information; or (iii) Seller receives any complaint, notice, or communication which relates directly or indirectly to a Security Incident involving (A) Seller's handling of Buyer Information or Seller's compliance with the data safeguards in the Agreement or applicable laws; in connection with Buyer Information or (B) the cybersecurity of the Goods provided to Buyer by Seller.
- f. “**Seller's Proprietary Information**” means any Seller information that is considered highly confidential where disclosure outside of the Buyer may result in significant loss of

Seller's intellectual property, PII, etc. and may cause damage to the operational effectiveness or otherwise substantially disrupt significant business operations, with examples including but not limited to: source code, private encryption keys, or Buyer Information.

2. **Notification of Vendor-Identified Security Incidents.** Seller agrees to notify Buyer's Access Administration Group by calling (902) 428-6683 and by email with a read receipt to [itsec.ops@nspower.ca](mailto:itsec.ops@nspower.ca) whenever it becomes aware of the occurrence of a Security Incident, but in no case later than twenty-four (24) hours of such awareness; a written notice shall also be sent by email to Seller's primary business contact with Buyer. The notice shall include the date and time of the Security Incident's occurrence (or the approximate date and time of the occurrence if the actual date and time of the occurrence is not precisely known) and a detailed summary of the facts and circumstances of the Security Incident, including a description of (a) why the Security Incident occurred (e.g., a description of the reason for the system failure), (b) the amount of Buyer Information known or reasonable believed to have been Disclosed, and (c) the measure being taken to address and remedy the occurrence to prevent the same or a similar event from occurring in the future.

Seller shall provide written updates of the notice to Buyer addressing any new facts and circumstances learned after the initial written notice is provided and shall provide such updates within a reasonable time after learning of those new facts and circumstances.

Seller shall reasonably cooperate with Buyer in Buyer's efforts to determine the risk posed by the Security Incident, including providing additional information regarding the Security Incident upon request from the Buyer.

3. **Coordinate of Responses to Cybersecurity Incidents.**

- a. **Response Plan.** Seller shall develop and implement a "Response Plan," which shall include policies and procedures to address Security Incidents. The Response Plan shall include appropriate provisions for mitigating the harmful effects of Security Incidents and addressing and remedying the occurrence(s) to prevent the recurrence of similar Security Incidents in the future. Seller shall provide Buyer access to inspect Seller's Response Plan. The development and implementation of the Response Plan shall follow industry standard practices, such as those that at a minimum are consistent with the contingency planning requirements of NIST Special Publication 800-61 Rev. 26, NIST Special Publication 800-53 Rev. 4, CP-1 through CP-137 and the incident response requirements of NIST Special Publication 800-53 Rev. 4, IR-1 through IR-10 as those standards may be amended.

Immediately upon learning of a Security Incident related to the Goods provided to Buyer, Seller shall implement its Response Plan and, within 24 hours of implementing its Response Plan, shall notify Buyer in writing of that implementation as described above.

- b. Prevention of Recurrence. Within five (5) days of a Security Incident, Seller shall develop and execute a plan that reduces the likelihood of the same or a similar Security Incident from occurring in the future consistent with the requirements of its Response Plan and industry standards (e.g., NIST Special Publication 800-61 Rev. 2 and NIST Special Publication 800-184, as may be amended,) and shall communicate that plan to Buyer. Seller shall provide recommendations to Buyer on actions that Buyer may take to assist in the prevention of recurrence, as applicable or appropriate.
- c. Coordination of Incident Response with Buyer. Within five (5) days of notifying Buyer in writing of the Security Incident, Seller shall recommend actions to be taken by Buyer on Buyer-controlled systems to reduce the risk of a recurrence of the same or a similar Security Incident, including, as appropriate, the provision of action plans and mitigating controls. Seller shall coordinate with Buyer in developing those action plans and mitigating controls. Seller will provide Buyer guidance, recommendations, and other necessary information for recovery efforts and long-term remediation and/or mitigation of cyber security risks posed to Buyer Information, equipment, systems, and networks as well as any information necessary to assist Buyer in relation to the Security Incident.
- d. Notification to Affected Parties.
  - i. Seller will, at its sole cost and expense, assist and cooperate with Buyer with respect to any investigation of a Security Incident, disclosures to affected parties, and other remedial measures as requested by Buyer in connection with a Security Incident or required under any applicable laws related to a Security Incident.
  - ii. In the event a Security Incident results in Buyer Information being Disclosed such that notification is required to be made to any person or entity, including without limitation any customer, shareholder, or current or former employee of Buyer under any applicable laws, including privacy and consumer protection laws, or pursuant to a request or directive from a governmental authority, such notification will be provided by Buyer, except as required by applicable law or approved by Buyer in writing. Buyer will have sole control over the timing and method of providing such notification.
- e. Unrelated Security Events. In the event:
  - i. Seller Proprietary Information, related to the Goods provided to the Buyer under the Agreement, has been corrupted or destroyed without authorization or has been accessed, acquired, compromised, modified, used, or disclosed by any unauthorized person, or by any person in an unauthorized manner or for an unauthorized purpose;
  - ii. Seller knows or reasonably believes that an act or omission has compromised

the cybersecurity of the Goods provided by Seller to an entity other than Buyer;

- iii. Seller receives any valid complaint, notice, or communication which relates directly or indirectly to (a) contractor's handling of Seller Proprietary Information or Sellers' compliance with applicable law in accordance with Seller Proprietary information or (b) the cybersecurity of the Goods provided by Seller to an entity other than Buyer (collectively an "Unrelated Security Incident"); or
- iv. Seller shall provide to Buyer a confidential report describing, to the extent legally permissible, a detailed summary of the facts and circumstances of the Unrelated Security Incident, including a description of (1) why the Unrelated Security Incident occurred, (2) the nature of the Seller's Proprietary Information disclosed, and (3) the measures being taken to address and remedy the occurrence to prevent the same or a similar event from occurring in the future.

4. **Access Control**

- a. **Development and Implementation of Access Control Policy.** Seller shall develop and implement policies and procedures to address the security of Seller's remote and onsite access to Buyer Information, Buyer systems and networks, and Buyer property (an "Access Control Policy") that is consistent with the personnel management requirements of industry standard practices (e.g., NIST Special Publication 800-53 Rev. 4 AC-2, PE-2, PS-4, and PS-5 as may be amended) and also meets the following requirements:
- b. **Buyer Authority over Access.** In the course of furnishing Goods to Buyer under the Agreement, Seller shall not access, and shall not permit its employees, agents, contractors, and other personnel or entities within its control ("Seller Personnel") to access Buyer's property, systems, or networks or Buyer Information without Buyer's prior express written authorization. Such written authorization may subsequently be revoked by Buyer at any time in its sole discretion. Further, any Seller personnel access shall be consistent with, and in no case exceed the scope of, any such approval granted by Buyer. All Buyer-authorized connectivity or attempted connectivity to Buyer's systems or networks shall be in conformity with Buyer's security policies as may be amended from time to time with notice to the Contractor.
- c. **Seller Review of Access.** Seller will review and verify Seller Personnel's continued need for access and level of access to Buyer Information and Buyer systems, networks and property on a quarterly basis and will retain evidence of the reviews for two years from the date of each review.

- d. Notification and Revocation. Seller will immediately notify Buyer in writing, via email to [itsec.ops@nspower.ca](mailto:itsec.ops@nspower.ca) is acceptable, but under no circumstances later than close of business on the same day as the day of termination or change set forth below, when:
- i. any Seller Personnel no longer requires such access in order to furnish the Goods provided by Seller under the Agreement;
  - ii. any Seller Personnel is terminated or suspended or his or her employment is otherwise ended;
  - iii. Seller reasonably believes any Seller Personnel poses a threat to the safe working environment at or to any Buyer property, including to employees, customers, buildings, assets, systems, networks, trade secrets, confidential data, and/or Buyer Information;
  - iv. there are any material adverse changes to any Seller Personnel's background history, including, without limitation, any information not previously known or reported in his or her background report or record,
  - v. any Seller Personnel loses his or her Canadian work authorization; or
  - vi. Seller's provision of Goods to Buyer under the Agreement is either completed or terminated, so that Buyer can discontinue electronic and/or physical access for such Seller Personnel.

Seller will take all steps reasonably necessary to immediately revoke such Seller Personnel electronic and physical access to Buyer Information as well as Buyer property, systems, or networks, including, but not limited to, removing and securing individual credentials and access badges, multifactor security tokens, and laptops, as applicable. Further, for such revoked Seller Personnel, Seller will return to Buyer any Buyer-issued property including, but not limited to, Buyer photo ID badges, keys, parking passes, documents, or electronic equipment in the possession of such Seller personnel. Seller will notify Buyer at [itsec.ops@nspower.ca](mailto:itsec.ops@nspower.ca) and by phone at (902) 428-6683 once access to Buyer Information as well as Buyer property, systems, and networks has been removed.

5. **Disclosure and Remediation of Vulnerabilities**

- a. Disclosure and Remediation by Contractor. Seller shall develop and implement policies and procedures to address the disclosure and remediation by Seller of vulnerabilities and material defects related to the Goods provided to Buyer under the Agreement including the following:
- i. Prior to the delivery of the procured Goods, Seller shall provide or direct Buyer



to an available source of summary documentation of publicly disclosed vulnerabilities and material defects in the procured Goods, the potential impact of such vulnerabilities and material defects, the status of Seller's efforts to mitigate those publicly disclosed vulnerabilities and material defects, and Seller's recommended corrective actions, compensating security controls, mitigations, and/or procedural workarounds.

- ii. Seller shall provide or direct Buyer to an available source of summary documentation of vulnerabilities and material defects in the procured Goods within thirty (30) calendar days after such vulnerabilities and material defects become known to Seller. The summary documentation shall include a description of each vulnerability and material defect and its potential impact, root cause, and recommended corrective actions, compensating security controls, mitigations, and/or procedural workarounds (e.g., monitoring).
  - iii. Seller shall disclose the existence of all known methods for bypassing computer authentication in the procured Goods, often referred to as backdoors, and provide written attestation that all such backdoors created by Seller have been permanently remediated.
- b. Disclosure of Vulnerabilities by Buyer. Whether or not publicly disclosed by Seller and notwithstanding any other limitation in the Agreement, Buyer may disclose any vulnerabilities, material defects, and/or other findings related to the Goods provided by Seller to (a) the Electricity Information Sharing and Analysis Center ("E-ISAC"), the United States Cyber Emergency Response Team ("CERT"), or any equivalent U.S. governmental entity or program, (b) to any applicable U.S. governmental entity when necessary to preserve the reliability of the BES as determined by Buyer in its sole discretion, or (c) any entity required by applicable law.

6. **Software and Patch Integrity and Authenticity**

- a. Hardware, Firmware, Software and Patch Integrity and Authenticity.
  - i. Seller shall establish, document, and implement risk management practices for supply chain delivery of hardware, software (including patches), and firmware provided under the Agreement. Seller shall provide documentation on its: chain-of-custody practices, inventory management program (including the location and protection of spare parts), information protection practices, integrity management program for components provided by sub-Sellers, instructions on how to request replacement parts, and commitments to ensure that for one (1) year spare parts shall be made available by Seller.
  - ii. Seller shall specify how digital delivery for procured Goods (e.g., software and

data) including patches will be validated and monitored to ensure the digital delivery remains as specified. If Buyer deems that it is warranted, Seller shall apply encryption technology to protect procured Goods throughout the delivery process.

- iii. If Seller provides software or patches to Buyer, Seller shall publish or provide a hash conforming to the Federal Information Processing Standard (FIPS) Security Requirements for Cryptographic Modules (FIPS 140-2) or similar standard information on the software and patches to enable Buyer to use the hash value as a checksum to independently verify the integrity of the software and patches.
- iv. Seller shall identify or provide Buyer with a method to identify the country (or countries) of origin of the procured Seller Goods and its components (including hardware, software, and firmware). Seller will identify the countries where the development, manufacturing, maintenance, and service for the Seller Goods are provided. Seller will notify Buyer of changes in the list of countries where Goods maintenance or other services are provided in support of the procured Seller Goods. This notification in writing shall occur at least 180 days prior to initiating a change in the list of countries.
- v. Seller shall provide a software bill of materials for procured (including licensed) Goods consisting of a list of components and associated metadata that make up a component.
- vi. Seller shall use or arrange for the use of trusted channels to ship procured Goods, such as Canadian registered mail and/or tamper-evident packaging for physical deliveries.
- vii. Seller shall demonstrate a capability for detecting unauthorized access throughout the delivery process.
- viii. Seller shall demonstrate chain-of-custody documentation for procured Goods as determined by Buyer in its sole discretion and require tamper-evident packaging for the delivery of this hardware.

b. Patching Governance.

- i. Prior to the delivery of any products and/or services to Buyer or any connection of electronic devices, assets, or equipment to Buyer's electronic equipment, Seller shall provide documentation regarding the patch management and vulnerability management/mitigation programs and update process (including third-party hardware, software, and firmware) for products, services, and any electronic device, asset, or equipment required by Seller to be connected to the

assets of Buyer during the provision of Goods under the Agreement. This documentation shall include information regarding:

- a) the resources and technical capabilities to sustain this program and process such as the method or recommendation for how the integrity of a patch is validated by Buyer; and
  - b) the approach and capability to remediate newly reported zero-day vulnerabilities for Seller Goods.
- ii. Unless otherwise approved by the Buyer in writing, the current or supported version of Seller Goods supplied by Seller shall not require the use of out-of-date, unsupported, or end-of-life version of third-party components (*e.g.*, Java, Flash, Web browser, etc.).
  - iii. Seller shall verify and provide documentation that procured Goods (including third-party hardware, software, firmware, and services) have appropriate updates and patches installed prior to delivery to Buyer.
  - iv. In providing the Goods described in the Agreement, Seller shall provide or arrange for the provision of appropriate software and firmware updates to remediate newly discovered vulnerabilities or weaknesses for Seller Goods within 30 days. Updates to remediate critical vulnerabilities shall be provided within a shorter period than other updates, within seven (7) days. If updates cannot be made available by Seller within these time periods, Seller shall provide mitigations, methods of exploit detection, and/or workarounds within seven (7) days.
  - v. When third-party hardware, software (including open-source software), and firmware is provided by Seller to Buyer, Seller shall provide or arrange for the provision of appropriate hardware, software, and/or firmware updates to remediate newly discovered vulnerabilities or weaknesses, if applicable to the Buyer's use of the third-party product in its system environment, within 30 days of availability from the original Seller and/or patching source. Updates to remediate critical vulnerabilities applicable to the Seller's use of the third-party product in its system environment shall be provided within a shorter period than other updates, within thirty (30) days of availability from the original Seller and/or patching source. If applicable third-party updates cannot be integrated, tested, and made available by Seller within these time periods, Seller shall provide or arrange for the provision of recommended mitigations and/or workarounds within 30 days.

c. Virus, Firmware and Malware.

- i. Seller will use reasonable efforts to investigate whether computer viruses or malware are present in any software or patches before providing such software or patches to Buyer. To the extent Seller is supplying third-party software or patches, Seller will use reasonable effort to ensure the third-party investigates whether computer viruses or malware are present in any software or patches providing them to Buyer or installing them on Buyer's information networks, computer systems, and information systems.
- ii. Seller warrants that it has no knowledge of any computer viruses or malware coded or introduced into any software or patches, and Seller will not insert any code which would have the effect of disabling or otherwise shutting down all or a portion of such software or damaging information or functionality. To the extent Seller is supplying third-party software or patches, Seller will use reasonable efforts to ensure the third-party will not insert any code which would have the effect of disabling or otherwise shutting down all or a portion of such software or damaging information or functionality.
- iii. When install files, scripts, firmware, or other Seller-delivered software solutions (including third-party install files, scripts, firmware, or other software) are flagged as malicious, infected, or suspicious by an anti-virus vendor, Seller must provide or arrange for the provision of technical justification as to why the "false positive" hit has taken place to ensure their code's supply chain has not been compromised.
- iv. If a virus or other malware is found to have been coded or otherwise introduced as a direct result of Seller's breach of its obligations under the Agreement, Seller shall upon written request by Buyer and at its own cost:
  - a) Take all necessary remedial action and provide assistance to Buyer to eliminate the virus or other malware throughout Buyer's information networks, computer systems, and information systems; and
  - b) the virus or other malware causes a loss of operational efficiency or any loss of data (A) where Seller is obligated under the Agreement to back up such data, take all steps necessary and provide all assistance required by Buyer and its affiliates, or (B) where Seller is not obligated under the Agreement to back up such data, use commercially reasonable efforts, in each case to mitigate the loss of or damage to such data and to restore the efficiency of such data.

d. End of Life Operating Systems

- i. Seller-delivered solutions will not be required to reside on end-of-life operating systems, or any operating system that will go end-of-life six (6) months from the date of installation.
- ii. Seller solutions will support the latest versions of operating systems on which Seller-provided software functions within twenty-four (24) months from official public release of that operating system version.

e. Cryptographic Requirements

- i. Seller shall document how the cryptographic system supporting the Seller's Goods procured under the Agreement protects the confidentiality, data integrity, authentication, and non-repudiation of devices and data flows in the underlying system. This documentation shall include, but not be limited to, the following:
  - a) The cryptographic methods (hash functions, symmetric key algorithms, or asymmetric key algorithms) and primitives (*e.g.*, Secure Hash Algorithm [SHA]- 256, Advanced Encryption Standard [AES]-128, RSA, and Digital Signature Algorithm [DSA]-2048) that are implemented in the system, and how these methods are to be implemented.
  - b) The preoperational and operational phases of key establishment, deployment, ongoing validation, and revocation.
- ii. Seller will use only "approved" cryptographic methods as defined in the FIPS 140-2 Standard when enabling encryption on its products.
- iii. Seller shall provide or arrange for the provision of an automated remote key-establishment (update) method that protects the confidentiality and integrity of the cryptographic keys.
- iv. Seller shall ensure that:
  - a) The system implementation includes the capability for configurable cryptoperiods (the life span of cryptographic key usage) in accordance with the Suggested Cryptoperiods for Key Types found in Table 1 of NIST 800-57 Part 1, as may be amended;
  - b) The key update method supports remote re-keying of all devices within one (1) year as part of normal system operations; and

- c) Emergency re-keying of all devices can be remotely performed within 30 days.
- v. Seller shall provide or arrange for the provision of a method for updating cryptographic primitives or algorithms.

**7. Remote Access Controls**

Seller shall coordinate with Buyer on all remote access to Buyer's systems and networks, regardless of interactivity, and shall comply with any controls for interactive remote access and system-to-system remote access sessions requested by Buyer.

- a. Controls for Remote Access. Contractors that directly, or through any of their affiliates, subcontractors, or service providers, connect to Buyer's systems or networks agree to the additional following protective measures:
  - i. Seller will not access, and will not permit any other person or entity to access, Buyer's systems or networks without Buyer's written authorization and any such actual or attempted access will be consistent with any such written authorization.
  - ii. Seller shall implement processes designed to protect credentials as they travel throughout the network and shall ensure that network devices have encryption enabled for network authentication to prevent possible exposure of credentials.
  - iii. Seller shall ensure Seller Personnel do not use any virtual private network or other device to simultaneously connect machines on any Buyer system or network to any machines on any Seller or third-party systems, without:
    - a) using only a remote access method consistent with Buyer's remote access control policies;
    - b) providing Buyer with the full name of each individual who uses any such remote access method and the phone number and email address at which the individual may be reached while using the remote access method; and
    - c) ensuring that any computer used by Seller personnel to remotely access any Buyer system or network will not simultaneously access the Internet or any other third-party system or network while logged on to Buyer systems or networks.
  - iv. Seller shall ensure Seller Personnel accessing Buyer networks are uniquely identified and that accounts are not shared between Seller Personnel.

**8. Seller Cybersecurity Policy.**

Seller will provide to Buyer the Seller's cybersecurity policy which shall be consistent with industry standard practices (e.g., NIST Special Publication 800-53 (Rev. 4) as may be amended). Seller will implement and comply with its established cybersecurity policy.

Any changes to Seller's cybersecurity policy as applied to Goods provided to Buyer under the Agreement and Buyer Information shall not decrease the protections afforded to Buyer or Buyer Information and any material changes shall be communicated to the Buyer in writing by Seller prior to implementation.

**9. Return or Destruction of Buyer Information.**

Upon completion of the delivery of the Goods to be provided under the Agreement, or at any time upon Buyer's request, Seller will return to Buyer all hardware and removable media provided by Buyer containing Buyer Information. Buyer Information in such returned hardware and removable media shall not be removed or altered in any way. The hardware should be physically sealed and returned via a bonded courier or as otherwise directed by Buyer. If the hardware or removable media containing Buyer Information is owned by Seller or a third-party, a notarized statement detailing the destruction method used and the data sets involved, the date of destruction, and the entity or individual who performed the destruction will be sent to a designated Buyer security representative within thirty (30) calendar days after completion of the delivery of the Goods to be provided under the Agreement, or at any time upon Buyer's request. Seller's destruction or erasure of Buyer Information pursuant to this Section shall be in compliance with industry standard practices (e.g., Department of Defense 5220-22-M Standard, as may be amended).

**10. Audit Rights.**

Upon request, Seller shall provide to Buyer the opportunity to review a copy of the Seller's policies, procedures, evidence and independent audit report summaries that are part of a cyber security framework (e.g. ISO-27001, SOC2). Buyer or its third-party designee may, but is not obligated to, perform audits and security tests of Seller's IT or systems environment and procedural controls to determine Contractor's compliance with the system, network, data, and information security requirements of the Agreement. Buyer audits of the Seller system shall be initiated with at least 30 days advance notice. These audits and tests may include coordinated security tests as mutually agreed to not unduly affect Seller operations, interviews of relevant personnel, review of documentation, and technical inspection of systems and networks as they relate to the receipt, maintenance, use, retention, and authorized destruction of Buyer Information. Seller shall provide all information reasonably requested by Buyer in connection with any such audits and shall provide reasonable access and assistance to Buyer upon request. Seller will comply, within reasonable timeframes at its own cost and expense, with all reasonable recommendations that result from such inspections, tests, and audits. Buyer reserves the right to view, upon request, any original security reports that Seller has undertaken or commissioned to assess Contractor's own network security. If requested, copies of these reports will be sent via bonded courier to Buyer security contact. Seller will notify Buyer of any such security reports or similar assessments once they have been completed. Any regulators of Buyer or its affiliates shall have the same rights of audit as described herein upon request.

11. **Regulatory Examinations.**

Seller agrees that any regulator or other governmental entity with jurisdiction over Buyer and its affiliates may examine Seller's activities relating to the performance of its obligations under the Agreement to the extent such authority is granted to such entities under the law. Seller shall promptly cooperate with and provide all information reasonably requested by the regulator or other governmental entity in connection with any such examination and provide reasonable assistance and access to all equipment, records, networks, and systems reasonably requested by the regulator or other governmental entity. Seller agrees to comply with all reasonable recommendations that result from such regulatory examinations within reasonable timeframes.

12. **Risk Assessment Questionnaire.**

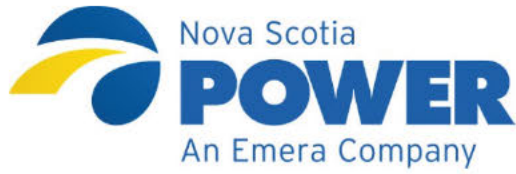
Seller shall be required to complete and submit to Buyer a Risk Assessment Questionnaire ("Questionnaire") upon request. Upon submission, Seller represents and warrants that the responses provided to the Questionnaire are complete and accurate. Seller shall notify Buyer immediately upon becoming aware that any responses to the Questionnaire are false or no longer hold true, and upon Buyer's request, Seller shall complete a new or updated Questionnaire, in whole or in part as indicated by Buyer. To the extent information requested by the Questionnaire is made publicly available by Seller, Seller may direct Buyer so such information; upon Buyer's review and determination of adequacy, such information may be deemed acceptable by Buyer in lieu of completing the Questionnaire.

13. **Reseller Services.**

To the extent Seller provides reseller services and is not the original provider ("OEM") of the services, software, equipment or other Works or Goods procured under the Agreement, Seller shall:

- a. Provide reasonable assistance as necessary to facilitate discussions between Buyer and the OEM;
- b. Shall assist Buyer in securing completion of any Questionnaires or other risk-related documents as required by Buyer;
- c. Shall ensure that the OEM complies with the terms and conditions of this Seller to including but not limited to securing the OEM's signature on this Seller to verify compliance;
- d. Provide any additional and reasonable assistance with respect to ensuring and verifying OEM compliance with this Seller to as may be reasonably requested by Buyer from time to time.




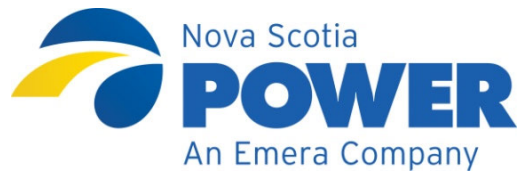


# T&D ENGINEERING SPECIFICATION

NUMBER: SE-59

**POWER TRANSFORMERS  
BATTERY ENERGY STORAGE SYSTEM STEP-UP, CONSERVATOR TANK**

<b>Prepared by:</b>	_____ Name (PRINT)	
	_____ Signature	
<b>Approved by:</b>	M Stewart _____ Name (PRINT)	<b>Seal:</b> 
<b>Previously Issued:</b>	03/06/2022	
<b>Revised:</b>		



# T&D ENGINEERING SPECIFICATION

NUMBER: SE-59

## CONTENTS

1. Scope
  2. Reference Standards
  3. Quality Assurance
  4. Service Conditions
  5. General
  6. Performance
  7. Sound Pressure Level
  8. Loss Evaluation
  9. Non-Conformance
  10. Pressure Vacuum Capability
  11. Forced Cooling
  12. Transformer Tank
  13. Moving Facilities
  14. Personnel Safety Features
  15. Paint Finish
  16. Radiators
  17. Valves and Pipes
  18. Conservator Volume(s)
  19. Miscellaneous
  20. Bushings
  21. Internal Current Transformers
  22. Core
  23. Windings
  24. Off Circuit Taps
  25. On-Load Tap Changer (OLTC)
  26. Control Cabinet(s)
  27. Accessories
  28. Rating Plate
  29. Tests
  30. Test Report
  31. Drawings
  32. Instruction Manuals
  33. Shipment
  34. Asset Condition Monitoring
- Appendix of Tables & Figures

## **1.0 SCOPE**

This Specification covers the standard technical requirements for the supply of two or more winding, liquid-filled power transformers with a base rating of 30 MVA and above, and a high voltage winding of 138 kV and above. The transformer must be suitable for use at an inverter-based energy plant (i.e. BESS – Battery Energy Storage System).

## **2.0 REFERENCE STANDARDS**

2.1 All requirements, definitions and tests, except as specifically covered in this Specification shall be in accordance with the latest issue of standards listed below:

### **2.1.1 CSA Standards**

C88	Power Transformers & Reactors
C88.1	Power Transformer & Reactor Bushings
C50	Insulating Oil, Electrical, for Transformers and Switches
C22.1	Canadian Electrical Code Part I
C22.2 #94	Special Purpose Enclosures 2, 3, 4, and 5
W47.1	Certification of companies for fusion welding of steel structures
W59	Welded steel construction (Metal-Arc Welding)

### **2.1.2 IEEE Standards**

C57.12.10	Standard Requirements for Liquid-Immersed Power Transformers
C57.12.90	Test Code for Liquid-Immersed Distribution, Power and Regulating Transformers and Shunt Reactors
C57.13	IEEE Standard Requirements for Instrument Transformers
C57.91	Guide for Loading Mineral-Oil-Immersed Transformers

### **2.1.3 ASME Standards**

Boiler and Pressure Vessel Code Section VIII	Rules for Const. of Pressure Vessels Div. 1
Boiler and Pressure Vessel Code Section IX	Welding and Brazing Qualifications

2.2 In the event of a conflict between the reference standards and this Specification, requirements of this Specification shall govern. Requirements stated in the Data Sheet at the time of inquiry shall take precedence over this Specification.

## **3.0 QUALITY ASSURANCE**

3.1 The manufacturer shall provide evidence that a manufacturing quality program, in accordance with ISO 9001, has been established and is being maintained.

- 3.2 The utility reserves the right to appoint an outside inspector to verify the manufacturer's quality assurance program.
- 3.3 The Supplier shall have been pre-qualified in accordance with NSPI QA-1.0.

#### **4.0 SERVICE CONDITIONS**

- 4.1 The transformer, complete with all accessories, shall be suitable for operation in a temperature range of -35°C to +40°C and withstand winds up to 120 km/h.
- 4.2 The transformer will be installed in a sea-coast marine, high humidity environment containing corrosive sulphur and salt elements. The manufacturer shall give due consideration to this in the selection of material for hardware, components and anti-corrosion coatings.
- 4.3 The Transformer shall be suitable for the loading profile of a 50MW, 200MWh, Battery Energy Storage System (BESS) with no impact on the service life of the transformer.

#### **5.0 GENERAL**

- 5.1 The transformer shall be an "Air Breathing" design employing a conservator type expansion tank and using a de-hydrating filter to remove humidity from all air entering the transformer.
- 5.2 The transformer shall be supplied with insulating oil containing an oxidation inhibitor conforming to or exceeding the requirements of CSA C50 Class "A", Type II & EEMAC B6.1.
- 5.3 The insulating oil shall contain 0 ppm of PCB's.
- 5.4 The bushings shall be arranged such that the H2 and X2 bushings share the same centerline and with the H1/X1 and H3/X3 bushings symmetrically arranged on either side of this centerline, as illustrated in Figure #1A. Where possible, the H2/X2 centerline shall, preferably align with the corresponding centerline of the main tank.
- 5.5 An H0 bushing, if required, shall preferably be located adjacent to either the H1 or H3 bushings. If there is insufficient space, the H0 bushing may be located adjacent to either the X1 or X3 bushing. An X0 bushing, if required, shall be located adjacent to either the X1 or X3 bushing.
- 5.6 The preferred radiator location is on the HV face of the tank. If additional radiators are required, they may be located on the LV face. Refer to Figure #1A for radiator locations.
- 5.7 The external conservator tank, shall be located toward the side of the main tank in the direction of either the H1/X1 or the H3/X3 bushings, as indicated on the data sheet.

5.8 An in-tank OLTC shall be located between the core and coils and the HV or LV side of the tank, depending on which winding is tapped.

Alternatively, an in-tank OLTC may be placed to the side of the core and coils. If an external conservator tank is also required, both the in-tank OLTC and external conservator tank shall be located in the same direction relative to the main tank centerline.

5.9 An on-tank OLTC shall be located on either side face of the main tank, with the control cabinet located on the opposite side face or the LV face.

**6.0 PERFORMANCE**

6.1 All transformers including those with forced-directed oil cooling shall be designed for an average winding temperature rise of 65°C above the ambient.

6.2 Ancillary equipment such as bushings, tap changer, bushing current transformers, winding leads, etc., as well as any other current carrying metallic parts, shall not restrict the transformer loading to levels below those permitted by the winding conductor.

6.3 NSP system fault capacity (three-phase, symmetrical) is as listed below:

**SYSTEM FAULT LEVEL**

<b>Nominal Voltage [kV]</b>	<b>Max Operating Voltage [kV]</b>	<b>Fault Level [MVA]</b>
12.47	13.2	200
25.94	26.4	350
69	72.5	3500
138	145	5000
230	245	10000
345	362	15000

The fault level values are based on the nominal voltage as 1.0 PU. For nominal voltages not listed above refer to CSA C88 for system fault capacity.

6.4 The short circuit design of the transformer shall be based on solid neutral grounding

6.5 The impedance shall be as specified on the data sheet.

6.6 The short circuit withstand capability of the transformer designs for 245 kV and 362 kV must consider that the 245 kV and 362 kV terminals of power transformers may be subjected to a single shot, high speed, single phase, trip and reclose.

6.7 The transformer manufacturer shall provide the following data for transformers with an HV rating of 230 kV and above.

- a) Calculated air core reactance for energization form all terminals, with other terminals open.
- b) Calculated B-H curve for terminal with lowest air core reactance.
- c) Calculated positive and zero sequence impedance, terminal-oriented matrix as a function of frequency. The format for each matrix element should be an impedance curve, as a function of frequency from 60 Hz to 200 kHz, in two parts: real and imaginary. The purpose of this data is to determine the location of internal resonances (in the frequency domain) for the purpose of transient modelling.

**7.0 SOUND PRESSURE LEVEL**

Sound pressure level of the transformer shall be 10 dB below the standard sound pressure level values listed in CSA C88 Table 8 unless specified otherwise at the time of inquiry.

**8.0 LOSS EVALUATION**

8.1 The Supplier shall guarantee the following losses for each transformer:

- a) No-Load loss in kilowatts at rated voltage and rated frequency.
- b) Total losses in kilowatts at rated output, rated voltage and rated frequency.
- c) Auxiliary losses.

8.2 Load losses will be evaluated on the ONAN, 65°C rise rating for each transformer. Transformer load losses determined under tests shall be corrected to an 85°C average winding temperature.

8.3 Transformer no load losses shall not be temperature corrected.

8.4 For comparison of responses, the transformer cost will be evaluated as follows:

$$\text{Evaluated Cost} = P + [A \cdot E] + [B \cdot L]$$

- where P = Transformer Price
- A = Evaluated Cost of excitation loss per kW
- B = Evaluated Cost of load loss per kW
- E = Excitation loss in kW
- L = Load loss in kW

The cost of losses will be specified in the data sheets at the time of inquiry.

**9.0 NON-CONFORMANCE**

- 9.1 If the measured excitation loss exceeds the guaranteed value by more than 7.5% (tolerance permitted by CSA C88), then the incremental cost of no-load loss evaluation shall apply as liquidated damages.
- 9.2 If the total measured loss exceeds the guaranteed value by more than 5% (tolerance permitted by CSA C88), then the incremental cost of total loss evaluation shall apply as liquidated damages.
- 9.3 Cooling and auxiliary losses shall not exceed the guaranteed values.
- 9.4 If a transformer exceeds the 65°C temperature rise during tests at rated load, resulting in a de-rating of capacity, then 1.5% of the transformer purchase price for each °C by which the temperature rise is exceeded shall apply as liquidated damages.
- 9.5 If the maximum, measured sound pressure level value exceeds the guaranteed sound pressure level value, then 1% of the transformer purchase price for each dB by which the sound pressure level value is exceeded shall apply as liquidated damages.
- 9.6 There will be no credit or payment of premium if actual values are better than the guaranteed values.
- 9.7 If the transformer's performance in the temperature rise test allows for the removal of one or more radiator units, the Purchaser reserves the right to have these radiator units remain with the transformer at a unit cost per radiator provided previously by the manufacturer.

**10.0 PRESSURE/VACUUM CAPABILITY**

- 10.1 The complete transformer assembly, including tank and radiators, shall be capable of withstanding full vacuum (zero absolute pressure).
- 10.2 The transformer tank shall withstand a minimum positive pressure of 70 kPa (10 psig).
- 10.3 When installed as a separate, externally mounted device, the diverter switch compartment on a load-tap-changing transformer shall be capable of withstanding full vacuum with normal pressure in the main tank and vice versa.

**11.0 FORCED COOLING**

**11.1 General**

- 11.1.1 Each successive fan stage shall increase the ONAN capacity by one-third (i.e. 100%, 133.3% and 166.7% respectively) unless otherwise specified.

11.1.2 Transformers with forced oil cooling shall be designed with internal baffles and ducts to force the cooling oil through the principal winding.

## 11.2 Cooling Control

11.2.1 All protective devices, control switches and contactors, etc., required for the control of fans shall be located in the transformer control cabinet.

11.2.2 Automatic control of the fans shall be actuated by a winding temperature indicator - calibrated to simulate the hottest spot temperature in the winding(s). As a back up to the winding temperature indicator signal, automatic control of the fans shall also be actuated by an oil temperature indicator.

11.2.3 The cooling control circuit shall include an “Auto/Manual” control switch and a “Start/Stop” manual control switch for each stage of cooling. There shall not be any “remote control” position.

11.2.4 An alarm relay shall be provided for each stage of fan and/or pump failure, generally in accordance with Figures #9 and #10.

11.2.5 Fan and pump numbers shall be included on the control schematic, and this fan numbering shall also be illustrated on the Layout drawing.

11.2.6 The fans and pumps associated with each stage of cooling shall be identified as a group on the layout drawing.

11.2.7 Flow switches with DPDT contacts (Qualitrol 92-35 Series, or equivalent) shall be mounted in each oil pump system to indicate direction of oil flow and to provide supervising alarm contacts for abnormal flow or incorrect flow direction. (See Fig. #10, re: ANSI type 80 device contacts (80-P#), associated with the 62-P# alarm relays.)

## 11.3 Fans

11.3.1 Fans shall be appropriate Krenz Vent model.

11.3.2 Fan guards shall be galvanized and meet OSHA requirements.

11.3.3 Fans shall not be located under radiators where they may become blocked by snow. Fans shall also not be located on top of the radiators.

11.3.4 Fans shall not be mounted directly on the radiators to prevent damage to the radiator paint finish and to facilitate possible future radiator replacement. Fans shall be mounted on a removable framework built from hot dipped galvanized steel angles and channels bolted to the transformer tank.



11.3.5 Fan motors shall be totally enclosed and weatherproof with sealed ball bearings.

11.3.6 Each fan motor shall have internal built-in overload protection.

11.3.7 The wiring to the fans shall be run radially from junction points and not daisy chained from fan to fan.

#### **11.4 Pumps**

11.4.1 Forced oil cooling shall include sufficient pumps so that loss of any one pump will still provide 100% capacity to circulate the oil through the radiators or coolers at rated kVA.

11.4.2 All pumps and their respective radiator groups, if applicable, shall be sized, laid out and controlled in the same manner and be readily removable for replacement without taking the transformer out of service.

11.4.3 Each pump and motor shall be completely enclosed in the oil circulating system so that both stator and rotor windings are submerged, and the bearings are continuously lubricated.

11.4.4 Each pump motor shall be individually protected.

11.4.5 Each pump shall be rated to pump cold oil continuously. The pump system shall be so designed that starting of a pump does not initiate an oil pressure surge (i.e. rapid pressure rise) trip.

#### **12.0 TRANSFORMER TANK**

12.1 The tank shall be of welded, sheet-steel construction, free from distortion and provided with a channel or I beam structural steel base to permit rolling and skidding of the transformer in any direction.

12.2 All welding shall conform to the requirements of CSA W59. The welders shall be qualified in accordance with CSA W47.1.

12.3 The tank cover shall be peaked or sloped to prevent water accumulation.

12.4 The tank cover shall be welded to the tank using flanges to facilitate removal. Manholes shall be provided to permit removal or installation of bushings, inspection of core and windings, tap changer mechanism and similar components. All manholes, bushing and other major openings in the cover shall have flanges of 10 mm minimum elevation around the edges to prevent entry of water when the cover is removed.

12.5 Manholes shall be circular with a minimum of 23" diameter

- 12.6 Hand holes shall be circular with a minimum 16” diameter
- 12.7 Joints sealed with a gasket shall be designed with stops to limit and maintain an even and effective pressure to ensure oil tightness without over stressing the gasket.
- These stops shall be designed such that the collection of water/moisture on the exterior side of the gasket is inhibited. This is to minimize the possible development of creeping corrosion of the metal under or above the gasket; and hence the development of a leak.
- 12.8 The preferred gasket material is Nitrile rubber.
- 12.9 Bushing turrets shall be water-tight and condensation proof.
- 12.10 The bottom plate of the transformer tank shall be at least 3 mm thicker than that required by design strength requirements to allow for possible rusting.
- 12.11 Four (4) tank grounding pads with two-hole NEMA standard spacing shall be provided at - one near each corner, approximately 150 mm above the bottom of the tank, as typically illustrated in Figure #1B.
- 12.12 Additional grounding pads, associated with surge arrester grounding, shall be provided, as per Section 27.6, specifically Clause 27.6.4, as typically illustrated in Figure #1B.
- 12.13 Insulator support brackets, as typically illustrated in Figure #1B, shall be welded to the tank wall near each neutral or normally grounded bushing. Post insulators, type TR-205 or approved equivalent, and the copper down lead bus bar from each of these bushings shall also be supplied.
- 12.14 For any tertiary bushing requiring a resistance grounding connection, the resistor, grounding transformer, resistor monitor probe, etc. will normally be installed adjacent to the that bushing. All such equipment will be supplied, if so specified on the data sheet. See Clause 27.11.

### **13.0 MOVING FACILITIES**

- 13.1 Hook-type lifting lugs shall be supplied with rounded edges and drilled for a shackle of sufficient size to lift the completely assembled and filled transformer.
- 13.2 Jacking steps shall be attached to the tank at each corner at a height not less than 300 mm and not more than 480 mm from the bottom of the transformer base. The jacking surface shall be not less than 200 mm x 250 mm, both unobstructed and level.
- 13.3 Pulling eyes, with a minimum of 50 mm in diameter, shall be provided on the transformer base, two per side, to permit pulling the transformer in any horizontal direction. The pulling eyes shall be braced to withstand a pull up to 15° vertically from the horizontal.

- 13.4 The transformer base shall be reinforced to permit moving the assembled and filled transformer on rollers in any direction.
- 13.5 The location of the "shipping" and "dressed" centre of gravity shall be painted on all four sides of the tank.
- 13.6 The location of the two "Plan View" centrelines of the transformer shall be painted on all four sides of the tank near the bottom.

#### **14.0 PERSONNEL SAFETY FEATURES**

- 14.1 Anti-skid paint shall be applied to the top of the transformer tank.
- 14.2 Manhole covers and hand-hole covers shall be provided with (hand hold) handles.
- 14.3 A permanently mounted ladder is not required. However, space shall be reserved on the transformer for positioning and securing a temporary portable ladder. Suitable anchors shall be provided at the top of the tank to set the position of the ladder, to restrain the top of the ladder from moving side to side and to allow the top of the ladder to be secured by tying, as typically illustrated in Figure #2.
- 14.4 For fall arrest, Nova Scotia Power uses Unique Concepts Ltd., Advanced Safety Systems, available in Canada through the company Capital Safety. This system utilizes a portable fall arrest anchor post which attaches to a welded on base plate, as typically illustrated in Fig. #2.

The base plate(s) shall be Capital Safety Part # 85-17412, which accommodates the Capital Safety post # 85-16691; which will be supplied by the purchaser.

At least one welded on base plate shall be provided and positioned such that:

- 1) The maximum distance to the edge of the transformer cover is less than 1,800 mm,
- 2) The maximum distance to the inside edge of any manhole allowing confined space entry is less than 900 mm, to allow use of the optional davit arm accessory for the anchor post.

If these maximum distance requirements cannot be met by one base, additional bases are required.

The baseplate shall be positioned and oriented such that the securing pin for the mast can be installed when the transformer is fully assembled (i.e. bushings installed, etc.).

- 14.5 If the transformer manufacturer, in its production facility, utilizes a fence-based fall arrest system attached to the transformer, technical details and dimensional specifications pertaining to the posts, rigid or flexible rails and toe kicks that are used shall be provided in the instruction manual to facilitate the Purchaser procuring compatible fencing materials that would utilize the fence attachments on the transformer.

## **15.0 PAINT FINISH**

- 15.1 The exterior paint colour shall be light gray, ANSI 70, unless otherwise specified on the data sheet.
- 15.2 The corrosion resistance of the paint surface shall conform to ANSI C57.12.28, latest revision, except the salt spray acceptance criteria shall be 1,500 hours. The painted panel used for the salt spray test shall conform to ANSI C57.12.29. The scribe through the paint for evaluation shall be at right angles to the weld bead. The painted panel test samples shall be made using normal production, welded material and equipment."
- 15.3 Total dry film paint thickness shall be not less than 0.127 mm (5 mils).
- 15.4 All large, non-metallic components which are not grey in colour, shall also be painted (i.e. PVC or ABS explosion vent piping).
- 15.5 A suitable quantity of primer and finish paint shall be supplied with the equipment for touch-up purposes.
- 15.6 As per Clause 14.1, anti-skid paint shall be applied to the top of the transformer tank.
- 15.7 For skid-base transformers, the tank base and underside of the tank shall be coated with asphalt mastic or a coal tar epoxy-polyamide paint system. One suggested product is Intertuf JBA016 black high build, available from International Paints (Canada) Limited.
- 15.8 The interior of the transformer tank shall be painted white using a paint which will not react with, or contaminate, the transformer oil - to facilitate internal inspections and to better display an internal flash over to the tank.
- 15.9 The interior of the control cabinet shall be painted white.
- 15.10 Unless unpainted galvanized radiators are specified (Clause 16.6), radiators shall be painted by the flow coating process and inverted following the application of each coat.

## **16.0 RADIATORS**

- 16.1 All units shall be equipped with tank mounted, detachable radiators.
- 16.2 Attachment to the main tank shall be by means of oil tight isolating valves. Valves shall be positive indicating with butterfly welded to shaft and turning handle pinned or welded to shaft. Valve should be securable in both the open and closed positions. The type of valve provided shall be Keystone HILOK High Performance Butterfly Valve (Figure 360/362) with reinforced Teflon seat. The Keystone valve selected shall be designed for use with transformer oil. Blanking plates for all openings shall be supplied.
- 16.3 Radiators shall not be positioned over manholes, hand-holes or inspection covers.

- 16.4 Radiators shall have lifting eyes and be equipped with drain valves (ball valve type) and non-corrodible brass plugs at both the bottom and top.
- 16.5 The design and construction of the headers and fins shall be such as to inhibit the collection and retention of moisture.
- 16.6 Unpainted, hot dip, galvanised radiators shall be supplied.
- 16.7 The distance between horizontal braces shall be a maximum of 500 mm on both sides of the radiators, and tack welded to each panel. Diagonal bracing shall be provided between each horizontal brace on both sides of the radiator. When looking at the radiator, the diagonal bracing shall start from the left at the bottom of the radiator, and then alternate direction with each successive horizontal brace (zig zag pattern). When looking at the diagonal bracing for the other side of the radiator it shall also start from the left at the bottom of the radiator, and then alternate direction with each successive horizontal brace (zig zag pattern). Horizontal and diagonal braces shall be of the same width and thickness of material.
- 16.8 A radiator drawing has been provided, illustrating the radiators, including overall radiator dimensions, fin spacing, top and bottom mounting flange centreline distance, flange details (i.e. bolt hole dimensions and placement, inside dimension of header pipe, gasket groves, etc.), radiator spacing, bracing details and bracing attachment details, etc.

## **17.0 VALVES AND PIPES**

- 17.1 All valves shall be non-corrodible and equipped with non-corrodible plugs.
- 17.2 The valves shall be installed by using rust proof fittings and hardware.
- 17.3 All valves sizes shall be in Imperial units (i.e. inches). Metric size valves are not acceptable.
- 17.4 All valves shall be of superior quality and of a type and size indicated in Figures #3A & B.
- 17.5 Pipe joints and fittings shall be "VICTAULIC" or NSP approved equal.
- 17.6 All elevated drain valves shall be piped to approximately 1,500 mm above the base of the transformer.
- 17.7 All piping shall be adequately braced to prevent vibration when the transformer is in service.
- 17.8 The transformer tank shall be provided with valves and fittings, in accordance with Figure #3A.

17.9 When an on-tank OLTC is provided it shall have valves and fittings in accordance with Figure #3A. When an in-tank OLTC is provided it shall have valves and fittings in accordance with Figure #3B.

17.10 OLTC's of other designs, if accepted by the Purchaser, shall be provided with the appropriate connections and valves to permit filtering of the tap changer oil.

## **18.0 CONSERVATOR VOLUME(S)**

18.1 All conservator volumes shall have sufficient capacity to ensure that oil will not be below the low oil alarm level at an ambient temperature of -35°C and will not overflow at an ambient temperature of +40°C with transformer loaded 133% above its nameplate rating.

18.2 A "main tank oil" expansion space accommodated within a separate, externally mounted conservator tank is assumed in this specification. This conservator tank shall be free breathing without use of a diaphragm (i.e. bladder system). A maintenance free dehydrating breather shall be installed to minimize the entry of humid air.

18.3 If an OLTC requires a separate, elevated conservator tank, then such a tank shall be provided. This conservator tank is assumed to be free breathing without use of a diaphragm. A maintenance free dehydrating breather shall be installed to minimize the entry of humid air.

18.4 An OLTC conservator shall be sloped 1° to assist in draining; and shall be provided with a drain pipe brought to 1,500 mm above the base of the transformer and clamped to the main tank for support.

18.5 The connecting pipe between the conservator and its associated main oil volume shall protrude 25 mm into the conservator tank to prevent sludge pickup.

18.6 If applicable, a manhole shall be located at the lower end of the conservator tank for cleaning and inspection purposes.

If two conservator volumes share a common physical tank, a manhole shall be located at the lower end of the main tank conservator volume, and on the physically opposite end for the OLTC conservator volume.

## **19.0 MISCELLANEOUS**

19.1 All nuts and bolts ½" in diameter and smaller shall be stainless steel or silicon bronze. Nuts and bolts over ½" shall be stainless steel or hot dipped galvanized. Plated fasteners are not acceptable.

19.2 Wiring on the exterior of the transformer shall be protected by rigid aluminum conduit. EMT is not acceptable.

Alternatively, liquid tight, flexible conduit suitable for outdoor application, with protective coating unaffected by oil, sunlight, or other agents may be used.

19.3 All conduit installed wiring shall comply with the Canadian Electrical Code, Part I (CSA C22.1) with regard to maximum permitted, percentage conduit fill (Table 8) and de-rated conductor ampacity (Table 5C).

19.4 All conduit installed wiring shall be Meggered after installation to verify that the electrical insulation was undamaged during installation.

19.5 Flexible cables (Tech type) or conduit suitable for outdoor application may be used for short runs to devices (i.e. from junction boxes to fan and pump motors, etc.).

19.6 Connections to fans shall be hard wired. Plugs are not acceptable.

## **20.0 BUSHINGS**

20.1 Bushings must conform to standard CSA C88.1

20.2 Openings in the cover must not be less than the dimensions shown in CSA C88.1, tables 3 and 4, column 9.

20.3 High voltage bushings shall be oil-filled condenser type, equipped with voltage tap, test tap, oil sampling port and a liquid level indicator readable from ground level. Alternatively, dry condenser type bushings are acceptable up to 72kV. High voltage bushings shall be draw-lead type whenever practicable for the rating and be equipped with universal clamp-type connectors on the air terminal. Bushings weather sheds shall be porcelain with ANSI Gray No. 70 glazing.

20.4 Installation of bushings must be such that it does not require large quantities of oil to be removed from the transformer.

20.5 Low voltage bushings shall be cover mounted, unless located in a secondary cable compartment. All bushings installed in a secondary cable compartment must be of solid core construction. The neutral bushing shall be of the same size and rating as the phase bushings. Each bushing shall have a spade type pad with four-hole NEMA spacing. Bushings weather sheds shall be polymer or porcelain with ANSI Gray No. 70 glazing.

20.6 Bushing porcelains shall be one piece without any joints and gaskets.

20.7 The bushing's inner conductor and top cap-nut shall be made of materials such that galvanic corrosion between dissimilar metals is prevented.

- 20.8 Bushing draw leads shall be adequately tied for shipping, but release of the tie shall be readily accomplished through the bushing portal.
- 20.9 The minimum mounting height for all bushings shall be 3,000 mm above the base of the transformer, except for oil to SF6 bushings and bushings located in a secondary cable compartment.
- 20.10 The minimum metal to metal clearance between the live parts of bushings in air shall be as per tabulated below:

<b>Voltage Class [kV]</b>	<b>Clearance (Phase-Phase) [mm]</b>
15	450
27.5	450
35	500
72.5	800
145	1650
245	2410
362	3100

- 20.11 The strike distance between live parts of the bushing and grounded parts in the area of the transformer cover shall not be less than the line-ground strike distance for the bushing itself.
- 20.12 The minimum clearance between the live parts of bushings and surge arresters and any components of the transformer that may be serviced (e.g. gas detector relay, valves, gauges, etc.) shall be as tabulated below:

<b>Voltage Class [kV]</b>	<b>Limit of Approach [mm]</b>
Up to 35	1200
72.5	1500
145	1800
245	2300
362	2900

- 20.13 The minimum leakage distance of the bushings shall be as tabulated below unless specified otherwise in the data sheet.

<b>Voltage Class [kV]</b>	<b>Leakage Distance [mm]</b>
15	300
27.5	500
35	700
72.5	1380
145	2760
245	4600
362	6900



**21.0 CURRENT TRANSFORMERS**

**21.1 General**

- 21.1.1 Bushing current transformers shall be supplied in quantities, locations and ratios as specified in the Data Sheet; and as typically illustrated in Figure #5.
- 21.1.2 The continuous thermal current-rating factor for bushing current transformers shall be 2.0.
- 21.1.3 The secondary terminals of external current transformers shall be wired to terminals blocks in the transformer control cabinet, labelled as per Figure #5.
- 21.1.4 All current transformers shall have fully distributed windings on all taps and be removable without removing the tank cover. This may be done by suitable sizing and access through tank cover manholes or by providing detachable CT bushing pockets.

**21.2 Internal Current Transformers**

- 21.2.1 When the bushing current transformers (BCT's) are housed in turrets, the secondary leads shall be brought out at the turrets.
- 21.2.2 When the BCT's are located inside the transformer tank and suspended from the tank cover, the secondary leads shall be carried through eyelets welded to the tank cover. Spacing between the eyelets shall not exceed 600 mm.
- 21.2.3 All current leads passing through the tank wall shall employ bolted through-type bushings. Plug-in receptacle-type connections shall not be used.
- 21.2.4 The inner diameter of the BCT's must not be less than the dimensions shown in CSA C88.1, tables 3 and 4, column 9.

**21.3 External Current Transformers**

- 21.3.1 Current transformers installed on external leads operating at ground potential shall be rated 600V; and shall be suitable for outdoor use, including weather proof secondary junction box.
- 21.3.2 Details associated with window type current transformers used for the tank ground protection option are provided in Section 27.9 of this specification.
- 21.3.1 Bushing mounted, slip on current transformers shall not be provided unless specifically requested on the data sheet.

**22.0 CORE**

- 22.1 The core shall, preferably, have an approximated circular cross-section.
- 22.2 Core clamps shall be insulated from the core and electrically connected to the tank. Clamps shall be painted white.
- 22.3 Bolts through the core shall not be used for core assembly.

22.4 The core and windings shall be braced to prevent displacement or distortion during short circuit. Temporary blocking, if any, shall be marked in red to facilitate identification for removal; and noted in the installation instructions.

22.5 The electrical grounding of the transformer core to the tank shall be via an insulated ground lead extending through the tank cover or wall via a bushing with a minimum rating of 5 kV. A removable connection shall be made from the bushing to the outside of the tank to allow testing.

The bushing and ground connection shall be housed in a weather tight, condensation proof box.

22.6 The core ground lead, lead connections, exit bushing and grounding connection shall be of sufficient cross-sectional area to withstand a fault current of 20 kA RMS for one second without fusing.

22.7 Grounding from the bushing shall be through a 250-ohm resistor of 25-watt (minimum) rating with a single insulated lead.

### 23.0 **WINDINGS**

23.1 The windings shall be circular. Rectangular coils are not acceptable.

23.2 The winding material shall be copper.

23.3 Sheet type windings are unacceptable.

23.4 Coil clamping rings shall be of one-piece construction and provide clamping to 100% of the winding's circumference.

23.5 Vapor phase dry out is the only acceptable means of removing moisture from the transformer cellulose insulation. Moisture content shall be <0.5%.

23.6 For dual or multiple voltage winding combinations, the series-parallel connections shall be by an off-circuit selector switch or a manual tap board, as specified in the Data Sheet.

23.7 The handle of a selector changer should preferably be located on the side of the tank and shall be lock able with a padlock having a 10 mm diameter shackle.

23.8 The selector switch or tap board shall be accessible through a hand hole in the cover of the transformer and shall require the removal of little or no oil from the main tank.

23.9 A delta connected tertiary (i.e. stabilizing) winding, if specified, may be partially buried with one corner brought out or fully brought out, as indicated on the Data Sheet.

23.10 In the case of a fully brought out, delta connected tertiary winding, metal phase barriers bonded to the transformer tank shall be installed between the bushings - so as to minimize the probability of a phase to phase fault.

23.11 Delta connected, tertiary (i.e. stabilizing) windings shall be provided with a facility to open the winding loop for test purposes. This may be provided in one of two ways, as specified on the Data Sheet:

- 1) The winding shall be provided with a link, readily accessible through a hand hole in the cover, to allow opening of the delta winding

- 2) The winding shall have one corner connection made externally, by bringing the two windings ends out, each through a bushing, and connecting together the live parts of these bushings. (See Figure #5) This connection may also be requested to be housed in an oil filled box. The grounding bond to this external, corner connection may pass through one or more externally mounted, outdoor rated, 600V insulated CT's.

**24.0 OFF-CIRCUIT TAPS**

- 24.1 Either an off-circuit tap switch or a manual tap board, shall be supplied on the high voltage winding as specified in the Data Sheet.
- 24.2 The handle of a tap changer should preferably be located on the side of the tank and shall be lock able with a padlock having a 10 mm diameter shackle.
- 24.3 The tap change switch or tap board shall be accessible through a hand hole in the cover of the transformer and shall require the removal of little or no oil from the main tank.
- 24.4 All taps shall have full load capacity.

**25.0 ON-LOAD Tap changer (OLTC)**

**25.1 General**

- 25.1.1 When specified on the data sheet, a motor operated, on-load tap changer shall be supplied.
- 25.1.2 The voltage range and number of steps shall be stated on the data sheet.
- 25.1.3 If not specified on the data sheet, as a minimum, the tap changer shall have a rated current not less than two times the current flow of the winding in which it is installed, with the transformer loaded to the ONAN rating and operating on the nominal voltage tap.
- 25.1.4 The OLTC shall be a high-speed resistance or vacuum reactance type.
- 25.1.5 The transformer shall be capable of carrying full MVA capacity on all tap positions.
- 25.1.6 Unless specified otherwise, the transformer shall be designed assuming the following:
  - a) that power flow will be from the HV to the LV terminals; and
  - b) that the transformer will be operated such that the LV terminals are maintained at a constant voltage.

This mode of operating shall be independent of the winding location of the OLTC.

**25.2 Construction**

- 25.2.1 Arcing/diverter switches shall be installed in a sealed tank with an oil system completely separate from the main tank oil.

- 25.2.2 Free breathing diverter compartments are to be equipped with a maintenance free dehydrating breather.
- 25.2.3 Design of the diverter switch shall be such that it will not stop between steps if the motor supply is interrupted before the step is completed.
- 25.2.4 The diverter switch contacts shall be rated for at least 200,000 transitions at its rated current, before requiring replacement; and the contacts shall be easily accessible.
- 25.2.5 Taps shall be so arranged that for a fixed primary voltage, the lowest numbered tap gives the lowest secondary voltage; and successive increasing tap numbers give increasing voltage steps.
- 25.2.6 The tap changer mechanism shall cause the tap changer to move only one step per operation.
- 25.2.7 An operations counter shall be provided.

**25.3 Control and Indication**

- 25.3.1 Control and indication of the OLTC has been provided in accordance with the simplified schematics illustrated in Fig's #12A and #12B.
- 25.3.2 A complete control and indication schematic for the OLTC system shall be provided. This schematic will include and incorporate a simplified illustration of the schematic provided by the OLTC manufacturer.

Interface terminals shall be clearly indicated for wiring connections between the main transformer control cabinet and the OLTC mechanism cabinet.

Interface terminals shall be clearly indicated for the wiring connections to be made by the Purchaser.

- 25.3.3 The following control equipment shall be provided in the OLTC control cabinet:
  - a) Switch for "Local" and "Remote" control functions ("Off" position optional)
  - b) Manual Raise/Lower Controls
  - c) Operations Counter
  - d) Tap Position Indicator with Drag Hands
  - e) Tap position indication equipment c/w analogue output transducer
  - f) Terminal blocks for cable connections by others
- 25.3.4 The following control equipment shall be provided in the main control cabinet:
  - a) Switch for "Local Manual", "Local Auto" and "Remote" control functions
  - b) Manual Raise/Lower Controls
  - c) Automatic voltage control equipment
  - d) Terminal blocks for cable connections for remote control by others
- 25.3.5 The OLTC drive motor shall have thermal overload protection; and a means shall be provided for isolating the motor from the supply. Supply voltage and number of phases will be as specified in the Data Sheet.

- 25.3.6 The tap position indication equipment shall be a slide-wire potentiometer comprising 1 W resistors (number of resistors same as the number of steps in the OLTC). Total resistance of the potentiometer shall not exceed 2,000 ohms. The three terminals of the potentiometer shall be wired to terminal blocks in the main control cabinet.
- 25.3.7 A slide wire transducer with a 0 to 1 mA output, compatible with the potentiometer resistance shall be installed in the control cabinet.
- The power connection shall be 129VDC. The input power connection to the device shall be run through a two fuse holder (see Clause 26.14) and then be connected to terminals in the control cabinet. The powering connection is illustrated in Fig. #8.
- 25.3.8 A tapchange auxiliary contact, closed during tap changer travel, shall be wired to terminals in control cabinet for a "tapchange-in-progress" indication.
- 25.3.9 Control cabinet for the load tap changer shall be near and on the same side as the transformer control cabinet. Alternatively, the two cabinets may be combined.
- 25.3.10 In the event of two control cabinets, the interconnecting wiring shall be via terminal blocks in the main control cabinet. Direct connections to devices within the main control cabinet are not acceptable. It is assumed that interconnection terminal blocks have been provided in the OLTC control cabinet by the manufacturer of the OLTC.
- 25.3.11 The diverter switch compartment shall have a magnetic oil level indication with a minimum of two normally open electrical contacts. The "Low Level" contact will be used either for alarm or to initiate oil containment equipment. The "Low Low Level" contact will be used to de-energize the transformer for a loss of OLTC oil.
- 25.3.12 The "Low Level" contact must be duplicated through the use of a relay. The coil of this relay shall be operable from either 120VAC or 129VDC. The relay shall be rail mounted Phoenix Contact Type EMG 22-REL/KSR-120/21-21 or approved equivalent. A typical connection diagram is illustrated in Figure #8.

## 25.4 **Automatic Voltage Control**

- 25.4.1 Automatic voltage control shall consist of the following:
- 1) A voltage regulating relay to automatically control the operation of the load tap changer, equipped with facilities for setting any voltage between 110 and 130 V; with a band width adjustable from + 1 to + 3 V.
  - 2) A time delay relay adjustable from 10 to 90 seconds.
  - 3) An OLTC backup control relay shall be provided to prevent a defective tap changer control from running the voltage outside the upper and lower limits.
  - 4) Test terminals shall be provided for adjustment of the voltage relay, reading of output voltage and for testing and calibration from an external power source.

- 5) The external 120VAC potential supply will be furnished by the Purchaser.

## 25.5 **Load Drop Compensation (LDC)**

- 25.5.1 If specified on the data sheet, a line drop compensator shall be supplied with reverse reactance polarity switch; and the required current transformer installed in the X1 bushing.

## 25.6 **Parallel Operation**

- 25.6.1 If a requirement for parallel operation is specified in the data sheets, all equipment necessary for future parallel operation with a similar transformer using the circulating current method shall be supplied. The control arrangement shall be generally in accordance with Figure #12B.
- 25.6.2 The required current transformer installed in the X1 bushing, if an LDC CT is not already specified.
- 25.6.3 If parallel operation is required with an existing unit, data will be supplied in the data sheet.

## 26.0 **CONTROL CABINET(S)**

- 26.1 The control cabinet shall be a NEMA Type 3 enclosure in accordance with CSA C22.2 No. 94 and made of stainless steel with a minimum No. 10 gauge thickness. The top of the cabinet shall be sloped to prevent water accumulation. A drip shield shall be provided above the cabinet door. The bottom shall be located approximately 700 mm above the transformer base. It shall be rigidly braced and secured to avoid amplifying transformer sound level.
- 26.2 The cabinet shall be equipped with an exterior hinged and pad lockable door (10 mm shackle) capable of being latched open or closed. The inside pocket on the door shall contain one copy of the instruction manual. All hinges, latches, pins, etc. shall be made of stainless steel. Piano type hinges are not acceptable.
- 26.3 All external cables, piping, etc., shall enter the control cabinet from the bottom of the cabinet only. Top entry is not permitted.
- 26.4 A pre-set, thermostatically controlled heater shall be provided in the cabinet for anti-condensation. A safety guard shall be provided in front of this heater for personnel safety.
- 26.5 The cabinet shall preferably be insulated with non-combustible insulation.
- 26.6 Screened vents, with filters shall be provided in the cabinet for air circulation.
- 26.7 All devices shall be identified with suitable nameplates in the English language.
- 26.8 All terminal blocks shall be numbered.

- 26.9 Sufficient space and clearances shall be provided at the bottom of the cabinet to facilitate cable entry and termination by others.
- 26.10 The cabinet shall be provided with a grounding bar for individual grounding of current transformers and a minimum of 25 control cable shields, etc.
- 26.11 All current transformer secondary wiring shall be minimum #10 AWG copper and all other wiring shall be a minimum #12 AWG copper and sized to the required current rating as per the Canadian Electrical Code, Part I (CSA C22.1) Table 2.
- 26.12 Terminal blocks used in the control circuit shall be as follows:
- a) Current Transformer Circuits - Phoenix Contact Type URK-ND2 or NSP approved equal.
  - b) Other Circuits - Phoenix Contact type UK16 or NSP approved equal.
- Terminal blocks shall be supplied complete with required blanking plates, insulating plates and tags.
- A minimum of 10% spare terminal blocks shall be supplied on each terminal strip.
- 26.13 Insulated wire connectors shall be used for terminating wires on the device terminals.
- 26.14 All fuse blocks shall be dead-front GEC "Red Spot" or approved equal.
- 26.15 All terminal blocks with voltages operating above 120 V shall be fitted with insulating covers to prevent accidental contact.
- 26.16 The cabinet shall be equipped with a switched light.
- 26.17 A 120 Volt, 15 Amp weatherproof convenience duplex receptacle shall be provided on the exterior of the control cabinet. A moulded case circuit breaker c/w ground fault shall be provided inside the cabinet protection for this receptacle.
- 26.18 A 120 Volt, 15 Amp, moulded case circuit breaker c/w ground fault shall be provided inside the cabinet protection, wired out to terminals, for use by the purchaser to power an on-line gas monitor (as per Fig #8). Alarm and indication terminals shall also be provided as per Fig #9.
- 26.19 A 120 Volt, 15 Amp, moulded case circuit breaker c/w ground fault shall be provided inside the cabinet protection, wired out to terminals, for use by the purchaser to power oil containment equipment (as per Fig #8). Associated alarm terminals shall also be provided as per Fig #9.
- 26.18 Space shall be provided inside the control cabinet for installation of a standard, socket base, glass jar housed, "kWhr / kVA demand", revenue style meter, c/w test switch - for the purpose of measuring power flow through the transformer for statistical record purposes.

The meter will be supplied and field installed by the Purchaser.

The transformer manufacturer shall provide the following material and wiring, in accordance with Figure # 11, to accommodate the meter:

100A, 13 jaw socket, c/w enclosure (if required),  
10 pole test switch (Measurina #9809511, or approved equivalent).

To facilitate both reading and “plugging in” and “unplugging” of the meter, the socket shall be mounted on the back plate of the control cabinet

If insufficient space is available in the control cabinet to accommodate the meter, as an option and with the approval of the Purchaser, the meter base (c/w a weather proof enclosure) may be mounted on an exterior side of the control cabinet.

**27.0 ACCESSORIES**

All standard accessories in accordance with CSA C88 shall be supplied, with modifications and additional requirements as listed below. All auxiliary contacts from the various devices shall be wired to the terminal blocks in the control cabinet.

**27.1 Temperature Indication**

27.1.1 Temperature control and indication for both oil and winding temperature shall be provided and wired directly to the SEL-2414 Transformer Monitor relay (refer to section 34 Asset Condition Monitoring).

27.1.2 With regard to the winding temperature simulation heater circuit, the heater wires and the winding temperature (WTI) current transformer leads shall first be brought out to suitable terminals in the transformer control cabinet, as per the typical circuit illustrated in Figure #7. This is to facilitate the trouble shooting of problems.

27.1.3 The SEL-2414 shall be programmed to operate as follows:

<b>Description</b>	<b>Oil Temperature</b>	<b>Winding Temperature</b>
First Stage Cooling	45°C	70°C
Second Stage Cooling	50°C	75°C
Alarm	80°C	105°C
Trip	95°C	120°C

**27.2 Oil Level Indicators**

27.2.1 MESSKO style MTO magnetic oil level indicators shall be supplied with the transformer and installed as described in this section.

27.2.2 Dials shall indicate the “Min” “25°C” and “Max” oil levels and must be easily viewable from ground level.

27.2.3 Each indicator shall be provided with two, electrically isolated, single pole, double throw contacts wired to the control cabinet. The contacts that close on low oil level shall be indicated on the drawings.

27.2.4 The intended function of the indicators is as described below and is illustrated in Fig #4.

**27.2.5 Oil Level Indicator (Measures conservator volume in External Tank or in main tank)**



The oil level indicator shall be mounted on the transformer tank wall. One contact will be used for remote low oil level alarm indication. The other contact will operate at a lower oil level and it will be dedicated for use in conjunction with oil containment equipment.

#### 27.2.6 **Oil Level Indicator (Measures oil volume inside main tank)**

The oil level indicator shall be mounted on the transformer tank wall. One contact shall close just before the oil level in the transformer tank falls to a level that will expose the core and coils. This contact will be used to de-energize the transformer. The other contact shall open at a higher oil level. It will be dedicated for use in conjunction with vacuum filling equipment.

### 27.3 **Pressure Relief and Regulation**

#### 27.3.1 **Pressure Relief Device**

27.3.1.1 A MESSKO MPreC pressure relief device complete with SPDT alarm contacts shall be mounted on the tank cover, and shall be equipped with an oil directed cover to direct oil downwards. It shall also include a saphamore for visual indication of device operation. Any oil discharged from the device shall be directed away from areas normally frequented for routine maintenance or inspection.

27.3.1.2 "Pressure Relief Valve" shall be stamped on the device.

27.3.1.3 The SPDT contacts shall be wired to terminal blocks in the control cabinet.

27.3.1.4 A functionally similar device with one normally open electrical contact shall be installed on any OLTC tank.

### 27.4 **Gas Detection/Protection**

27.4.1 All free breathing conservator type transformers shall be equipped with a Gas Detector relay to monitor gas accumulation and sudden pressure (ABB Model 11C) shall be provided.

27.4.2 The relay shall be of a two-element type with electrically separate DPST contacts for tripping on sudden pressure rise and for alarm on gas accumulation.

27.4.3 The DPST contacts shall be wired to terminal blocks in the control cabinet.

27.4.4 The highest point of the gas detector relay shall be below the bottom of the conservator tank, and the relay shall be located as to permit visual inspection from the ground.

27.4.5 The gas relay shall be mounted to collect all the gas evolved. All pockets or spaces which are vented to the transformer tank shall be piped to the relay with piping having a minimum 5 degrees slope upward to the relay.

- 27.4.6 A gate valve shall be provided between the transformer and the gas relay to allow free passage of gas. The valve handle shall face the direction of gas relay access.
- 27.4.7 A stainless steel or copper tube, 8 mm or larger inside diameter and secured to the side of the tank, shall run from the gas accumulation element to a sampling valve approximately 1,500 mm above ground level. The valve shall be suitably capped.

**27.5 Dehydrating Breather**

- 27.5.1 A maintenance free dehydrating breather of a design approved by the Purchaser shall be supplied (Reinhausen MTRAB Dehydrating Breather)
- 27.5.2 A maintenance free dehydrating breather shall also be supplied on a separate tap changer compartment.
- 27.5.3 Top of breathers shall be approximately 1,500 mm above the transformer base. Pipe shall be rigid 1” IPS, with threaded fittings. Tubing, EMT, etc., is not acceptable.

**27.6 Surge Arrester Mounting Brackets**

- 27.6.1 Surge arrester mounting brackets shall be supplied unless specifically not requested on the data sheet.
- 27.6.2 As a minimum, mounting brackets for the surge arresters shall be located as to provide the same phase to phase clearance as for the associated bushings.
- 27.6.3 Terminal height of arrester not to exceed that of corresponding bushing.
- 27.6.4 Grounding pads with two-hole NEMA standard spacing shall be provided on the transformer tank wall near the top, for arrester grounding - one for each arrester, as typically depicted in Figure #1B.
- 27.6.5 The surge arrester mounting bracket shall include six mounting holes sized to accept a ½" bolt, for the attachment of the surge arrester. These shall be on a 10" (254 mm) diameter bolt circle; with two holes placed on a line oriented perpendicular to the main tank and with the four remaining holes spaced 60° apart along the bolt circle, as illustrated in Figure #1B.

Other structural and design considerations include, but are not limited to, the following:

<b>Voltage Class [kV]</b>	<b>Arrester Weight [kg min.]</b>	<b>Arrester Height [mm min.]</b>	<b>Centre Line Spacing [mm min.]</b>
15	35	525	605
27.5	45	700	605
72.5	50	810	1150
145	135	1450	2075
230	275	2800	3650
345	365	3700	4100

**27.7 Surge Arresters**

27.7.1 Surge arresters shall be supplied only when specifically requested on the data sheet.

27.7.2 Surge arresters shall be completely specified on, or by a supplement to, the data sheets.

The NSP specification, "SE-20 - Surge Arresters - Station Class", will also be supplied, if necessary.

**27.8 Glanding Plate Storage Box**

27.8.1 A weather repellent box shall be provided, affixed to the transformer, for storage of the glanding plates used to cover the apertures associated with accessories removed for shipping.

**27.9 Tank Ground Protection**

When specified on the data sheet (line 6.3), the tank ground protection option shall include the following features, as typically illustrated in Figure #2:

27.9.1 Four tank ground CT's shall be supplied, as per the following:

GE Type JCP-0, 1,200-5A	Cat # 750X015005
single ratio, window type with base	
c/w secondary terminal conduit box	Cat # 9689693011

or an approved equivalent.

27.9.2 A means to mount a tank ground CT's shall be installed on at each of the four corners of the transformer tank, near the base, each close to each corresponding tank grounding pad.

27.9.3 Two tank ground CT's shall be installed at two of the four mounting locations, on diagonally opposite corners of the transformer tank.

During installation, the Purchaser will install two tank ground conductors - one through each window type CT and connect each of them to the associated grounding pad on the tank wall, as typically illustrated in Figure #2.

The two additional corner mounts are to provide flexibility in the tank ground CT mounting locations, should the transfer ever have to be relocated.

27.9.4 Two additional tank ground CT's shall be installed under the transformer control cabinet.

During installation, the Purchaser will install all protection & control, and station service power cables through these two-window type CT, as typically illustrated in Figure #2.

27.9.5 The secondary terminals of these CT's shall be wired to terminals blocks in the transformer control cabinet. The secondary conductors shall be jumpered at the terminal blocks as typically illustrated in Figure #2

27.9.6 Glanding plates for terminating cables in all high voltage cable termination cubicles shall be constructed from an insulating board material.

**27.10 Power Cable Entrance Junction Box**

27.10.1 When specified on the data sheet, a weather proof box shall be provided for the termination of power cables up to 25 kV.

27.10.2 The box shall be sufficiently spacious, as to provide the same BIL level as the associated transformer winding. This is to eliminate the requirement to cover the bolted connections to the associated bushings with electrical insulating tape to facilitate periodic, future disconnection and re-connection for maintenance testing.

27.10.3 Any requirement for internal bus bars to facilitate the support and termination of multiple cable per phase shall be specified on the data sheet.

**27.11 Tertiary Winding Grounding Provisions**

27.11.1 When specified on the data sheet, provision will be made for grounding a delta connected tertiary winding using a grounding transformer and power resistor mounted directly to the tank of the transformer. A typical mounting arrangement is illustrated in Figure #2.

27.11.2 The proposed transformer is a utility standard, oil filled, pole mounted unit; designed and built to the CSA C2 standard and usually rated 10kVA; and supplied by the Purchaser.

27.11.3 The power resistor is typically short time rated to 1 minute and enclosed in a ventilated stainless-steel enclosure.

27.11.3 Specific physical details about the transformer and resistor would be provided as a part of the drawing approval process.

27.11.3 Two #12 copper, 600V insulated conductors, shall be installed between terminals in the transformer control cabinet and a weather proof junction box near the mounting location if the power resistor. The voltage developed across the power resistor is an analogue quantity required by the protection scheme supplied by the Purchaser; and the Purchaser will extend these conductors to the terminal of the power resistor at the time of installation.

**28.0 RATING PLATE**

28.1 The name plate shall be fabricated from stainless steel, and permanently engraved with data in accordance with CSA C88.

28.2 A schematic representation of main winding and CT connections shall be shown on nameplate. Ratios and polarities shall be indicated for all current transformers.

28.3 The Purchaser's purchase order number shall be stamped on the nameplate.

28.4 Measured values of positive and zero sequence impedance shall be shown based on the ONAN rating. Positive and zero-sequence impedances between windings shall be shown H-L, H-T, L-T.

28.5 A label made of laminated plastic approx. 50 mm x 75 mm, with white background, and indicating PCB level in oil along with date of test shall be affixed near the rating plate.

28.6 When load tap changing is supplied, a separate nameplate with data in accordance with CSA C88, shall be mounted on the tap changer or the tap changer control cabinet.

29.0 **TESTS**

All transformers on a purchase order shall be tested in accordance with CSA C88 but with modifications and additions described below:

29.1 **Winding Resistance:** Resistance measurements shall be taken at all tap positions. Phase to phase and per phase resistance values shall be recorded.

29.2 **Ratio:** Ratio shall be measured at all tap positions.

29.3 **Polarity and Phase Relationships**

29.4 **Excitation Current:** Excitation current shall be measured at 100%, 105% 110% and 115% of the rated voltage at principal tap connection.

29.5 **Excitation Loss:** Excitation loss shall be measured at 100%, 105% and 110% of the rated voltage at principal tap connection.

29.6 **One Hour Excitation:** This test shall be performed on all transformers.

29.7 **Positive Sequence Impedance:** Positive Sequence Impedance tests shall be performed for maximum boost, nominal and maximum buck positions of the OLTC with off-circuit tap switch, if provided, in the nominal ratio position. For three winding transformers and autotransformers with delta tertiaries, the impedance between each pair of windings shall be measured, i.e. HV LV, HV TV, LV TV.

29.8 **Zero Sequence Impedance:** Zero Sequence Impedance tests shall be performed for maximum boost, nominal and maximum buck positions of the OLTC with off-circuit tap switch, if provided, in the nominal ratio position. For three winding transformers and autotransformers with delta tertiaries, the impedance between each pair of windings shall be measured, i.e. HV LV, HV TV, LV TV.

29.9 **Load Loss:** Load loss shall be measured at rated load and at rated voltage

29.10 **Temperature Rise:** Temperature rise test shall be performed on all transformers at maximum rated capacity.

29.11 **Gas in Oil Analysis:** Dissolved gas in oil analysis shall be performed both before and after the temperature rise test. As a pass/fail criteria, the increase in gas content during the temperature rise test shall be less than the following maximum limits:

Gas	PPM
H <sub>2</sub>	10
CH <sub>4</sub>	1
C <sub>2</sub> H <sub>6</sub>	1
C <sub>2</sub> H <sub>4</sub>	1
C <sub>2</sub> H <sub>2</sub>	0
CO	25
CO <sub>2</sub>	150

Oil samples will be taken as follows:

Test	Location	
	Top	Bottom
Before Temperature Rise Test	1	0
After Temperature Rise Test	2	2

The “Before” sample and two “After” samples, one from the top and one from the bottom, will be analysed. The remaining top and bottom samples will be retained for possible later analyses.

- 29.12 **Induced Potential Test:** The tap changer shall be set to include full winding for this test. A three phase test shall be performed. Induced potential test voltage and duration for these transformers shall be as required by CSA Std. C88.
- a) Voltage Classification up to 242 kV: Induced potential test voltage and duration for these transformers shall be as required by CSA Std. C88.
  - b) Voltage Classification 345 kV and above: For these transformers a voltage of 2.0 times maximum rating plate voltage shall be applied for 5 seconds followed by 1.5 times maximum rating plate voltage for 1 hour.
- 29.13 **Partial Discharge:** In addition to RIV, partial discharge measurements using the apparent charge method shall be recorded. Apparent charge shall not exceed 500 pC.
- 29.14 **Impulse Testing**
- 29.11.1 **Lightning Impulse Test:** Lightning Impulse tests shall be performed on all transformer terminals including neutrals.
  - 29.11.2 **Chopped Wave Test:** The chopped wave test is not a routine requirement and shall be performed only when specified on Data Sheet. Crest of the chopped wave shall be same as that of the full wave. Minimum time to flash over shall be 3 micro-seconds.
  - 29.14.3 **Switching Impulse Test:** Switching impulse test shall be performed on HV winding terminals with a voltage class of 245 kV and above. The neutral shall be grounded during this test.
- 29.15 **Core Insulation:** Core insulation tests (minimum 1,000 volt insulation tester) shall be repeated after transformer is loaded on the carrier immediately prior to shipping. Results to be shown on test report (resistance and voltage of tester).
- 29.16 **Insulation Power Factor:** Insulation power factor tests for the transformer winding shall be performed in accordance with ANSI C57.12.90 Method II (test with guard circuit). The power factor value measured at a temperature range between 20°C and 30°C and corrected to 20°C shall not exceed 0.35%.
- 29.17 **Bushing Power Factor:** Power Factor tests shall be performed for all bushings with a resulting power factor stamped on the bushing nameplate and recorded in the test results. This test shall be conducted for both the “C1” and “C2” capacitances.

- 29.18 **Pressure Test:** A pressure test on the tank and cooling system shall be made employing hot oil at 50°C and 35 kPa for a period of 24 hours. If any leaks appear, they shall be repaired and the test shall be repeated.
- 29.19 **Vacuum Test:** A vacuum test shall be performed on all tanks and cooling systems designed for vacuum filling.
- 29.20 **Sound-Level Test:** When specified on the data sheet, sound level test shall be performed.
- 29.21 **Current Transformers:** The current transformers shall be tested after installation in the power transformer from their terminals in the control cabinet. The tests shall be conducted in accordance with C57.13. The following tests are required:
- (a) Ratio Test
  - (b) Polarity Test
  - (c) Saturation Curve
  - (d) Insulation Resistance Test
  - (e) DC Resistance Test
- 29.22 **Winding Temperature:** The results of calibration tests on the winding temperature device(s) (hot spot indicator) shall be shown on the test report.
- 29.23 **Functional Tests:** The secondary circuit wiring of fans, controls, etc. shall be checked to ensure correct functioning from initiating source to actual component operation from terminals for connection by the Purchaser.
- 29.24 **OLTC Equipment:** The OLTC equipment shall be tested electrically, as well as manually, to verify correct sequencing. The motor shall be operated at 90% of it's rated voltage. The following tests are required:
- a) Operation of the tap changer over its entire range at rated voltage
  - b) Operation of the tap changer over its entire range at rated current
  - c) Operation of automatic voltage control equipment.
- 29.25 **Control Wiring Insulation Test:** The control wiring shall be tested at two times the circuit voltage plus 1,000 volts (1,500 V minimum) to ground (60 Hz) for one minute.
- 29.26 **Paint Thickness:** The thickness of the external paint coating shall be measured at 12 locations selected by the Company or its representative. Minimum acceptable thickness shall be 0.115 mm (3 mils).

30.0 **TEST REPORT**

- 30.1 The test results shall show all tests conducted in accordance with this specification.
- 30.2 Upon completion of tests, official copies of the test results shall be distributed to the purchaser, in descending order of preference, as follows:
- a) one (1) electronic copy in a ".pdf" document file format, or
  - b) three (3) paper copies.

31.0 **DRAWINGS**

The following drawings are required for approval:

**31.1 Outline and General Assembly:**

This drawing shall show transformer assembly details including mass, dimensions, location of accessories, hand holds, manholes, centre of gravity, lifting & moving details, etc.

This drawing shall indicate the distance from the underside of the top cover to the top of the oil for the Min, Max and 25°C oil levels marked on the main tank oil level dial.

A temperature compensated dip stick measurement, used to confirm a correctly installed oil amount, shall be indicated, relative to some convenient reference, such as the underside of the cover or the top of a cover flange.

**31.2 Bill of Materials.** This shall include, but not be limited to the following:

- a) Rating, type, leakage distance and manufacturer of the bushings
- b) Type, catalogue no., material and manufacturer of connectors when supplied.
- c) Type, catalogue no., manufacturer of accessories, e.g. gauges, indicators, pressure relief devices, breathers
- d) Type, catalogue no., manufacturer, size and material of valves, pipes and fittings
- e) Type, rating and manufacturer of OLTC
- f) Quantity, rating, capacity and manufacturer of fans
- g) Type, catalogue no. and manufacturer of control switches, terminal blocks, fuses, instruments and relays in the control cabinet(s)

**31.3 Nameplate diagram.**

In addition to other standard information, this drawing shall also indicate if the transformer, radiators and tap changer, if applicable, are rated for full vacuum.

**31.4 Schematic diagrams**

As a minimum, schematic diagrams shall be provided, illustrating load tap changer control, cooling (fan and pump) control, winding temperature indication and alarm and indication contacts. These schematics shall be in accordance with Fig's #7, #9, #10 and #12A & #12B.

These schematic drawing shall clearly indicate the customer connection terminals, if applicable.

Each of these schematics shall be complete and, preferably, represented on a single drawing sheet. If a schematic diagram requires more than one sheet, the interface points common to each combination of drawing sheets shall be clearly illustrated on each. Incomplete schematic representations, or partial schematic representations using wiring drawing interface points are not acceptable.

Small schematic diagrams shall not be duplicated on two or more drawings.

**31.5 Wiring Diagrams.**

**31.6 Shipping Drawing:** This drawing shall show the following information:

- a) Shipping heights, width, length and base dimensions
- b) Shipping weight



- c) Centers of gravity in shipping condition
- d) Location of jack steps, rolling areas and blocking areas.
- e) Slinging requirements and restrictions, if any, for crane off-loading of the transformer.
- f) Position of gas bottles, regulators and gauges if shipped gas filled.
- g) Details of gas shipping conditions and pressure checks to be made.
- h) Status of OLTC compartment as to whether oil or gas filled.
- i) Position of core ground, test link.
- j) Complete Bill of Materials indicating parts shipped separately.
- k) Position of impact recorders.

31.7 Drawings for approval may be submitted to the purchaser, in descending order of preference, as per the following:

- a) one (1) electronic copy in the following CAD file formats:
  - InterGraph - ".dgn" document, latest release,
  - AutoCad - ".dwg" document, one short of latest release,
- b) one (1) electronic copy in the following file formats:
  - ".dxf" document,
  - ".pdf" document,
- c) three (3) paper copies.

## 32.0 INSTRUCTION MANUALS

The instruction manual shall include the following:

- a) Instructions for receiving, storage, assembly and initial oil filling.
- b) Details of accessories supplied with the transformer.
- c) Drawings and details of the radiators supplied with the transformer, including overall dimensions, surface area, mounting flange details and centre-to-centre spacing, and weight: empty and filled.
- c) Details of motors and fans.
- d) Details of pressure/vacuum regulator.
- e) Details of de-hydrating breather(s).
- f) Details of bushing current transformers.
- g) Drawings and instructions for bushings.
- h) Details and instructions for the tap changers including control devices.
- i) Details of gaskets, including list, material, thickness and dimensional details of all gaskets.
- j) List of all valves including size, manufacturer and type number.
- k) Procedures to calibrate and adjust switches, contacts, oil level gauges, temperature indicators, etc.
- l) Procedure to test and calibrate winding hot spot temperature.

- m) Test reports.
- n) Spare parts lists complete with all reference numbers.
- o) All approved drawings.

**32.1 Other Drawings**

The instruction manuals shall include internal assembly drawings for the Purchaser's use for maintenance. These drawings may be non-dimensional and marked "Confidential" and shall include the following:

- a) Inside assembly - High voltage and low voltage (non-dimensioned) - stamped "Confidential".
- b) Inside assembly - Plan and End View (non-dimensioned) - stamped "Confidential".
- c) Connections to series - multiple terminal board, if so equipped.

In addition to, or in lieu of, high resolution photographs shall be included in the instruction book documenting various views of the finished core and coil assembly, including as a minimum, the four side views.

32.2 The instruction manuals shall be distributed to the purchaser, as per the following:

- a) one (1) electronic copy in a ".pdf" document file format to purchaser,
- b) three (3) paper copies - one (1) with transformer,  
two (2) to purchaser.

**33.0 SHIPMENT**

33.1 Transformers shall be shipped dry air filled, unless mutually agreed and specified otherwise.

33.2 For transformers shipped filled with dry air, the following shall apply:

- a) Gas pressurization shall be sufficient to keep transformer dry during shipment and for one month after arrival.
- b) Pressure gauges, valves and gas cylinder physically attached to the transformer and suitably protected from damage shall be supplied for replenishing gas pressure during transit and storage.
- c) Type of gas, initial pressure and temperature, as well as minimum pressure requirements, shall be tagged to the cylinder in a weather proof manner.
- d) Instructions shall be provided for the initial tests on arrival (pressure and moisture requirements).

33.3 The main tank containing the core and coils shall have an operational and activated deck mounted impact recorder with sufficient battery life for twice the duration of the trip. The record from the recorder shall be provided.

The Purchaser reserves the right to have its own solar powered, magnetically attached impact recorder mounted by the manufacturer without regard to the method of shipment.

33.4 When auxiliary equipment such as bushings, or radiators are shipped separately, each container shall be clearly marked with the Company Purchase Order and Serial Number

of the transformer with which it is associated. A detailed packing slip shall accompany each shipment.

- 33.5 Any auxiliary equipment not designed for indefinite outdoor storage shall be packed separately and the container clearly marked "for indoor storage." For parts requiring special precautions during storage, the details shall be shown on the outside of each container, or in a durable envelope attached to the container and labelled "Storage Instructions."
- 33.6 Before a transformer is shipped, all the necessary drawings and information relating to position of oil filling valves and vacuum pump attachments with complete oil filling instructions and special precautions must be sent to the Company. All drawings necessary for the handling and assembly of the transformer including internal arrangement shall be shipped to the Company prior to shipment of the transformer.
- 33.7 Method of oil shipment will be as specified in the Data Sheet. Arrangements for oil shipment must be confirmed with NSPI prior to shipment.
- 33.8 A spare set of gaskets for use during site assembly shall be shipped.
- 33.9 Transit bushing to be provided for facilitating SFRA testing prior to oil filling and assembly.

**34.0 ASSET CONDITION MONITORING**

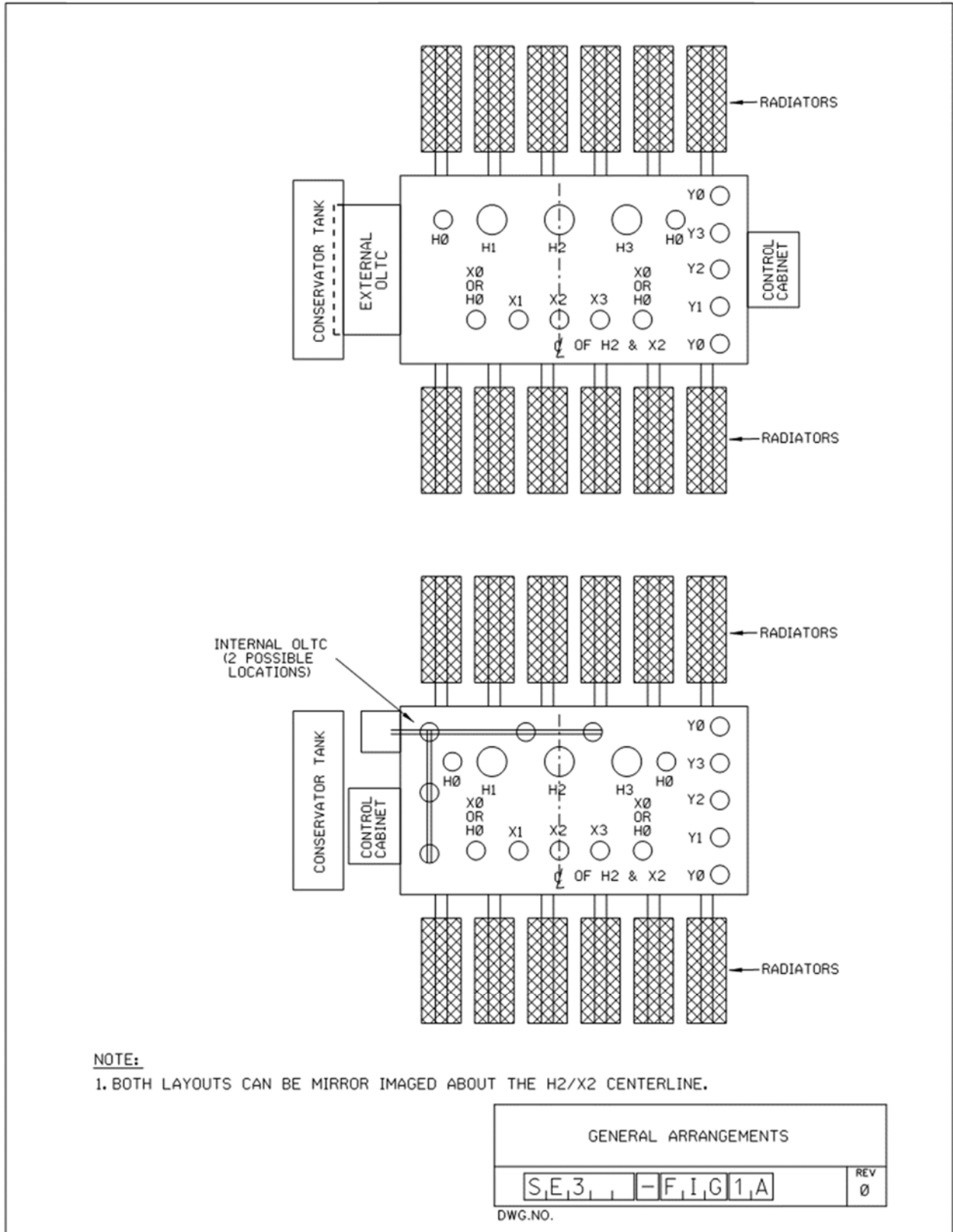
34.1 Supplier shall install and commission the SEL-2414 transformer online monitoring device. The SEL-2414 shall either directly measure or communicate with other appropriate measurement devices for the purpose of monitoring and recording the following health indicators:

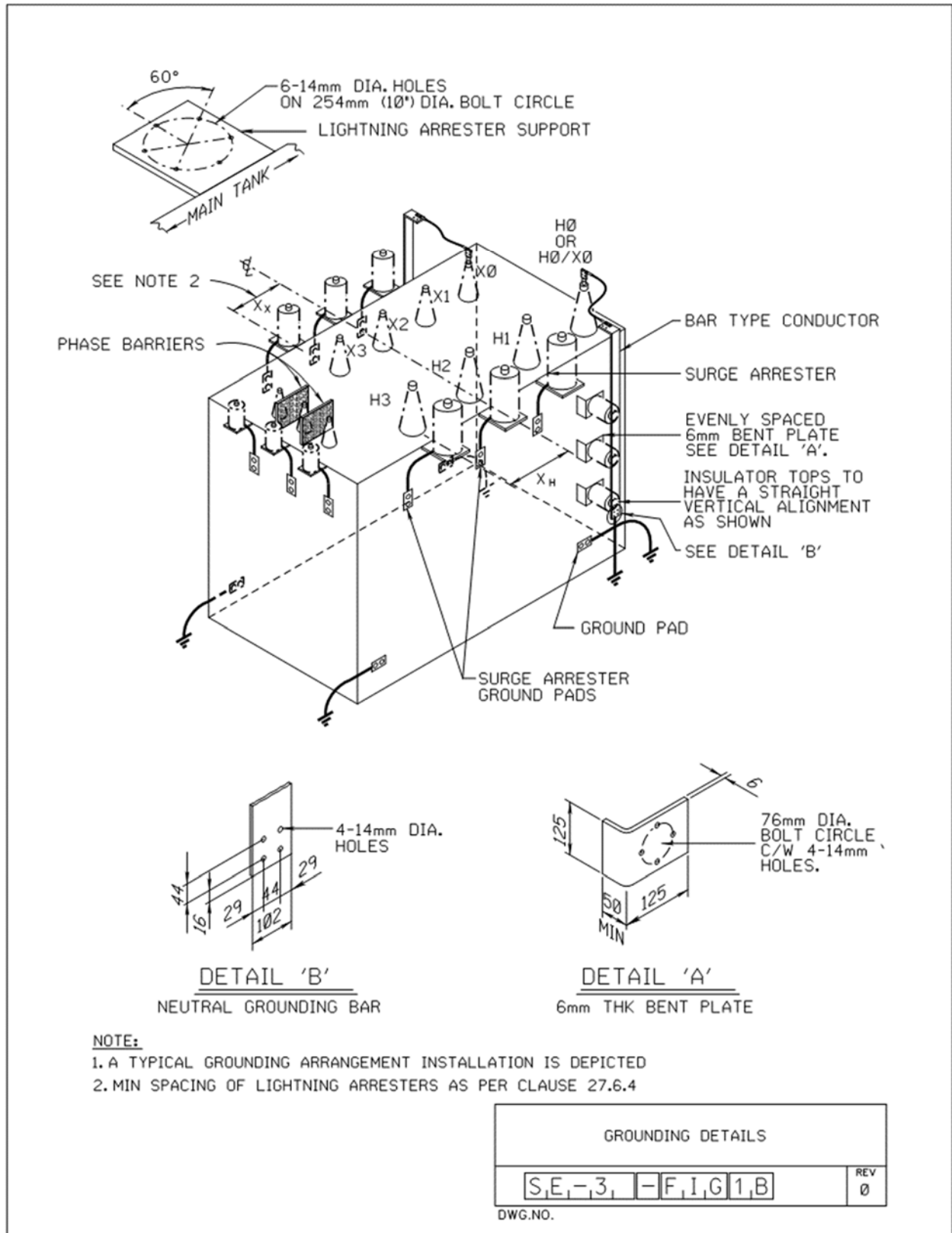
- a) Main tank top oil temperature
- b) Winding hotspot temperature
- c) LTC tank oil temperature
- d) Ambient temperature
- e) Online dissolved gas analysis. (9 gas)
- f) Online moisture-in-oil
- g) Motor current of stage 1 and stage 2 cooling systems
- h) Tap changer motor current
- i) Fan Motor Current
- j) Through Fault Current
- k) Megawatt and Mega VAR hours

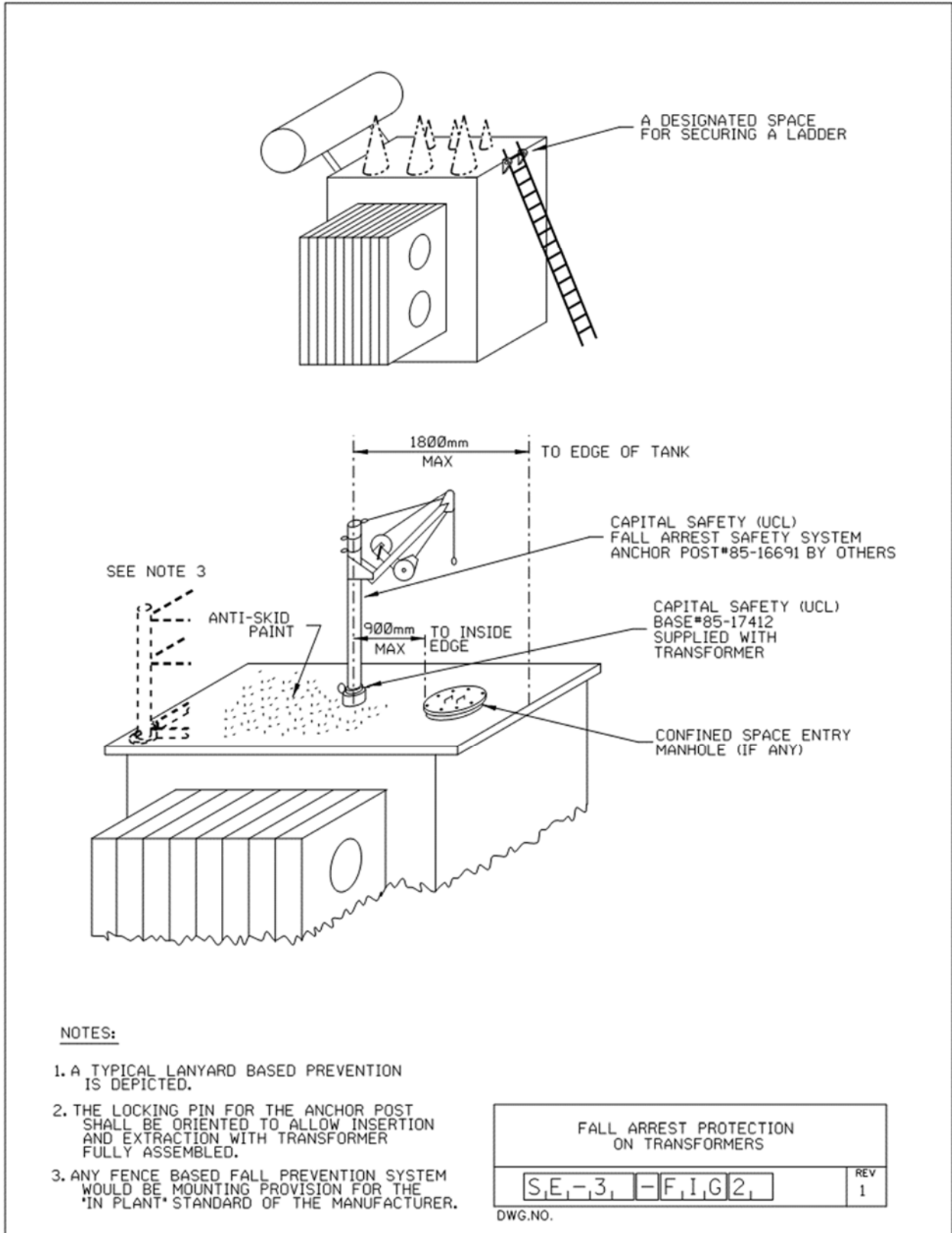
All temperature and current transducers, current transformers, wiring and other devices required to complete the full functionality of the indicators listed above shall be provided.

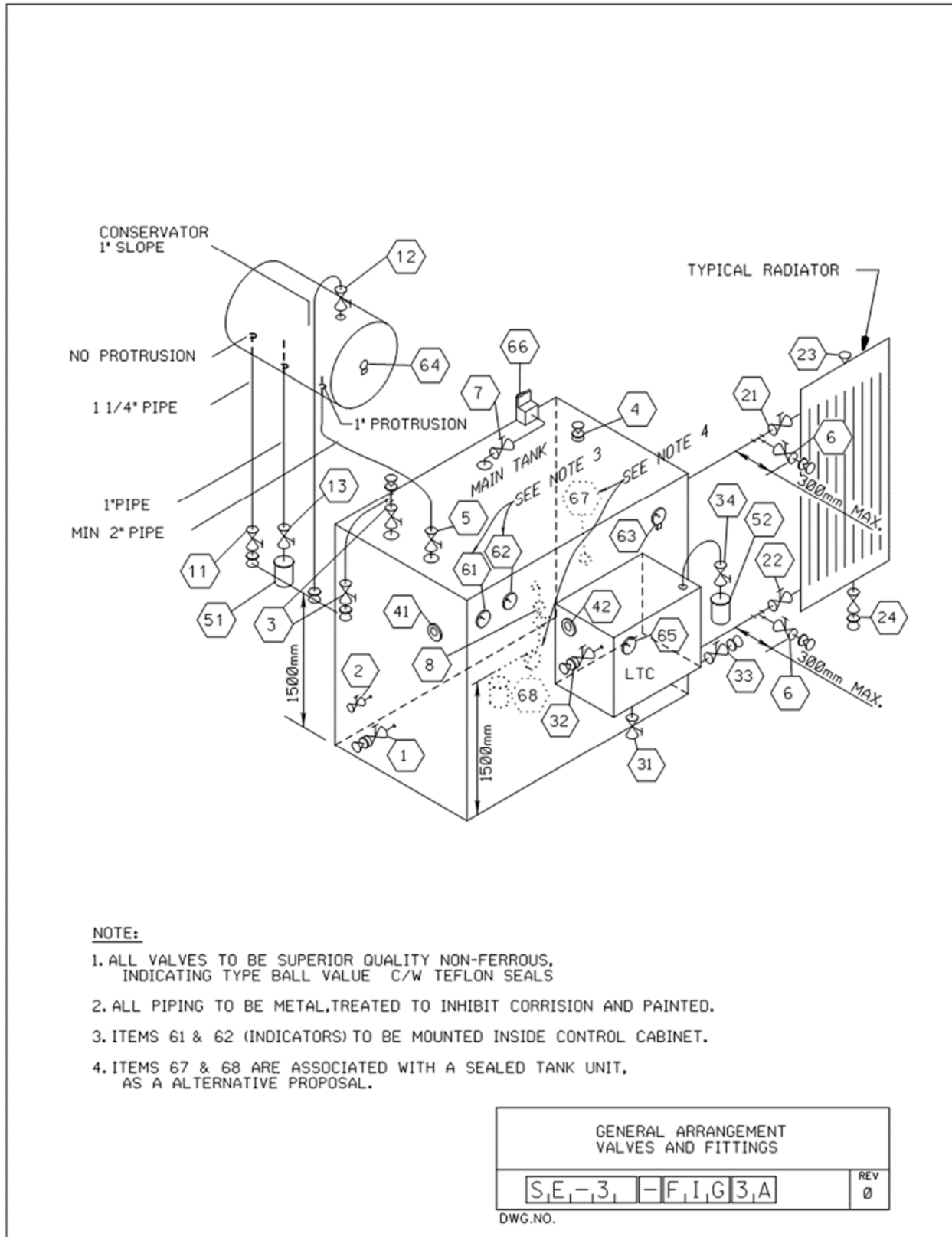
- 34.2 The device shall control the two stages of cooling as well as provide digital outputs for oil temperature alarms and winding temperature alarms. The device shall be self-monitoring and provide a failsafe digital output contact for device failure. Power supply shall be from 125 VDC unless otherwise specified. The device shall be capable of SCADA communication via DNP3.0 protocol over multi-mode fibre.
- 34.3 The SEL-2414 shall incorporate a daily exercise circuit for the transformer fans. The fans shall start every day at 9am Atlantic Standard Time and must run for 10 minutes.

- 34.4 The SEL-2414 shall be programmed to store minimum and maximum transformer temperature history.
- 34.5 The SEL-2414 shall have three AC current and three AC voltage inputs.
- 34.6 The current and voltage inputs shall be the CT type terminals Phoenix Contact Type URK-ND2 and the voltage terminals shall be the Phoenix Contact type UK16.
- 34.7 The SEL-2414 shall preferably be mounted inside the transformer control cabinet. A separately mounted NEMA 4X stainless steel weatherproof enclosure is acceptable as an alternative. The enclosure shall be opened by hand without requiring the use of any tools.
- 34.8 An SEL-2414 wiring schematic, logic diagram and settings file shall be provided for NSPI review.











<b>MAIN TANK - Valves and Plugs</b>				
<b>Item No.</b>	<b>Item</b>	<b>Size (ips)</b>	<b>Location</b>	<b>Function</b>
1	Oil Drain Valve (Globe) c/w 1¼" pipe connection, and plug	2" (min)	Bottom of Tank Side Wall	Oil Drain, Oil Filtering
2	Oil Sampling Valve (Angle Needle) c/w brass plug	½"	Adjacent to Item #1  12" from tank bottom  Internal piping shall be used to ensure that the oil sample will be obtained from the tank bottom	Oil Sampling
3	Vacuum Pump Connection Valves (2) c/w 4" pipe connection to 1,500 mm  above transformer base, Gate valve at top with "T" connection to pipe (c/w plug), and Ball valve at bottom c/w plug.	4"	Top of Tank, Above Item #1	Vacuum Pump Connection
4	Vacuum Level Probe Connection Valve (Gate) c/w plug	1¼"	Top of Tank, Diametrically Opposite Item #1	Vacuum Level Probe Connection
5	Conservator Pipe Connection Valve (Ball)	2" (min)	Top of Tank, Diametrically Opposite Item #1	Conservator Tank Isolation
6	On-Line Gas Monitor Connection Isolation Valve (Gate) c/w plug (i.e. ABB CoreSense)	2"	Tank Side of the top and bottom Radiator Shut-Off Valves, 300mm max. dist. to end of valve	On-Line Gas Monitor Connections
7	Gas Relay Isolation Value (Ball)	½" (min)	Adjacent to Item #66	Gas Relay Isolation
8	Pressure/Vacuum Regulator Isolation Valve (Ball)	1"	Tank Wall, Adjacent to Item #67	Pressure/Vacuum Regulator Isolation

<b>CONSERVATOR - Valves and Plugs</b>				
Item No.	Item	Size (ips)	Location	Function
11	Oil Drain Valve (Gate) c/w 1¼" pipe connection to 1,500 mm above transf. base, Valve at bottom c/w Plug	1¼"	Bottom of Conservator Tank Lower End (i.e. sloping bottom)	Oil Drain, Oil Top Up, Oil Filtering
12	Vacuum Pulling Connection/Valve (Ball)	2" (min)	Top of Conservator Tank, Diametrically Opposite Item #6	Vacuum Pump Connection
13	De-Hydrating Breather Isolation Valve c/w 1" pipe connection to 1,500 mm above transf. base,  Ball Valve at lower end of pipe,  De-Hydrating breather on end	1"	End of Pipe, Above Item #51	Conservator Isolation

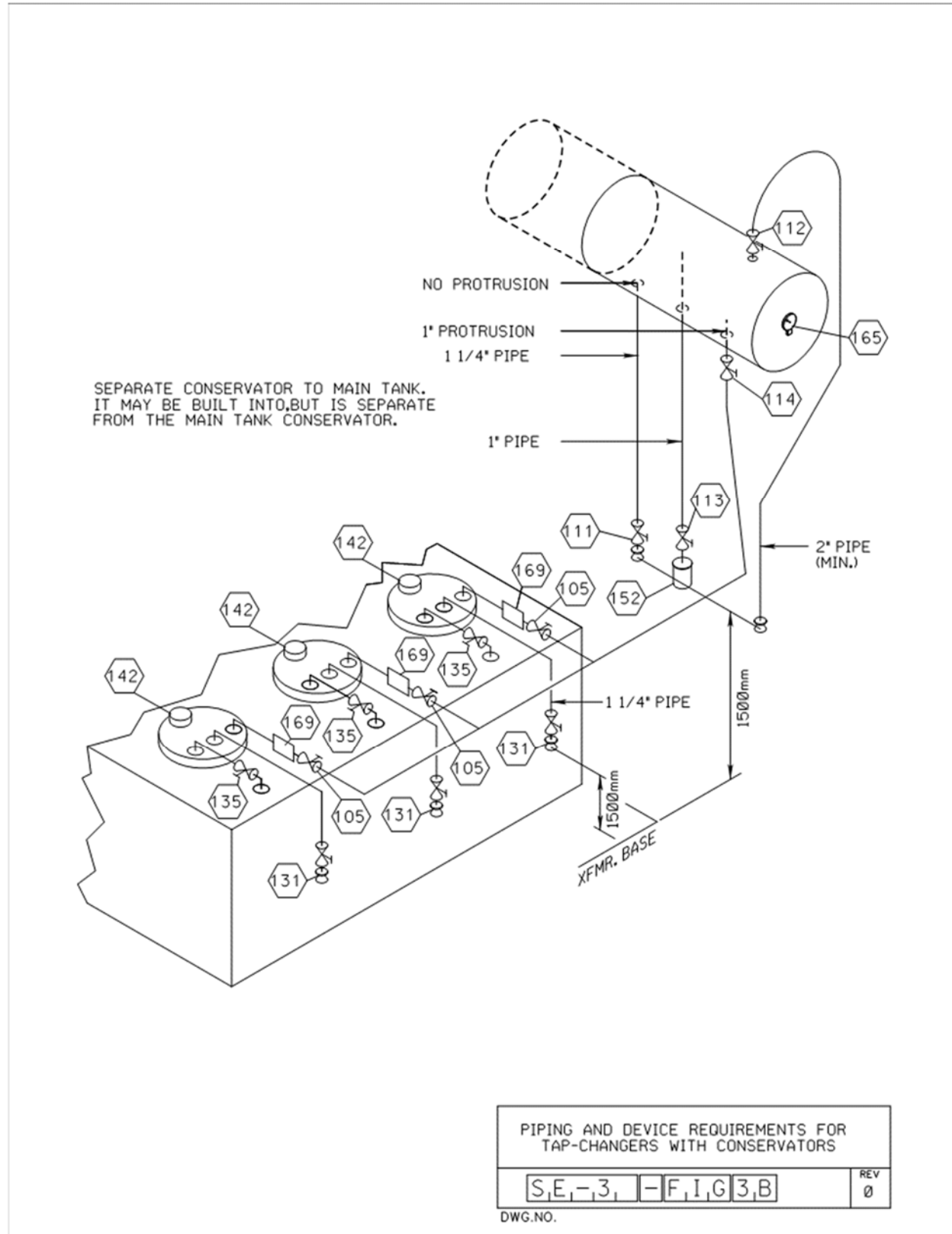
<b>RADIATORS - Valves and Plugs</b>				
Item No.	Item	Size (ips)	Location	Function
21	Oil Shut-Off – TOP  Keystone HILOK High Performance Butterfly Valve (Figure 360/362) with reinforced teflon seat	Not Spec'd	Top End of Radiator	Radiator Isolation
22	Oil Shut-Off – BOTTOM  Keystone HILOK High Performance Butterfly Valve (Figure 360/362) with reinforced teflon seat	Not Spec'd	Top End of Radiator	Radiator Isolation
23	Radiator Drain Valve (Ball) c/w Brass Plug	Not Spec'd	Top of Radiator	Vent for Oil Drain
24	Radiator Drain Valve (Ball) c/w Brass Plug	Not Spec'd	Bottom of Radiator	Oil Drain

<b>ON-TANK OLTC - Valves and Plugs</b>				
Item No.	Item	Size (ips)	Location	Function
31	Oil Drain Valve c/w Plug	1¼"	Lowest Point in OLTC	Oil Drain
32	Oil Filter Connection - TOP c/w plug	1"	75 mm below top of OLTC Oil	Oil Filtering
33	Oil Filter Connection - BOTTOM c/w plug	1"	25 mm above bottom of OLTC, Diametrically Opposite Item #11	Oil Filtering
34	De-Hydrating Breather Isolation Valve c/w 1" pipe connection to 1,500 mm above transf. base, Ball Valve at lower end of pipe, De-Hydrating breather on end	1"	End of Pipe, Above Item #51	OLTC Isolation

<b>Pressure Relief</b>				
Item No.	Item	Size (ips)	Location	Function
41	Pressure Relief - Main Tank MESSKO MPreC		Main Tank Cover	Pressure Relief, Transf. Prot. Trip
42	Pressure Relief - OLTC Tank (Ext.) c/w Electrical Contacts, and Oil Deflector	Not Spec'd	Top of OLTC Tank Wall	Pressure Relief, Transf. Prot. Trip

<b>De-Hydrating Breathers</b>				
Item No.	Item	Size (ips)	Location	Function
51	De-Hydrating Breather to Main Tank Conservator	1" Pipe		
52	De-Hydrating Breather to OLTC Conservator	1" Pipe		

<b>Gauges and Indicators</b>				
Item No.	Item	Size (ips)	Location	Function
61	Oil Temperature Gauge (Not used with online temperature monitoring)		Main Tank Control Cabinet	Cooling Initiate, High Oil Temp. Alarm, High Oil Temp. Trip
62	Winding Temperature Gauge(s) (Not used with online temperature monitoring)		Main Tank Control Cabinet	Cooling Initiate, High Wind. Temp. Alarm, High wind. Temp. Trip
63	Oil Level Gauge - Main Tank MESSKO style MTO		Top of Main Tank Wall	Oil Level Indication, Oil Filling Alarm, Low Oil Prot. Trip
64	Oil Level Gauge – Main Tank Conservator MESSKO style MTO		Higher End of Conservator Tank	Oil Level Indication Oil Containment Initiate Low Oil Prot. Alarm
65	Oil Level Gauge - OLTC Conservator c/w contacts		Top of OLTC Tank	Oil Level Indication, Oil Containment Initiate, Low Oil Prot. Alarm
66	Gas Detector Relay (ABB Model 11C)		Top of Main Tank (i.e. on cover)	Gas Accum. Prot. Alarm, Gas Prot. Trip



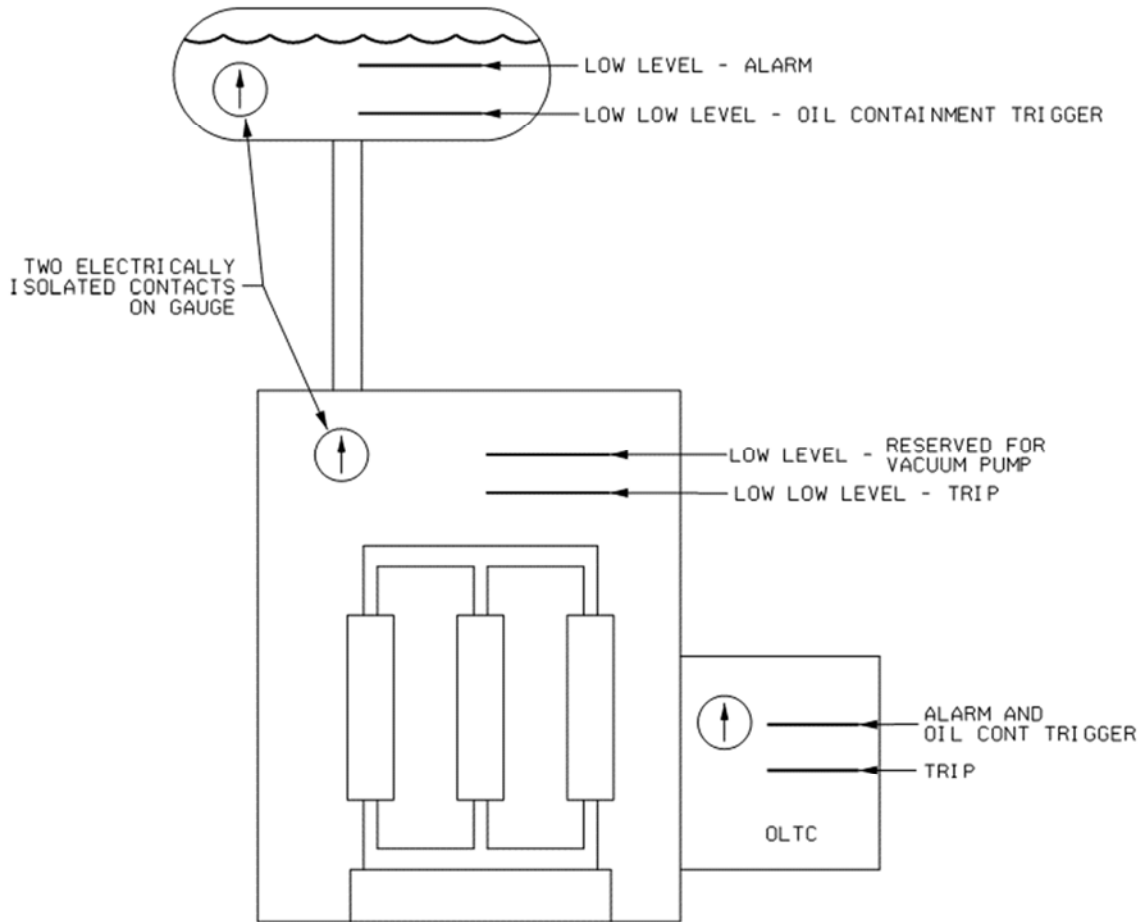
<b>OLTC CONSERVATOR - Valves and Plugs</b>				
Item No.	Item	Size (ips)	Location	Function
111	Oil Drain Valve (Gate) c/w 1¼" pipe connection to 1,500 mm above transf. base, Valve top and bottom, plug on lower valve	1¼"	Bottom of Conservator Tank, Lower End (i.e. sloping bottom)	Oil Drain, Oil Top Up, Oil Filtering
112	Vacuum Pulling Valve (Ball) c/w 2" (min) pipe connection to 1,500 mm above transf. base, Valve top and plug on bottom.	2" (min)	Top of Conservator Tank, Diametrically Opposite Item #6	Vacuum Pump Connection
113	De-Hydrating Breather Isolation Valve c/w 1" pipe connection to 1,500 mm above transf. base, Ball Valve at lower end of pipe, De-Hydrating breather on end	1"	Top of Tank, Above Item #1	Conservator Isolation
114	Conservator Pipe Connection Valve (Ball)	Not Spec'd	Bottom of Conservator Tank, Upper End (i.e. sloping bottom)	Conservator Tank Isolation

<b>IN-TANK OLTC - Valves and Plugs</b>				
Item No.	Item	Size (ips)	Location	Function
105	Conservator Pipe Connection Valve(s) (Ball)	Not Spec'd	Top of OLTC Tank(s),	OLTC Tank Isolation
131	Oil Drain Valve(s) (Gate) c/w 1¼" pipe connection to 1,500 mm above transf. base, Valve at bottom c/w plug	1¼"	Tap Changer Head	Oil Drain, Oil Sample
135	Pressure By-Pass Connection(s) (Ball) Between Main Tank and OLTC Tanks	1¼"	Tap Changer Head	Oil Filtering

<b>Pressure Relief</b>				
Item No.	Item	Size (ips)	Location	Function
142	Pressure Relief – In-Tank OLTC c/w Electrical Contacts, and Oil Deflector	Not Spec'd	Tap Changer Head	Pressure Relief

<b>De-Hydrating Breathers</b>				
Item No.	Item	Size (ips)	Location	Function
152	De-Hydrating Breather to OLTC Conservator	1" Pipe		

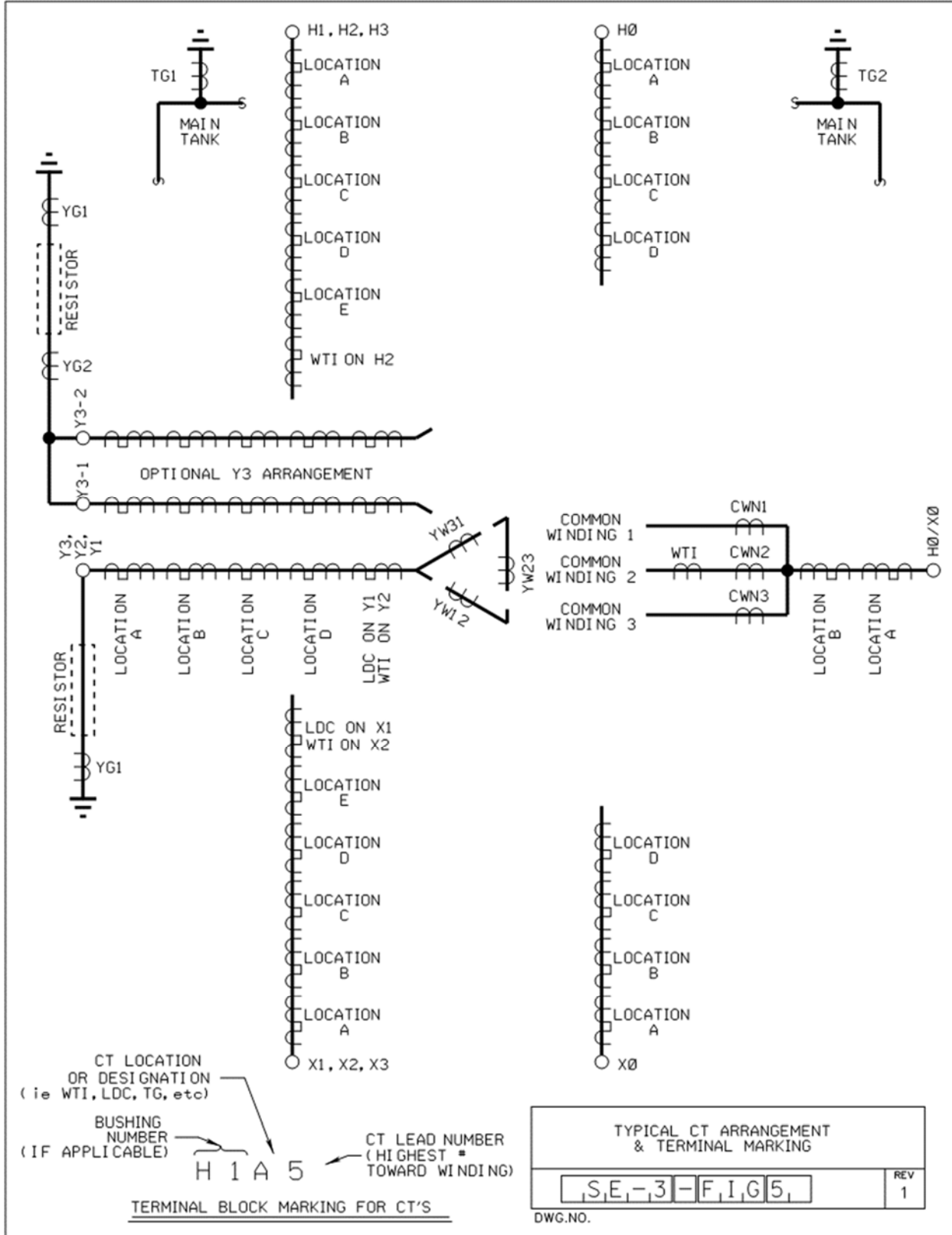
<b>Gauges and Indicators</b>				
Item No.	Item	Size (ips)	Location	Function
165	Oil Level Gauge - OLTC Conservator c/w contacts		Higher End of Conservator Tank	Oil Level Indication, Oil Containment Initiate, Low Oil Prot. Alarm
169	Reverse Flow Device	Not Spec'd	Tap Changer Head	OLTC Prot. Trip

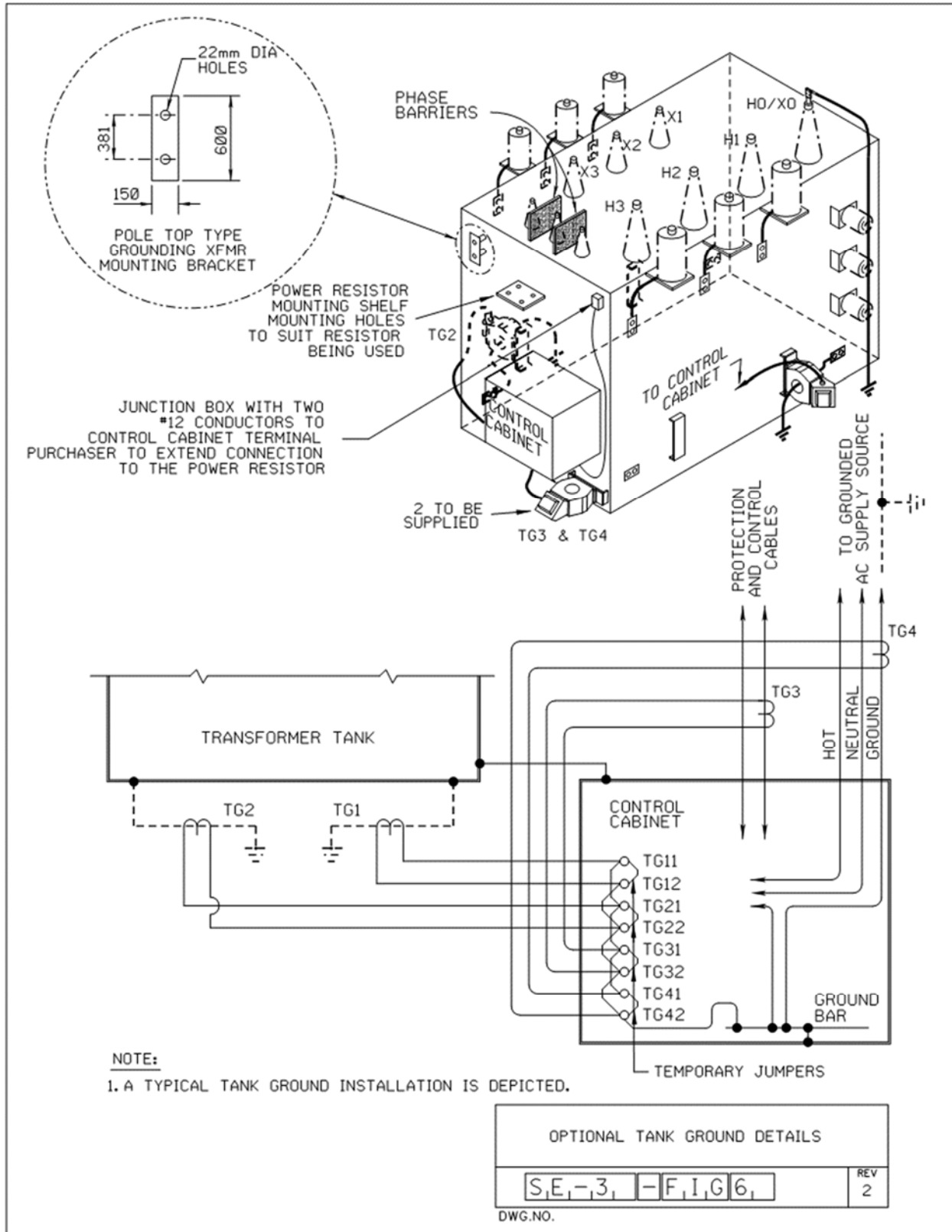


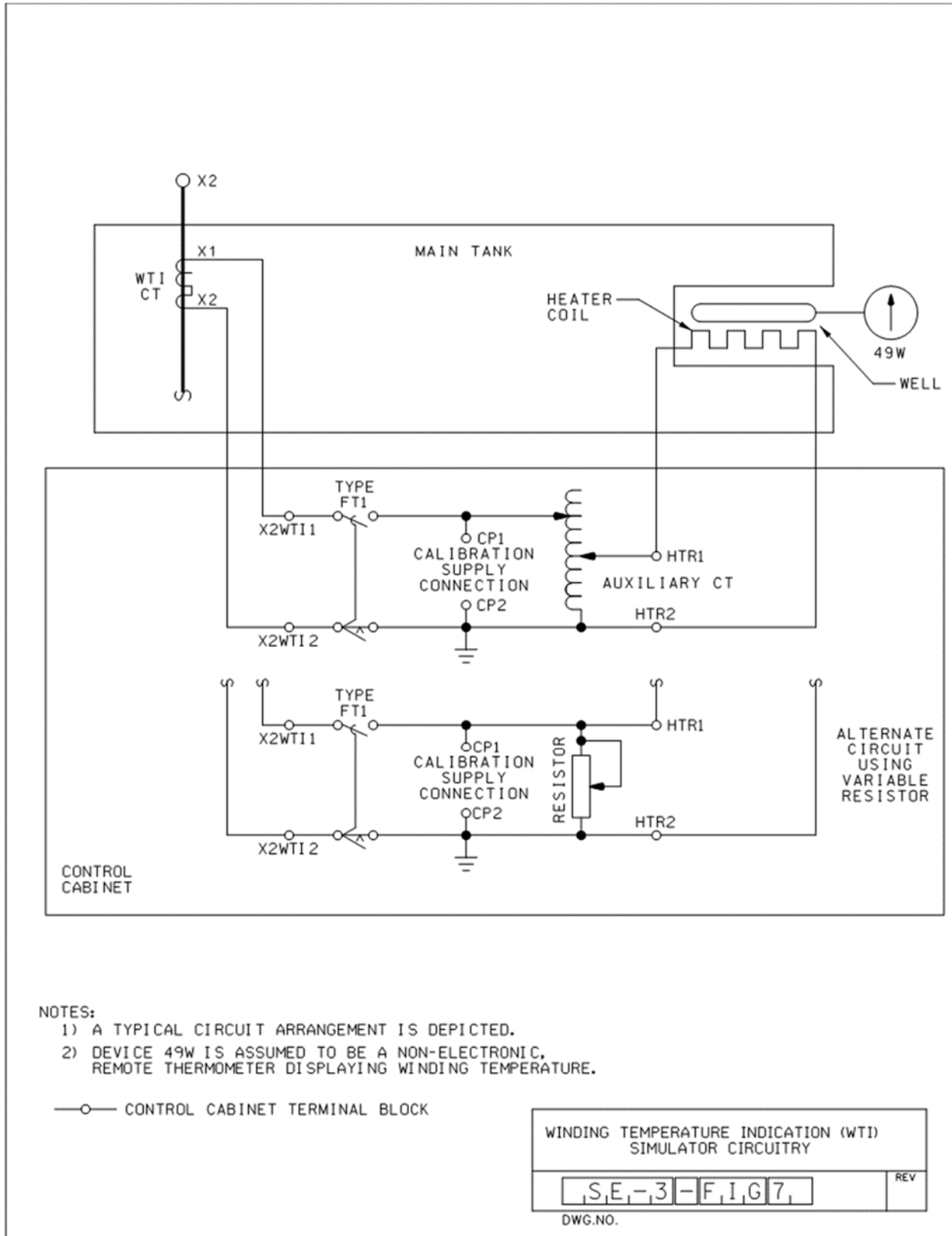
OIL LEVEL INDICATIONS	
SE-3-FIG 4	REV 0

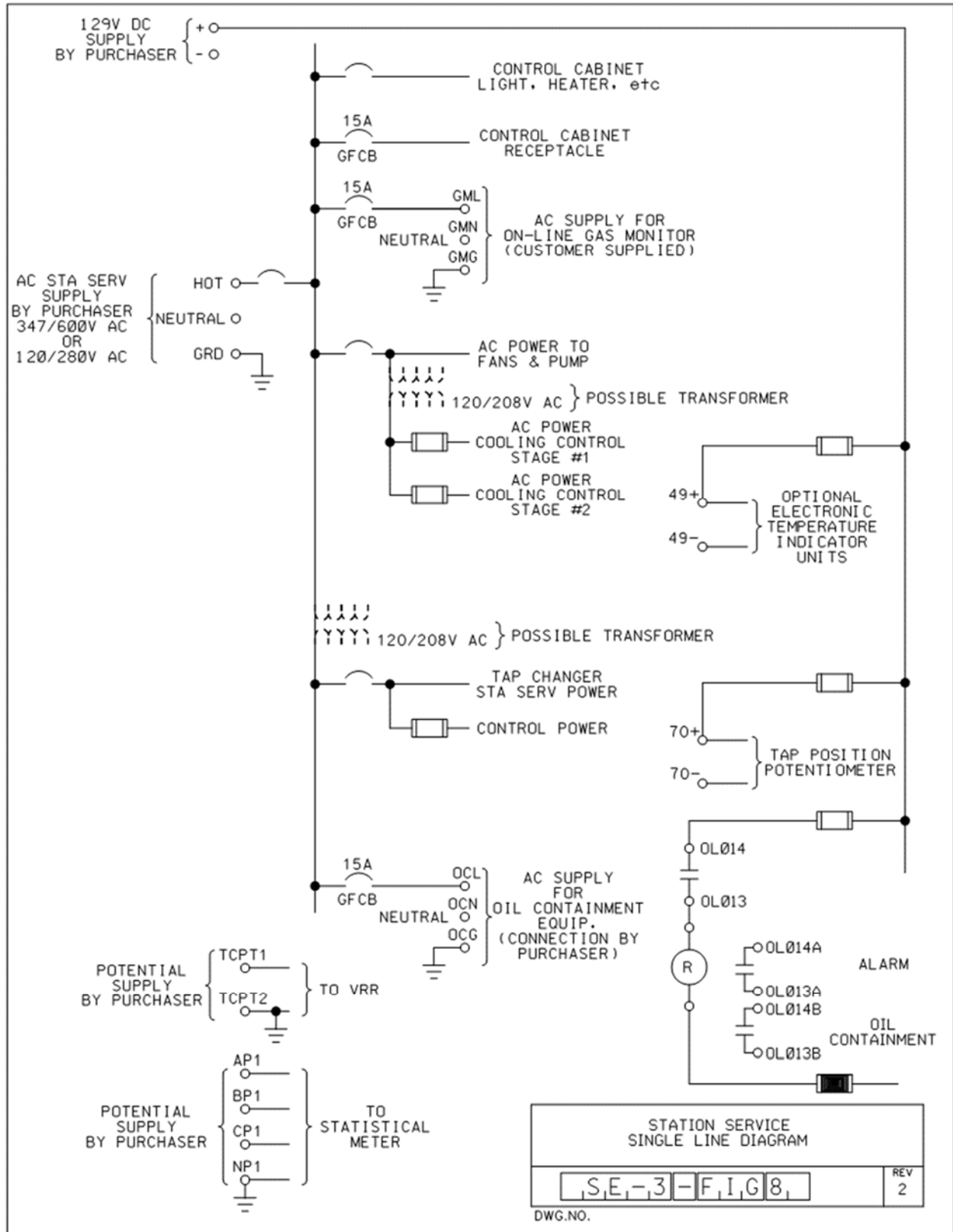
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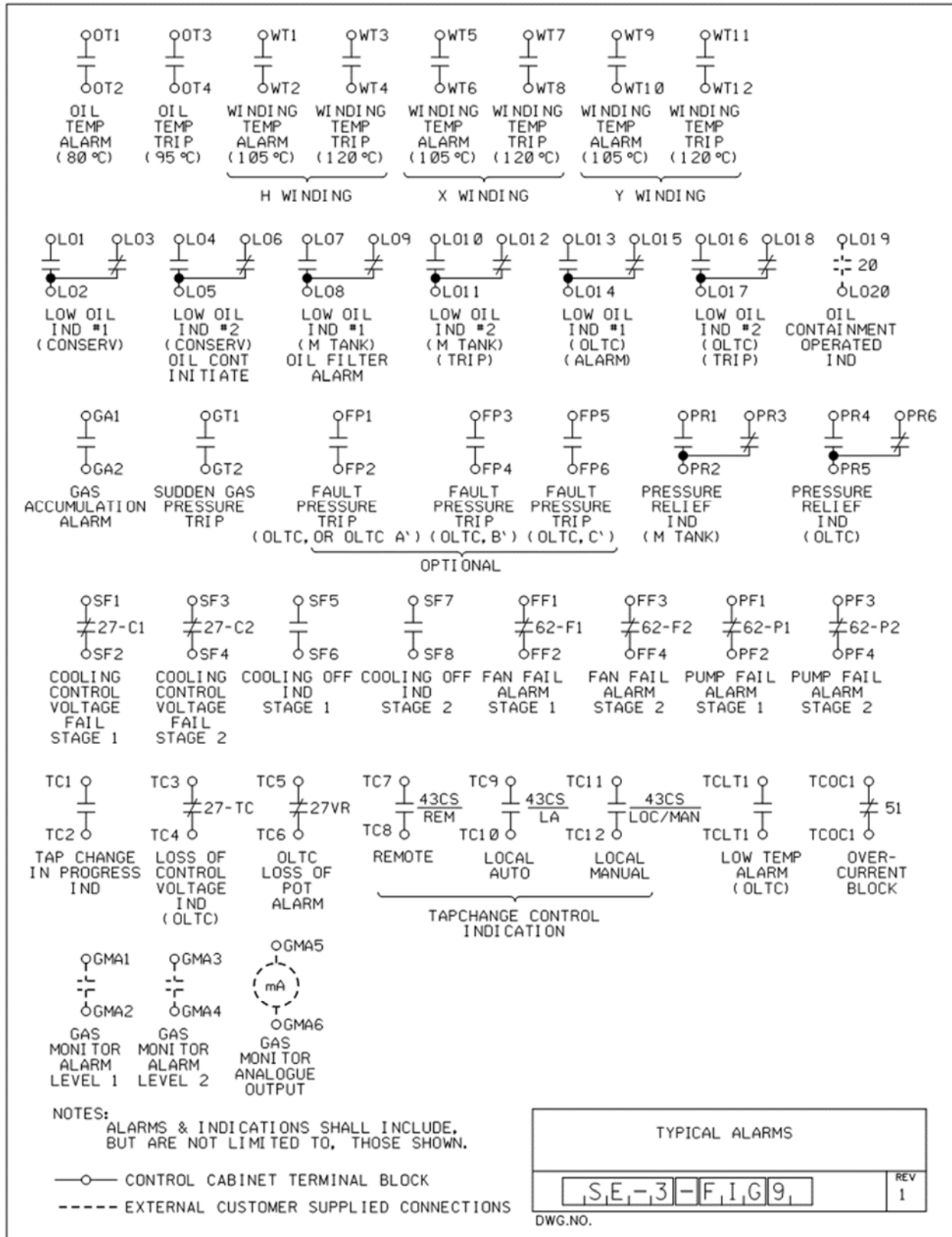


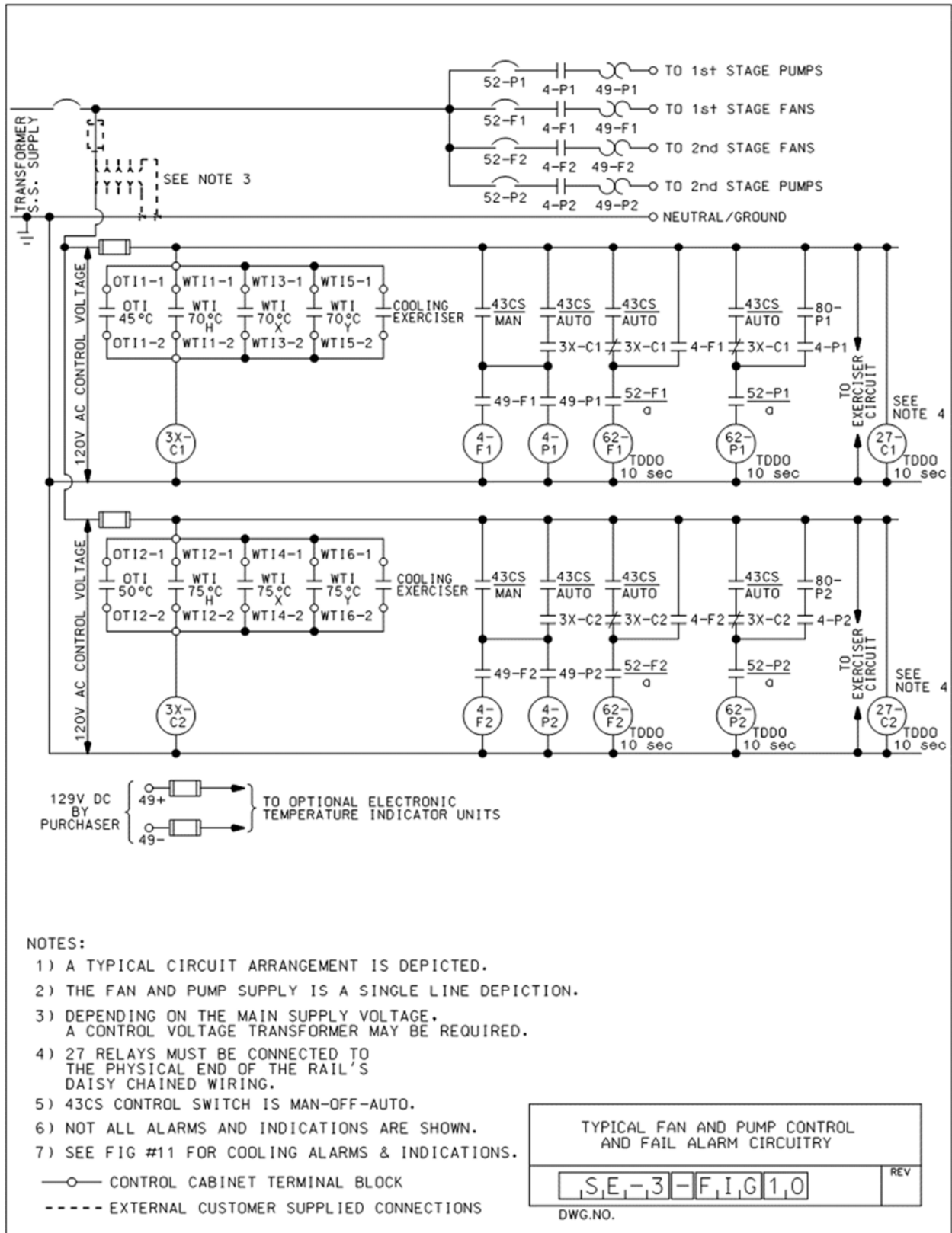


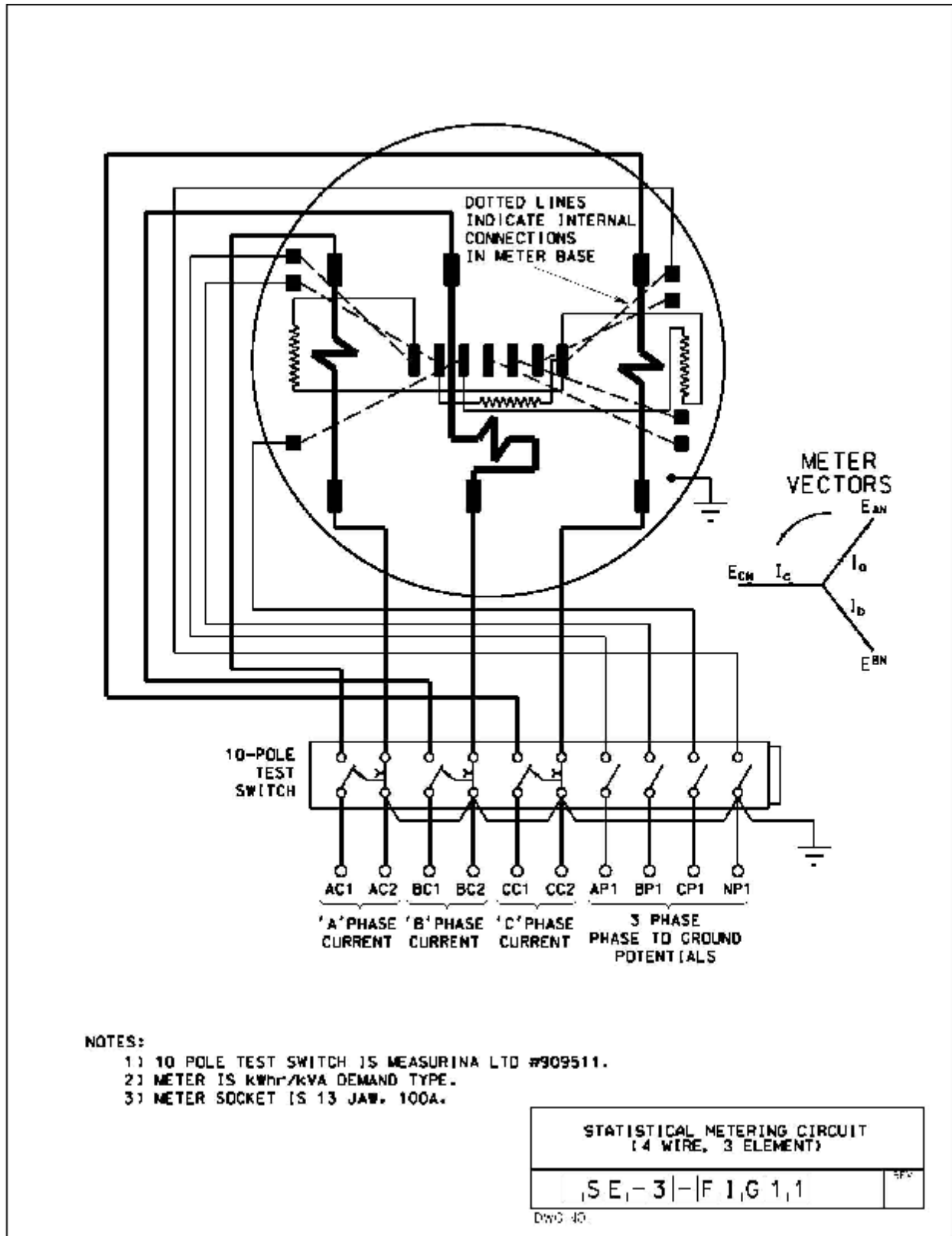


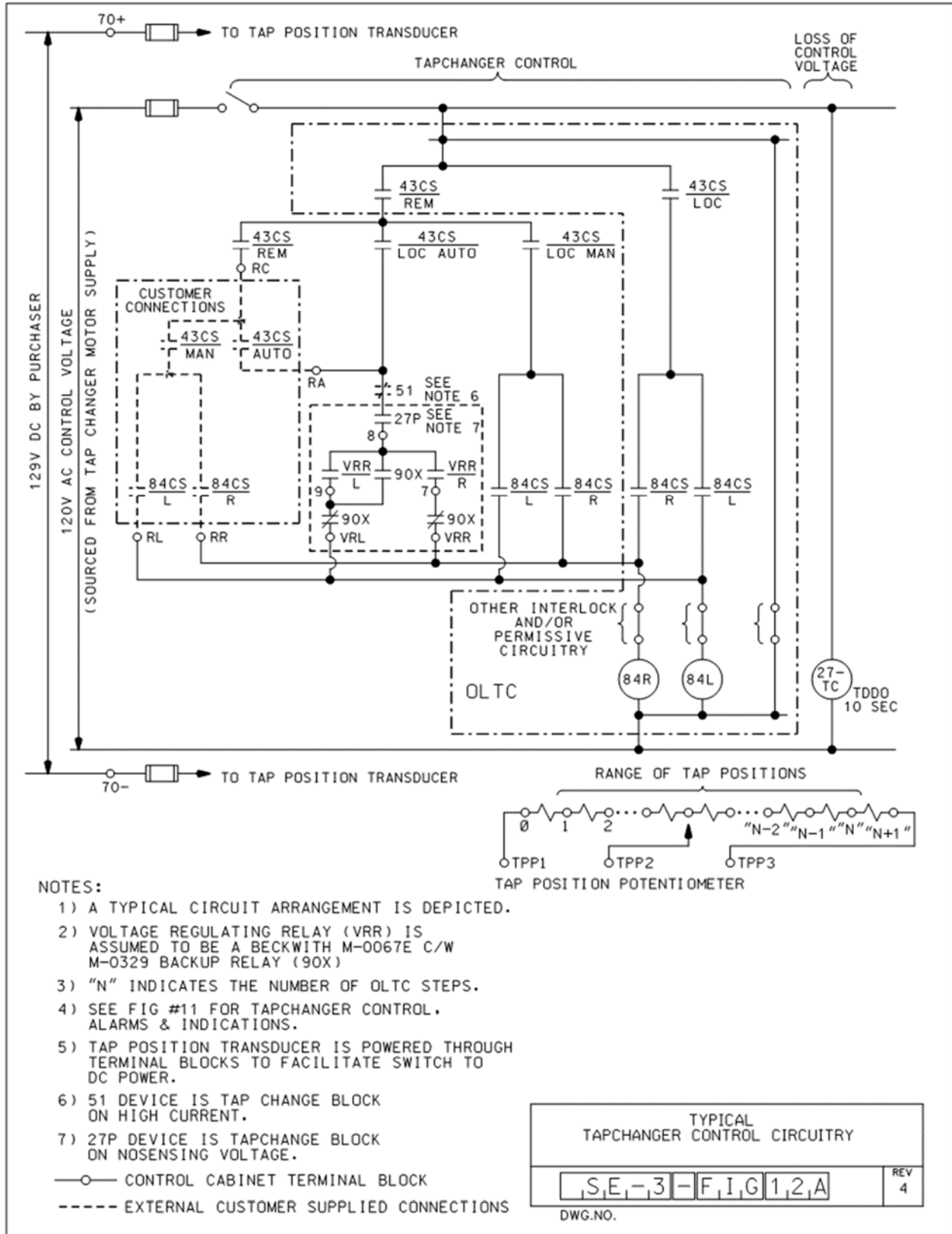




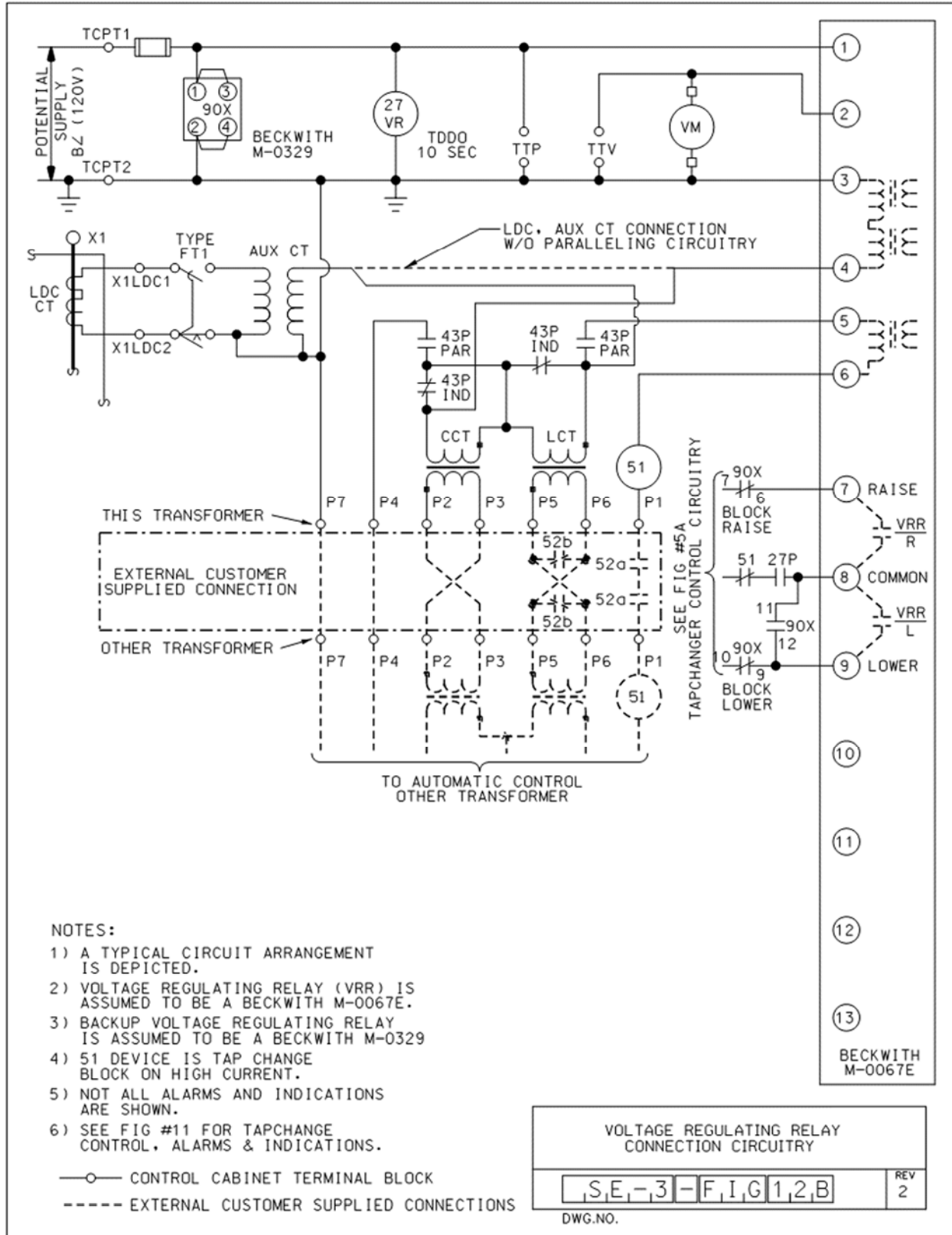














**UARB APPROVAL SHEET**

**Project Title:** Battery Energy Storage System Project

**CI Number:** C0045132

**Date:** January 25, 2024

Expenditure Profile			Type of Filing	
Year	Budget Amount	Project Estimate	<input type="checkbox"/>	
2022	2,811,444	2,811,444	<input checked="" type="checkbox"/>	Capital Project Authorization
2023	18,843,125	19,472,660	<input type="checkbox"/>	Unforeseen and Unbudgeted (U&U)
2024	18,684,609	43,211,426	<input type="checkbox"/>	Planned & Advanced (P&A)
2025	152,006,460	127,516,881	<input checked="" type="checkbox"/>	Subsequent Approval Item
2026	53,488,588	53,122,829	<input type="checkbox"/>	Authorization to Overspend (ATO)
2027		(3,291,005)	<input type="checkbox"/>	Scope Change
<b>Total</b>	<b>\$245,834,225</b>	<b>\$242,844,234</b>	<input type="checkbox"/>	Final Cost (FIN)

**COMMENTS**

Submitted on behalf of NOVA SCOTIA POWER INCORPORATED

Authorized Signatory  
Dave Pickles  
Chief Operating Officer

DATE  
January 25, 2024

Approved on behalf of NOVA SCOTIA UTILITY AND REVIEW BOARD

DATE

**CI Number: C0045132**

**Title: Battery Energy Storage System Project**

<b>Start Date:</b>	2022/06
<b>In-Service Dates:</b>	
<i>Bridgewater:</i>	2025/11
<i>Spider Lake:</i>	2025/11
<i>White Rock Road:</i>	2026/08
<b>Final Cost Date:</b>	2027/02
<b>Function:</b>	Transmission
<b>Forecast Amount:</b>	\$242,844,234 [Net SREP Funding estimate (\$111,175,859)]

**DESCRIPTION:**

Please refer to the Company’s main application for full details on the project.

The Governor in Council, under N.S. Regulation 250/2023 enacted under Section 4D of the *Electricity Act* has directed NS Power to install three 50 MW 4-hour duration lithium-ion utility-scale batteries facilities each with a nameplate capacity of 200MWh. This project includes the installation of the facilities at the following locations adjacent to an existing substation:

- 1) Bridgewater, Lunenburg County adjacent to 99W Substation
- 2) Spider Lake, Halifax County adjacent to 132H Substation
- 3) White Rock Road, Municipality of the County of Kings adjacent to 43V Canaan Road Substation

Each facility will have the following major components:

1. Batteries with energy storage capacity of at-least 200 megawatt-hours (MWh) at the start of operation and balance of system components, including the battery management systems (BMS) and safety systems.
2. A power conversion system (PCS), with grid-forming functionality and sufficient power capacity to deliver 50 MW of alternating current at the point of interconnection (POI) with NS Power’s grid, net of losses and auxiliary loads, with inverter system controls.
3. An energy management system (EMS) to dispatch the BESS based on monitoring of grid frequency, voltage, power factor, and other relevant grid parameters at the point of interconnection (POI) and to manage operations of the BESS safely and reliably.
4. Connection to the 138kV transmission system and full integration with the Energy Control Centre and provision for site access to BESS facilities.

The BESS will provide the following functions on NS Power’s system:

1. *Dispatchable firm capacity:* The BESS can provide reliable capacity for a continuous duration of 4 hours at full output to meet peak system demand. The proposed BESS would store 600 MWh of energy, enabling up to 4 hours of continuous output at 150 MW (or longer durations at lower output levels; i.e. 50 MW for 12 hours, or myriad additional capacity/duration combinations) for inclusion in the generation dispatch schedule between recharge cycles.
2. *Energy time shifting, or “arbitrage”:* The BESS will allow NS Power to store low-cost energy purchased and generated off-peak and utilize that to displace energy that would otherwise be generated or purchased during higher cost on-peak periods. NS Power’s typical operation would charge the BESS during high wind/low load situations (predominantly overnight) and economically dispatch the BESS during high load/low wind situations (predominantly evening or morning peaks). This functionality directly enhances the value of intermittent renewable resources by converting their intermittency to high value period dispatchability.
3. *Grid frequency and voltage support:* The BESS will be able to sense and respond to fluctuations in system frequency to mitigate system-level frequency spikes or dips because of changes in generation or load and thus maintain grid stability to ensure reliable and continuous flow of electricity across the grid. The BESS can also provide system voltage support by adjusting reactive power production or absorption in order to

meet local system requirements and respond to disruptions in other areas of the grid. The BESS can provide this support automatically, supporting typical grid voltage and frequency fluctuations or correcting for an atypical event such as loss of a generation source or loss of a significant load.

4. *Grid flexibility through response to controlled set points:* The NS Power System Operator will determine set points for active and reactive power levels which the BESS will then be able to automatically respond to, instantaneously offsetting increases and decreases in customer load and resulting changes in system current and voltage. The main objective of such “P/Q” (i.e. active power and reactive power) set points is to balance the system generation and load keeping the system frequency within the limits prescribed by the ECC.
5. *Spinning reserve:* Spinning reserve is generation capacity that is online, synchronized to the grid and able to respond quickly to sudden changes in load or unexpected events, such as an unplanned generation outage. The proposed BESS will provide nearly instantaneous response by being able to immediately inject power onto the grid during such an event, and without any associated fuel (including carbon) costs. This service can be provided whenever the BESS is producing energy below its maximum capacity, including when idle or charging.

**Summary of Related CIs +/- 2 years:**

Pursuant to Section 11.2 of the CEJC, related CIs for Transmission include “Work completed on the same asset class (Padmount transformers, Breakers, etc.) or in the same location (feeder, Transmission Line).”

- No other projects in 2021/2022

**Depreciation Class:**

- Transmission Plant – Station Equipment
- Transmission Plant – Poles and Fixtures
- Transmission Plant – Overhead Conductors and Devices
- Transmission Plant – Underground Conduit
- Transmission Plant – Underground Conductors and Devices
- Transmission Plant – Battery Storage Systems
- General Plant – Communication Equipment
- General Plant – Communication Equipment SCADA Equipment
- General Plant – Transportation Equipment
- General Plant – Office Furniture and Equip – Computer Hardware
- General Plant – Office Furniture and Equip – Computer Software

**Estimated Life of the Asset:** 20 Years

**JUSTIFICATION:**

**Justification Criteria:** Transmission Plant

**Sub Criteria:** Requirement to Serve

Refer to Section 9 – Project Need of the Application. As a result of N.S. Regulation 250/2023 enacted under Section 4D of the *Electricity Act*, NS Power asserts the Battery Energy Storage System Project meets all of the criteria articulated in the Nova Scotia Power Inc. Capital Planning & Capital Expenditure Justification Criteria Detailed Document (CEJC).

**Reason for Variance from 2024 ACE Plan**

The variance of approximately \$3.0 million from the 2024 ACE Plan is due to further refinement of the project estimate prior to filing this submission.

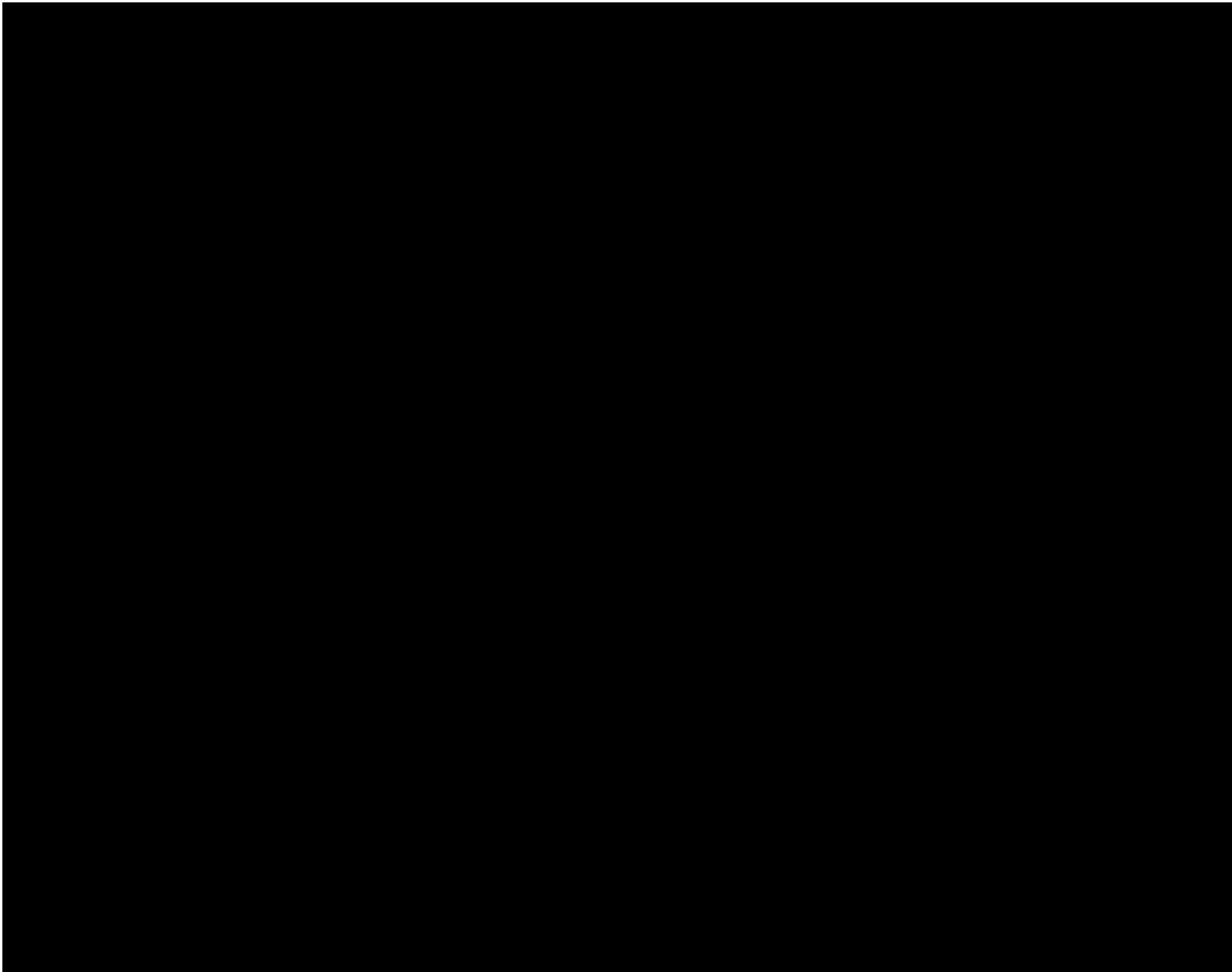
Location: Transmission CI#: C0045132 Title: Battery Energy Storage System Project Execution Year: 2024-2026					
Description	Unit	Quantity	Unit Estimate	Total Estimate	Cost Support Reference
<b>Regular Labour</b>					
ECEI Project Management Team	PD	9677	\$ 650	\$ 6,289,927	
NSP Business Unit Support	PD	3071	\$ 600	\$ 1,842,396	
Energy Control Centre (ECC)	PD	1207	\$ 546	\$ 659,164	
NSP Engineering & Technical Resources	PD	1680	\$ 467	\$ 783,740	
			<b>Sub-Total</b>	<b>\$ 9,575,228</b>	
<b>Materials</b>					
Batteries & Balance of System	Lot	1			CI C0045132 BESS CWO 3 Attachment 1 FULLY CONFIDENTIAL Items 3, 4, 5, 6, 7, 8, 15, and 20
Main Transformer and Spare Parts	Lot	3			CI C0045132 BESS CWO 3 Attachment 2 FULLY CONFIDENTIAL Items 1 and 4
Main Transformer Additional Electrical Components	Lot	1	\$ 235,095	\$ 235,095	
Buildings, structures and grounds	Lot	1	\$ 296,818	\$ 296,818	
Communications & Other Materials	Lot	1	\$ 88,572	\$ 88,572	
Site vehicles	Lot	1	\$ 180,000	\$ 180,000	
			<b>Sub-Total</b>	<b>\$ 220,021,441</b>	
<b>Contracts</b>					
Batteries & Balance of System Installation	Lot	1			CI C0045132 BESS CWO 3 Attachment 1 FULLY CONFIDENTIAL Items 2, 9, 10, 11, 12, 13, 14, 16, 17, 19, 21, and 22
Site Investigation and Preparation	Lot	1	\$ 1,399,381	\$ 1,399,381	
Sound Mitigation	Lot	1	\$ 2,040,000	\$ 2,040,000	
Substation Equipment Installation					
Engineering and Civil works	Lot	1	\$ 1,316,500	\$ 1,316,500	
Transformer offloading and field testing	Lot	3			CI C0045132 BESS CWO 3 Attachment 2 FULLY CONFIDENTIAL Item 3
Generator Interconnection	Lot	1	\$ 9,375,379	\$ 9,375,379	
Project Management					
Project Management	Lot	1	\$ 4,152,935	\$ 4,152,935	
Field Resources & Site Supervision	Lot	1	\$ 1,748,598	\$ 1,748,598	
Site security (physical and cybersecurity)	Lot	1	\$ 750,000	\$ 750,000	
Communications	Lot	1	\$ 36,000	\$ 36,000	
ECC Integration Design & Implementation	Lot	1	\$ 1,974,090	\$ 1,974,090	
Energy Capacity and Availability Guarantee	Lot	1			
			<b>Sub-Total</b>	<b>\$ 48,801,142</b>	
<b>Consulting</b>					
EPC Battery Facility Design & Project Management	Lot	1			CI C0045132 BESS CWO 3 Attachment 1 FULLY CONFIDENTIAL Item 1
Communications	Lot	1	\$ 124,528	\$ 124,528	
Quality Management					
QA/ QC	Lot	1			
Independent Project Review & Engineering Services	Lot	1			
Substation Technical Support	Lot	1			
Engineering & Studies					
Conceptual design and preliminary engineering services	Lot	1	\$ 1,054,402	\$ 1,054,402	
Sound Studies	Lot	1	\$ 225,000	\$ 225,000	
Arc Flash Study	Lot	1	\$ 60,000	\$ 60,000	
Electrical Switching Studies	Lot	1	\$ 150,000	\$ 150,000	
Site Preparation	Lot	1	\$ 80,000	\$ 80,000	
Transportation Logistics Review	Lot	1	\$ 50,000	\$ 50,000	
			<b>Sub-Total</b>	<b>\$ 5,143,823</b>	
<b>External Legal and Audit</b>					
Legal Costs	Lot	1	\$ 494,988	\$ 494,988	
Strategic Procurement Support	Lot	1	\$ 1,593,562	\$ 1,593,562	
			<b>Sub-Total</b>	<b>\$ 2,088,550</b>	
<b>Royalty, Easement, Appraisal</b>					
Land	Lot	1	\$ 670,170	\$ 670,170	
			<b>Sub-Total</b>	<b>\$ 670,170</b>	
<b>Freight Postage Delivery</b>					
Batteries & Balance of System	Lot	1			CI C0045132 BESS CWO 3 Attachment 1 FULLY CONFIDENTIAL Item 18
Main Power Transformers	Lot	3			CI C0045132 BESS CWO 3 Attachment 2 FULLY CONFIDENTIAL Item 2
Communications & Other	Lot	1	\$ 9,078	\$ 9,078	
			<b>Sub-Total</b>	<b>\$ 22,667,051</b>	
<b>Meals</b>					
Meals	Lot	1	\$ 34,715	\$ 34,715	
			<b>Sub-Total</b>	<b>\$ 34,715</b>	
<b>Travel Expense</b>					
Travel Expense	Lot	1	\$ 1,311,987	\$ 1,311,987	
			<b>Sub-Total</b>	<b>\$ 1,311,987</b>	
<b>Office Supplies</b>					
Office Supplies	Lot	1	\$ 18,852	\$ 18,852	
			<b>Sub-Total</b>	<b>\$ 18,852</b>	
<b>Telephones</b>					
Telephones	Lot	1	\$ 48,203	\$ 48,203	
			<b>Sub-Total</b>	<b>\$ 48,203</b>	
<b>Membership Dues</b>					
Membership Dues	Lot	1	\$ 545,866	\$ 545,866	

<b>Sub-Total</b>					<b>\$ 545,866</b>
<b>Subscription/Info.Sftwr</b>					
Subscription/Info.Sftwr	Lot	1	\$ 10,381	\$	10,381
<b>Sub-Total</b>					<b>\$ 10,381</b>
<b>Application Software</b>					
NSP IT Business Support & Services	Lot	1	\$ 2,860,300	\$	2,860,300
<b>Sub-Total</b>					<b>\$ 2,860,300</b>
<b>Comp Hardware &amp; Op Software</b>					
Comp Hardware & Op Software	Lot	1	\$ 104,068	\$	104,068
<b>Sub-Total</b>					<b>\$ 104,068</b>
<b>Rent</b>					
Rent	Lot	1	\$ 364,081	\$	364,081
<b>Sub-Total</b>					<b>\$ 364,081</b>
<b>Training and Development</b>					
Training and Development	Lot	1	\$ 72,923	\$	72,923
<b>Sub-Total</b>					<b>\$ 72,923</b>
<b>Personal Equipment</b>					
Personal Equipment	Lot	1	\$ 48,076	\$	48,076
<b>Sub-Total</b>					<b>\$ 48,076</b>
<b>Fleet Fuel</b>					
Fleet Fuel	Lot	1	\$ 45,000	\$	45,000
<b>Sub-Total</b>					<b>\$ 45,000</b>
<b>Rental/Maint of Equipment</b>					
Rental/Maint of Equipment	Lot	1	\$ 27,000	\$	27,000
<b>Sub-Total</b>					<b>\$ 27,000</b>
<b>Other Goods &amp; Services</b>					
Contingency	%	5.2%	\$ 314,458,857	\$	16,354,853
Project Management Reserve Contingency	%	3.1%	\$ 314,458,857	\$	9,840,656
<b>Sub-Total</b>					<b>\$ 26,195,509</b>
<b>Capital Contributions</b>					
NRCAN Smart Renewables & Electrification Pathways Funding	Lot	1	\$ 111,175,859	\$	111,175,859
<b>Sub-Total</b>					<b>\$ 111,175,859</b>
<b>Interest Capitalized</b>					
AFUDC				\$	13,365,727
<b>Sub-Total</b>					<b>\$ 13,365,727</b>
<b>SUB-TOTAL (no AFUDC)</b>					<b>\$ 229,478,508</b>
<b>TOTAL (AFUDC included)</b>					<b>\$ 242,844,234</b>
Original cost				\$	-

Note 1: The labour figures noted above are an average of salaries across a variety of jobs within similar classifications including fringe, and are used solely for budgeting purposes.

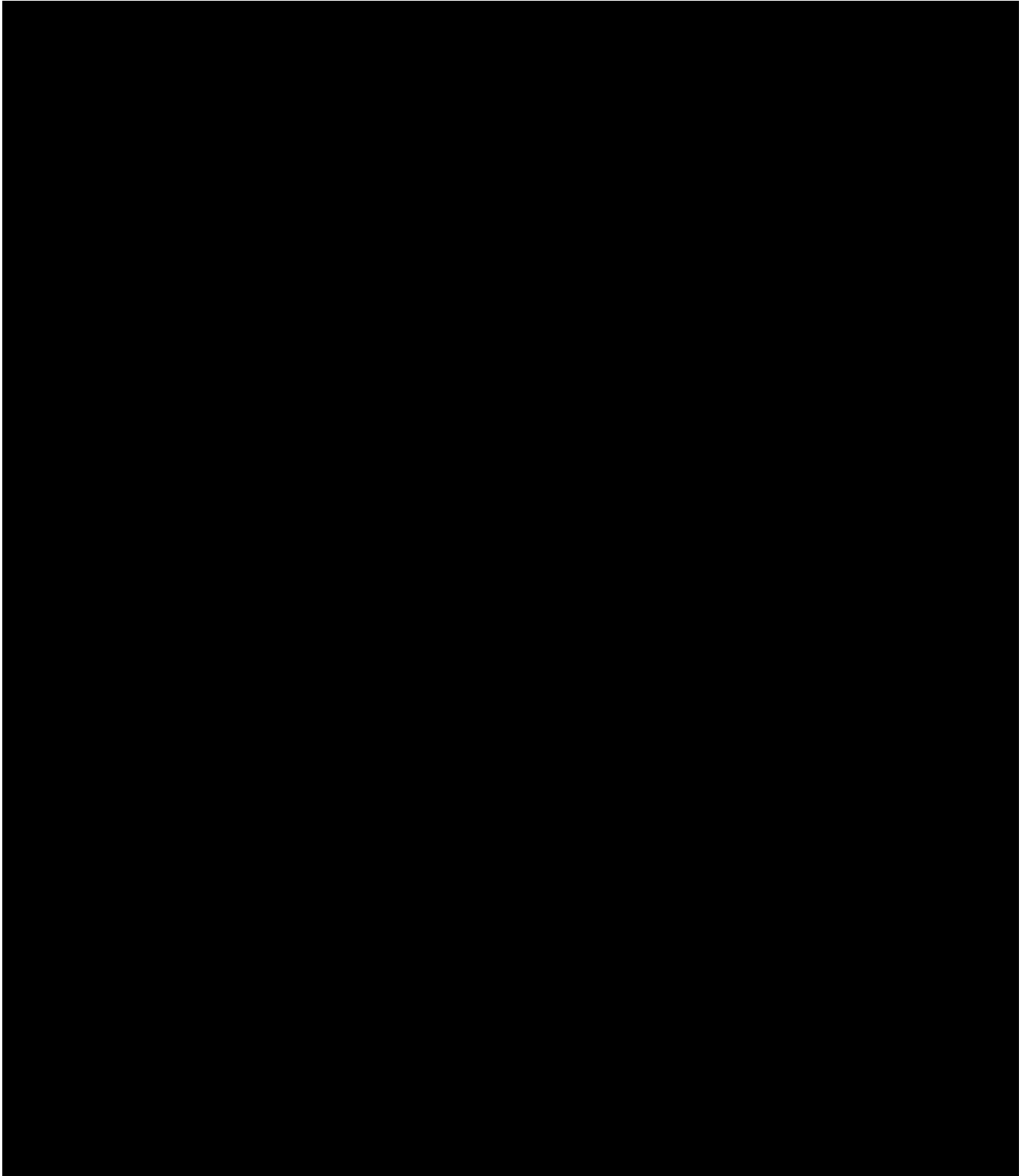
Note 2: Small differences in totals are attributable to rounding.

Note 3: Contingency and Management Reserve determined using a combination of subject mater experts and stimulation analysis aligned with the Non-Binding Contingency Guidelines. Risks are related to potential contract disputes, delays from geopolitical issues as well as environmental and archaeological constraints.



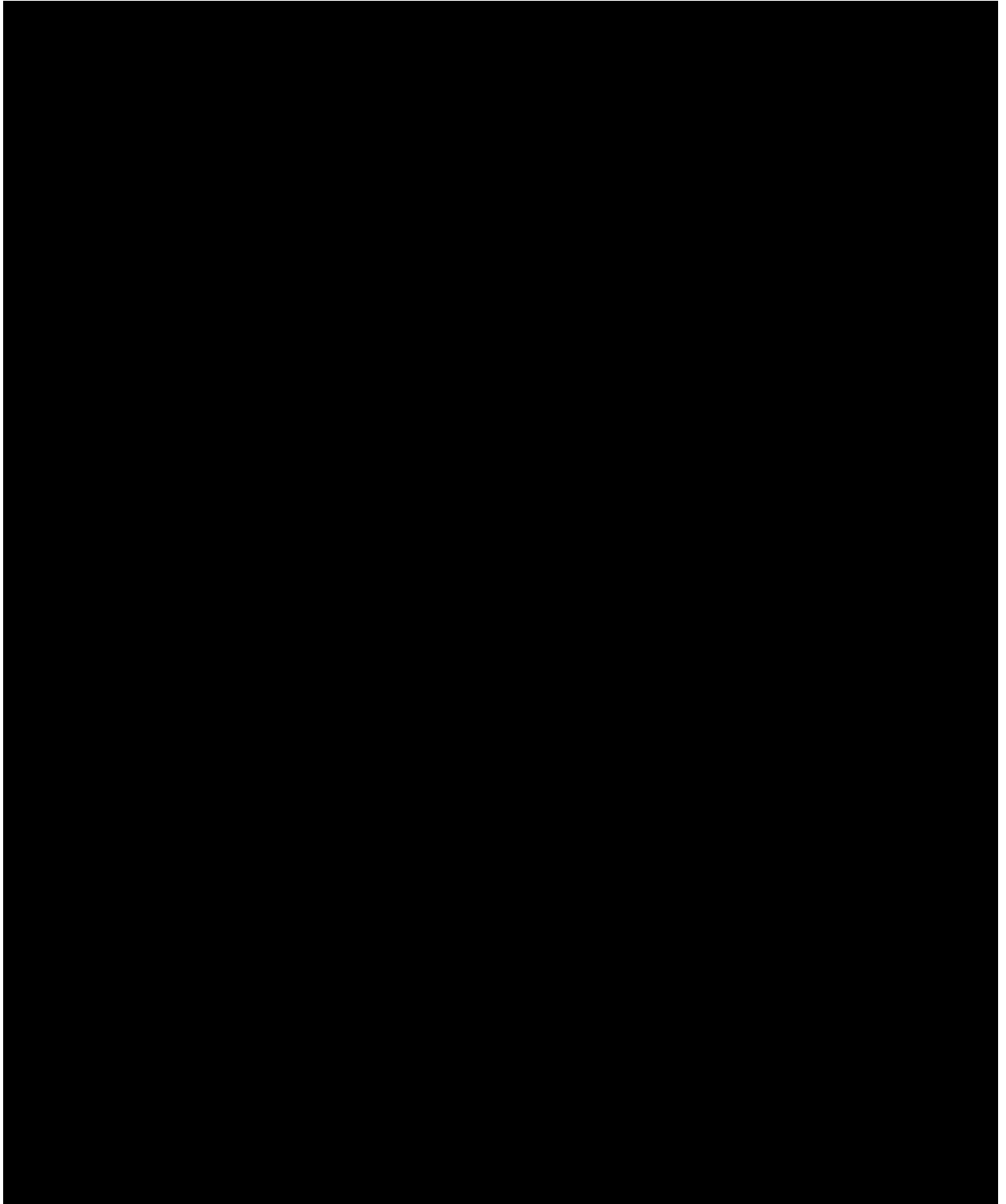
CI C0045132 BESS CWO 3 Attachment 2

**SCHEDULE C**









# REDACTED (CONFIDENTIAL INFORMATION REMOVED)

**CI Number** : C0045132                      - Battery Energy Storage System Project

**Project Number**     C0045132

**Parent CI Number** :                                      -

**Asset Location** : 1455                                 - 1455 Transmission Plant General

**Budget Version**     UARB Submissions

**Capital Item Accounts**

Exp. Type	Utility Account	Forecast Amount
Additions	0100 - TP - Land	670,170
Additions	0300 - TP - Buildings, Structures and Grounds	12,381,243
Additions	0700 - TP - Environmental Equipment	172,269
Additions	2200 - TP - Electrical Control Equipment	2,231,007
Additions	2300 - TP - Power Equipment - Station Service	50,247
Additions	3500 - TP - Wood Poles	626,168
Additions	3900 - TP - Overhead Conductor	349,491
Additions	4300 - TP - Substation Devices	2,543,694
Additions	4400 - TP - Substation Transformers	33,565,096
Additions	4500 - TP - Underground Conduit	154,107
Additions	4600 - TP - Underground Conductors	3,852,611
Additions	6100 - GP - Telephone / Communications Equipment	60,891
Additions	6400 - GP - Remote Monitoring	1,226,542
Additions	6500 - GP - Transportation Vehicles	151,378
Additions	7200 - GP - Computer Hardware	593,560
Additions	7800 - GP - Computer Software	2,895,625
Additions	8500 - TP - Battery Storage Systems	181,320,135
		Total Cost: 242,844,234
		Original Cost: -



**Project Cost Estimate Input Checklist and Maturity Matrix**

Transmission Line Infrastructure		Required fields:		Estimate Classification				
Project Name: Grid Battery Project		Started or Preliminary		Class 5	Class 4	Class 3	Class 2	Class 1
Maturity Level of Project Definition Deliverables		Defined or Complete		0% to 2%	1% to 15%	10% to 40%	30% to 75%	65% to 100%
<b>General Project Data</b>								
<b>A. Scope</b>								
Project Scope of Work Description	Defined (D)	P	P	D	D	D		
Site Infrastructure (Access, Construction Power, Camp, etc.)	Defined (D)	NR	P	D	D	D		
<b>B. Capacity</b>								
Voltage (kV) and Circuits	Defined (D)	P	P	D	D	D		
<b>C. Project Location</b>								
Not Applicable								
<b>D. Requirements</b>								
Codes and/or Standards	Defined (D)	NR	P	D	D	D		
Environmental Monitoring	Preliminary (P)	NR	NR	P	P			
<b>E. Technology Selection</b>								
Not Applicable	Defined (D)							
<b>F. Strategy</b>								
Right-of-Way (ROW)	Not Applicable (NA)							
Contracting/Sourcing	Defined (D)	NR	P	D	D	D		
Escalation	Defined (D)	NR	P	D	D	D		
<b>G. Planning</b>								
System / Grid Planning (including substation and interconnect locations)	Defined (D)	P	P	D	D	D		
Logistics Plan	Preliminary (P)	P	P	P				
Integrated Project Plan	Defined (D)	NR	P	D	D	D		
Project Code of Accounts	Defined (D)	NR	P	D	D	D		
Project Schedule	Defined (D)	NR	P	D	D	D		
Regulatory Approval & Permitting	Defined (D)	NR	P	D	D	D		
Risk Register	Defined (D)	NR	P	D	D	D		
Stakeholder Consultation/Engagement/Management Plan	Defined (D)	NR	P	D	D	D		
Work Breakdown Structure (WBS)	Defined (D)	NR	P	D	D	D		
Start-up & Commissioning Plan	Defined (D)	NR	P	P/D	D	D		
<b>H. Studies</b>								
Routing Options	Defined (D)	P	P	D	D	D		
Topography & Bathymetry	Preliminary (P)	P	P	P/D				
Environmental Impact/Sustainability Assessment	Not Applicable (NA)	NR						
Environment/Existing Conditions	Defined (D)	NR	P	D	D	D		
Meteorology and/or Oceanographic / Subsea	Defined (D)	NR	P	D	D	D		
Soils & Hydrology	Defined (D)	NR	P	D	D	D		
<b>Technical Deliverables (Specifications and/or Drawings)</b>								
Conductor, Insulator, Grounding, Joint Design (including protection for buried or subsea)	Complete (C)	S	P	C	C	C		
Foundation / Structure (Tower) Design	Preliminary (P)	S	P					
Route Mapping / Survey	Complete (C)	S/P	P/C	C	C	C		
Design Specifications	Complete (C)	NR	S/P	C	C	C		
Instrument List	Complete (C)	NR	S/P	C	C	C		
Construction Permits	Preliminary (P)	NR	S/P	P/C				
Geometric Layout, Alignment, Profile, Cross Section	Preliminary (P)	NR	S/P	P/C				
Land / ROW Title Negotiation	Complete (C)	NR	S/P	P/C	C	C		
Civil / Site / Structural / Architectural Discipline Drawings	Preliminary (P)	NR	S/P	P				
Crossings and Borings Designs and Drawings	Not Applicable (NA)	NR						
Demolition Plans and Drawings	Not Applicable (NA)	NR						
Erosion Control Plan & Drawings	Not Applicable (NA)	NR						
Foundation / Structure (Tower) Discipline Drawings	Preliminary (P)	NR	S/P	P				
Tower / Structure Location / Spotting	Preliminary (P)	NR	S/P	P				
Instrument Datasheets	Complete (C)	NR	NR/S	P	P/C	C		
Electrical Discipline Drawings	Preliminary (P)	NR	NR	S/P	P/C			
Instrumentation / Control System Discipline Drawings	Started (S)	NR	NR	S/P				
<b>Total # Deliverables for this Project</b>				9	32	35	27	25
<b>% Defined/Complete towards Class Estimate</b>				100%	100%	97%	75%	69%



Natural Resources  
Canada

Ressources naturelles  
Canada

January 16, 2024

Chrissy Cruikshank  
Manager  
Nova Scotia Power Inc.  
1223 Lower Water Street  
Halifax, NS, B3J 3S8

Dear Chrissy Cruikshank,

**Subject: SREPS-GM-087 Grid Capacity Coal Closure Project at Spider Lake**

We are pleased to inform you that under the *Smart Renewables and Electrification Pathways Program* (the “Program”), your project has met the requirements for funding approval of an amount up to \$43,333,333 or 33% of Total Project Costs, whichever is the lesser amount, pending additional information the Program team requests relating to eligible activities/costs, updated budget and subject to the successful negotiation and execution of a written contribution agreement (the “Agreement”). This project approval is non-transferable. If there are changes to the project ownership, the program may withdraw its support for the project.

A draft copy of the Agreement will be sent to you shortly. Natural Resources Canada will not accept any changes to the provisions of its standard agreement template unless your legal counsel provides a legal rationale for the changes. The department will only consider changes in cases where the existing provisions create a legal impediment to you entering into the Agreement.

Until a written Agreement is signed by both parties, no commitment or obligation exists on the part of Natural Resources Canada to make any financial contribution to your organization’s proposed project. However, effective **January 3, 2024** (Project Approval Date), your organization can incur eligible expenditures directly related to, and necessary for, the project, which under the terms and conditions of the Program and Agreement, may be reimbursed **(to a maximum of 30% of Natural Resources Canada’s contribution)** following the signing of the Agreement.

Any project expenditures incurred **prior** to the Project Approval date will not be reimbursed by the Program, however any costs incurred from the Conditional Approval date of March 1, 2022 to January 2, 2024 can count towards your portion of Total Project Costs.

If the Agreement is not fully executed within the same fiscal year as the Project Approval date (i.e., Agreement execution by March 31, 2024, for your project), any costs incurred from the Project Approval date to March 31<sup>st</sup> of this fiscal year will not be eligible for

Canada

reimbursement under the Program. However, these costs will be counted towards total project costs.

Please, do not make any public announcements about your project, including funding offered, until the Agreement has been signed and Natural Resources Canada has had the chance to discuss with your organization about funding announcement opportunities.

Should you have any questions, please do not hesitate to contact the Program team by email at: [sreps-erite@nrcan-rncan.gc.ca](mailto:sreps-erite@nrcan-rncan.gc.ca)

Yours sincerely,

**Beaulac, Zoe**

Digitally signed by Beaulac, Zoe  
Date: 2024.01.16 11:01:38  
-05'00'

Zoe Beaulac  
Associate Director, Program Management and Oversight  
Renewable & Electrical Energy Division, Electricity Systems Branch  
Natural Resources Canada  
580 Booth St., Ottawa ON K1A 0E4



Natural Resources  
Canada

Ressources naturelles  
Canada

January 16, 2024

Chrissy Cruikshank  
Manager  
Nova Scotia Power Inc.  
1223 Lower Water Street  
Halifax, NS, B3J 3S8

Dear Chrissy Cruikshank,

**Subject: SREPS-GM-086 Grid Capacity Coal Closure Project at Bridge Water**

We are pleased to inform you that under the *Smart Renewables and Electrification Pathways Program* (the “Program”), your project has met the requirements for funding approval of an amount up to \$43,333,333 or 33% of Total Project Costs, whichever is the lesser amount, pending additional information the Program team requests relating to eligible activities/costs, updated budget and subject to the successful negotiation and execution of a written contribution agreement (the “Agreement”). This project approval is non-transferable. If there are changes to the project ownership, the program may withdraw its support for the project.

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Canada

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Yours sincerely,

Beaulac,  
Zoe

Digitally signed by  
Beaulac, Zoe  
Date: 2024.01.16  
11:00:39 -05'00'

Zoe Beaulac  
Associate Director, Program Management and Oversight  
Renewable & Electrical Energy Division, Electricity Systems Branch  
Natural Resources Canada  
580 Booth St., Ottawa ON K1A 0E4





Natural Resources  
Canada

Ressources naturelles  
Canada

January 16, 2024

Chrissy Cruikshank  
Manager  
Nova Scotia Power Inc.  
1223 Lower Water Street  
Halifax, NS, B3J 3S8

Dear Chrissy Cruikshank,

**Subject: SREPS-GM-085 Grid Capacity Coal Closure Project at White Rock**

We are pleased to inform you that under the *Smart Renewables and Electrification Pathways Program* (the “Program”), your project has met the requirements for funding approval of an amount up to \$43,333,333 or 33% of Total Project Costs, whichever is the lesser amount, pending additional information the Program team requests relating to eligible activities/costs, updated budget and subject to the successful negotiation and execution of a written contribution agreement (the “Agreement”). This project approval is non-transferable. If there are changes to the project ownership, the program may withdraw its support for the project.

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**Canada**

reimbursement under the Program. However, these costs will be counted towards total project costs.

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Yours sincerely,

**Beaulac, Zoe**  
Digitally signed by Beaulac,  
Zoe  
Date: 2024.01.16 10:59:33  
-05'00'

Zoe Beaulac  
Associate Director, Program Management and Oversight  
Renewable & Electrical Energy Division, Electricity Systems Branch  
Natural Resources Canada  
580 Booth St., Ottawa ON K1A 0E4



June 12, 2023

Nova Scotia Utility and Review Board  
1601 Lower Water Street  
Halifax, NS B3J 3P6

Dear Chair and Board Members:

**Re: Grid Scale Battery Storage Project – Bridgewater, NS**

The Council for the Town of Bridgewater, at the June 12, 2023 meeting, formally passed a motion indicating the Town's support for the Grid Scale Battery project proposed for the Bridgewater location, adjacent to the existing substation located off of King Street. It is understood that this site has been chosen as it is situated near a substation and adjacent to a 138V transmission line.

This project will drive value for our community and all Nova Scotians by providing capacity and balance to the province wide energy system. The project will provide employment opportunities in the design and construction phase and given its location, will enable a transition to more renewable energy by providing safe, reliable and clean energy during peak demands, lessen the impact of unplanned grid disturbances. This supports the Town's initiatives to explore renewable energy generation and move towards net zero.

Town Council is also pleased to see that NSPI will be undertaking community, stakeholder and Mi'kmaw engagement through the planning and construction of this project to ensure the community awareness, understanding and overall support.

Sincerely,

A handwritten signature in black ink, appearing to read "Tammy Crowder", written over a circular graphic element.

Tammy Crowder, MURP, MCIP  
Chief Administrative Officer

c. David Mitchell, Mayor  
Members of Town Council

HALIFAX



MIKE SAVAGE

MAYOR  
LE MAIRE  
ME'R

1841 Argyle Street  
PO Box 1749  
Halifax, Nova Scotia  
Canada B3J 3A5

902.490.4010  
1.800.835.6428

mayor@halifax.ca  
halifax.ca  
@MikeSavageHFX

July 31, 2023

Nova Scotia Utility and Review Board  
Third Floor, Summit Place  
1601 Lower Water Street  
Halifax, Nova Scotia B3J 3P6

Dear Chair and Board Members,

Re: Proposed Grid-Scale Battery Project – Waverley, Nova Scotia

As Mayor of Halifax, I am pleased to provide this letter of support for the proposed Grid-Scale Battery Project located near Spider Lake in Waverley. After meeting with the project team from Nova Scotia Power and learning about the benefits this Project will bring to residents; I recognize projects like these are essential in our clean energy transition.

Halifax is in the midst of an energy transition with HalifACT: *Acting Together on Climate Change* which will chart our journey to net-zero municipal operations by 2030 and net-zero total emissions by 2050. These targets will be accomplished through collaborative efforts by all. The proposed Grid-Scale Battery Project will support our transition, enable more renewables to be added to the grid and provide balance to the energy system, province-wide.

I am pleased Nova Scotia Power is committed to consulting and working with the Waverley community as the project progresses. I look forward to hearing more about this exciting development and the benefits it will bring our municipality and our province.

Kindest regards,

Mike Savage  
Mayor

/bmj



MUNICIPALITY *of the*  
COUNTY *of* KINGS

4/24/2023

Nova Scotia Utility & Review Board  
third floor, Summit Place  
1601 Lower Water St.  
Halifax, NS B3J 3P6

Dear Chair and Board Members,

The municipality of the County of Kings has discussed with Nova Scotia Power representatives its proposal to establish a grid-scale battery storage installation within our municipality.

We unreservedly support the proposal.

Our municipality has been working for some years to establish shovel ready green energy projects to meet our goals, both for climate change mitigation and power security. We see this proposal in the same light.

If one were to look only at the necessity of renewables in our electricity supply, one concludes that the requirement for substantial increase in grid-scale electricity storage is, equally, a necessity.

Respectfully,

Mayor Peter Muttart  
Municipality of the County of Kings  
RPM/slf

Phone: 902-678-6141 or 1-888-337-2999  
Monday - Friday 8:30 a.m. - 4:30 p.m.  
[inquiry@countyofkings.ca](mailto:inquiry@countyofkings.ca)

181 Coldbrook Village Park Drive,  
Coldbrook, N.S. B4R 1B9

July 17<sup>th</sup> 2023

Nova Scotia Utility and Review Board  
Third Floor, Summit Place  
1601 Lower Water St.  
Halifax, NS B3J 3P6

Dear Chair and Board Members,

**RE: Grid scale battery storage projects Bridgewater, Halifax and Kings County**

The Ecology Action Centre is writing to provide its conditional support for the three grid scale battery projects being proposed by Nova Scotia Power Inc. (NSPI) for Bridgewater, Halifax and Kings County. We understand that the lithium-ion batteries are current industry standard, and support the selection and build of lithium-ion batteries as an interim measure, but we will continue to urge NSPI to move to battery technology with lower global impact as these technologies are developed, tested and become cost competitive.

As we move towards a larger portion of electricity on the grid being provided by intermittent sources -such as solar and wind- battery storage technologies such as grid scale batteries will be increasingly important to store excess renewable energy when it is available, and move this supply to when there is not enough capacity to meet demand. This can provide additional firm capacity to support peak demand as we phase out coal and natural gas from the grid, and stress on the grid grows at these typical peaks as transportation and heating end uses electrify. Additionally these projects are placed at key junctures on the grid where they can best provide grid frequency and voltage support as well as flexibility to the grid, to enhance reliability and resilience. This will be increasingly important as weather patterns become more volatile as the impacts of climate change intensify.

The Ecology Action Centre is also encouraged to hear that stakeholder engagement is ongoing with municipalities, stakeholders and Indigenous communities by Nova Scotia Power Inc. relating to the placement of these projects to ensure understanding of impacts of the projects on the grid and communities are well understood, and concerns raised well considered.

Sincerely,

Brenna Walsh  
Senior Energy Coordinator

