

BC HYDRO SITE C CLEAN ENERGY PROJECT

GENERATING STATION AND SPILLWAYS CIVIL WORKS CONTRACT

for the Site C Clean Energy Project

Schedule 8

Quality Management

GENERATING STATION AND SPILLWAYS CIVIL WORKS CONTRACT

SCHEDULE 8

QUALITY MANAGEMENT

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GENERATING STATION AND SPILLWAYS CIVIL WORKS CONTRACT

SCHEDULE 8

QUALITY MANAGEMENT

1 INTERPRETATION

1.1 Definitions

In this Schedule 8 [Quality Management], in addition to the definitions set out in Schedule 1 [Definitions and Interpretation]:

“**Audit**” has the meaning set out in ISO 9000;

“**Completion for Inundation Report**” has the meaning set out in Section 7.5 of this Schedule 8 [Quality Management];

“**Concession**” has the meaning set out in ISO 9000;

“**Construction Quality Management Plan**” has the meaning set out in Appendix 8-3 [Construction Quality Management Plan];

“**Correction**” has the meaning set out in ISO 9000 and results in one of the following actions:

- (a) Repair;
- (b) Rework;
- (c) Scrap; or
- (d) Use As Is;

“**Corrective Action**” has the meaning set out in ISO 9000;

“**External Quality Audit**” means a second party Quality Audit conducted by parties having an interest in the relevant organization;

“**Final Quality Report**” has the meaning set out in Section 7.3 of this Schedule 8 [Quality Management];

“**Hold Point**” means a point in the performance of a component or element of the Work past which the Contractor will not proceed without the prior written consent of Hydro’s Representative;

“**Inspection and Testing**” means any inspection, calibration, sample, monitoring, test or trial;

“**Inspection and Test Plans**” has the meaning as set out in Section 5.3 of this Schedule 8 [Quality Management];

“**Internal Quality Audit**” means a first party Quality Audit of an organization’s own processes conducted by or on behalf of the relevant organization;

“**ISO**” means the series of standards, developed and published by the International Organization for Standardization in effect as of the Effective Date, which for certainty includes ISO 9000, ISO 9001, ISO 9004, and ISO 19011;

“Nonconformity” means any failure to comply with any obligation under the Contract, including any element of the Work that for any reason does not conform to the requirements of the Contract;

“Nonconformity Report” has the meaning set out in Section 8.1(a)(ii) of this Schedule 8 [Quality Management];

“Nonconformity Tracking System” has the meaning set out in Section 8.2 of this Schedule 8 [Quality Management];

“NPE” means a failure by the Contractor to meet a requirement in respect of a Nonconformity in this Schedule 8 [Quality Management], and as described in Section 8 of this Schedule 8 [Quality Management], and in Appendix 8-1 [Assignment of NPE Points];

“NPE Points” means those points assigned to the Contractor in accordance with Section 8 of this Schedule 8 [Quality Management] and in Appendix 8-1 [Assignment of NPE Points];

“Preventive Action” has the meaning set out in ISO 9000;

“Quality” has the meaning set out in ISO 9000;

“Quality Assurance” consists of that part of Quality Management focused on providing confidence that quality requirements will be met;

“Quality Audit Plan” means a plan describing the scope and schedule of an Internal Quality Audit or an External Quality Audit;

“Quality Audit Program” has the meaning set out in Section 6.1 of this Schedule 8 [Quality Management];

“Quality Control” means that part of Quality Management focused on fulfilling Quality requirements;

“Quality Documentation” has the meaning set out in Section 3.2 of this Schedule 8 [Quality Management];

“Quality Management” has the meaning set out in ISO 9000;

“Quality Management System” or **“QMS”** has the meaning set out in ISO 9000;

“Quality Manager” has the meaning set out in Section 4.1 of this Schedule 8 [Quality Management];

“Quality Manual” has the meaning set out in Appendix 8-2 [Quality Manual];

“Quality Objectives” has the meaning set out in ISO 9000;

“Quality Policy” has the meaning set out in ISO 9000;

“Quality Processes” has the meaning set out in Section 1.1 of Appendix 8-2 [Quality Manual];

“Quality Progress Report” has the meaning set out in Section 4.2(m) of this Schedule 8 [Quality Management];

“Quality Record” means:

- (a) a plan, record or report required to be prepared or submitted to BC Hydro pursuant to this Schedule 8 [Quality Management];

- (b) a plan, record or report related to Quality, required to be prepared or submitted to BC Hydro pursuant to Schedule 6 [Specifications and Drawings]; and
- (c) any other document stating results achieved or providing evidence of activities performed relating to Quality Management;

“**Repair**” has the meaning set out in ISO 9000;

“**Rework**” has the meaning set out in ISO 9000;

“**Scrap**” has the meaning set out in ISO 9000;

“**Test Result Tracking System**” has the meaning set out in Section 5.6 of this Schedule 8 [Quality Management];

“**Use As Is**” means that no action to eliminate a detected Nonconformity is needed;

“**Witness Point**” means a point in the performance of a component or element of the Work, as defined in the Contract, for which BC Hydro is entitled to review the Work performed before the Contractor proceeds with related Work; and

“**Work Method Statements**” or “**WMS**” means written management plans for critical and complex activities, processes or plans where the absence of written instructions could have a negative impact on worker safety, quality, consistency, cost or schedule, which constitute commitments of the Contractor and describe how work will be performed, inspected or tested and will include a checklist to confirm that the Work is being conducted in accordance with the appropriate standard, code, specification or plan in accordance with the Contract.

2 QUALITY MANAGEMENT SYSTEM

2.1 Quality Management System

The Contractor will develop and implement a Quality Management System in accordance with the requirements of this Schedule 8 [Quality Management] and the terms of the Contract. The Contractor is solely responsible for the Quality of the Work and the Contractor acknowledges that a comprehensive Quality Management System is critical for the proper and timely completion of the Work.

2.2 ISO Reference Documents

Without limiting the requirement of the Quality Management System to comply with any requirement in this Schedule 8 [Quality Management], the Contractor’s Quality Management System will incorporate the requirements of the ISO 9000, ISO 9001, ISO 9004, and ISO 19011 Standards.

2.3 Contractor Responsibilities

The Contractor is responsible for all Quality activities required to manage the performance of the Work including its own processes and procedures as well as those of all other Contractor Persons, and will require that all Contractor Persons comply with the requirements of the Quality Management System.

2.4 Quality Management System Requirements

The Contractor’s Quality Management System will comply with:

- (a) the requirements, principles, and intent of the ISO 9001 Standard and any other applicable standards specified in this Schedule 8 [Quality Management];

- (b) Good Industry Practice; and
- (c) all other requirements set out in the Contract, including this Schedule 8 [Quality Management].

2.5 Continual Improvement in Quality Management System

The Contractor will implement a program and will have mechanisms in place, such as management reviews and Quality Audit programs, that will record, track, implement, and close out all identified opportunities for improvement. This includes mechanisms for follow-up to verify the effectiveness of actions taken. The program will be used to continually improve the effectiveness and efficiency of the Quality Management System.

The Contractor will ensure that all Contractor Persons are aware of the importance of continuous improvement and are actively engaged in its implementation in connection with the performance of the Work.

3 QUALITY DOCUMENTATION

3.1 Principles

The minimum requirements and principles which apply to the Quality Documentation are set out in this Schedule 8 [Quality Management]. The Contractor will comply with the requirements and principles of the ISO 9000 Standard, including:

- (a) customer focus;
- (b) leadership;
- (c) engagement of people;
- (d) process approach;
- (e) improvement;
- (f) evidence-based decision making; and
- (g) relationship management.

3.2 Quality Documentation Requirements

The minimum documentation (the “**Quality Documentation**”) requirements for the Quality Management System are:

- (a) the Quality Manual in accordance with Appendix 8-2 [Quality Manual] to this Schedule 8 [Quality Management];
- (b) the Construction Quality Management Plan in accordance with Appendix 8-3 [Construction Quality Management Plan] to this Schedule 8 [Quality Management];
- (c) the Work Method Statements;
- (d) the Inspection and Test Plans in accordance with Section 5.3 of this Schedule 8 [Quality Management];

- (e) the Quality Audit Program in accordance with Section 6.1 of this Schedule 8 [Quality Management];
- (f) the plans and procedures prepared by Contractor Persons in connection with the Contractor's Quality Management System; and
- (g) the Quality Records.

3.3 Quality Documentation Submittals

The Contractor will prepare and submit to Hydro's Representative for Consent:

- (a) the Quality Manual within 60 days after the Effective Date in accordance with Appendix 8-2 [Quality Manual] to this Schedule 8 [Quality Management];
- (b) the Construction Quality Management Plan within 90 days after the Effective Date in accordance with Appendix 8-3 [Construction Quality Management Plan] to this Schedule 8 [Quality Management];

The Contractor will prepare and submit to Hydro's Representative for Review:

- (c) each Inspection and Test Plan at least 60 days (or such shorter period as specified in Schedule 6 [Specifications and Drawings]) prior to performing the relevant Work in accordance with Section 5.3 to this Schedule 8 [Quality Management]. The Contractor will not commence or permit the commencement of the relevant Work until the Inspection and Test Plan has been returned endorsed Accepted.
- (d) the Quality Audit Program within 90 days from the Effective Date in accordance with Section 6.1 of this Schedule 8 [Quality Management];

If Quality Documentation relies on or incorporates any quality manual, plan, procedure, external reference document or like document then such document or the relevant parts thereof will be submitted to Hydro's Representative at the time that the relevant Quality Documentation is submitted for Consent or Review or otherwise, as the case may be. The contents of such quality manual, plan, procedure, external reference document or other document will be taken into account in the Hydro's Representative's consideration of the relevant Quality Documentation.

The Quality Documentation will be reviewed and approved by the Quality Manager prior to submittal to BC Hydro for Consent or Review or otherwise, as the case may be.

3.4 Timing of Implementation

The Quality Manual and Construction Quality Management Plans must be fully implemented within 180 days from the Effective Date. For the purposes of this Schedule 8 [Quality Management], "implement" or "implemented" will mean that all plans and all personnel and equipment necessary to carry out the plans are in place.

The Contractor will not commence or permit the commencement of any aspect of the Work before those parts of the Quality Documentation that concern such aspect of the Work have been submitted to the BC Hydro in accordance with this Schedule 8 [Quality Management] and have been returned with an endorsement confirming that the Hydro Representative has no objection in accordance with Schedule 5 [Submittals Procedure], and are implemented as necessary to perform the Work.

BC Hydro reserves a right to conduct an audit of such implementation at any time, but intends to conduct an audit shortly after the 180 day period.

3.5 Changes to Quality Documentation

The Contractor will, from time to time, update its Quality Management System and all Quality Documentation to ensure that the Quality Management System and all Quality Documentation are, and at all times remain, in full compliance with the ISO 9001 Standard, the requirements of this Schedule 8 [Quality Management], and the terms of the Contract.

The Contractor will, from time to time, submit to Hydro's Representative for Review any changes to any of the Quality Documentation required for such Quality Documentation to continue to be relevant and effective and to reflect and comply with the requirements set out in this Schedule 8 [Quality Management].

If Hydro's Representative has returned with no objection to a change, addition or revision proposed to the Quality Documentation, then the Quality Documentation will be amended to incorporate such part, change, addition or revision. The Contractor will ensure that BC Hydro at all times has a copy of the Contractor's current Quality Documentation.

The Contractor will not implement any amendments to the Quality Management System or the Quality Documentation until the applicable amendments have been submitted for Review and returned with an endorsement confirming that BC Hydro has no objection to the proposed amendments in accordance with Schedule 5 [Submittals Procedure].

4 QUALITY MANAGER

4.1 Qualifications, Appointment and General Responsibilities

At all times during the performance of the Work the Contractor will employ a person as Quality manager (the "**Quality Manager**") with the qualifications as set out below who will have defined authority for ensuring the establishment, implementation and maintenance of the Quality Management System in the performance of the Work and auditing and reporting on the performance of the Quality Management System during the performance of the Work. The Quality Manager will be a full time role located at the Site, with no other responsibilities.

The Quality Manager will:

- (a) report directly to, or have delegation from, the Contractor's Representative for Quality matters with respect to the Work;
- (b) be independent from persons responsible for the execution and performance of the Work;
- (c) be either:
 - (i) a certified QMS Audit Team Leader in accordance with ISO 19011; or
 - (ii) have experience in a similar quality management representative role for a similar project; and have successfully completed an ISO 9001 Audit Team Leader course; and
- (d) be either:
 - (i) a Professional Engineer with a minimum of ten (10) years of relevant experience; or
 - (ii) an individual with a minimum of twenty (20) years of relevant experience.

4.2 Specific Responsibilities

Without limiting the generality of the foregoing, the job specification and responsibilities of the Quality Manager will include the following:

- (a) develop, implement and maintain, and ensure the effective operation of the Quality Management System;
- (b) initiate management reviews, not less frequently than annually, and take other actions necessary to ensure the effective operation and continual improvement of the Quality Management System;
- (c) develop, implement and maintain, and ensure the effective operation of the Quality Manual and Construction Quality Management Plan in the context of the Quality Management System;
- (d) develop, implement and maintain, and ensure the effective operation of Inspection and Test Plans, including approval of such prior to submittal to BC Hydro;
- (e) manage, and if appropriate delegate, Quality Assurance and Quality Control activities as part of the Quality Manual and Construction Quality Management Plan for the Work. Any delegation of these activities will be under the direct supervision of the Quality Manager who retains responsibility and authority at all times;
- (f) lead a Quality team that is independent from the Contractor's production team that is responsible for the execution and performance of the Work, and ensure that the personnel on such team are properly qualified and trained for their role and have completely familiarized themselves with all documents necessary to do so;
- (g) the Quality Manager shall have the authority to intercede directly and stop all unsatisfactory Work and control further processing, delivery, and installation of Nonconformities;
- (h) prepare Quality Audit Programs and schedule and coordinate Internal Quality Audits and External Quality Audits of key processes, procedures, and work elements with the Contractor's personnel and with its Contractor Persons;
- (i) ensure that all Quality Audits required under Section 6.2 of this Schedule 8 [Quality Management] and under the Quality Documentation are conducted, and report the findings of such Audits to Hydro's Representative;
- (j) have the authority to immediately stop any Work or activity which is not being performed or carried out in accordance with the terms of the Contract;
- (k) as may be delegated from the Contractor's Representative, liaise with Hydro's Representative as the primary representative for the Contractor on all matters with respect to Quality and the Quality Management System;
- (l) coordinate all matters and issues relating to the compliance of the Quality Management System with the ISO 9001 Standard;
- (m) prepare, and submit to BC Hydro, monthly reports concerning progress on Quality matters and the Quality Management System ("**Quality Progress Reports**");
- (n) ensure that relevant Quality Records are completed as required and retained in accordance with the Quality Management System and Schedule 15 [Records];
- (o) develop and implement a program for Correction and, when applicable, Corrective Action in respect of Nonconformities;

- (p) develop and implement a program for Preventive Action in respect of potential Nonconformities; and
- (q) carry out any other matters which, in accordance with the terms of the Contract or Good Industry Practice, are the responsibility of the Quality Manager.

5 INSPECTION AND TESTING

5.1 Inspection and Testing Requirements

If in accordance with the provisions of the Contract the Contractor is required to carry out any Inspection and Testing the Contractor will perform, or cause the performance, of such Inspection and Testing in accordance with the provisions of Section 5 of this Schedule 8 [Quality Management] except if and to the extent such provision of the Contract expressly directs or permits otherwise.

Any reference to inspection or testing by the Contractor will include Inspection and Testing by any Contractor Person, any third party or independent certified laboratory or agency engaged by, or on behalf of, a Contractor Person.

The Contractor will monitor the performance of the Work, including the Inspection and Testing, and all other actions required by the Contract, the applicable standards and the Quality Documentation that are performed by Contractor Persons or independent test facilities and laboratories engaged by, or on behalf of, a Contractor Person, to ensure compliance with the requirements of the Contract.

5.2 Accreditation Standards

All Inspection and Testing performed by or on behalf of the Contractor will be performed by personnel or entities that meet the following standards:

- (a) all on and off Site Inspection and Testing will be carried out by agencies, personnel and laboratories that are duly accredited in accordance with Good Industry Practice for the carrying out of Inspection and Testing of work similar in nature, scale and scope to the Work being tested or inspected; and
- (b) laboratory accreditation will be in accordance with ISO/IEC 17025, provided that, for specific activities Hydro's Representative may require other industry-recognized accreditation in lieu of ISO/IEC 17025, including:
 - (i) concrete, concrete materials and flowable mortar (including activities of sampling, making, storing and transport of test pieces, taking concrete cores and carrying out concrete strength, slump, air content and density tests) will comply with CSA A283, "Qualification Code for Concrete Testing Laboratories", to the appropriate category for the tests being done and using testing procedures in accordance with the latest edition of CSA A23.1 and A23.2;
 - (ii) structural steel and welding will comply with CSA W178.1, "Certification of Welding Inspection Organizations";
 - (iii) protective coatings will comply with the standards of the "NACE International", as appropriate to the Work being carried out; and
 - (iv) any other laboratory accreditations specifically identified in the Contract.

5.3 Inspection and Test Plan

The Contractor will prepare inspection and test plans (each an “**Inspection and Test Plan**”) detailing all Inspection and Testing to be performed by the Contractor and other Contractor Persons. BC Hydro may, in its discretion, identify Witness Points or Hold Points in such Inspection and Testing. A Hold Point cannot be waived unless BC Hydro has specifically waived a Hold Point in writing.

Each Inspection and Test Plan will include, at a minimum:

- (a) a description of the Inspection and Testing;
- (b) reference to the Inspection and Testing method;
- (c) reference to specific locations and components;
- (d) frequency, number of, and time schedule of Inspection and Testing;
- (e) reference to standards, codes, specifications, and acceptance criteria;
- (f) all applicable Witness Points and Hold Points. BC Hydro may add Witness Points or Hold Points to any part of the Inspection and Test Plan;
- (g) procedures, forms and checklists required;
- (h) personnel or entities responsible for Inspection and Testing;
- (i) reports and other Quality Records produced from Inspection and Testing; and
- (j) other records generated as evidence of the Inspection and Testing.

5.4 Notice of Inspection and Testing

The Contractor will give written notice to Hydro’s Representative of all Inspection and Testing for which there is an associated BC Hydro Witness Point or Hold Point specified in the Contract or in the relevant Inspection and Test Plan at least four Business Days (or such other period as may be specified in the Contract) for activities on Site, and ten Business Days (or such other period as may be specified in the Contract) for activities off-Site, prior to the start of the Inspection and Testing for the relevant Work.

The Hydro Representative will be entitled to attend any Inspection and Testing. All access and facilities necessary for Hydro’s Representative to witness the performance of Inspection and Testing will be provided by the Contractor as part of the Work.

5.5 Inspection and Test Records and Reports

Without limiting the requirements of the Contract, the applicable standards and the Quality Documentation, all Inspection and Testing records and reports will include:

- (a) the item tested;
- (b) test equipment used;
- (c) actual results of the applicable Inspection and Testing;
- (d) remarks regarding conformance with the Contract;
- (e) photographs of the Work;

- (f) calibration certificates and records for testing equipment used;
- (g) name and position of the person who actually performed the measurements;
- (h) name, position and signature of the person (e.g., Quality Manager, Professional of Record) who verified and approved the measurements; and
- (i) contact information of the entity (Contractor or Subcontractor) responsible for the applicable Inspection and Testing.

Contractor will provide Hydro's Representative with timely communication of and access to test data and reports. The Contractor will submit to the Test Result Tracking System and to the Site C Document Control:

- (j) all Inspection and Testing records and reports to Hydro's Representative within 24 hours of Inspection and Testing completion; and
- (k) all test results that verify conformance to all Witness Points and Hold Points immediately after completion of the Inspection and Testing, as described in (a) through (i) above.

With respect to any continuous Inspection and Testing operations, the Contractor will provide Hydro's Representative with inspection and test summary sheets and statistical analyses indicating strength and quality trends, on a weekly or more regular basis unless otherwise agreed to by BC Hydro.

The Quality Manager will be responsible to review all Inspection and Testing records and reports for completeness of the information they contain and acknowledgement of the results, regardless of the pass or failure of such results. Any delegation of these activities will be under the direct supervision of the Quality Manager who retains responsibility and authority at all times;

For certainty, all Inspection and Testing records and reports, including any such records and reports produced in accordance with an Inspection and Test Plan, will be deemed to be Quality Records.

Complete Inspection and Test Plan records, and a certification that those Quality Records verify and confirm that the Work covered by the Quality Records has been completed in accordance with the requirements of the Contract, will be retained by the Contractor in accordance with the requirements of Schedule 15 [Records].

5.6 Test Result Tracking System

Within 90 days after the Effective Date, the Contractor will establish a system to provide Hydro's Representative with "real-time" access and ready retrieval of all Inspection and Testing Records and Reports (the "**Test Result Tracking System**"). All Inspection and Test Records and Reports will be input into the Test Result Tracking System within 24 hours of Inspection and Testing completion. The Test Result Tracking System must provide an effective and efficient means to submit and report on all Inspection and Testing results and will:

- (a) be operated and maintained by the Contractor until Total Completion;
- (b) comprise a single repository containing all Inspection and Testing results and formal test reports;
- (c) provide the Contractor and BC Hydro live and remote access by computer to current Inspection and Testing results and formal test reports; and
- (d) be traceable to the actual components of the Work to which each result or report applies.

6 QUALITY AUDITS AND MONITORING

6.1 Quality Audit Program

The Contractor will prepare an Audit program (the “**Quality Audit Program**”) in respect of the Work that will detail, to the satisfaction of Hydro’s Representative, the Internal Quality Audits and the External Quality Audits that will be conducted by the Contractor on its own processes and those of the other Contractor Persons, and the planned dates of such Quality Audits, in upcoming 12 month intervals. The Contractor will schedule Internal Quality Audits and External Quality Audits to ensure that all key processes, procedures, and work elements are reviewed regularly (at least annually) and in accordance with Good Industry Practice.

The Contractor will prepare updated Quality Audit Programs in respect of the Work to Hydro’s Representative for Review at twelve month intervals thereafter.

6.2 Contractor’s Quality Audits

The Contractor will conduct Internal Quality Audits and External Quality Audits in accordance with the ISO 19011 Standard, the requirements of this Schedule 8 [Quality Management], the Quality Manual, the Construction Quality Management Plan, the Quality Documentation, and the Quality Audit Program.

The Contractor will prepare a Quality Audit Plan for each Audit and will provide the Quality Audit Plan in advance to the Contractor’s personnel (with respect to an Internal Quality Audit) and to its Contractor Persons (with respect to an External Quality Audit) to confirm the scope and schedule of an Audit. A copy of the Quality Audit Plan will be provided to Hydro’s Representative in advance of the date of the Audit.

The purpose of the Contractor’s quality auditing process is to:

- (a) assess the level of conformance of the Contractor’s and other Contractor Persons’ work activities and processes in accordance with the Quality Management System, the Quality Manual, the Construction Quality Management Plan, the other Quality Documentation, and the terms of the Contract;
- (b) assess the level of implementation, effectiveness, and functioning of the Contractor’s and other Contractor Persons’ work activities and processes in accordance with the Quality Management System, the Quality Manual, the Construction Quality Management Plan, the other Quality Documentation, and the terms of the Contract; and
- (c) identify opportunities for improvement, all Nonconformities and the necessary Correction, Corrective Actions, and Preventive Actions necessary to facilitate continual improvement.

The Contractor will document, or cause to be documented, the results of each Internal Quality Audit and External Quality Audit in an audit report and submit such report to Hydro’s Representative For Information Only, within five Business Days after completion of the Audit.

Where necessary, follow-up audits will be scheduled to ensure that identified Correction, Corrective Actions, and Preventive Actions are carried out by the Contractor in a timely and effective fashion.

Internal Quality Audits and External Quality Audits will be scheduled taking into account the status and importance of the processes being audited as well as the results of previous audits.

6.3 BC Hydro's Quality Audits

BC Hydro may at any time and from time to time audit any element of the Contractor's Quality Management System and specific areas of interest during the performance of the Work. The objective of Quality Audits will be to monitor the Contractor's activities involving its work practices, workmanship and general quality of materials. Hydro's Representative may review the Quality Documentation and any Quality Records to identify critical activities, processes and procedures on which BC Hydro's auditing efforts and resources should be directed and focused.

BC Hydro will determine the frequency of auditing through regular and ongoing review of the Contractor's performance and management systems. Work procedures and activities that show good audit performance may have the frequency of auditing decreased, while those that show poor performance or increased risk may have the frequency of auditing increased all at no cost or expense to BC Hydro.

Hydro's Representative may, during the performance by BC Hydro of a Quality Audit, record any observations and inform the Contractor of any concerns with respect to Quality and any Nonconformities that require further evaluation and resolution.

The Contractor will provide, and will ensure the other Contractor Persons provide, Hydro's Representative with all documentation, records, on and off site access, facilities and assistance for the safety and convenience of Hydro's Representative.

Hydro's Representative may employ independent auditors, and Inspection and Testing agencies. These agents will be afforded the same facilitation provided to Hydro's Representative.

6.4 BC Hydro's Monitoring

In addition to carrying out any audits of the Contractor's Quality Management System as described in Section 6.3 of this Schedule 8 [Quality Management], Hydro's Representative may, at its discretion, monitor and verify the operation of the Quality Management System by, among other things, carrying out spot checks and making independent inspections and tests of any Work element or material including any Work element or material which fails any inspection or test or is suspected by Hydro's Representative of not complying with the requirements of the Contract.

The monitoring and verification of the Quality Management System by Hydro's Representative will not relieve the Contractor of its responsibility to comply with the requirements of this Schedule 8 [Quality Management], and the Contractor will not rely on such monitoring and verification for its own Quality Control or Quality Assurances.

7 QUALITY RECORDS

7.1 Quality Records

The Contractor will establish and maintain a complete and accurate set of all Quality Records. The Contractor will ensure that a complete set of Quality Records is maintained and retained in accordance with the requirements of Schedule 15 [Records].

The Quality Records will provide objective evidence of conformance with all requirements of the Contract in the performance of the Work, compliance with the ISO 9001 Standard and the effective operation of the Quality Management System.

Each Quality Record will be traceable to the actual components of the Work to which it applies.

Unless otherwise agreed by BC Hydro in writing, all Quality Records will be available to BC Hydro upon request.

7.2 Quality Progress Reports

For each month from the Effective Date until Total Completion, the Contractor will prepare and submit to Hydro's Representative, For Information Only, on or before the seventh day of the following month, a comprehensive Quality Progress Report.

Each Quality Progress Report will address all Quality management activities under the Quality Manual and Construction Quality Management Plan for the applicable reporting period and any outstanding Quality issues from prior reporting periods.

The Quality Progress Reports will, as a minimum, include the following information separately identified for the Quality Manual and for the Construction Quality Management Plan:

- (a) a Nonconformity Report log summarizing the Nonconformity Tracking System and providing the following in respect of each Nonconformity Report: "description of Nonconformity", "date open", "date closed", "status" (open, pending, closed), "description of Correction" (i.e., Repair, Rework, Scrap, Use As Is), "description of Corrective Action", and "description of status" which describes the current status of the Nonconformity Report, when closed and how it was closed;
- (b) Preventive Action logs providing details of the Preventive Actions performed to date and their close-out status;
- (c) a summary of any Inspection and Testing activities conducted, including identification and review status of all related Inspection and Test Plans;
- (d) Internal Quality Audits and External Quality Audits including any third party Quality Audits performed;
- (e) any continual improvement initiatives taken including those implemented as a result of Preventive Actions;
- (f) any changes made to the Quality Management System, the Quality Manual, the Construction Quality Management Plan, and other Quality Documentation in compliance with the provisions of the Contract; and
- (g) progress report photos.

7.3 Final Quality Report

The Contractor will, not later than 30 days after Substantial Completion of Work, submit to BC Hydro a final quality report (the "**Final Quality Report**") to provide objective evidence that the Quality of the Work satisfies the requirements of the Contract. The Final Quality Report will be a compilation of all the Quality Records produced during and in connection with the performance of the Work.

7.4 Additional Information

Notwithstanding any other provision of this Contract including this Schedule 8 [Quality Management], the Contractor will provide Hydro's Representative with such information as Hydro's Representative may request from time to time to demonstrate compliance with this Schedule 8 [Quality Management].

7.5 Completion for Inundation Report

At least 5 days prior to the commencement of commissioning any part or system forming part of the dam, the water passages or the Gates by BC Hydro, the Contractor will submit a report to BC Hydro the "**Completion for Inundation Report**" which will include:

- (a) a list of all identified Nonconformities with respect to the applicable part or system, that were identified during construction, split into Nonconformities identified in:
 - (i) each dam block, for structures; and
 - (ii) each Gate or major system, for electrical and mechanical equipment.;
- (b) a copy of all records and the certification required by the last paragraph in Section 5.5 of this Schedule;
- (c) details of the applicable remedial plan and disposition for each identified Nonconformity;
- (d) the date and time at which each Nonconformity was identified or discovered, rectified and closed; and
- (e) a certification by the Contractor's Representative that all Nonconformities of which the Contractor is aware, relating to the applicable part or system, have been identified and described in the Completion Report,

Where further Nonconformities are identified during BC Hydro's commissioning of any part or system forming part of the Work, the Contractor will, within 14 days after rectification of the applicable Nonconformity, issue an addendum to the Completion Report complying with the requirements in (a) through (e) above, in respect of each Nonconformity.

8 NONCONFORMITIES

8.1 Nonconformity Reporting Process

The Contractor will manage Nonconformities as follows:

- (a) upon discovery of a Nonconformity by the Contractor, other Contractor Persons, or any other entity, such Nonconformity will be reported to the Quality Manager and, where the Nonconformity relates to the Environmental Requirements, the Contractor's environmental obligations under the Contract, including Schedule 7 [Environmental Obligations], or compliance with an EPP, CMP or Environmental Aspect, additionally to the Environmental Manager who will:
 - (i) within one Business Day of the discovery of the Nonconformity, notify BC Hydro in writing of such Nonconformity;
 - (ii) within two Business Days of the discovery of the Nonconformity, issue a report of such Nonconformity (a "**Nonconformity Report**") into the Nonconformity Tracking System in accordance with Section 8.2 of this Schedule 8 [Quality Management] describing the nature of the problem with reference to the applicable requirements of the Contract. The date of issue will also be recorded denoting the commencement of the "open" status of the Nonconformity Report;
 - (iii) within five Business Days of the discovery of the Nonconformity, the Contractor will complete its investigation and analysis of the Nonconformity and:
 - (A) propose a Correction to resolve the Nonconformity describing the nature of the Correction (i.e. Repair, Rework, Scrap, or Use As Is) and provide confirmation of a plan committing to the scope and timing of the Correction;
 - (B) if applicable as required by the ISO 9001 principles, propose a Corrective Action to eliminate the root cause of the Nonconformity describing any improvements to

work activities or processes to prevent reoccurrence and provide confirmation of a plan committing to the scope and timing of the Corrective Action; and

- (C) report the Correction and, if applicable, the Corrective Action into the Nonconformity Tracking System and updating the Nonconformity Report; and
- (iv) submit a copy of the Nonconformity Report to Hydro's Representative for Review, provided that: (A) the time for BC Hydro's review under Schedule 5 [Submittals Procedure] will be four Business Days, or such other time as may be reasonably required in the circumstances as agreed by Hydro's Representative in writing; and (B) where the Nonconformity relates to the Environmental Requirements, the Contractor's environmental obligations under the Contract, including Schedule 7 [Environmental Obligations], or compliance with an EPP, CMP or Environmental Aspect, the Nonconformity Report must be signed by the Environmental Manager confirming his or her review and approval of the proposed Correction and, where applicable, Corrective Action.
- (b) the Contractor will submit any Correction that is a "Repair" or a "Use As Is" to BC Hydro For Consent because, in each case, a Concession would be necessary. BC Hydro may, in its discretion, require the Contractor to instead implement a Correction that is "Rework" or "Scrap" unless the parties are able to negotiate a Concession that is acceptable to BC Hydro in its discretion, to be confirmed as a Development Change;
- (c) the Contractor will rectify the Nonconformity in accordance with the Correction and, if applicable, Corrective Action described in Section 8.1(a)(iii) of this Schedule 8 [Quality Management] to which BC Hydro has no objection in accordance with Schedule 5 [Submittals Procedure], within the time identified in the applicable Nonconformity Report and included in the Nonconformity Tracking System, failing which Hydro's Representative may assign an NPE Point, which will persist until the failure is corrected;
- (d) the Contractor will, after Correction in accordance with Section 8.1(c) of this Schedule 8 [Quality Management], return the Nonconformity Report to the Quality Manager and, where the Nonconformity relates to the Environmental Requirements, the Contractor's environmental obligations under the Contract, including Schedule 7 [Environmental Obligations], or compliance with an EPP, CMP or Environmental Aspect, additionally to the Environmental Manager for verification and acceptance, at which time the Quality Manager and, where applicable, the Environmental Manager will:
 - (i) confirm the effective rectification of the Nonconformity in accordance with the Correction described in Section 8.1(a)(iii) of this Schedule 8 [Quality Management];
 - (ii) if applicable, confirm the effective elimination of the root cause of the Nonconformity in accordance with the Corrective Action described in Section 8.1(a)(iii) of this Schedule 8 [Quality Management];
 - (iii) report the date and the results of the satisfactorily completed rectification and verification of the Correction and, if applicable, the Corrective Action conducted in Section 8.1(c) into the Nonconformity Tracking System and update the Nonconformity Report. Where the Nonconformity relates to the Environmental Requirements, the Contractor's environmental obligations under the Contract, including Schedule 7 [Environmental Obligations], or compliance with an EPP, CMP or Environmental Aspect, the Nonconformity Report must be signed by the Environmental Manager to confirm the satisfactory completion of the rectification in accordance with the Correction and, where applicable, Corrective Action; and

- (iv) submit a copy of the Nonconformity Report For Information Only to Hydro's Representative within two Business Days thereafter. The date of issue will be recorded denoting the completion and "closed" status of the Nonconformity Report;
- (e) the Contractor and Quality Manager will identify, using reasonable efforts, and record all Nonconformities;
- (f) BC Hydro reserves the right to conduct follow up reviews, on reasonable notice to the Contractor, to determine if the Contractor's Correction and, if applicable, Corrective Action has been implemented, completed and found to be effective;
- (g) if at any time Hydro's Representative becomes aware of a Nonconformity, risk of Nonconformity, or it is not satisfied with a Nonconformity Report issued by the Contractor in accordance with Section 8.1(a)(ii), Section 8.1(a)(iv) and Section 8.1(d)(iv) of this Schedule 8 [Quality Management], Hydro's Representative may:
 - (i) issue a written report to the Quality Manager describing the Nonconformity or potential Nonconformity;
 - (ii) mandate a maximum time period for development and implementation of Correction and, if applicable, Corrective Action regarding the Nonconformity (but not for a risk of a Nonconformity);
 - (iii) if applicable, assign an NPE Point in accordance with Section 8.3 of this Schedule 8 [Quality Management] in respect of the Nonconformity (but not for a risk of a Nonconformity), which NPE Point will persist until the Nonconformity is rectified; and
 - (iv) designate additional Witness Points or Hold Points;
- (h) Where BC Hydro issues a written report describing a Nonconformity in accordance with Section 8.1(g)(i) of this Schedule 8 [Quality Management], the Contractor will promptly prepare and enter a Nonconformity Report with respect to such Nonconformity into the Nonconformity Tracking System in accordance with Section 8.1 of this Schedule 8 [Quality Management]; and
- (i) notwithstanding anything else to the contrary, unless specifically permitted in writing by BC Hydro, in its discretion, the Contractor will not be entitled to proceed with any portion of the Work until all Nonconformities that are related to, or form part of such portion of the Work, have been rectified in accordance with Section 8.1(b) of this Schedule 8 [Quality Management] and verification and acceptance of the rectification has been provided in accordance with Section 8.1(d) of this Schedule 8 [Quality Management],

all without prejudice to any other right or remedy available to BC Hydro (although except as may be expressly stated otherwise in the Contract), nothing in this Schedule 8 [Quality Management] will impose any obligation on BC Hydro to inspect the Work to identify Nonconformities, and any inspection of the Work by BC Hydro will be for the sole and exclusive benefit of BC Hydro.

8.2 Nonconformity Tracking System

The Contractor will implement and maintain a tracking system (the "**Nonconformity Tracking System**") to monitor the status of all Nonconformity Reports initiated by BC Hydro and the Contractor.

The format, flow of information, and reporting structure of the Nonconformity Tracking System will be submitted to Hydro's Representative for Review within 60 days of the Effective Date. Within 90 days after the Effective Date, the Nonconformity Tracking System will be fully operating with the following minimum requirements:

- (a) be operated and maintained by the Contractor until Total Completion;
- (b) comprise a single repository containing Contractor and BC Hydro initiated Nonconformity Reports;
- (c) assign reference numbers of all Nonconformity Reports;
- (d) have a description of each and all Nonconformity Reports;
- (e) have the ability to attach supporting material such as photos and documents to a Nonconformity Report;
- (f) provide the Contractor and BC Hydro with live and remote access by computer to the current Nonconformity Report status, dates, data and supporting material;
- (g) include links to Correction and Corrective Actions related to the Nonconformity Reports;
- (h) be traceable to actual parts, components, locations, drawings and data sheets as appropriate;
- (i) have the date and time at which Nonconformities were identified or discovered, rectified and closed;
- (j) record NPE Points as required by Section 8.3 of this Schedule 8 [Quality Management]; and
- (k) produce summary reports for delivery to Hydro's Representative of Nonconformity Reports, of NPE Points accrued for each day in any given month, and of the Maximum NPE Points in that month in accordance with Section 6.1 of Schedule 11 [Prices and Payment].

8.3 Assignment of NPE Points

- (a) In addition to the assignment of NPE Points as described in Section 8 of this Schedule 8 [Quality Management], NPE Points may be assigned by BC Hydro on the basis set out in Appendix 8-1 [Assignment of NPE Points] of this Schedule 8 [Quality Management].
- (b) BC Hydro expressly reserves the right to refrain from assigning all or any portion of the NPE Points set out in this Schedule 8 [Quality Management] in respect of any NPE, and BC Hydro may do so without prejudice to any of its other available rights and remedies in respect of that NPE, and without prejudice to its right to assign NPE Points, and to exercise any of its other available rights and remedies, in respect of any other NPE. Any such refraining by BC Hydro from assigning any NPE Points will not excuse the Contractor from performing, nor otherwise affect the Contractor's obligation to perform, all of its obligations under the Contract.
- (c) The assignment of NPE Points is in addition to and not in substitution for or to the exclusion of any other rights and remedies available to BC Hydro under the Contract or at law or in equity, and BC Hydro may have recourse to any one or more of all of such rights and remedies, concurrently or successively, as it sees fit, without prejudice to any of its other available rights and remedies.
- (d) BC Hydro will notify the Contractor of the assignment by BC Hydro of any NPE Points after such assignment and the Contractor will promptly enter such into the Nonconformity Tracking System. The NPE Points will persist in the Nonconformity Tracking System as described in Section 8.1 of this Schedule 8 [Quality Management] or as described in Appendix 8-1 [Assignment of NPE Points] of this Schedule 8 [Quality Management].

- (e) The Contractor will be entitled to dispute the assignment of any NPE Points only if the Contractor refers such dispute to the Dispute Resolution Procedure within 10 Business Days after its receipt from BC Hydro of notice of such assignment.

8.4 Unremedied Nonconformity

Hydro's Representative may issue further reports in accordance with section 8.1(g) if a Nonconformity identified in a Nonconformity Report continues unremedied beyond the time identified in the applicable Nonconformity Report. Whether or not a further Nonconformity Report is issued, NPE Points may be assigned in respect of such unremedied Nonconformity in accordance with Section 8.3 of this Schedule 8 [Quality Management].

In the event that a Nonconformity continues to persist unremedied beyond the time identified in the applicable Nonconformity Report, then for each complete 28 day period from its original date of issue in accordance with Section 8.1(a)(ii) of this Schedule 8 [Quality Management], Hydro's Representative may assign an additional number of NPE Points in respect of such unremedied Nonconformity in accordance with Section 8.3 of this Schedule 8 [Quality Management]. The number of additional NPE Points assigned for each such 28 day period will be equal to the number of NPE Points initially assigned in respect of the NPE, to a maximum per Nonconformity of 50 NPE Points.

GENERATING STATION AND SPILLWAYS CIVIL WORKS CONTRACT

APPENDIX 8-2

QUALITY MANUAL

1 QUALITY MANUAL

1.1 The Contractor will prepare and implement a comprehensive quality manual that describes the Quality Management System for all aspects of the Work including the construction (the “**Quality Manual**”). The Quality Manual will establish the Quality Policy and Quality Objectives for all aspects of the Work and, in accordance with the requirements of the ISO 9001 Standard, will describe the processes that will be established, implemented, controlled and continually improved (the “**Quality Processes**”) to achieve the established Quality Objectives.

1.2 The Quality Objectives will be specific, measurable, achievable, results focused, timely, and consistent with the Quality Policy and linked to meeting the needs and performance expectations of BC Hydro in respect of the Work. The Quality Management System described in the Quality Manual will include all the activities required to achieve these Quality Objectives, including project controls such as scope, cost, schedule and general document control management activities. All of these activities will be subject to Internal Quality Audits and External Quality Audits.

1.3 The Quality Manual will describe the nature of the Contractor’s organization involved in performing the Work and how key management activities (such as project controls, design, construction, and other disciplines) will interface with each other. The Quality Manual will also provide the organization chart, authority and responsibilities of all key personnel. The Quality Manual will also show how the various levels of Quality Management System documentation are linked together.

1.4 The Quality Manual will clearly define the reporting function and authority of the Contractor’s Quality Manager, who will liaise with Hydro’s Representative and act as the single point representative of the Contractor for all matters relating to Quality Management.

GENERATING STATION AND SPILLWAYS CIVIL WORKS CONTRACT

APPENDIX 8-3

CONSTRUCTION QUALITY MANAGEMENT PLAN

1 CONSTRUCTION QUALITY MANAGEMENT PLAN

1.1 The Contractor will prepare and implement a construction Quality management plan (the "**Construction Quality Management Plan**") that describes how the Contractor intends to manage and provide objective evidence of the processes and procedures in connection with the construction activities in accordance with the ISO 9001 Standard, the Quality Management System requirements stated in the Quality Manual and the provisions of the Contract.

1.2 In addition to any other requirements of the Contract, the Construction Quality Management Plan will include:

- (a) an organizational chart identifying key construction quality personnel (including the Quality Manager and the manager responsible for Site laboratory testing) and the linkage with the overall Quality Management System as documented in the Quality Manual;
- (b) a description of the responsibilities, qualifications, and authority of the personnel identified under Section 1.2(a) of this Appendix 8-3 [Construction Quality Management Plan] and a plan for maintaining the independence and consistency of the quality team;
- (c) a description of the organizational interfaces between the personnel identified under Section 1.2(a) of this Appendix 8-3 [Construction Quality Management Plan] and those of the design and other disciplines;
- (d) identification of all Subcontractors engaged in construction activities;
- (e) identification of all laboratories, inspection agencies and inspectors used by the Contractor in connection with the construction activities, including evidence of their accreditations and contact information;
- (f) a description of all Site test laboratories, including a plan to establish, certify, operate and maintain the laboratories in accordance with ISO/IEC 17025 standard, with the capability and capacity to handle the progression of the Work, and containing all testing equipment and personnel to fulfill all technical requirements of the Contract; and
- (g) a communications strategy relating to Quality between the Contractor, Subcontractors and BC Hydro including Site kickoff meetings and monthly meetings to discuss the Quality Progress Report concerning construction for such month.

1.3 The Construction Quality Management Plan will, at a minimum, include or reference detailed quality system procedures and process flow charts for the following processes:

- (a) Inspection and Testing;
- (b) materials identification and traceability;
- (c) quality assessment of Subcontractors engaged in supply and construction activities;
- (d) purchasing process, information and verification;

- (e) preservation of product (packaging, handling, shipping and storage);
- (f) External Quality Audits of Subcontractors;
- (g) Internal Quality Audits;
- (h) control of nonconforming products;
- (i) Correction, Corrective Actions, Preventive Actions and opportunities for improvement;
- (j) document management;
- (k) Site test laboratory procedures; and
- (l) control of documents, Quality Records and any mandatory documented procedures in addition to the foregoing in accordance with the ISO 9001 Standard.

1.4 The Construction Quality Management Plan will include procedures for Work, such as placement of CIPC, for which the performance cannot be verified by subsequent monitoring or measurement.

1.5 All of the activities and processes of the Construction Quality Management Plan described in Section 1 of Appendix 8-3 [Construction Quality Management Plan], will be subject to Internal Quality Audits and External Quality Audits.

1.6 For the purposes of this Section 1 of Appendix 8-3 [Construction Quality Management Plan], “construction activities” is deemed to include the supply and delivery to Site of significant equipment and bulk materials critical to the performance of the Work. In respect of such equipment and materials, the Contractor will submit an Inspection and Test Plan for those inspections and tests to be performed off Site, and a separate Inspection and Test Plan for those to be performed on Site.