

ADDITIONAL SPECIFICATION

SC GENERAL DECOMMISSIONING, TESTING AND COMMISSIONING PROCEDURES

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SC 01 SCOPE

This specification encompasses all aspects of the repairs/upgrade of systems and services that form part of an installation/ sub-installation, including the factory and on-site testing, decommissioning, installation and commissioning of all equipment, instrumentation and materials reconditioned, supplied and installed as part of an installation as defined in Additional Specification SA: General Maintenance.

The specified procedures are the minimum requirements to be supplemented by various technical and particular specifications in this document. These requirements shall apply to all commissioning work scheduled as part of the initial repair, upgrade and/or new installation work on installations/ sub-installations, as well as commissioning work that is part of the routine preventive and corrective maintenance.

SC 02 PHASED REPAIRS AND UPGRADING OF THE INSTALLATION/ SUB-INSTALLATION

When an installation/ sub-installation consists of parallel systems or components, the complete installation/ sub-installation and all its components shall be repaired and/or upgraded without taking the complete installation/sub-installation out of commission at any time, unless otherwise specified in the Technical Specifications.

In order to schedule the repairs/upgrade of an installation/ sub-installation, all work shall be done in phases as specified in the Technical Specifications and illustrated in detail on the Drawings. Repairs/ upgrade of each part shall terminate with the successful reconditioning of that part.

Each part of the system shall be decommissioned and recommissioned in the sequence specified in the Technical Specifications and on the Drawings.

The Contractor shall install all the necessary temporary specials, spool pieces, supporting frames and brackets to provide a functional link between each repaired and upgraded part of the system and the part of the installation that has not yet been repaired and upgraded during recommissioning. Electrical and instrumentation Contractors and subcontractors shall ensure that the system remains operational as specified, using either existing or newly installed instruments, cables and controls.

Payment is based on the successful recommissioning of a specific part of the installation.

SC 03 **DETAILED COMMISSIONING PROGRAMME**

No work of any kind on any part of the existing installation shall take place prior to the Engineer's approval of a detailed commissioning programme. This programme shall be submitted in addition to the general programme for planning and monitoring contract progress, at least two weeks prior to any programmed shutdown. The programme shall be the coordinated product of the Engineer and the User Client. Commissioning programmes shall take all process requirements into account. The detailed commissioning programme shall indicate all actions necessary for:

- (a) Decommissioning
- (b) Recommissioning of parts of the installation
- (c) Commissioning of the installation as a whole.

All work deemed necessary for practical completion of the installation shall be indicated on the commissioning programme.

The programme shall indicate the milestones to be achieved before shutdown and decommissioning as activities of zero duration, all of which shall be prerequisites linked to the "start" of decommissioning.

The following specific actions shall be included in the programme, clearly indicating the time allowed for:

- (a) Communication, including the time for confirmation of the official shutdown;
- (b) Draining parts of the installation to sumps, where available, or to other storage facilities provided by the Contractor;
- (c) Installation of temporary blanked flanges or other means of isolation where necessary;
- (d) Partial decommissioning and removal of existing material and equipment to perform work, including protection of pipework against hot work, cutting into pipework, loosening bolts, flanges and all other work necessary for recommissioning;
- (e) Installation of temporary functional links (pipe specials) between any two parts of the installation;

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- (f) Each individual field weld, subject to the Engineer's approval;
- (g) Non-destructive testing of materials, for manufacturing/construction quality and for producing test results;
- (h) Installation of all instruments and their connection to SCADA systems;
- (i) Installation and connection of all power cables;
- (j) De-aeration of all pipe sections;
- (k) Communication between the Contractor, the Engineer, the Employer and the User Client;
- (l) Start-up of the complete system, indicating start-up procedures.

Inspection of the prefabricated installation, testing of all equipment prior to final commissioning, pressure testing and non-destructive testing shall be clearly scheduled in the project progress programme.

Day 30 tests and instruction/training sessions with the User Client shall be scheduled in the project progress programme.

SC 04 COMMISSIONING COMMUNICATION CHANNELS

The Contractor shall communicate with the User Client's operating and maintenance managers via the Engineer to finalise start-up after decommissioning in accordance with the specified procedures.

The following key parties shall be involved before and during shutdown and decommissioning of any part of the system:

Contractor:	Site Agent
Engineer:	Resident Engineer
Employer:	Representative of Area Manager
User Client:	Operating and Maintenance Manager.

SC 05 COMMISSIONING RISK CONTROL AND PENALTIES

- (a) The safety instructions stipulated by the Occupational Health and Safety Act, 1993 (Act 85 of 1993) shall be adhered to at all times.
- (b) The Contractor shall not be allowed to work on any part of the installation without obtaining a commissioning check permit on the day of shutdown. A typical example of a commissioning check permit is included in this document, referring to the minimum required milestones to be achieved prior to decommissioning.

- (c) Payment reductions for exceeding the maximum permissible down-time during maintenance shall apply as stipulated in the General Conditions of Contract and the Contract Data. This stipulation does not include shutdowns during programmed routine preventive maintenance work.

SC 06 DELAYS OF SCHEDULED SHUTDOWNS

Specific dates on which an installation shall be shut down for decommissioning shall be finalised during coordination meetings of all the parties involved, including the Engineer, the Employer, the User Client and the Contractor.

Although a date for each shutdown will be scheduled at the coordination meetings, the actual date of the shutdown shall be determined by the process requirements and user demands, allowing for a window of seven (7) calendar days from the date of the planned shutdown.

Prospective bidders shall make allowances in their bid rates for the shutdown to occur at any time during this seven-day period. No additional payment shall be due if the shutdown occurs within this seven-day period.

If the Contractor fails to commence with the shutdown and decommissioning of the installation within the scheduled period, all additional costs arising from the shutdown at a later stage shall be for the Contractor's account.

SC 07 MATERIAL AND EQUIPMENT PROCUREMENT AND PROTECTION

It is the responsibility of the Contractor to ensure the functionality of all units of new equipment prior to decommissioning, before installation of any specific part of the system. If the equipment, whether free-issued or not, does not conform to the functionality specifications during pre-installation testing, the Contractor shall notify the Engineer in writing without delay.

SC 08 TESTING OF EQUIPMENT PRIOR TO RECOMMISSIONING

The equipment shall be tested for functionality after pre-installation of equipment in parts of the installation.

- (a) The Contractor shall inform the Engineer well in advance of his intention to perform the first tests and start-up of equipment in order to allow a representative of the Engineer to witness the tests. The extent of all precommissioning tests and checks shall be agreed with the Engineer prior to commencement.
- (b) The Contractor shall first conduct his own tests of the equipment. When he is satisfied that the equipment complies with the specifications, he shall notify the Engineer that he is ready for the official tests on completion. The Contractor shall not conduct an official test without the Engineer's presence or approval. All equipment shall conform to the specified requirements.
- (c) Before starting up any part of the installation or filling the tanks and sumps with liquid, the Contractor shall clean out the tanks, pipes, fittings, equipment or

structures and, if necessary, make arrangements with other Contractors to remove their building rubble from the structures, check that all safety devices and alarms have been set and activated, all nuts have been tightened correctly, that all the equipment is complete and ready for start-up, that the plant has been installed correctly, and that copies of the operating manuals have been handed to the Engineer.

- (d) The Contractor shall start up each section of equipment after ensuring that oil fillings, lubrication, vibration monitoring, cable termination and so on have been correctly completed. He is also responsible for the first refilling of all lubricating oils and for adjusting the plant to operate according to the specifications. Before any equipment is started or energised, the Contractor shall ensure that it is safe in terms of the personnel and equipment on the site to do so. The Contractor's tendered rates and sums shall allow for these costs.

All equipment shall be tested according to the relevant specifications that form part of this document.

No shutdown or decommissioning of any part of the system shall take place unless all the equipment to be installed have been tested by the Contractor and approved by the Engineer.

SC 09 **TESTING OF MATERIAL AND EQUIPMENT SPECIFICATIONS AND WORKMANSHIP**

All results of the required non-destructive, precommissioning and manufacturing testing shall be submitted to the Engineer well in advance of testing the equipment on recommissioning. All such test results shall be submitted before Day 1 commissioning tests and no certificate of practical completion shall be issued prior to receipt of the required test results.

SC 10 **DECOMMISSIONING**

The decommissioning period shall commence on the instant of the entire system shutdown. The recommissioning period shall start in parallel with decommissioning.

Shutdown and decommissioning shall not proceed without compliance with all the milestones in the detailed commissioning programme. The list of milestones in this document is not complete but indicates the minimum requirements. Milestones to be achieved prior to shutdown and decommissioning may be added to the programme at the Engineer's discretion.

The Contractor is responsible for the safe decommissioning of all material, equipment, components and instrumentation to avoid damage to parts or components of the installation.

SC 11 RECOMMISSIONING, COMMISSIONING AND COMPLETION OF INSTALLATIONS**SC 11.01 RECOMMISSIONING**

Recommissioning means the commissioning of all sections or systems that form part of the installation to meet the required functional specifications for the individual section or system prior to commissioning of the repaired and upgraded installation.

The Contractor is responsible for the recommissioning of all parts of the system and he shall perform the tasks listed below.

- (a) Prior notice shall be given to and proper arrangements shall be made for recommissioning with the Employer, the Engineer, the User Client and the suppliers of equipment that is affected by recommissioning and testing.
- (b) If plant and equipment supplied by others are to be commissioned, the supplier's specific permission together with all requirements related to commissioning shall be obtained prior to recommissioning without in any way altering the General Conditions of Contract and the Contract Data with reference to the Contractor's liability in terms of defects.
- (c) The new and reconditioned parts of the installation shall be thoroughly inspected by a responsible representative of the Contractor to ensure that manufacture/construction and installation work have been completed according to the specifications.

SC 11.02 COMMISSIONING AND COMPLETION OF REPAIRS, UPGRADING AND/OR NEW WORK

Commissioning means commissioning of the repaired and upgraded installation as a whole to perform in perfect working order.

- (a) The commissioning period for each installation as a whole:
 - (i) Commences with the Day 1 tests of the complete repaired and upgraded installation;
 - (ii) Includes commissioning of all sections and systems that have been recommissioned prior to the Day 1 tests;
 - (iii) Includes training of the User Client's operating personnel and the maintenance teams;
 - (iv) Terminates with a Day 30 test in compliance with the commissioning report.
- (b) The purpose of the Day 1 tests is to ensure that:
 - (i) The electronic, electrical and mechanical equipment and materials are functional and in perfect working order with respect to each other and the installation as a whole;

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- (ii) The commissioning period, including training, commences on successful completion of the Day 1 tests;
 - (iii) The Contractor is entitled to a certificate of practical completion for the repairs and upgrading of the installation on successful completion of the Day 1 tests;
 - (iv) The Contractor becomes responsible for maintenance of the installation and is entitled to performance-based payments in compliance with Additional Specification SA: General Maintenance.
- (c) Commissioning shall be undertaken over a trouble-free period up to Day 30. During this period the Contractor shall train the User Client's operators and his maintenance team for operating and maintaining the installation. This training shall allow for all possible operational conditions, including emergency conditions, the correct servicing of every part, the type of oil or grease to be used, and similar tasks. The training shall take place by means of demonstrations, and the operating and maintenance manuals shall be referred to for this purpose.
- (d) Day 30 commissioning tests shall be performed thirty calendar days after the successful completion of the Day 1 tests. The commissioning period of the installation terminates upon the successful completion of the Day 30 tests.
- (e) The Contractor shall conduct all the tests required to satisfy the Engineer that the installation is performing according to specification, and shall make allowance for these tests in his bid rates and prices. These tests shall be conducted to certify that the installation, as repaired, upgraded and installed, is in perfect working order in terms of the specified functional requirements. The Contractor shall note that all equipment is to be tested as part of an installation, where appropriate, and will not be passed if all protection devices, interlocking with other equipment, etc, are not fully functional.
- (f) The Engineer shall provide commissioning sheets to the Contractor at least three weeks before the commissioning period commences, for all the equipment supplied, reconditioned and installed by the Contractor. The Contractor shall complete the commissioning sheets during the commissioning period and all items listed shall be entered. No completion certificate will be issued for an installation of which the equipment has incomplete commissioning reports. Information that is not available or applicable, or instances where certain tests have not been carried out, are subject to the Engineer's decision.
- (g) Commissioning of the plant (which includes the thirty days between the Day 1 and Day 30 tests) includes operating under conditions that adequately prove that all the specifications have been met. All safety devices, standby plant, automatic controls and protection devices shall be adequately tested for reliability and correct functioning. The Contractor may be called upon to repeat testing during the maintenance period if the performance of the equipment is suspected to be substandard. Costs related to such tests shall be for the Contractor's account and shall comply with the specified requirements. Copies of updated commissioning reports shall be provided to the Engineer within two days after a test has been performed.

- (h) The Contractor is responsible for providing all labour and materials (including testing equipment) during the commissioning period and shall carry out all the servicing and adjustments to ensure that the installation operates as specified. Valid calibration certificates shall be available for all testing equipment on the site during the commissioning period.
- (i) Programmes for the Day 1 tests, Day 30 tests and instruction/training sessions with the User Client's operators and maintenance team shall be prepared by the Contractor and submitted to the Engineer at least two weeks before the commissioning period commences. The Contractor shall provide weekly updates of these schedules for the duration of the commissioning period.
- (j) The Contractor shall note that if any equipment fails during the commissioning period, the equipment shall be repaired or replaced by the Contractor, and testing and commissioning shall commence from scratch.
- (k) Successful commissioning of an installation entitles the Contractor to a certificate of completion for the installation.

SC 12 MEASUREMENT AND PAYMENT

SC.12.01 DECOMMISSIONING AND REMOVING PARTS OF THE INSTALLATION/ SUB-INSTALLATION..... Unit: sum

The unit of measurement shall be a sum.

The sum bid shall include full compensation for all actions and labour required for shutdown and decommissioning of the entire installation as specified to enable decommissioning and removal of parts of the installation as listed in the Bill of Quantities.

The sum bid shall include full compensation for the decommissioning and removal of the parts and components of an installation as listed individually in the Bill of Quantities, including actions and/or costs resulting from such work, to enable the recommissioning of parts of the repaired and/or upgraded installation.

The sum bid shall include full compensation for final dismantling of decommissioned materials and equipment and the removal of all such items to stores on site, as directed by the Engineer.

SC.12.02 COMMISSIONING AND TESTING OF PARTS OF THE INSTALLATION/ SUB-INSTALLATION Unit: sum

The unit of measurement shall be a sum.

The sum bid shall include full compensation for commissioning and testing parts of the installation to be operational while still incomplete in relation to the entire repaired and/or upgraded system or installation.

Separate payment items shall be billed for separate parts of the system.

SC.12.03 COMMISSIONING AND TESTING OF THE INSTALLATION/ SUB-INSTALLATION Unit: sum

The unit of measurement shall be a sum.

The sum bid shall include full compensation for commissioning the, repaired, upgraded and/or new installation/sub-installation as a whole and for all costs and expenses related to labour, removal, repair, reinstallation and testing of material and equipment during the commissioning period for each part of the installation. The sum bid shall include full compensation for the final commissioning and testing, including Day 1 and Day 30 tests, of all parts and components of the installation to the specified functional condition.

Payment shall be based on successful completion of the Day 30 tests.

**SC.12.04 PROVISION FOR SAFETY AND HOT WORK REQUIREMENTS
DURING SHUTDOWN Unit: number**

The unit of measurement shall be the number of shutdowns during which all the required safety and hot work requirements are provided.

The bid rates shall include full compensation for all the required safety and hot work requirements and arrangements in accordance with the specifications during a shutdown period, including all labour, personnel, equipment, materials and consumables required.

SC 13 APPOINTMENT OF AN INDEPENDENT COMMISSIONING AGENT (CxA)

An independent Commissioning Agent (CxA) shall be appointed to develop and coordinate the execution of a detailed testing and commissioning plan, which includes observing and documenting all systems performance to ensure that the systems are functioning in accordance with the baseline design requirements and the contract documents. The CxA will not be responsible for design or general construction scheduling, cost estimating, or construction management, but may assist with problem-solving or resolving non-conformance issues or deficiencies.

Commissioning SPECIFICATION

Commissioning is a process designed to verify that systems operate according to the owner's project requirements and/or basis of design.

Objectives

The objective of the commissioning process is to provide documented confirmation that the installation fulfils the functional and performance requirements of the Client and Operators.

It is necessary to review the basis of design documents detailing the system function, performance, and maintainability requirements, verify and document compliance with these criteria throughout construction, start-up, functional and integrated testing periods.

The results shall be presented in a logical manner for acceptance by the Client/Engineer for inclusion in the Operation and Maintenance (O&M) manuals, and to align training on system operation with the results of the commissioning process to ensure the facility is operated as intended.

Commissioning Outcomes

Project Delivery

Delivery of facilities which meet the design intent.

Minimise re-work or duplication of work. Do it right 1st time

Testing and Verification

Robust testing, verification and certification of systems and components to ensure effective operation and conformance with design.

Health and Safety

Excellent safety performance without harm to the environment or personnel

Documenting

Capturing of performance data and quality control processes to be used at a later date.

Consistent reporting of status and progress is vital

Training

Build competence of Operations Team by inclusion in commissioning activities.

Handover

Handover of facilities to Operations Team with detailed Operational Readiness

Documentation as well as Standard and Emergency Operating Procedures

Commissioning plan

The Commissioning Plan (CxP) outlines the execution of the commissioning process.

This plan provides guidance to distinguish and define the handover between execution of construction phase commissioning (Levels 1 to 3) and the acceptance phase of the project commissioning (Levels 4 and 5).

As part of the close out of the Level 3 commissioning step the below information needs to be provided:

Confirmation letter L1-L3 documents are complete and accepted by the CxA.

Calibration certificates of all measuring equipment are available.

Confirmation letter from the contractor the deep cleaning has been finalized.

Contractor to provide redline drawings update of all construction documents.

Contractor to submit the O&M and System manual.

The Operator Training Program records are available for all systems.

Spare parts schedule and plant replacement strategy available.

CE certificates of all equipment available.

Warranties of all equipment available.

Fire stopping certification available.

SLD's electrical and mechanical on the walls of relevant plant rooms.

Logs of all firmware versions are provided in the manual.

Logs of all equipment software, alarm and setpoints settings are provided in the manual.

Scope of Commissioning

The following sub-installations will be commissioned from Level1 Factory Acceptance Tests (FAT) up to Level 5 Integrated System Testing (IST):

Sub-Installation 1: CCTV Surveillance System

Sub-Installation 2: Modular Containerised Data Centre (MCDC) and Hyper-Converged Infrastructure (HCI)

Sub-Installation 3: Access Control System

Sub-Installation 4: Cell phone Detection, Intercom and Public Address Systems

Sub-Installation 5: Security Electrical Services

Sub-Installation 6: Sally Port and Guard House

Sub-Installation 7: Dividing Fence System and Walkway

Sub-Installation 8: Outer and Inner Security Fencing Systems

COMMISSIONING PROCESS

Level 1: Factory Acceptance Testing

Carried out under strict conditions at equipment manufacturer or vendor factory to ensure system integrity and correct limitations.

Product factory testing and verification to ensure compliance with manufacturers' specifications, ratings and characteristics.

Will include owner defined functional, performance or aesthetic requirements

Component certifications or documentation

This will cover submittal reviews and factory witness testing.

Factory witness testing will include mock-ups of equipment or systems in controlled environments, at the manufacturer or vendor's factory.

Testing in this environment makes it easier and less expensive to find and fix design and implementation issues with equipment and software.

It also allows asynchronous testing of many different systems while the site itself is still under construction, aiding in overall timeline efficiency

Level 2: Site Acceptance Testing

Once the equipment has passed factory acceptance testing and it has been delivered to site, it then needs to undergo site acceptance testing.

Inspection, verification or tests performed on the products upon delivery to the site.

Equipment is inspected to ensure compliance with all design criteria, is not damaged, and that there is a proper storage plan in place.

The inspection is undertaken by the Commissioning Agent.

Test documentation for quality auditing purposes, including method statements and schematics, are also included.

This is to ensure that the equipment brought to the site meets the end user's specifications before it enters the facility

Ensure the products delivered match those purchased and tested during the FAT and have not been damaged or altered during shipment

Level 3: Installation and Verification

Covers installation inspections and verification, sometimes referred to as pre-functional testing. This is the inspection of the installation of the equipment only.

Site inspections and certifications to document that installation is done as per design, verifying compliance with the specifications, maintainability, manufacturer's installation requirements and client directives.

The contractor and commissioning agent work together to determine if the equipment was installed correctly and is in compliance with industry requirements and regulations.

Both the contractors and commissioning agent will verify that all equipment is installed properly, and that installation meets design and operational standards.

This is the first time the equipment is turned over and checked for functionality.

Equipment is started for the first time to check proper, independent operation. Testing is repeated after corrections are made to any equipment that fails testing

Energisation and start-up of equipment.

Level 4: Functional Testing Phase

Functional performance testing will be conducted to either individual components or equipment, or tightly coupled components and equipment.

Demonstration that related components, equipment and ancillaries of a defined system operate and function as designed.

Each control loop is checked, actual operation is compared to designed sequences of operation, and performance is observed. Setpoint adjustments may be made as necessary. Performance of monitoring and control functions

Includes isolation for maintenance, emergency and failure scenarios, verification of settings, safeties and capacities

Operational issues are uncovered during this phase.

This level of commissioning will involve more stakeholders, disciplines, and entities working together than other phases, at least with respect to testing.

Level 5: Integrated System Testing

Integrated System Testing demonstrates the performance of interrelated components and systems of the facility as a whole against all design criteria.

Systems are operated in various modes to demonstrate proper response to equipment failures and utility problems.

It's at this point where the response from all systems must be proven to work together in unison and prevent any interruptions to the operation of the facility.

Verify that system, holistically responds as designed to expected and unexpected anomalies.

Commissioning Issue Register Log (IRL)

Updated and circulated after each commissioning activity L1-L5

Centrally managed and controlled

Updated and closed out proactively.

Recommended L1-L3 → Main Contractor. Submit weekly commissioning agent and project management team

Recommended L4-L5 → CxA to submit to project management team and client.

L4-L5 will not proceed without submission and signoff of a L1-L3 IRL.

Level 4 commissioning will not advance to Level 5 without the submission, signoff and acceptance of closed-out items on the L4 IRL

Commissioning Documentation

L0-Design	
Quality Assurance & Quality Control (QAQC) Plan	Contractor
Safety Plan	Contractor
Commissioning Schedule	Contractor
Commissioning Equipment List	Contractor
Design Review Reports	Commissioning Agent
Drawings and Documents	Engineer
L1-Factory Acceptance Tests (FAT)	
FAT Schedule	Contractor
L1 Test Scripts	Contractor
L2 QAQC	
Co-ordination Study	Engineer
Arc Flash Study	Engineer
L2 Electrical Testing Plan	Contractor
LOTO Plan	Engineer
Pre-Energization Plan	Engineer
L2 Commissioning Scripts	Contractor
L3 Startup	
Startup Plan	Engineer

Load Bank Plan	Commissioning Agent
Test Equipment	Contractor
L3 Commissioning Scripts	Contractor
Elec 3rd Party Tests, International Electrical Testing Association for Acceptance Testing Specification (NETA ATS)	Contractor
Mech 3rd Party Tests, Testing, Adjusting and Balancing for HVAC Systems - (TAB)	Contractor
L3 IRL	Commissioning Agent
L4 FPT	
Commissioning Implementation Plan	Commissioning Agent
Load Bank Plan	Commissioning Agent
Test Equipment	Contractor
L4 Commissioning Scripts	Commissioning Agent
L4 Test Reports and Test Data	Commissioning Agent
L4 IRL	Commissioning Agent
L5 IST	
L5 IST Plan	Commissioning Agent
L5 Commissioning Scripts	Commissioning Agent
L5 Test Reports and Test Data	Commissioning Agent
L5 IRL	Commissioning Agent
L6 Handover	
Acceptance Docs	Engineer
Snag Closeout	Engineer
IRL Consolidated	Commissioning Agent
Final Commissioning Report	Commissioning Agent
Training	Contractor
Manuals	Contractor

OPERATIONAL READINESS

Operational Readiness is a process designed to effectively handover to the Client a site fully ready for operations activities. These documents are supplement to the general hand over requirements (occupation certificate, CoC's, etc.) and the requirements stipulated in the project specifications and other contract documents.

These requirements are a prerequisite to the works achieving practical completion. The documents required are detailed in the section to follow:

Mandatory Items to be supplied:

Critical Spares to be purchased, onsite and available

All Emergency Response equipment to be purchased, onsite and available. This includes: First Air Boxes, Oil Spill Kits, and Emergency Apparel cabinets

All Mechanical, Electrical and Electronic schematics

All Equipment O&Ms (soft and hard copies)

All support contacts

All emergency supplier contact information to be in place

Full MEP and integrated control training to take place between IST and Practical Completion as per approved Training Specification

Signed off training register.

Operational readiness documents approved and in final version (soft and hard copies)

Laminated process flow and schematic diagrams to be placed in close proximity of prospective equipment.

Site Configuration Procedure

A documented description of the normal configuration of the site.

This should include all documentation related to the design, commissioning and studies that describe the normal configuration of the site.

This sets the initial conditions for the execution of a SOP or MOP.

To be provided prior to handover

Standard Operating Procedure

Integrated system(s) SOP (Standard Operating Procedure) intended to be overarching document which provides high level control and policy around the change of state of high risk components of the integrated infrastructure and control philosophy of which includes: Risk Assessment, Step by step method statement to complete each change, process flows, procedure overview, terminology, Scope & Applicability Quality checks, fail over procedures and roll back plans

Method of Procedure

MOP (Method Of Procedure) documents the steps required to execute a particular portion of an SOP, and will include:

Document scope, Prerequisites, Tasks and sequence of tasks

Emergency Operating Procedure (EOP)

Includes detailed written instructions which must be carried out sequentially when an abnormal event occurs.

End to end energisation from complete building black out through to system re-energisation post black out

To indicate the systematic sequential start-up of all plant and the dependency of plant on each other during the start-up process.

Environmental impacts, leaks, floods, etc.

A number of 'what if' scenarios

EOPs will include: Generators, Manual energisation, generator supply off line, static switching, UPS systems, HVAC units, Fire alarm action, isolating electrical supply in event of fire or flood, chilled water leaks, flood recovery, fire recovery, fuel leaks.

Experience required:

- At least 10 years' experience in Integrated Security System maintenance, operation, construction and/or commissioning
- At least 10 years of construction/commissioning experience with new build projects of a similar nature
- At least 10 years of experience with electrical and mechanical Test Equipment
- Proven understanding of Integrated Security System (ISS) and sub-systems in a Correctional Facility or similar environment, with focus on :
 - Construction Quality Assurance/Quality Control
 - Design Review
 - Factory Acceptance Tests/Factory Witness Tests observation
 - Quality Assurance/Quality Control checks
 - Functional Performance Testing
 - Integrated Systems Testing
 - Equipment Operations

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- Warranty/ Seasonal Testing
 - Maintenance Development
 - Develop and write detailed Commissioning Test Scripts
 - Issue identification and resolution management
- ECSA registration is preferable
- Commissioning Certification in the relevant field
- The Independent Commissioning Agent shall be appointed for a duration of up to 200 hours
- The Engineer shall check and validate the independency of The Independent Commissioning Agent
- The Independent Commissioning Agent shall be approved by the Engineer upon validation