

Part 1 General

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract involves control and burner upgrades for existing steam boilers at the Saskatchewan Penitentiary in Prince Albert, Alberta.
- .2 Perform work in accordance with CSC Saskatchewan Penitentiary Technical Requirements and Institutional Requirements for Contractors. Perform all work indicated on the drawings including work, but not limited to, the following:

.1 Demolition

- .1 Remove and dispose of existing burners on Boilers 1 and 2.
- .2 Remove and dispose of gas and oil trains for Boilers 1 and 2. Refer to drawings for details.
- .3 Remove and dispose of local boiler control panels for Boilers 1 and 2. Retain, in place and well labelled, all controls wiring connected to existing sensors and valves.
- .4 Remove and dispose of existing air compressors and compressed air piping for boilers 1 and 2.
- .5 Remove and dispose of motor control center (MCC).
- .6 Remove and dispose of power supply cable from existing switchgear C13-E to MCC.
- .7 Remove and dispose of power supply cables from MCC to Boiler 1, Boiler 2, Boiler 3, Boiler 1 and 2 Air Compressors, and Feedwater Pump No. 1. The power supply cable from MCC to Feedwater Pump No. 1 is already disconnected at the pump and has been replaced by a new feed.
- .8 Remove and dispose of existing control panel located in control room. Retain, in place and well labelled, all controls wiring connected to existing sensors and valves.
- .9 Remove and retain two existing desks and two existing computers from control room.

.2 Construction

- .1 Supply and install new burners for Boilers 1 and 2. Modify the front wall refractory and mounting plate on each boiler to accommodate the new burners.
- .2 Supply and install new gas and oil trains as shown on drawings.
- .3 Supply and install new power supply cables and breakers on existing switchgear C-13E for Boilers 1, 2 and 3.
- .4 Supply and install new local control panels for Boilers 1 and 2. Mount the new boiler control panels where the existing control panels were removed.
- .5 Supply and install new Master Boiler Control Panel in the control room.
- .6 Supply and install new controls network to monitor boilers, economizers, and feedwater systems. Supply and install new controls cabinet in

- controls room to contain equipment and cabling. Utilize existing sensors and controllers as shown on drawings.
- .7 Supply and install new conduit and cabling for controls network.
 - .8 Supply and install new conduit and power supply circuits on existing Panel C-13A for:
 - .1 Master Boiler Control Panel;
 - .2 Controls Cabinet.
 - .3 OWS 2
 - .9 Supply and install two new Operator Work Stations (OWS) in the control room and connect to new control network. Provide programming and graphics to display and control boiler and ancillary device operating parameters.
 - .10 Commission all upgrades, including:
 - .1 Boiler 1 and 2 burners;
 - .2 Boiler 1 and 2 gas and oil trains;
 - .3 Local Boiler Control Panels (combustion management systems);
 - .4 Master Boiler Control Panel;
 - .5 Boiler control network;
 - .6 Operator Work Stations 1 and 2;
 - .7 Boilers 1, 2 and 3.
 - .11 Enclose and finish hole in wall of control room left by removed control panel. Repaint patched hole.
 - .12 Return two existing desks to control room.

Note: Demolition and construction work must be staged to minimize boiler downtime. Refer to staging in article 1.2.5 Work Sequence.

- .3 Expedite procurement and delivery of all equipment and supplies to within 6 weeks of award of contract. Delivery of burners is identified as critical to the project schedule. Expedite delivery of burners to site within 6 weeks of award of contract.
- .4 Work includes demolition of all existing systems that are to be replaced in the above work. Any areas damaged during the demolition and renovation of the facility (cut-outs, patching, holes, etc.) must be repaired to its original state.
- .5 Any penetrations made throughout the work, must be properly covered and sealed. Any penetrations through existing fire rated walls or ceilings must be fire stopped.
- .6 Remove all waste material off site and dispose of the waste according to Section 01 74 21 and in compliance with the Rural Municipality regulations.
- .7 All work on site must be under supervision of Saskatchewan Penitentiary escorts.
- .8 Work also includes start-up, commissioning, and training of all systems installed and modified.
- .9 All materials and workmanship must be as per stamped plans and specifications within.

1.2 WORK SEQUENCE

- .1 Construct Work in stages to accommodate Owner's need to generate steam throughout duration of construction. Demolition, construction, and commissioning work shall be performed concurrently for various aspects of the project, were necessary, to avoid interruptions to steam generation. A minimum of two boilers must be operational at all times and therefore only one boiler can be removed from service at any time. All three boilers must be returned to service no later than November 15, 2018.
- .2 Commissioning of each boiler shall be completed and the boiler operation turned over to CSC before the next boiler is removed from service. Each boiler must be fully operational and able to run independently off its local control panel before being turned over to CSC. Substantial completion milestones will be attributed to the upgrades for each boiler. See staging below for more information.
- .3 The contractor shall be responsible for operating each boiler from the time the boiler is removed from service for upgrades until the boiler is fully operational, commissioned, and turned over to CSC.
- .4 Contractor to provide a construction schedule, including a staging plan, for review and approval by Departmental Representative prior to start of work. Owner shall be consulted on the development of the construction schedule and shall be involved in any changes to the approved construction schedule.
- .5 Required stages:
 - .1 **Controls Network Installation**

Prior to the start of any demolition, equipment for the new controls network will be installed and commissioned. The controls network will be partially commissioned in advance of the replacement of local boiler controls on Boilers 1 and 2 to facilitate quick switchover from the existing controls panel to new controls network. This stage will include:

 - .1 Installation of new controls cabinet in control room;
 - .2 Installation of new master modbus controller and ancillary process controllers (economizers, feedwater, pressure monitors, etc.) and network controllers;
 - .3 Installation of new controls conduit;
 - .4 Installation of new controls wiring (partial);
 - .5 Re-routing of existing controls wiring (where necessary) from existing control panel to new control cabinet.
 - .6 Installation of new power supply circuit for controls cabinet;
 - .7 Installation of one new Operator Work Station, complete with graphics;
 - .8 Commissioning of controls network (partial - without connection to boilers);

.2 Master Boiler Control Panel Installation

Similar to the controls network, the master boiler control panel will be installed and commissioned (partially) prior to any demolition to facilitate quick switchover from the existing control panel to new controls network. At the end of this stage, Boiler 3 will be fully integrated into the new control network. This stage will include:

- .1 Installation of new master boiler controls panel in control room;
- .2 Installation of new power supply circuit for master boiler control panel;
- .3 Connection of master boiler controls panel to controls network;
- .4 Connection of Boiler 3 local control panel to master control panel.
- .5 Commissioning of master boiler controller (partial - integrate control of Boiler 3);
- .6 Commissioning of controls network (partial – to integrate monitoring and control of Boiler 3 through Operator Work Station).

.3 Power Supply Replacement

The existing MCC will be removed and select equipment will be reconnected directly to existing switchgear C-13E using new power cables.

Replacement of power supply for Boilers 1, 2, and 3 shall be staged to avoid interruptions to steam production. The power supply for Boiler 3 will be replaced first, while Boilers 1 and 2 remain connected to the MCC until their burners and control panels are upgraded in Stage 4.

Overall, power supply replacement will involve the following:

1. The following devices will be disconnected from the existing MCC:
 - a. Boiler 1
 - b. Boiler 2
 - c. Boiler 3
 - d. Feedwater Pump No.1
 - e. Air Compressor 1
 - f. Air Compressor 2
2. The following devices will be reconnected to the existing switchgear C-13E using new power cables:
 - a. Boiler 1
 - b. Boiler 2
 - c. Boiler 3

The power supply for Feedwater Pump No. 1 is no longer fed from the MCC, so the existing starter and power cable removed for this device will be removed and not replaced. The power supply for Air Compressors 1 and 2 will be removed and not replaced because these compressors will be removed as part of this project work (see Stage 6).

.4 Boiler 1 Burner and Controls Replacement

During this stage, Boiler 2 will continue to be controlled by the existing control panel and Boiler 3 will be controlled by the new control network. Operators will manually modulate the output of Boilers 2 and 3 through these two systems. At the end of this stage, Boiler 1 will be controlled through the new control network. Boiler 1 will be taken out of service and the following work will be performed:

1. Replacement of burner, including modifications to front wall refractory and mounting plate;
2. Replacement of gas and oil trains;
3. Replacement of power supply cable (see above);
4. Replacement of local boiler control panel;
5. Connection of local boiler control panel to new control network;
6. Commissioning of burner, boiler, and local boiler controls.
7. Commissioning of master boiler control panel (partial – to integrate monitoring and control of Boiler 1)
8. Commissioning of controls network (partial – to integrate monitoring and control of Boiler 1 through Operator Work Station)

.5 Boiler 2 Burner and Controls Replacement

During this stage, Boilers 1 and 3 will be controlled by the new control network. At the end of this stage, Boiler 2 will also be controlled through the new control network. Boiler 2 will be taken out of service and the following work will be performed:

1. Replacement of burner, including modifications to front wall refractory and mounting plate;
2. Replacement of select components of gas and oil trains;
3. Replacement of power supply cable (see above);
4. Replacement of local boiler control panel;
5. Connection of local boiler control panel to new control network;
6. Commissioning of burner, boiler, and local boiler controls.
7. Commissioning of master boiler control panel (partial – to integrate monitoring and control of Boiler 2)
8. Commissioning of controls network (partial – to integrate monitoring and control of Boiler 2 through Operator Work Station)

.6 Demolition of Air Compressors 1 and 2

Existing air compressors 1 and 2 will be removed and disposed of. New burners on Boilers 1 and 2 do not require an external source of compressed air.

.7 Demolition of Existing Control Panel

The existing control panel will be removed and disposed of, including all controllers and equipment contained within. Select existing wiring will remain routed up from the basement and across the floor of the control room in conduit to the new control cabinet.

.8 Restoration of Control Room

The hole in the control room wall that was created when the control panel was removed will be patched. Interior and exterior walls of the control room will be repainted. Desks will be returned to the control room and a second Operator Work Station will be installed.

.9 Verification and Final Commissioning

All new and modified systems will be verified and final adjustments and commissioning will be conducted.

.6 Refer to Section 01 32 16 for Project Schedule requirements.

.7 Maintain fire access/control.

1.3 CONTRACTOR USE OF PREMISES

.1 Limit use of premises for work to accommodate the continued use of the building within as a secure maximum detention facility.

.2 Co-ordinate use of premises under direction of Departmental Representative

.3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative

.6 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.4 OWNER OCCUPANCY

.1 Owner will occupy premises during entire construction period for execution of normal operations. Work is contained within the powerhouse. This building is not used to house inmates; however, select inmates do work within the building.

.2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.5 EXISTING SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where work involves breaking into or connecting to existing services, give Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions.
- .3 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .4 It is critical that sufficient building heat must be maintained at all times and that a minimum of two boilers be operational at all times during construction. The contractor is responsible for keeping boilers operational and for resolving issues relevant to the project work after boilers have been returned to service and are being operated by CSC, but prior to substantial completion for the project. The contractor will respond immediately to issues experienced with boilers during this period and will prioritize keeping a minimum of two boilers operational at all times. Refer to Section 01 78 00 – Closeout Submittals for warranty requirements.
- .5 Provide temporary services when directed by Departmental Representative to maintain critical building and systems.
- .6 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .7 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .8 Record locations of maintained, re-routed and abandoned service lines.

1.6 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Change Orders.
 - .7 Other Modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Approved Work Schedule.
 - .10 Health and Safety Plan and Other Safety Related Documents.
 - .11 Other documents as specified.

Part 2 **Products**
2.1 **In accordance with specifications provided in each section.**

Part 3 **Execution**
3.1 **In accordance with specifications provided in each section.**

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 11 00 – Summary of Work.

1.2 ACCESS AND EGRESS

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.3 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security, temporary security must be specified to be reviewed and approved by CSC.
- .4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .5 Closures: protect work temporarily until permanent enclosures are completed.

1.4 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.5 EXISTING SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum.

1.6 SPECIAL REQUIREMENTS

- .1 Perform Work in accordance with CSC Saskatchewan Penitentiary Technical Requirements and Institutional Requirements for Contractors.
- .2 Construction Escorts:
 - .1 Departmental Representative will provide construction escort as required
 - .2 Notify Departmental Representative 48 hours in advance of when an escort will be required
- .3 Carry out all Work Monday to Friday from 8:00 to 16:00 hours.
- .4 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

1.7 SECURITY

- .1 Security clearances:
 - .1 Personnel employed on this project will be subject to security check
 - .2 Obtain requisite clearance as instructed by Departmental Representative
 - .3 On award of contract the Departmental Representative will provide "Personnel Screening Request and Authorization" form, "Declaration Regarding Criminal Convictions" form, and "Security Screening Certificate and Briefing" form to the Contractor
 - .4 These forms must be filled out for each person who will have access to the work area
 - .5 These forms will be processed by the CISD and only persons passing this screening process will be allowed on site
- .2 Security escort:
 - .1 Personnel employed on this project must be escorted when executing work in non-public areas during normal working hours. Personnel must be escorted in all areas after normal working hours.
 - .2 Submit an escort request to Departmental Representative at least 7 days before service is needed. For requests submitted within time noted above, costs of security escort will be paid for by Departmental Representative. Cost incurred by late request will be Contractor's responsibility.
 - .3 All contractors must sign in and out every day

1.8 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking and vaping is not permitted.

1.9 WORKING CONDITIONS

- .1 Subject to Institutional Security requirements, the Warden or designate shall permit the contractor as much freedom of action and movement as is reasonably possible and the contractor in turn shall be expected to cooperate with institutional personnel in ensuring that security requirements are observed by construction workers.

1.10 OBSERVATION AND INSPECTION

- .1 Construction activity and all related movement of personnel and vehicles shall be subject to observation and inspection by institutional staff to ensure that security requirements are met.

1.11 PARKING

- .1 The Warden or designate shall assign the area to be used by the construction personnel
- .2 All unattended vehicles must have windows closed, with doors locked, and keys removed
- .3 Vehicles must not contain any type of weapons or ammunition

1.12 SHIPPING AND ACCESS TO THE SITE

- .1 Contractor shall verify with the Warden or designate the hours during which vehicles will be allowed to enter or leave the institution. Normal construction Work hours on site are 8:00 to 16:00
- .2 Contractor shall have all project material and equipment addressed in his/her name
- .3 The Warden or designate may prohibit or restrict access to any part of the institution
- .4 Private vehicles will not be allowed within the institution's security wall or fence without special permission
- .5 Trucks delivering materials, equipment, and tools to the job will be allowed when the contents are certified at gate entrance. All vehicles are subject to search.

1.13 TOOLS AND EQUIPMENT

- .1 The contractor shall maintain inventory of all tools and equipment. A copy of these tools and equipment shall be left with the officer
- .2 Contractor shall keep all tools and equipment under constant supervision and not leave them unattended.
- .3 Contractor shall store tools and equipment in places approved by Warden or designate

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative. Meetings will be held a minimum of every two weeks.
- .2 Departmental representative shall prepare agenda and minutes for construction meetings. Meeting minutes shall include significant proceedings and decisions and identify actions by parties.
- .3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative
- .4 Provide physical space and make arrangements for meetings.
- .5 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants
- .6 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors, will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

1.3 PROGRESS MEETINGS

- .1 During course of Work and 1 week prior to project completion, schedule progress meetings.
- .2 Hold meetings at a minimum every 2 weeks.
- .3 Contractor, major Subcontractors involved in Work, Departmental Representative are to be in attendance.
- .4 Notify parties minimum 5 days prior to meetings.
- .5 Departmental Representative to record minutes of meetings and circulate to attending parties and affected parties not in attendance .
- .6 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.

- .4 Problems which impede construction schedule.
- .5 Review of product/equipment delivery schedules.
- .6 Corrective measures and procedures to regain projected schedule.
- .7 Revision to construction schedule.
- .8 Progress schedule, during succeeding work period.
- .9 Review submittal schedules: expedite as required.
- .10 Review proposed changes for affect on construction schedule and on completion date.
- .11 Other business.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Sunday to Saturday, inclusive, will provide seven day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

1.2 REQUIREMENTS

- .1 Ensure Schedule is practical and will remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 14 working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.
- .5 Carry out all Work Monday to Friday from 8:00 to 16:00 hours.
- .6 Complete Work to replace one burner and to return the associated boiler to service within 14 consecutive work days. Complete Work to replace burners on Boilers 1 and 2 and return boilers to service within 28 consecutive work days.
- .7 Return all three boilers to service no later than November 15, 2018.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within 5 working days of Award of Contract Bar (GANTT) Chart as a project schedule for planning, monitoring and reporting of project progress.

1.4 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
 - .1 Initial site visit and inspection of existing conditions;
 - .2 Shop drawings, work plan, and pre-construction submissions;
 - .3 Site mobilization;
 - .4 Demolition (staged);
 - .5 Work (staged);
 - .6 Commissioning and testing;
 - .7 Final inspections (Consultant, AHJ, and Departmental Representative)
 - .8 Deficiencies;
 - .9 Training;
 - .10 Final certification;

1.5 PROJECT SCHEDULE

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return revised schedules within 2 working days.
- .3 Revise schedule based on Departmental Representative's feedback and resubmit within 2 working days.
- .4 Accepted revised schedule will be used as baseline for updates.
- .5 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows. Refer to Section 01 11 00 for staging details.
 - .1 Award
 - .2 Shop Drawings
 - .3 Permits
 - .4 Material Procurement
 - .5 Mobilization
 - .6 Controls Network Installation
 - .7 Master Boiler Control Panel Installation
 - .8 Power Supply Replacement
 - .9 Boiler 1 Burner and Controls Replacement
 - .10 Boiler 1 Returned to Service
 - .11 Boiler 2 Burner and Controls Replacement

- .12 Boiler 2 Returned to Service
- .13 Demolition of Air Compressors 1 and 2
- .14 Demolition of Existing Control Panel
- .15 Restoration of Control Room
- .16 Verification and Commissioning

1.6 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on semi-weekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.7 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule. Hold meetings at a minimum every 2 weeks according to Section 01 31 19 – Project Meetings.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 CONSTRUCTION SCHEDULE

- .1 Work must be staged in order to accommodate the Owner's need to generate steam throughout duration of construction. Refer to Section 01 11 01 – Summary of Work for staging and work sequence requirements.
- .2 A minimum of two boilers must be operational at all times and therefore only one boiler can be removed from service at any time.
- .3 Return all three boilers to service no later than November 15, 2018.
- .4 Expedite procurement and delivery of all equipment and supplies to within 6 weeks of award of contract. Delivery of burners is identified as critical to the project schedule. Expedite delivery of burners to site within 6 weeks of award of contract.
- .5 Schedule work as follows:
 - .1 Week 0 – Contract Award
 - .2 Week 1 – Shop Drawing Submission
 - .3 Week 1-6 – Material Procurement & Mobilization
 - .4 Week 4-15 – On-Site Construction

- .5 Week 16-17 – Final Commissioning
- .6 Week 18 – Substantial Completion and Final Acceptance

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by Contractor to Departmental Representative for review and approval.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

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- .5 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
 - .6 Accompany submissions with transmittal letter, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
 - .7 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .2 Capacities.
 - .3 Performance characteristics.
 - .4 Standards.
 - .5 Operating weight.
 - .6 Wiring diagrams.
 - .7 Single line and schematic diagrams.
 - .8 Relationship to adjacent work.
 - .8 After Departmental Representative's review, distribute copies.
 - .9 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
 - .10 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
 - .11 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

- .2 Testing must have been within 3 years of date of contract award for project.
- .12 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .13 Submit electronic copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .14 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative
- .15 Delete information not applicable to project.
- .16 Supplement standard information to provide details applicable to project.
- .17 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .18 The review of shop drawings by Public Works and Government Services Canada (PSPC) is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that PSPC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Province of Saskatchewan
 - .1 The Saskatchewan Employment Act (S-15.1)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation.
- .3 Submit 3 copies of Contractor's authorized representative's work site health and safety inspection reports to authority having jurisdiction, weekly Departmental Representative
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 3 days after receipt of comments from Departmental Representative
- .7 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .8 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.
- .2 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project.

1.4 SAFETY ASSESSMENT

- .1 Perform site specific safety hazard assessment related to project.

1.5 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.6 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
 - .1 Operating equipment and mechanical and electrical service spaces.

1.7 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.
- .3 Contractor must be COR certified.

1.8 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.9 COMPLIANCE REQUIREMENTS

- .1 Comply with O-1.1 Reg 1 - The Occupational Health and Safety Regulations, 1996
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.10 UNFORSEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Saskatchewan having jurisdiction and advise Departmental Representative verbally and in writing.
- .2 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Health and Safety co-ordinator and follow procedures in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.11 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - Have site-related working experience specific to activities associated with the work & working knowledge of occupational safety and health regulations.
 - .1 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

- .2 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

1.12 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative

1.13 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.14 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 This Section references to laws, by laws, ordinances, rules, regulations, codes, orders of Authority Having Jurisdiction, and other legally enforceable requirements applicable to Work and that are; or become, in force during performance of Work.

1.2 RELATED REQUIREMENTS

- .1 Section 02 82 00 - Asbestos Abatement - Minimum Precautions
- .2 Section 02 83 10 - Lead-Base Paint Abatement - Minimum Precautions

1.3 REFERENCES TO REGULATORY REQUIREMENTS

- .1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Specific design and performance requirements listed in the specifications or indicated on the Drawings may exceed the minimum requirements established by the referenced Building Code; these requirements will govern over the minimum requirements listed in the Building Code.
 - .1 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.

1.4 HAZARDOUS MATERIAL DISCOVERY

- .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative. Refer to Section 02 82 00 - Asbestos Abatement - Minimum Precautions.

1.5 BUILDING SMOKING ENVIRONMENT

- .1 Smoking and vaping is not permitted at the Saskatchewan Penitentiary.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: Except as otherwise specified, Constructor shall apply for, obtain, and pay all fees associated with, permits, licenses, certificates, and approvals required by regulatory requirements and Contract Documents, based on General Conditions of Contract and the following:
 - .1 Regulatory requirements and fees in force on date of Bid submission, and
 - .2 Any change in regulatory requirements or fees scheduled to become effective after date of tender submission and of which public notice has been given before date of tender submission

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.2 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies may be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection by contractor.
- .5 Notwithstanding any additional testing the Departmental Representative may undertake, the contractor is responsible to perform all required quality control testing as indicated in the plans and specifications and as required by all applicable codes

1.3 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.4 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative

1.6 REPORTS

- .1 Submit electronic copies of inspection and test reports to Departmental Representative.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures

1.2 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location of staging area, if required.
- .2 Remove from site all such work after use.

1.3 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2, if required.

1.4 HOISTING

- .1 Provide, operate and maintain hoists required for moving of workers, materials and equipment.
- .2 Hoists to be operated by qualified operator.

1.5 SITE STORAGE/LOADING

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.6 CONSTRUCTION PARKING

- .1 Parking will be permitted on site.

1.7 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 All equipment and tools shall be removed from site daily.
- .2 Material storage shall not be allowed on-site unless approved otherwise. Provide requests for on-site material storage to Departmental Representative for review prior to start of construction.

1.8 SANITARY FACILITIES

- .1 Departmental Representative and Security will provide sanitary facilities for contractor use during construction. Keep facilities clean.

1.9 UTILITIES

- .1 Contractor may use existing site power. Contractor is responsible for setup of any required temporary service panels
- .2 Contractor may utilize existing site water supply.

1.10 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Waste Management in accordance with Section 01 74 21.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of existing equipment, fixtures and outlets indicated or specified are to be considered as approximate. Contractor shall verify on site.
- .2 Install equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Departmental Representative of impending installation and obtain approval for actual location, if actual location varies from the location specified.

1.2 RECORDS

- .1 Maintain a complete, accurate log of work as it progresses.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1

General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures and submittal requirements provided in each section.

1.2 MATERIALS

- .1 As specified on drawings and specifications.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.3 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

- .1 Execute cutting, fitting, and patching to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Restore work with new products in accordance with requirements of Contract Documents.
- .8 Fit Work tight and sealed to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .9 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or tenants.
- .2 Remove waste materials from site daily. Do not burn waste materials on site.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Dispose of waste materials and debris off site.
- .5 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .6 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .7 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .8 Schedule cleaning operations so that resulting dust, debris and other contaminants will not contaminate building systems.

1.2 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris other than that caused by Owner or tenants.
- .5 Remove all waste materials from site when construction is complete.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

Part 2 Products
2.1 NOT USED

Part 3 Execution
3.1 NOT USED

END OF SECTION

Part 1 General

1.1 WASTE MANAGEMENT GOALS

- .1 Minimize amount of non-hazardous solid waste generated by project and accomplish maximum source reduction, reuse and recycling of solid waste where practical.
- .2 Protect environment and prevent environmental pollution damage.

1.2 DEFINITIONS

- .1 Approved/Authorized recycling facility: waste recycler approved by applicable provincial authority.
- .2 Inert Fill: inert waste - exclusively asphalt and concrete.
- .3 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .4 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .5 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .6 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
 - .2 Returning reusable items including pallets or unused products to vendors.
- .7 Separate Condition: refers to waste sorted into individual types.
- .8 Source Separation: act of keeping different types of waste materials separate beginning from the point they became waste.

1.3 USE OF SITE AND FACILITIES

- .1 Execute Work with minimal interference and disturbance to normal use of premises.
- .2 Maintain security measures established by facility provide temporary security measures approved by Departmental Representative

1.4 WASTE PROCESSING SITES

- .1 Contractor is responsible to research and locate waste diversion resources and service providers. Salvaged materials are to be transported off site to approved and/or authorized recycling facilities or to users of material for recycling.

1.5 STORAGE, HANDLING AND PROTECTION

- .1 Store, materials to be recycled on site, in a location approved by the Departmental Representative, until project completion.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Protect structural components not removed from movement or damage.
- .4 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative
- .5 Protect surface drainage, mechanical and electrical from damage and blockage.
- .6 Provide on-site facilities and containers for collection and storage of recyclable materials.
- .7 Separate and store materials produced during project in designated areas.
- .8 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off site processing facility for separation.

1.6 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste into waterways
- .3 Remove materials on-site as Work progresses.

1.7 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 Products

- 2.1 NOT USED

Part 3 Execution

3.1 APPLICATION

- .1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

- .1 Clean in accordance with Section 01 74 11 – Cleaning.

3.3 DIVERSION OF MATERIALS

- .1 Separate materials that can be recycled from general waste in separate piles or containers.

- .2 Remove recyclable materials from site and deliver to a municipal recycling facility.
- .3 Sale of recyclable material is not permitted

3.4 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

- .1 Schedule G - Government Chief Responsibility for the Environment:

Province	Address	General Inquires	Fax
Saskatchewan	Saskatchewan Environment and Resource Management 3211 Albert Street Regina SK S4S 5W6	306-787-2700	306-787-3941

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative's inspection.
 - .2 Departmental Representative Inspection:
 - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Equipment and systems: tested, adjusted balanced and fully operational.
 - .4 Certificates required by Utility companies: submitted.
 - .5 Operation of systems: demonstrated to Owner's personnel.
 - .6 Commissioning of mechanical systems: completed in accordance with 01 91 13 - General Commissioning (Cx) Requirements and Departmental Representative
 - .7 Work: complete and ready for final inspection.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Departmental Representative
 - .2 When Work incomplete according to Departmental Representative complete outstanding items and request re-inspection.
 - .5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
 - .6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
 - .7 Final Payment:

.1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.2 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to contract completion with Departmental Representative to:
 - .1 Verify Project requirements.
 - .2 Review warranty requirements.
 - .2 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, two final copies of maintenance manuals in English.
- .3 Provide evidence, if requested, for type, source and quality of products supplied.

1.3 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .4 Arrange content by systems under Section numbers and sequence of Table of Contents.
- .5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .6 Text: manufacturer's printed data, or typewritten data.
- .7 Record Drawings:
 - .1 The contractor will provide record drawings of all mechanical work. Show dimensioned layouts and schematics of gas piping, oil piping, and other key equipment and components.

- .2 The contractor will provide record drawings for all electrical work. Show on record drawings the location and size of new conduits, wiring, panels, and motor control centers.
- .3 The contractor will provide record drawings of all controls work. Show schematics of control system configuration, layout, and all inputs and outputs.
- .8 Provide hard copy of record drawings with reinforced punched binder tab.
- .9 Bind in with text; fold larger drawings to size of text pages.

1.4 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.5 RECORD DOCUMENTS AND SAMPLES

- .1 Maintain, at site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.

- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by change orders.
 - .4 Details not on original Contract Drawings.
 - .5 Referenced Standards to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain field test records, inspection certifications, manufacturer's certifications, required by individual specifications sections.
- .7 Provide digital photos, if requested, for site records.

1.7 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

- .4 Additional requirements: as specified in individual specifications sections.

1.8 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, 15 days before planned pre-warranty conference, to Departmental Representative approval.
- .3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Departmental Representative's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Conduct joint 6 month and 12 month warranty inspection, measured from time of acceptance, by Departmental Representative.
- .9 Include information contained in warranty management plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
 - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roof metal
 - .3 Contractor's plans for attendance at 6 and 12 month post-construction warranty inspections.
- .10 Respond immediately to oral or written notification of required construction warranty repair work.
- .11 Written verification to follow oral instructions.

- .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

- .1 Demonstrate scheduled operation and maintenance of equipment and systems to Owner's personnel.
- .2 Owner: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.
- .3 Preparation:
 - .1 Verify conditions for demonstration and instructions comply with requirements.
 - .2 Verify designated personnel are present.
 - .3 Ensure equipment has been inspected and put into operation
- .4 Demonstration and Instructions:
 - .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment
 - .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
 - .3 Review contents of manual in detail to explain aspects of operation and maintenance.
 - .4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures
- .2 Submit schedule for demonstration two weeks prior to designated dates, for Departmental Representative's approval.
- .3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .4 Give time and date of demonstration, with list of persons present.
- .5 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

Part 2 Products

2.1 NOT USED

Part 3 Execution

- .1 Training to consist of two sessions, each covering the same content, each 4 hours in length. All trainees will attend one of two sessions. Refer to Section 01 91 41.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 General requirements relating to commissioning of project's components and systems, specifying general requirements to PV of components, equipment, sub-systems, systems, and integrated systems.
 - .2 Commissioning process will be conducted by the Contractor, under the review of the Departmental Representative for final acceptance. The contractor shall provide a commissioning plan and schedule, including commissioning check-sheets, and training plans. All commissioning documents will be reviewed and approved by the Departmental Representative prior to the start of commissioning. Functional performance testing check-sheets shall be executed by the Contractor. Completed commissioning documents will be reviewed and approved by the Departmental Representative.

1.2 GENERAL

- .1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:
 - .1 Verify installed equipment, systems and integrated systems operate in accordance with Contract Documents and design criteria and intent.
 - .2 Effectively train O M staff.
- .2 Contractor performs Cx process, operating equipment and systems, troubleshooting and making adjustments as required.
 - .1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.
 - .2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.
- .3 Design Criteria: To meet Project functional and operational requirements.

1.3 COMMISSIONING OVERVIEW

- .1 Section 01 91 31 - Commissioning (Cx) Plan
- .2 For Cx responsibilities refer to Section 01 91 31 - Commissioning (Cx) Plan
- .3 Cx to be a line item of Contractor's cost breakdown.
- .4 Cx activities supplement field quality and testing procedures described in relevant technical sections.
- .5 Departmental Representative will issue Substantial Acceptance Certificate when:

- .1 Completed Cx documentation has been received, reviewed for suitability and approved by Departmental Representative
- .2 Equipment, components, systems, and integrated systems have been fully commissioned and functional as per design intent within the context of the Owner Requirement
- .3 Final O & M and Training Manual are received, reviewed and approved by the Departmental Representative for suitability
- .4 Completion of Training Sessions to all Operational and Maintenance Staff

1.4 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

- .1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the unfunctional system, including related systems as deemed required by Departmental Representative, to ensure effective performance.
- .2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

1.5 PRE-CX REVIEW

- .1 During Construction:
 - .1 Co-ordinate provision, location and installation of provisions for Cx.
- .2 Before start of Cx:
 - .1 Have completed Cx Plan up-to-date.
 - .2 Ensure installation of related components, equipment, sub-systems, systems is complete.
 - .3 Fully understand Cx requirements and procedures.
 - .4 Have Cx documentation shelf-ready.
 - .5 Understand completely design criteria and intent and special features.
 - .6 Complete TAB procedures on systems and submit for review and approval by Departmental Representative
 - .7 Complete and have commissioning schedule up to date
- .3 Inform Departmental Representative in writing of discrepancies and deficiencies on finished works.

1.6 CONFLICTS

- .1 Report conflicts between requirements of this section and other sections to Departmental Representative before start-up and obtain clarification.
- .2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.7 COMMISSIONING DOCUMENTATION

- .1 The Contractor shall provide a commissioning plan and schedule, including commissioning specifications, check-sheets, and training plans. Functional performance testing check-sheets shall be executed by the Contractor. The Departmental Representative shall review commissioning documentation and sign approved commissioning forms. The Contractor shall include completed commissioning forms in the O&M manual.

1.8 COMMISSIONING SCHEDULE

- .1 The Contractor shall provide a commissioning plan and schedule, including commissioning specifications, check-sheets, and training plans.

1.9 STARTING AND TESTING

- .1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

1.10 WITNESSING OF STARTING AND TESTING

- .1 Provide 48 hours' notice to Departmental Representative prior to commencement.

1.11 PROCEDURES

- .1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.
- .2 Conduct start-up and testing in following distinct phases:
 - .1 Included in delivery and installation:
 - .1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.
 - .2 Visual inspection of quality of installation.
 - .2 Start-up: follow accepted start-up procedures.
 - .3 Operational testing: document equipment performance.
 - .4 System PV: include repetition of tests after correcting deficiencies.
 - .5 Post-substantial performance verification: to include fine-tuning.
- .3 Correct deficiencies and obtain approval from Departmental Representative after distinct phases have been completed and before commencing next phase.
- .4 Document required tests on approved PV forms.
- .5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Departmental Representative. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, the contractor shall be responsible for repairing damage, re-commissioning, and re-testing.

1.12 START-UP DOCUMENTATION

- .1 The Contractor shall assemble start-up documentation and submit to Departmental Representative for approval before commencement of commissioning.

- .2 Start-up documentation to include:
 - .1 Factory and on-site test certificates for specified equipment.
 - .2 Pre-start-up inspection reports.
 - .3 Signed installation/start-up check lists.
 - .4 Start-up reports,
 - .5 Step-by-step description of complete start-up procedures, to permit Departmental Representative to repeat start-up at any time.

1.13 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS

- .1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer and coordinate with SaskPen.
- .2 Develop written maintenance program, with assistance of manufacturer(s) where necessary, and submit Departmental Representative for approval before implementation.
- .3 Operate and maintain systems for length of time required for commissioning to be completed. Coordinate with SaskPen.
- .4 After completion of commissioning, operate and maintain systems until issuance of certificate of substantial completion.

1.14 TEST RESULTS

- .1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.
- .2 Provide manpower and materials, assume costs for re-commissioning.

1.15 START OF COMMISSIONING

- .1 Notify Departmental Representative at least 5 days prior to start of Cx.
- .2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

1.16 WITNESSING COMMISSIONING

- .1 Departmental Representative to witness activities and review and approve results.

1.17 AUTHORITIES HAVING JURISDICTION

- .1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.
- .2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.
- .3 Provide copies to Departmental Representative within 5 days of test and with Cx report.

1.18 EXTRAPOLATION OF RESULTS

- .1 Where Cx of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions when approved by Departmental Representative in accordance with

equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.

1.19 DEFICIENCIES, FAULTS, DEFECTS

- .1 Correct deficiencies found during start-up and Cx to satisfaction of Departmental Representative Report problems, faults or defects affecting Cx to Departmental Representative in writing. Stop Cx until problems are rectified. Proceed with written approval from Departmental Representative

1.20 COMPLETION OF COMMISSIONING

- .1 Upon completion of Cx leave systems in normal operating mode.
- .2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of substantial completion.
- .3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Departmental Representative

1.21 ACTIVITIES UPON COMPLETION OF COMMISSIONING

- .1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

1.22 TRAINING

- .1 In accordance with Section 01 91 41 - Commissioning (Cx) - Training

1.23 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

- .1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

1.24 OCCUPANCY

- .1 Cooperate fully with Departmental Representative during stages of acceptance and occupancy of facility.

1.25 OWNER'S PERFORMANCE TESTING

- .1 Performance testing of equipment or system by Departmental Representative will not relieve Contractor from compliance with specified start-up and testing procedures.

Part 2 Products
2.1 NOT USED

Part 3 Execution
3.1 NOT USED

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Contractor shall develop a Commissioning (Cx) Plan in accordance with this section and Section 01 91 13 – General Commissioning Requirements.

1.2 REFERENCE STANDARDS

- .1 CSA Z320-11 (R2016) – Building Commissioning Standard
- .2 Underwriters' Laboratories of Canada (ULC)

1.3 GENERAL

- .1 Provide a fully functional facility:
 - .1 Systems, equipment and components meet user's functional requirements before date of acceptance, and operate consistently at peak efficiencies and within specified energy budgets under normal loads.
 - .2 O&M personnel have been fully trained in aspects of installed systems.
 - .3 Complete documentation relating to installed equipment and systems.
- .2 Term "Cx" in this section means "Commissioning".
- .3 Use this Cx Plan as master planning document for Cx:
 - .1 Outlines organization, scheduling, allocation of resources, documentation, pertaining to implementation of Cx.
 - .2 Communicates responsibilities of team members involved in Cx Scheduling, documentation requirements, and verification procedures.
 - .3 Sets out deliverables relating to O&M, process and administration of Cx.
 - .4 Describes process of verification of how built works meet design requirements.
 - .5 Produces a complete functional system prior to issuance of Certificate of Occupancy.
 - .6 Management tool that sets out scope, standards, roles and responsibilities, expectations, deliverables, and provides:
 - .1 Overview of Cx.
 - .2 General description of elements that make up Cx Plan.
 - .3 Process and methodology for successful Cx.
- .4 Acronyms:
 - .1 Cx - Commissioning.
 - .2 EMCS - Energy Monitoring and Control Systems (Also ref. DDC Systems)
 - .3 MSDS - Material Safety Data Sheets.
 - .4 PI - Product Information.
 - .5 PV - Performance Verification.

- .6 TAB - Testing, Adjusting and Balancing.
- .5 Commissioning terms used in this Section:
 - .1 Bumping: short term start-up to prove ability to start and prove correct rotation.
 - .2 Deferred Cx - Cx activities delayed for reasons beyond Contractor's control due to lack of occupancy, weather conditions, need for heating/cooling loads.

1.4 DEVELOPMENT OF 100% CX PLAN

- .1 The Contractor shall submit a commissioning plan to the Departmental Representative prior to the start of commissioning. The commissioning plan shall take into account:
 - .1 Approved shop drawings and product data.
 - .2 Approved changes to contract.
 - .3 Contractor's project schedule.
 - .4 Cx schedule.
 - .5 Contractor's, sub-contractor's, suppliers' requirements.
 - .6 Project construction team's and Cx team's requirements.

1.5 EXTENT OF CX

- .1 Commission the following systems and equipment:
 - .1 Boiler 1 Burner
 - .2 Boiler 1 Local Boiler Control Panel
 - .3 Boiler 2 Burner
 - .4 Boiler 2 Local Boiler Control Panel
 - .5 Boiler 1, 2, and 3 Drum Level Controllers and Economizer Temperature Controllers
 - .6 Control Network
 - .1 Master Boiler Control Panel
 - .2 Operator Workstations
 - .3 Modbus Master Controller
 - .4 Pump Controller
 - .5 Deaerator Controllers (Existing)
 - .7 Sensors and Actuators
 - .1 Calibration and testing of all new, modified, or re-connected sensors and actuators.

1.6 DELIVERABLES RELATING TO O&M PERSPECTIVES

- .1 General requirements:
 - .1 Compile English documentation.
 - .2 Documentation to be computer-compatible format ready for inputting for data management.
- .2 Provide deliverables:

- .1 Warranties.
- .2 Project record documentation.
- .3 Product data sheets.
- .4 Shop drawings.
- .5 Completed commissioning forms.
- .6 Inventory of spare parts, special tools and maintenance materials.
- .7 Training per Section 01 91 41.

1.7 DELIVERABLES RELATING TO THE CX PROCESS

- .1 General:
 - .1 Start-up, testing and Cx requirements, conditions for acceptance and specifications form part of relevant technical sections of these specifications. Commissioning is the responsibility of the contractor, under the review and approval of the Departmental Representative.
- .2 Definitions:
 - .1 Cx as used in this section includes:
 - .1 Cx of components, equipment, systems, subsystems, and integrated systems.
 - .2 Factory inspections and performance verification tests.
- .3 Deliverables: provide:
 - .1 Startup, pre-Cx activities and documentation for systems, and equipment.
 - .2 Completed installation checklists (ICL).
 - .3 Completed product information (PI) report forms.
 - .4 Completed performance verification (PV) report forms.
 - .5 Results of Performance Verification Tests and Inspections.
 - .6 Training Plans.
 - .7 Cx Reports.
 - .8 Prescribed activities during warranty period.
- .4 Departmental Representative to participate.

1.8 START-UP

- .1 Start-up components, equipment and systems.
- .2 Departmental representative to monitor all of these start-up activities.
 - .1 Rectify start-up deficiencies to satisfaction of Departmental Representative
- .3 Performance Verification (PV):
 - .1 Approved Cx Agent to perform.
 - .1 Repeat when necessary until results are acceptable to Departmental Representative.
 - .2 Use modified procedures to suit project requirements.

- .3 Departmental Representative to witness and certify reported results using approved PI and PV forms.
- .4 Departmental Representative to approve completed PV reports

1.9 CX REPORTS

- .1 Complete CX reports and checklists during the commissioning process, witnessed by the Departmental Representative. Submit reports to the Departmental Representative for review and acceptance.
- .2 Include completed and certified PV reports in properly formatted Cx Reports.
- .3 Final acceptance of commissioning reports by Departmental Representative.

1.10 ACTIVITIES DURING WARRANTY PERIOD

- .1 Cx activities must be completed before issuance of Substantial Certificate, it is anticipated that certain Cx activities may be necessary during Warranty Period, including:
 - .1 Adjustments to controls programming and operator work stations to improve system performance and user interface functionality.

1.11 TRAINING PLANS

- .1 Refer to Section 01 91 41 - Commissioning (Cx) - Training

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Sample commissioning forms are provided in this section. The contractor shall develop and submit customized commissioning forms for each of the following:
 - .1 Boiler 1 Burner
 - .2 Boiler 1 Local Boiler Control Panel
 - .3 Boiler 2 Burner
 - .4 Boiler 2 Local Boiler Control Panel
 - .5 Boiler 1, 2, and 3 Drum Level Controllers and Economizer Temperature Controllers
 - .6 Control Network
 - .1 Master Boiler Control Panel
 - .2 Operator Workstations
 - .3 Modbus Master Controller
 - .4 Pump Controller
 - .5 Deaerator Controllers (Existing)
 - .7 Sensors and Actuators
 - .1 Calibration and testing of all new, modified, or re-connected sensors and actuators.
- .2 The Contractor shall submit the commissioning forms listed above to the Departmental Representative for review and approval prior to the start of commissioning. The Contractor or Departmental Representative may choose to request the inclusion of additional commissioning forms at any point during the construction or commissioning.

1.2 INSTALLATION/START-UP CHECK LISTS

- .1 Include the following data:
 - .1 Product manufacturer's installation instructions and recommended checks.
 - .2 Special procedures as specified in relevant technical sections.
 - .3 Items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.
- .2 Equipment manufacturer's installation/start-up check lists are acceptable for use. As deemed necessary by Departmental Representative supplemental additional data lists will be required for specific project conditions.
- .3 Use check lists for equipment installation. Document check list verifying checks have been made, indicate deficiencies and corrective action taken.
- .4 Use of check lists will not be considered part of commissioning process but will be stringently used for equipment pre-start and start-up procedures.

1.3 PRODUCT INFORMATION (PI) REPORT FORMS

- .1 Product Information (PI) forms compiles gathered data on items of equipment produced by equipment manufacturer, includes nameplate information, parts list, operating instructions, maintenance guidelines and pertinent technical data and recommended checks that is necessary to prepare for start-up and functional testing and used during operation and maintenance of equipment. This documentation is included in the BMM at completion of work.
- .2 Prior to Performance Verification (PV) of systems complete items on PI forms related to systems and obtain Departmental Representative's approval.

1.4 PERFORMANCE VERIFICATION (PV) FORMS

- .1 PV forms to be used for checks, running dynamic tests and adjustments carried out on equipment and systems to ensure correct operation, efficiently and function independently and interactively with other systems as intended with project requirements.
- .2 PV report forms include those developed by Contractor records measured data and readings taken during functional testing and Performance Verification procedures.
- .3 Prior to PV of integrated system, complete PV forms of related systems and obtain Departmental Representative's approval.

1.5 COMMISSIONING FORMS

- .1 Use Commissioning forms attached to verify installation and record performance when starting equipment and systems.
- .2 Strategy for Use:
 - .1 Contractor provides project-specific Commissioning forms from manufacturer with Specification data included, to complement commissioning forms attached to this section.
 - .2 Contractor will provide required shop drawings information and verify correct installation and operation of items indicated on these forms.
 - .3 Confirm operation as per design criteria and intent.
 - .4 Identify variances between design and operation and reasons for variances.
 - .5 Verify operation in specified normal and emergency modes and under specified load conditions.
 - .6 Record analytical and substantiating data.
 - .7 Verify reported results.
 - .8 Form to bear signatures of recording technician and reviewed and signed off by Departmental Representative.
 - .9 Submit immediately after tests are performed.
 - .10 Reported results in true measured SI unit values.
 - .11 Provide Departmental Representative with originals of completed forms.
 - .12 Maintain copy on site during start-up, testing and commissioning period.

Part 2 Products

2.1 Sample commissioning forms can be found on the following page.

Part 3 Execution

3.1 **NOT USED**

END OF SECTION

BURNER
Static Verification



REVISION #: _____

NAME: _____
 COMPANY: _____
 ADDRESS: _____

CUSTOMER: PWGSC
 PROJECT: SASKPEN BOILER CONTROLS
 FILE NUMBER: R.079836.001
 DATE: 04/09/2018

NAMEPLATE			
MANUFACTURER		EQUIPMENT NO.	
SERVICE		LOCATION	

BURNER	DETAILS	COMMENTS
MANUFACTURER		
MODEL NO.		
SERIAL NO.		
FIRING RATE (MBH)		
FUEL TYPE		
MOTOR (HP)		
VOLTAGE / PHASE / FREQUENCY		

BURNER	STATUS	COMMENTS
BOILER, BURNER, AND FLUE CLEAN AND FREE OF DEBRIS		
NO DAMAGE TO REFRACTORY OR COMBUSTION CHAIN		
NO DAMAGE TO FLUES, CHIMNEYS, AND BOILER JACKET		
FLAME DETECTOR		
MOUNTING PLATE		
SLEEVE POSITION		
GAS TRAIN		
- INSTALLED TO DRAWINGS / SHOP DRAWINGS		
- PIPE AND DEVICE SIZE CORRECT		
- HIGH AND LOW PRESSURE SWITCHES		
- AHJ INSPECTION COMPLETED		
- VENTS INSTALLED		
OIL TRAIN (COMPONENTS, SIZE, INSPECTION)		
- INSTALLED TO DRAWINGS / SHOP DRAWINGS		
- PIPE AND DEVICE SIZE CORRECT		
COMBUSTION AIR INLET		
PIPE INSULATION INSTALLED		
COMBUSTION MANAGER / CONTROL PANEL		
POWER SUPPLY CONNECTED		
ALL LABELS VISIBLE		
PRESSURE AND TEMPERATURE GAUGES INSTALLED		

BURNER
Static Verification



REVISION #: _____

NAME: _____
 COMPANY: _____
 ADDRESS: _____

CUSTOMER: PWGSC
 PROJECT: SASKPEN BOILER CONTROLS
 FILE NUMBER: R.079836.001
 DATE: 04/09/2018

STARTERS AND DISCONNECTS		
BOILER FLUID AT CORRECT LEVEL		
INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS		
BOILER SAFETIES - INSTALLATION AND OPERATION		
BURNER SET TO MANUFACTURER'S SPECIFICATIONS		
ALL SENSORS AND ACTUATORS CALIBRATED		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

BURNER

Start-Up



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

BURNER	STATUS	COMMENTS
PILOT BURNER FLAME		
MAIN BURNER FLAME		
VENT DAMPER OPERATION		
AIR PURGED FROM SYSTEM		
AIR PURGED FROM GAS PIPING		
GAS PIPING CHECKED FOR LEAKS		
OIL PIPING CHECKED FOR LEAKS		
BURNER FLAME SHAPE		
MANUFACTURER'S START UP CHECKLIST ATTACHED		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

BURNER

Functional Performance Testing



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

BURNER	STATUS	COMMENTS
TEST LOCAL CONTROLS AND INTERLOCKS		
TEST HIGH TEMPERATURE LIMIT		
TEST IGNITION SYSTEM SAFETY DEVICE		
TEST SAFETY SENSORS AND TRIPS		
ACTUATION AND COORDINATION OF FUEL AND AIR SENSORS VERIFIED		
ADJUSTMENT OF FLAME SHAPE		
TEST REMOTE MONITORING AND CONTROL THROUGH NETWORK		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

DEAERATOR LEVEL CONTROLLER

Static Verification



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

DEAERATOR LEVEL CONTROLLER	STATUS	COMMENTS
CONFIRM EXISTING CONTROLLER HAS BEEN CONNECTED TO CONTROL NETWORK		
ALL NEW WIRING ORGANIZED, PROTECTED, AND LABELLED		
GENERAL COMMENTS:		

POSITION/TITLE	SIGNATURE	DATE

DEAERATOR LEVEL CONTROLLER

Start-Up



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

DEAERATOR LEVEL CONTROLLER	STATUS	COMMENTS
TEST AND MONITOR CONTROL LOOP AT STARTUP		
TEST SAFETIES AND INTERLOCKS		
CONFIRM CONTROLLER CAN BE MONITORED AND CONTROLLED FROM OWS		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

DEAERATOR LEVEL CONTROLLER

Functional Performance Testing



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

DEAERATOR LEVEL CONTROLLER	STATUS	COMMENTS
TEST ALARMS AND ERROR MESSAGES ON CONTROLLER ARE RELAYED TO OWS VIA NETWORK		
TEST DATALOGGING CAPABILITIES THROUGH CONTROL NETWORK		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

DRUM LEVEL CONTROLLER

Start-Up



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

DRUM LEVEL CONTROLLER	STATUS	COMMENTS
TEST AND MONITOR CONTROL LOOP AT STARTUP		
TEST SAFETIES AND INTERLOCKS		
CAN BE MONITORED AND CONTROLLED FROM MASTER BOILER CONTROLLER AND OWS		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

DRUM LEVEL CONTROLLER

Functional Performance Testing



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

DRUM LEVEL CONTROLLER	STATUS	COMMENTS
TEST ALARMS AND ERROR MESSAGES ON CONTROLLER ARE RELAYED TO MASTER CONTROL PANEL AND OWS VIA NETWORK		
RECALIBRATE SENSORS, ACTUATORS, AND CONTROL LOOP GAIN AS NECESSARY TO OPTIMIZE START-UP		
TEST DATALOGGING CAPABILITIES THROUGH CONTROL NETWORK		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

ECONOMIZER TEMPERATURE CONTROLLER

Static Verification



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

ECONOMIZER TEMP CONTROLLER	STATUS	COMMENTS
INSTALLED AS PER DRAWINGS & SPECIFICATIONS		
INSTALLED AS PER MANUFACTURER'S INSTRUCTIONS		
CONNECTED TO CONTROL NETWORK		
ALL CONNECTED SENSORS AND ACTUATORS CALIBRATED (ATTACH ITEMIZED CHECKLIST)		
SETPOINTS ENTERED		
WIRING ORGANIZED, PROTECTED, AND LABELLED		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

ECONOMIZER TEMPERATURE CONTROLLER

Start-Up



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

ECONOMIZER TEMP CONTROLLER	STATUS	COMMENTS
TEST AND MONITOR CONTROL LOOP AT STARTUP		
TEST SAFETIES AND INTERLOCKS		
CAN BE MONITORED AND CONTROLLED FROM OWS		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

ECONOMIZER TEMPERATURE CONTROLLER

Functional Performance Testing



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

ECONOMIZER TEMP CONTROLLER	STATUS	COMMENTS
TEST ALARMS AND ERROR MESSAGES ON CONTROLLER ARE RELAYED TO OWS VIA NETWORK		
RECALIBRATE SENSORS, ACTUATORS, AND CONTROL LOOP GAIN AS NECESSARY TO OPTIMIZE START-UP		
TEST DATALOGGING CAPABILITIES THROUGH CONTROL NETWORK		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

LOCAL BOILER CONTROL PANEL

Static Verification



REVISION #: _____

NAME: _____
 COMPANY: _____
 ADDRESS: _____

CUSTOMER: PWGSC
 PROJECT: SASKPEN BOILER CONTROLS
 FILE NUMBER: R.079836.001
 DATE: 04/09/2018

LOCAL BOILER CONTROL PANEL	STATUS	COMMENTS
INSTALLED AS PER DRAWINGS & SPECIFICATIONS		
INSTALLED AS PER MANUFACTURER'S INSTRUCTIONS		
INSTALLED WITH ECONOMIZER TEMPERATURE CONTROLLER AND DRUM LEVEL CONTROLLER		
CONNECTED TO MASTER BOILER CONTROL PANEL AND CONTROL NETWORK		
CAN BE MONITORED AND CONTROLLED FROM MASTER BOILER CONTROL PANEL AND OWS		
ALL CONNECTED SENSORS AND ACTUATORS CALIBRATED (ATTACH ITEMIZED CHECKLIST)		
CONTROL STRATEGY STAGING CONFIGURED AS INDICATED ON DRAWINGS AND SPECS		
PANEL SECURLY MOUNTED		
WIRING ORGANIZED, PROTECTED, AND LABELLED		
POWER CONNECTED		
GENERAL COMMENTS:		

POSITION/TITLE	SIGNATURE	DATE

LOCAL BOILER CONTROL PANEL

Start-Up



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

LOCAL BOILER CONTROL PANEL	STATUS	COMMENTS
TEST BOILER AND BURNER START-UP PROCESSES		
ATTACH MANUFACTURER'S START-UP CHECKLIST		
TEST SAFETIES AND INTERLOCKS		
TEST LOCAL AUDIBLE ALARM		
TEST TO ENSURE BOILER CAN OPERATE INDEPENDENTLY OF MASTER BOILER CONTROL PANEL AND CONTROL NETWORK		
TEST TO ENSURE BOILER CAN BE MONITORED AND CONTROLLED REMOTELY VIA MASTER BOILER CONTROL PANEL AND OWS		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

LOCAL BOILER CONTROL PANEL

Functional Performance Testing



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

LOCAL BOILER CONTROL PANEL	STATUS	COMMENTS
TEST ALARMS AND ERROR MESSAGES ON LOCAL BOILER CONTROL PANEL ARE RELAYED TO MASTER BOILER CONTROL PANEL AND OWS		
RECALIBRATE SENSORS AND ACTUATORS AS REQUIRED		
TEST DATALOGGING CAPABILITIES THROUGH MASTER CONTROL PANEL AND CONTROL NETWORK		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

MASTER BOILER CONTROL PANEL

Start-Up



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

MASTER BOILER CONTROL PANEL	STATUS	COMMENTS
TEST LEAD/LAG OPERATION AND BOILER MODULATION		
TEST SAFETIES AND INTERLOCKS		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

MASTER BOILER CONTROL PANEL

Functional Performance Testing



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

MASTER BOILER CONTROL PANEL	STATUS	COMMENTS
TEST ALARMS AND ERROR MESSAGES ON MASTER CONTROL PANEL ARE RELAYED TO OWS VIA NETWORK		
TEST DATALOGGING CAPABILTIES THROUGH CONTROL NETWORK		
TEST LOCAL AUDIBLE ALARM		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

MODBUS MASTER BOILER CONTROLLER / CONTROL NETWORK

Static Verification



REVISION #: _____

NAME: _____
 COMPANY: _____
 ADDRESS: _____

CUSTOMER: PWGSC
 PROJECT: SASKPEN BOILER CONTROLS
 FILE NUMBER: R.079836.001
 DATE: 04/09/2018

MODBUS MASTER CONTROLLER / CONTROL NETWORK	STATUS	COMMENTS
INSTALLED AS PER DRAWINGS & SPECIFICATIONS		
INSTALLED AS PER MANUFACTURER'S INSTRUCTIONS		
ATTACH MANUFACTURER'S START-UP CHECKLIST		
CONNECTED TO CONTROL NETWORK AND ANCILLARY CONTROLLERS AND SENSORS		
WIRING ORGANIZED, PROTECTED, AND LABELLED		
DATA LOGGING FUNCTIONALITY CONFIGURED		
ALL CONTROLS EQUIPMENT CONNECTED TO ESSENTIAL POWER SUPPLY OR UPS BACKUP		
GENERAL COMMENTS:		

POSITION/TITLE	SIGNATURE	DATE

MODBUS MASTER BOILER CONTROLLER / CONTROL NETWORK

Start-Up



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

MODBUS MASTER CONTROLLER / CONTROL NETWORK	STATUS	COMMENTS
CONFIRM NETWORK OPERATION VIA OWS		
OPTIMIZE NETWORK SPEEDS AND OWS PARAMETER REFRESH RATES		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

MODBUS MASTER BOILER CONTROLLER / CONTROL NETWORK

Functional Performance Testing



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

MODBUS MASTER CONTROLLER / CONTROL NETWORK	STATUS	COMMENTS
RESOLVE ALL ISSUES IDENTIFIED IN STATIC VERIFICATION AND START-UP		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

OPERATOR WORK STATION

Start-Up



REVISION #: _____

NAME: _____
 COMPANY: _____
 ADDRESS: _____

CUSTOMER: PWGSC
 PROJECT: SASKPEN BOILER CONTROLS
 FILE NUMBER: R.079836.001
 DATE: 04/09/2018

OWS	STATUS	COMMENTS
CONFIRM THE FOLLOWING DEVICES, AND CONNECTED SENSORS, CAN BE MONITORED AND CONTROLLED REMOTELY FROM THE OWS:		
- Boiler 1 Local Control Panel		
- Boiler 2 Local Control Panel		
- Boiler 3 Local Control Panel		
- Boiler 1 Economizer Temperature Controller		
- Boiler 2 Economizer Temperature Controller		
- Boiler 3 Economizer Temperature Controller		
- Master Boiler Control Panel		
- Boiler 1 Drum Level Controller		
- Boiler 2 Drum Level Controller		
- Boiler 3 Drum Level Controller		
- Deaerator Level Controller 1		
- Deaerator Level Controller 2		
- Pump Controller (Feedwater and Hotwell Pumps)		
- Steam Flow (x5)		
- City Water Pressure		
- Deaerator Pressure		
- Instrument Air Pressure		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

OPERATOR WORK STATION

Functional Performance Testing



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

OWS	STATUS	COMMENTS
TEST ALARMS AND ERROR MESSAGES ON ALL CONNECTED PANELS AND CONTROLLERS ARE RELAYED TO OWS VIA NETWORK		
TEST DATALOGGING CAPABILITIES THROUGH CONTROL NETWORK		
TEST AUDIBLE AND VISUAL ALARMS ON OWS		
TEST AUDIBLE AND VISUAL ALARMS ON NETWORK		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

PUMP CONTROLLER

Static Verification



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

PUMP CONTROLLER	STATUS	COMMENTS
INSTALLED AS PER DRAWINGS & SPECIFICATIONS		
INSTALLED AS PER MANUFACTURER'S INSTRUCTIONS		
ATTACH MANUFACTURER'S START-UP CHECKLIST		
CONNECTED TO CONTROL NETWORK		
CAN BE MONITORED AND CONTROLLED REMOTELY FROM OWS		
FEEDWATER AND HOTWELL PUMPS CONNECTED		
WIRING ORGANIZED, PROTECTED, AND LABELLED		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

PUMP CONTROLLER

Start-Up



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
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FILE NUMBER: R.079836.001
DATE: 04/09/2018

PUMP CONTROLLER	STATUS	COMMENTS
CONFIRM IN EVENT SIGNAL WITH CONTROL NETWORK IS LOST, CONTROLLER MAINTAINS PUMP OPERATION ACCORDING TO LAST SIGNAL RECEIVED UNTIL CONNECTION IS REGAINED		
CONFIRM PUMP STATUS MONITORING AT OWS		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

PUMP CONTROLLER

Functional Performance Testing



REVISION #: _____

NAME: _____
COMPANY: _____
ADDRESS: _____

CUSTOMER: PWGSC
PROJECT: SASKPEN BOILER CONTROLS
FILE NUMBER: R.079836.001
DATE: 04/09/2018

PUMP CONTROLLER	STATUS	COMMENTS
ADDRESS ISSUES IDENTIFIED IN STATIC VERIFICATION OR START-UP CHECKS		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

Part 1 General

1.1 TRAINEES

- .1 Trainees: personnel selected for operating and maintaining this facility. Includes Facility Manager, building operators, maintenance staff, security staff, and technical specialists as required.
- .2 Trainees will be available for training during later stages of construction for purposes of familiarization with systems.

1.2 INSTRUCTORS

- .1 Contractor to provide instruction on the following:
 - .1 Start-up, operation, shut-down of equipment, components and systems installed or changed through this project.
 - .2 Control features, reasons for, results of, implications on associated systems of, adjustment of set points of control and safety devices.
 - .3 Instructions on servicing, maintenance and adjustment of systems, equipment and components.

1.3 TRAINING OBJECTIVES

- .1 Training to be detailed and duration to ensure:
 - .1 Safe, reliable, and effective operation of systems in normal and emergency modes under all conditions.
 - .2 Effective on-going inspection, measurements of system performance.
 - .3 Proper preventive maintenance, diagnosis and trouble-shooting.
 - .4 Ability to update documentation.
 - .5 Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

1.4 TRAINING MATERIALS

- .1 Instructors to be responsible for content and quality.
- .2 Training materials to include:
 - .1 "As-Built" Contract Documents.
 - .2 O&M Manual.
- .3 Departmental Representative will review training manuals.
- .4 Training materials to be in a format that permits future training procedures to same degree of detail.

1.5 SCHEDULING

- .1 Training will be included in the Commissioning Schedule created by the Contractor.

- .2 Deliver training during regular working hours,
- .3 Training to consist of two sessions, each covering the same content, each 4 hours in length. All trainees will attend one of two sessions.
- .4 Training to be completed prior to acceptance of facility.

1.6 RESPONSIBILITIES

- .1 Contractor is responsible for preparation, coordination, and implementation of training.
- .2 Upon completion of training, provide written report, signed by Instructors, witnessed by Departmental Representative.

1.7 TRAINING CONTENT

- .1 Training to include demonstrations by Instructors using the installed equipment and systems.

Part 2 Products

2.1 NOT USED

Part 3 Execution

- 3.1 Record one training session on video and include the video in the operations and maintenance manual. The video shall be stored in the manual on a flash drive.

END OF SECTION