# COMMISSIONING PLAN

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| For: | Transnet Port Terminals (TPT), Saldanha |
| Project Name: | FEL 3 Saldanha Bulk Terminal Equipment Refit: Stacker Reclaimers, Shiploaders and Tippler 2. (Phase-4: Stacker Reclaimer 3) |
| Project Number: | Z.5200160 |

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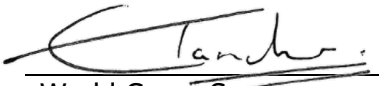

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## 1. PURPOSE

The purpose of this Commissioning Plan is to describe a standard approach to the commissioning management process, define the various stages of commissioning. This Commissioning Management Functional Execution Plan is directed mainly at Mechanical and Electrical Works. Structural works are subject to a fully comprehensive sampling, testing, inspection and quality control in accordance with SANS standards and procedures or best international practices including verification of dimensions and tolerances in accordance with plans, drawings and specifications and as such the commissioning of structural works are limited to the completion of punch list items.

## 2. INTRODUCTION

The appointed Principle Contractor will be responsible for the final detailed execution plan of the *works* and arrangements. This document gives basic guidelines of what is expected during the commissioning phase. It shall be the Principle Contractor's responsibility to complete all work as per scope, work-off all safety related punch list items, do safety checks with support of the Client's Operational Team & Commissioning Manager, sign-off completion of safety checks with client, obtain Ready for Certificate Commissioning (RFC), do Cold Commissioning with support of Client's Team, run the system and carrying out all necessary adjustments, sign completion of Cold Commissioning Certificate, do Hot Commissioning with material/Iron Ore under full operational production and proof equipment under original design load capacity. At completion of commissioning, acceptance certificate is to be completed and signed-off.

## 3. COMMISSIONING PROCESS

The Principle Contractor shall be responsible for organising and carrying out all the equipment tests and trials as specified in the relevant contract documents. The Principle Contractor shall be responsible to ensure that all the applicable statutory tests and design code requirements are met and that the necessary representatives of these agencies are present to witness these tests where applicable. Where the ultimate user is responsible for statutory testing and/or registration of plant and equipment, he/she shall arrange for such testing and/or registration.

### 3.1 Safety during Commissioning

The appointed Commissioning Manager will be in control of all Commissioning Activities:
During the Commissioning phase, safety measures, to prevent the plant from being energised or being operated accidentally are of paramount importance. This is to be achieved by co-ordination of all Commissioning activities and the use of a common Lock-

Out System that will prevent people from accidentally operating isolated plant/equipment and which will, always, indicate the commissioning status of the piece of equipment being commissioned.

All personnel, whether from BTS, Transnet Port Terminals or Contractors who will be involved in the isolation and Lock-out of the plant, must be trained and appointed as "responsible persons" of the Commissioning Team. They will be tested to ensure that they have sufficient knowledge of the plant and the Lock-Out System, to carry out their duties in a safe manner, not endangering their own lives or those of other people working on the plant or put the plant itself at risk. Responsible/Appointed persons will perform their duties under the general supervision of a competent person is term of the OHS Act, General Machinery Regulations 2.

## 3.2 Tags

A system of tags will be used to provide a record of inspection and checks to facilitate a systematic check out of equipment and ensure the safety of all involved.

## 3.3 Lockout procedure

A safe lockout procedure shall be implemented, under the control of the BTS Engineering- and Operation Managers and strictly imposed to ensure the safety of personnel engaged on the work of commissioning and start-up.

BTS to ensure sufficient Lock-out and Commissioning training are provided to ALL personnel that will be involved during the commissioning stages.

Responsibilities on permit transfer, lock-out procedures will be covered under the training and preparation for commissioning.

## 3.4 Commissioning Planning and Coordination

### 3.4.1 Principal Contractor's Commissioning Plan

The Principle Contractor shall prepare and supply a commissioning plan to cover the overall commissioning of completed work under his scope of work. This commissioning plan shall also consist of an organogram indicating all Commissioning Engineers and other staff required for the commissioning process and a detailed commissioning scheduled showing all commissioning activities on a 24/7 hourly scheduled basis. This Commissioning plan shall be reviewed and approved by the TPT Project Manager.

### 3.4.2 Commissioning Teams

The Principal Contractor's Commissioning Manager will take the overall responsibility for all commissioning activities. The Commissioning Manager will be assisted by a team of Engineers from all disciplines which were involved during the refurbishment execution, to make-up the Commissioning Team, with members and representatives from all departments (ECM Team, TPT projects, BTS and the responsible Principal Contractor).

The Principal Contractor shall designate representatives of his staff to assume responsibility for the complete inspection and testing of all work within the scope of his contract and to participate in commissioning activities. The Principal Contractor shall be responsible for and co-ordinate all the work of its sub-contractors. Commissioning Teams will be identified using the format shown in Table 1.

**Table 1: Identification of Commissioning Teams**

| Commissioning Teams | | | |
|---|---|---|---|
| TPT Project Manager | | | |
| TPT (ECM) Commissioning Manager | | | |
| Discipline | Principal Contractor | ECM Team | BTS/ Client Eng. & Comm. Team |
| Mechanical | X | X | X |
| Electrical & Instrumentation | X | X | X |
| Structural/Operations | | | X (Operations) |
| QC | X | X | X |
| Safety | X | X | X |

Refer to Annexure 6, the proposed Organogram for the Commissioning Resources.

# 4. COORDINATION OF ALL COMMISIONING ACTIVITIES

## 4.1 DAILY COORDINATION AND PLANNING MEETING

Each morning a commissioning coordination and planning meeting will be held to review the following:

- Commissioning safety permit status, safety isolation and lock-outs, planned for the day
- Safety and new hazardous conditions
- Testing, shutdowns, tie-in's and work planned for the day
- Commissioning status and short-term forecasts
- Defect list punching and back-punching activities for the day
- Issues requiring resolution

The coordination meetings will be very brief with limited discussions. Participants will be encouraged to resolve issues immediately following the meeting and report back on the conclusions at the next morning's meetings.

These meetings will be attended by all the members representing all teams (BTS, TPT, EPCM and Principal Contractor).

The commissioning meeting may form part of the daily feedback meeting. The daily meeting will be chaired by the TPT Senior Project Manager and attended by all required stakeholders

# 5. PRE-REQUISITES FOR COMMISSIONING

A complete and detailed test and inspection protocol for testing of pre-assembled modules (if applicable), as well as the request for commissioning of all equipment to be commissioned, shall be submitted by the Principle Contractor for approval by TPT Project Manager, ECM Construction- and Quality Manager, before the start of testing and/or commissioning.

This test and inspection protocol shall include all tests and inspections required in terms of the respective specifications and other tests and inspections deemed necessary by the Principal Contractor to prove to the Employer's satisfaction that the equipment complies with the Works Information and must include the following where applicable:

- Signed-off Completion Certificates for all Mechanical- and EI&C Installation.

- Principle Contractor to apply and obtain a Mechanical Completion certificate/ "Ready for Commissioning Certificate: (RFC)
- Pre-commissioning (Cold Commissioning) tests to be performed by the Contractor
- Tests to prove the integrity of the safety devices, limit systems and emergency systems
- Tests to prove the integrity of all service stops and emergency stops.
- Complete Cold Commissioning
- Commence with Hot Commissioning, with Iron Ore material, with support of BTS.
- Full load tests to all mechanical- electrical- and conveyor equipment on effected route.

**Functional tests**

- Operational tests during Cold Commissioning, without material.
- Endurance/Proofing test of 40 hours, under full designed load for SR3 as complete operating system.
- Hot Commissioning Certificate will be signed-off and the project to be taken over by the Client/BTS on completion of endurance tests.

## 5.1 Testing and commissioning

BTS representatives work together with the Projects team and Contractor's commissioning team during the commissioning and testing phases.

Modules pre-assembled off site shall be trial assembled and fully tested as far as practical and be accepted by the projects team prior to delivery to site. All tests performed off site shall be repeated on completion, of refit scope of work planned for SR3, before commissioning starts, the Contractor shall satisfy himself that the installation is complete in all respects and shall carry out the necessary pre-commissioning tests.

During this period the Construction Manager will carry out visual inspections on the equipment. After approval of the test and inspection protocol by the Project Manager, the Contractor shall fully test the equipment in the presence of TPT/BTS Maintenance, Operations and Quality in accordance to the approved protocol. As far as practical the equipment shall be fully tested prior to it being Hot Commissioned.

All motions of the equipment shall be tested, during Cold Commissioning Phase, to prove correct operation and to enable position indicators and limit switches to be set, and other operational adjustments made.

Before the commencement of any tests, the Principal Contractor shall provide the initial fill of oil for all new/refurbished equipment supplied by the PC as part of their scope. Oil and grease for components supplied, to be lubricated as per OEM's/Transnet Specifications. All other existing components requiring top-up lubrication to be toped-up with lubrication, (grease and oil) supplied by BTS.

## 6. COMMISSIONING APPROACH

Project execution plan details the basic activities and durations to be completed and Mechanical and Electrical completion certificates to be signed off by all required parties. Commissioning Manager will then issue the Mechanical Completion Certificate/ Ready for Commissioning Certificate (RFC) before Cold Commissioning may commence.

For the detailed scope of work refer to latest Owner Requirements & Specification (Ref. Z.5200160-ORS) and the Engineering Report (Ref. Z.5200160-ER).

The commissioning for the refurbished equipment will be monitored and carried out as per agreed commissioning schedule; the table below shows the major equipment infrastructures subject to commissioning.

**Table 2**: **Phase 4 Equipment subject to commissioning/endurance testing**

| |
|---|
| Stacker Reclaimer and tripper car 3 complete System |

The hours recorded for operating the entire stream will be utilised as the commissioning hours, TPT operations will be expected to provide a document indicating the hours achieved during Hot Commissioning. This document must contain the conveyor selection route and the hours recorded for each route. The hours will be added up to achieve the endurance testing objectives, which are 40hrs (either continuous or consecutive sessions) for the system operating under load.

Structural work and corrosion protection will be inspected, and data packs signed off, representatives from the Project Team must participate during inspection, and if any findings lead to the rejection of the final work, the contractor must re-visit the works information and execute the work accordingly to meet the specified quality.

## 7. STAGES OF COMMISSIONING

**Please note:** The Principal Contractor will not be allowed to proceed to Cold Commissioning until all Category A items have been resolved i.e. the plant may not be energized and run without all the safety requirements being met.

**Priority Legend**

Category A: Items which compromise the safety and the integrity of BTS
(Examples: Instrumentation, Start-up & Operational Control; All safety devises/pull wires; safety guards not properly installed; lose bolts; unsafe grating/access; insufficient lighting and firefighting equipment or un-grouted components etc.)

Category B: Operational requirements i.e. items which might cause operational delays e.g. spillage; belt skews; not sufficient operation personnel to commence with commissioning etc.

Category C: Items which can be completed after start up and must be completed prior to final acceptance e.g. painting; smaller adjustments not effecting the safe operation of the equipment and work that can be executed during the next scheduled maintenance window.

### 7.1 Stage 1 – Pre-commissioning / Completion of Erection and Installation

The Stage 1 activities are all those activities that take place prior to Cold Commissioning including Mechanical/EI&C and Physical completion ready to be subjected to functional testing, Punch listing (defect list) and completion of all Category A and B punch items. Mechanical/Mechanical/EI&C and Physical completion includes running the conveyor selection routes, flushing, hydro testing, pressure testing and other test necessary before being integrated into functional modules.

The term Mechanical Completion refers to the physical completion of work regardless of the discipline involved i.e. Physical completion of electrical instrumentation and control work is termed "Mechanical Completion".

When tests and/or checks are to be carried out to demonstrate Mechanical Completion that involves the application of energy, such as running the conveyor selection route, a safe working procedure must be developed by the Contractors and demonstrated to the relevant Commissioning Manager.

A Safety Clearance Certificate is issued after the completion of Stage 1 (a copy of which must be filed in the commissioning file and the original retained by the Contractor). In situations, such as sub stations, where no energy or livening up is required before the commencement of the Hot Commissioning, the Safety Clearance Certificate is only issued at the end of Cold Commissioning.

Depending on the contractual interfaces, more than one Safety Clearance Certificate may need to be issued for a functional entity to ensure that "user" responsibility is adequately defined and accepted.

For Structural, work where no commissioning involved, only a Completion Certificate is required once the required Punch List items are cleared.

## 7.2 Stage 2 – Cold Commissioning

Cold Commissioning activities are those required to bring any plant system, stream, module, unit from the status of mechanical completion to the point where Hot Commissioning may commence under the supervisory control of the relevant contractor and the issue of Cold Commissioning Certificate. This will entail running the system, Module or Unit under no load conditions and where applicable, on automatic control with stimulations as required.

Cold Commissioning activities are non-operating adjustments and cold alignment checks made by the contractor, in accordance with detailed checklists. The activities cover a very wide range and include checks on electrical, motors, control and safety systems as well as running the plant under simulated conditions without load.

Before any Unit, Module or System is energised during Cold Commissioning a Safety Clearance Certificate must be issued. Updated Maintenance Manuals to be prior to Cold Commissioning, for information to be captured into the SAP maintenance system.

No Cold Commissioning will be allowed unless the Contractor has submitted the commissioning, operating, maintenance manuals and mechanical completion certificate have been issued for the Contract Works or part thereof. Red lined "as built" drawings must be available and must be kept up to date as the commissioning process continues.

### a) Testing of Individual Equipment (Units)

This stage of Commissioning consists of the complete inspection, testing and operation of each piece of equipment individually, including electrical control and power wiring which has been connected to the equipment, as well as, the checking of the configuration and

calibration of each instrumentation loop. It is the Contractors responsibility to carry out Cold Commissioning related to the Scope of work, as defined in the relevant contract, to the satisfaction of the responsible Commissioning Team. The responsible Commissioning Team will provide technical assistance where necessary and will witness the inspections/tests.

**b) Testing Modules and Systems (Functional Tests)**

This stage of Commissioning consists of the testing and operation of the Works, grouped together into modules and/or systems, as agreed between the Commissioning Manager and the Contractor.

At the end of the Cold Commissioning stage, the Contractor shall have corrected all the deficiencies that the Commissioning Team deems necessary to allow Hot Commissioning to continue in a safe and controlled manner. The project Engineering Lead, Commissioning Manager and the Project Manager may agree that some minor deficiencies could be corrected during the Hot Commissioning stage. Where specifically agreed to by TPT Project Team and BTS, the Contractor may remedy defects during the maintenance/warranty period.

To note the successful Completion of Cold Commissioning, the Transnet Port Terminals Senior Project Manager will prepare a Cold Commissioning Certificate (accompanied by a categorised Punch List). By signing the Cold Commissioning Certificate, the Contract Works are accepted by the Project Team for Care, Custody and Control and the Client becomes the "User" in terms of the OHS ACT but note (This is a Provisional TCC subject to successful Endurance Test; the 12 month warranty period would start after the endurance test).

## 7.3 Stage 3 – Hot Commissioning (System Integration and Load Tests)

This stage of Commissioning consists of placing the Works into operation by BTS with the assistance of TPT projects, Contractors and Equipment Suppliers, using the operating and maintenance personnel of BTS. Hot Commissioning includes performance testing of the Works in terms of the Contract.

**a) Set-up and Tuning of system Parameters**

During this phase, material, iron ore, will be introduced into the system to allow the Client with the assistance of TPT Projects to set system parameters and perform the necessary tuning.

### b) Production build-up

Production build-up entails the verification of quality, process and reliability parameters during production cycles while production levels are increased to prepare for performance testing.

### c) Acceptance/Performance Testing, Endurance Testing

After successful completion of commissioning, the equipment shall be subjected to acceptance testing, i.e. actual operation conditions.

The purpose of this test is to prove that the Plant operates under maximum expected operating conditions and that the safety and other mechanisms repeatedly operate as required and that the Plant is structurally and mechanically sound and ready for full operation.

Acceptance testing will comprise of a minimum of 40 hours endurance test (either continuous or consecutive sessions), of which the last 32 hours must be a completely trouble-free operation to the satisfaction of the Project Manager. If the operation is not trouble free, Endurance Testing will continue until the EQUIPMENT operates for 32 hours trouble free before the Endurance Testing can be deemed complete.

During this endurance test (the first 20 hours of the 40 hours), should there be any interruptions due to trips, faults etc., which can be reset in less than 1 hour, the test will continue. If, however it takes longer that 1 hour to get the Plant operational then the endurance testing hours will be reset zero.

During endurance testing, the Contractor must compile a register of faults, stoppages and test results indicating Date, Shift, Operator, Time, Duration and Description of the problem.

During acceptance testing the Plant will be operated by the Employer's operators, but the Contractor shall provide at his own cost the personnel and all equipment necessary for acceptance testing, including a sufficient number of suitably qualified people to assist the Employer's Plant operators for the duration of acceptance testing.

To note the successful completion of Hot Commissioning, the TPT Senior Project Manager will issue a Completion Certificate for Design, Supply and Installation. Contractors will undertake to complete all outstanding punch list work during the maintenance/warranty period and by an agreed date

## 8. PUNCH LISTING

### a) Mechanical Completion Punch List

When in the opinion of the Contractor, the Works or part of the Works is sufficiently complete to warrant the commencement of Cold Commissioning of such Works, the Contractor will submit a request for a joint Mechanical Completion Punch list inspection, after having punched the works himself and cleared all Category 'A' and 'B' Punch list Items. Any additional Category 'A' Punch list Items identified by the Transnet Port Project team and BTS must be rectified before proceeding to the next stage. Once all Category A Punch List Items have been rectified a Mechanical Completion Certificate/Ready for Commissioning Certificate (RFC) will be issued to the Contractor.

For part of the structural contracts, a Construction Completion Certificate will be issued at this point. It is at this point that the Construction Manager handed over the completed project to the Commissioning Manager to proceed with the commissioning process.

The Construction Manager will be responsible to ensure that all construction related punch list items, that hinder the Commissioning Process, are cleared and completed before signing-over the Construction Completion Certificate to the Commissioning Manager.

Note: Mechanical Completion also means Electrical, Instrumentation and Control Completion where relevant.

### b) Cold Commissioning Verification

Any functional defects/deficiencies identified during Cold Commissioning will be registered in the Deficiency Management Database for rectification and closeout.

When the Works has been Cold Commissioned, the Contractor will submit a request for a joint Cold Commissioning Punch list inspection to verify that all Category 'A' and 'B' punch items are completed and to ensure that any damaged plant or equipment are repaired prior to the issue of a Cold Commissioning Certificate.

For installation only contracts, a Completion Certificate must be issued at this point.

### c) Hot Commissioning Verification

Any functional defects/deficiencies observed during Hot Commissioning will be recorded in the Deficiency Management Database for rectification and close out.

As soon as the *Contract Works* have successfully passed all applicable performance tests in accordance with the conditions of the relevant contract and upon completion of Hot Commissioning, TPT Project Manager and the Client verify that all functional defects/deficiencies recorded in the Deficiency Management Database have been investigated, resolved and closed out have been signed off.

For supply and install contracts a Completion Certificate will be prepared by the TPT Project Manager for acceptance by the Client.

### d) Punch List Categories

Punch list items will be categorised into Category 'A', 'B' or 'C' punch items.

### e) Punch List Register

All Punch lists must be registered with the Commissioning Manager who will maintain a Register of Punch list items in the Commissioning Database for follow-up and close out.

The Commissioning Manager will be responsible to ensure that all Commissioning Punch list Items are cleared and completed by the agreed date.

When items on the punch lists are cleared, the Commissioning Manager will ensure that the punch list register in the Commissioning Database is updated to reflect the status of punch list completion.

### f) Functional Defects

Functional defects and deficiencies identified during the Commissioning and Maintenance phases will be recorded by the Commissioning Manager in the Deficiency Management Database and handed over to the responsible Contractor and/or TPT Projects for clearance.

## 8.1 Equipment Modifications

Any modifications required by the Client to any equipment, plant or control, should be identified before the commissioning process commences.

These Modifications to be identified during the construction/refurbishment phase of the project and managed according to the Change Control Procedure.
All proposed/required modifications shall be presented in writing, by the Client, in time not to delay the project commissioning phase, approved and logged in the change register.

If it is a Process change then a re-HAZOP must be carried out prior to the commencement of the work to ensure that the proposed process change is safe to implement.

Once the scope of the modification is finalised, the TPT Project Manager will examine and evaluate time and cost implications. Allocation of funds if required will be approved in accordance with TPT - Change Control Procedure prior to implementation of the change.

Requests for changes are not Punch List Items and must be logged and controlled outside the Punch List Process.

All requests for plant modification or comments from the Client's operating personnel must be channelled through the TPT Project Manager and TPT Construction Manager for review and approval, before the Commissioning Phase.

## 8.2 Safety Clearance Inspection

It is the responsibility of the Contractor to prepare the Works for Safety Clearance Inspections. The purpose of the Safety Clearance Inspection and Certificate is as follows:

- To ensure that the plant in question is safe to be energised from a mechanical, electrical and process perspective
- To ensure that the surrounding environment is conducive to safe operating practises i.e. no debris lying around, all trenches covered, barricades are installed, fire extinguishers available etc.

Any Health and Safety requirements identified during Punch listing must be rectified before the issue of a Safety Clearance Certificate.

When the prerequisites as defined above have been met, a Safety Clearance Certificate can be issued. Once the Safety Clearance Certificate has been signed the plant MUST be energised.

If for some reason the plant cannot be energised at that time, the process must be repeated just prior to the plant being energised.

After the issue of a Safety Clearance Certificate, plant can only be worked on under permit issued by an Appointed Person of the defined "User", in terms of the OHS Act to a Responsible Person (Refer to The Permit to Work Procedure). A copy of the Safety Clearance Certificate must, upon completion, be forwarded to the relevant Commissioning Manager. The responsible Commissioning Team will organise and co-ordinate these inspections and will only issue a Safety Clearance Certificate when the plant is safe to be energised. To ensure total safe working conditions, a series of checks and tests shall be made involving all disciplines, to establish the status of each piece of equipment. These checks and tests will include but are not limited to:

- Lubrication
- Alignment
- Rotation
- Power supply available and adequate
- Electrical equipment, safety checks and interface controls already checked out
- All safety precautions in effect; and
- What other equipment will also run and whether it was checked and declared safe via a Safety Clearance Certificate.

When tests and/or checks are to be carried out to demonstrate Mechanical Completion that involves the application of energy, such as megger testing of cables, a safe working procedure must be developed by the Contractors and demonstrated to the Commissioning Manager.

Prior to such tests or checks, a safety walk down of the equipment to be tested will be carried out by the Commissioning Manager and Commissioning Teams to ensure that the area is made safe, barricaded or demarcated, locked out where required, relevant danger signs attached and that only persons directly involved in such testing are allowed inside the demarcated area while testing is in progress.

The Commissioning Manager must inform all parties working in the immediate vicinity of such tests and of the dangers associated with the testing.

To provide a record of inspection and checks, to ensure the safety of all involved and to facilitate a systematic check out, a system of tags shall be used together with the Permit to Work system. These tags shall be sequentially numbered to facilitate a tracking system related to responsibility for safety. The issue and control of tags will be the responsibility

The Contractor shall arrange for visits by the relevant authority, provide all personnel and equipment necessary to conduct the tests as required and hand over to the Commissioning

Manager the documents and certificates of the approved equipment. The relevant Commissioning Team shall be present during tests for verification and acceptance as identified on the relevant Commissioning Plan (Hold and Witness Points). The unit/module/system to be energised will be locked out and tagged in accordance with the agreed lock out and tagging procedure as described in the BTS "Safe Lock-out Procedure".

## 8.3 Statutory Certification and Approvals

The Contractor shall obtain from the applicable authorities, all necessary certification and approvals for equipment in his scope of supply. Approvals are typically required for:

- EC&I infrastructure supplied
- Cranes and other lifting equipment
- Hydraulic Systems and other pressure vessels
- All other equipment listed by legislation

The Statutory Certifications and approvals shall be included in the Contractor's Safety file. To be checked and accepted by the Construction Manager and will form part of the Mechanical Completion/Ready for Commissioning Certificate (RFC) to be handed over to the Commissioning Manager.

## 8.4 Verification of Commissioning Activities

### a) Commissioning Quality Control Plan (QCP)

The Commissioning Manager assisted by the Site QA/QC Coordinator prior to any commissioning activities taking place must develop a Master Commissioning QCP.

The following Commissioning QCP's need to be developed by TPT together with the Contractors and approved by Client/BTS prior to any commissioning activities taking place.

- Cold Commissioning QCP
- Hot Commissioning QCP
- Test and Evaluation QCP for Acceptance/Performance Testing

### b) Commissioning Inspections

TPT Projects shall ensure that, prior to Commissioning QCP approval, the Contractor has broken down their Commissioning QCP to include adequate inspections and checks for each piece of equipment.

TPT Projects shall ensure that the Contractor's Commissioning QCP's make reference to relevant forms and check lists that will be required.

The Commissioning Team that includes Contractor's representatives and shall be recorded on the relevant forms and check sheets shall conduct commissioning inspections.

When the Commissioning Team for that specific unit/module/system is satisfied that Commissioning has been done correctly the Commissioning QCP shall be signed off.

**c) Testing and Trials**

Commissioning will only be considered complete when the Commissioning Team is satisfied that all necessary tests have been correctly completed and that the recorded data confirms that the relevant equipment or system is ready for the next Commissioning stage.

## 8.5 Care, Custody and Control

After Hot Commissioning, the Hot Commissioned system will be transferred to the Care, Custody and Control of the Client. The transfer is formalised only when the Client signs the Hot Commissioning Certificate.

TPT Projects Senior Project Manager will prepare the Hot Commissioning Certificate for signature by the relevant parties.

**Defects Correction/Defects Liability/Warranty Period**

All Categories 'C' Punch list items as well as defects occurring during the Defects Correction/Defects Liability/Warranty Period must be closed out before the expiry of the Maintenance/Warranty Period.

To facilitate the administration of the guarantees, all defects and/or repair work during the Defects Correction/Defects Liability/Warranty Period must be logged in the Deficiency Management Database.

The reporting of such defects/deficiencies is the responsibility of the Operating and Maintenance Staff. It is the responsibility of the TPT Project Manager in conjunction with the relevant Contractor, to determine whether such defects and deficiencies are the responsibility of the Contractor and should expedite the rectification of such defects and deficiencies.

## 8.6 Spares

The Principal Contractor and BTS shall be jointly responsible for provide critical spares for the SR3, at the Bulk Terminal Saldanha, quantified and as agreed between the parties, as detailed in the engineering reports (Z.5200160-ER) and Procurement Report (Z.5200160-PR). The technical performance specifications shall be submitted to the Project Team for approval prior to delivery.

## 9. ORGANISATION

The Contractor will be responsible for the planning of the commissioning together with the TPT Project Team well ahead of the commissioning phase meaning this document shall be revised and a detailed plan submitted for updates and comprehensive commissioning plan to address any commissioning loopholes if noted.

## 10. COMMISSIONING SCHEDULE

The Principal Contractor to provide a detailed commissioning schedule during the commissioning planning phase to be approved by the Project Team. This schedule to be aligned to the overall project schedule and the Cold & Hot Commissioning specifications mentioned in this document.

## 11. SAFETY

In addition to complying with applicable statutory health and safety requirements, the Contractor shall comply with TPT safety regulations and guidelines.

The Project Team shall provide the Principal Contractor with copies of the TPT safety, health, environmental, quality and risk documents, and the relevant updates thereof from time to time.

Commissioning staff will be required to attend the Transnet safety inductions, site-/task specific training and medical checks. Such staff must ensure that they are aware of normal operational- and other construction activities during the commissioning period. Appropriate safety equipment must be used.

All equipment is to be fully and properly commissioned without the bypassing of any safety systems or safety equipment. The designed processes, electrical-, instrumentation and control procedures to be adhered to. Where such bypassing is unavoidably necessary for commissioning purposes, even if detailed in the commissioning procedure, it will not be done without the written approval of the appointed responsible Engineer from BTS, on

evaluating of the written recommendation from the Commissioning Manager. Commissioning will take place in a set sequence. This will be strictly adhered to so that staff will not be expected to work in an unsafe environment or unduly long hours.

A policy of "Zero Tolerance" will be strictly adhered to and it will be the responsibility of the Commissioning Manager to ensure this is the case.

## 12. HAND-OVER PROCEDURES

The following data-packs, properly documented and filed both in Hard and Soft copies, would be required before handover of the Plant:

- All Structural Material Test Certificates
- Corrosion Protection Dry Film Thickness tests
- Alignment verification results
- Inspection reports
- Red Lining of Manufacturing drawings if applicable
- Signed off all commissioning certificates together with completed punch lists
- Required statutory documents upon receipt of complete documentation a Hand Over certificate to be signed by TPT.

### 12.1 Red Lining" of Commissioning Drawings

During Commissioning, all authorized changes to drawings, (such as P&ID's, Loop Diagrams, Control Circuits, Cable Schedules, O&M Manuals, etc.), will be marked up in RED on the set of Commissioning Drawings and Manuals.

Authorization to affect changes to Documentation will be done in accordance with the Technical Query Work Instruction.

Upon final completion of the update to the drawings, the status will be classed as "As Built" and the drawings will be revised to the next revision and issued to the Client.

### 12.2 Training and Manning

All personnel involved in Commissioning must be appropriately trained. This will require the recruitment or transfer of personnel in sufficient time for training to take place (This project will not require major training as it is a refurbishment of the existing plant equipment, but if there is any form of training required, the operational readiness report will detail the training information).

The Transnet Port Terminals Commissioning Manager must ensure that all staff involved in commissioning activities is familiar with the plant to be commissioned. It is Transnet Port Terminals responsibility, supported by its Contractors to provide trained personnel during Cold Commissioning. However, Client Operating staff should make use of this period to familiarize themselves with the plant, well in advance for training by BTS where specialist training in terms of the Contract is required.

Manning schedules must be prepared in good time for control purposes.

## 12.3 Contractual Certification

To note; the successful completion of identified stages of the Contract Works, Contractual Certification, as detailed below is required.

## 12.4 Mechanical Completion Certificates

As soon as in the opinion of the Contractor, the Works has physically been completed in accordance with the drawings and specifications as detailed in the Scope and Specification of the Works and that the Works or portion thereof is ready for Cold Commissioning to commence he shall arrange for an internal punch list to take place and rectify all category 'A' and "B" Punch List Items. Once Contractor is satisfied that the plant is ready for Cold Commissioning to commence, he shall complete a request for Punch Listing and submit to the Project Team who will arrange for a formal Punch List to take place. Once it is verified that the remaining Category 'A' and 'B' Punch List items, were addressed, the Construction Manager will prepare a Mechanical Completion Certificate for Signature by the various Parties and Hand-over the completed *Works* for Commissioning to the Project Team, to commence with Cold Commissioning.

## 12.5 Cold Commissioning Certificates

Once Cold Commissioning is complete with no remaining Category 'A' and 'B' punch items, the relevant Contractor must request the issuance of a Cold Commissioning Certificate.

The Commissioning Manager will, when requested by the Construction Manager, certify that Category 'A' and 'B' punch items have been signed off and that Contractor has agreed in writing to rectify any remaining deficiencies during the Defects Correction/Defects Liability/Warranty Period within 30 days, except for new defects.

## 12.6 Completion Certificates

As soon as the *Works* have successfully passed any required Performance/Acceptance Test with only Category 'C' Punch List Items remaining with a commitment to complete the Category 'C' Punch List Items by an agreed date during the Defects Correction/Warranty Period and following the application by Contractor for a Completion Certificate, a Completion Certificate will be issued.

## 12.7 Final Certificates

On expiry of the Defects Correction/Defects Liability/Warranty Period and once all punch list items, defects reported during the maintenance/warranty period and commercial issues are successfully resolved, Transnet Capital Projects shall arrange with Client to issue a Final Certificate to Contractor.

All punch list items, functional defects and deficiencies must be cleared before the issue of a Final Certificate.

## 13. RECORDS

All records generated in accordance with the requirements of this procedure retained in accordance with the requirements of: Archiving and Retention of Documents and signed over to the Client.

# 14. ANNEXURES

## Annexure 1 – Commissioning Responsibility Matrix

| | Principal Contractor | | | | TPT Project Team | | |
|---|---|---|---|---|---|---|---|
| COMMISSIONING PHASE | CONSTRUCTION MANAGER | COMMIS-SIONING MANAGER | ENGINEER | CONTRACTOR OR SUPPLIER | TPT | ENGINEERING AND MAINTENANCE | OPERATIONS |
| **CONSTRUCTION** | | | | | | | |
| Safety | A | | I/V | R | | | |
| Planning | A | | I/V | R | | | |
| Supervision | A | | I/V | R | | | |
| Installation | A | | A | R | | | |
| Quality/QCP | A | | A | R | | v | |
| **CHECKOUT ACCEPTANCE** | | | | | | | |
| Safety | I | R/A | I/V | I | | | |
| Planning | I | RIA | I/V | I | | | |
| Supervision | I | R/A | I/V | I | | | |
| Contractor Equipment Inspections & Punch Listing | I | R/A | v | I | | | |
| Check Construction in accordance with design/specification | V/A | A | R/A | I | v | v | v |
| Punch Listing | V/A | R/A | I/A | I | v | I | V/A |
| Check out Acceptance Certificate | V/A | R/A | A | | | A | A |
| **STAGE 1:PRE-COMMISSIONING** | | | | | | | |
| Safety | I | R | I/V | I | I | | I |
| Planning | I | R/A | I/V | I | I | | I |
| Equipment Inspection &Testing | I | RIA | I/V | I | v | v | v |
| Check construction in accordance with design /specification | I | v | R/A | | v | v | v |
| Check Lists | A | R/A | I/A | I | v | v | V/A |
| Taking Over Certificate (Install Contractors) | A | R/A | A | | | A | A |

| | Principal Contractor | | | | TPT Project Team | | |
|---|---|---|---|---|---|---|---|
| COMMISSIONING PHASE | CONSTRUCTION MANAGER | COMMIS-SIONING MANAGER | ENGINEER | CONTRACTOROR SUPPLI ER | TPT | ENGINEERING AND MAINTENANCE | OPERATIONS |
| **STAGE 2: COLD COMMIS-SIONING** | | | | | | | |
| Safety | I | R | I/V | I | I | | I |
| Planning | I | R | | note 2 | Note 1 | | Note |
| Check construction in accordance with design/spec. | I | v | R/A | | v | v | v |
| System Inspection & Testing | I | R/A | I/V | I | v | v | v |
| Overall Systems Integration | I | R/A | I/V | note 2 | v | v | v |
| Check Lists | I | R/A | I/ A | note 2 | v | v | V/A |
| Issue Commissioning Handover Packs | I | R/A | V/A | | A | A | A |
| T.C.C | | R/A | A | | | A | A |
| **STAGE 3: HOT COMMIS-SIONING** | | | | | | | |
| Safety | | | | | I | R | R |
| Planning | | | | | I | R | R |
| Check performance to specification | s | s | s | | R | I | I |
| 1st (example)tap | | s | s | | R | I | I |
| T.C.C.C | | R | v | | I | A | A |
| **PRODUCTION & OPTIMISATION** | | | | | | | |
| Safety | | | | | | R | R |
| Completion of CAT 'C' punch items | I | R | I/V | I | v | A | A |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Issuing of Site de-establishment Memorandum | | R | I/V | | v | v | A |

**R** = Responsible (Actively conducting accountable activities and control over others involved)
**I** = Involved (Actively rendering accountable assistance, part of the team doing day to day activities)
**V** = Verify (Only doing spot checks I verification)
**S** = Support (There to give support where required)
**A**= Approve
**Note 1** = Where applicable
**Note 2** = Where applicable

# Annexure 2—Commissioning File Contents

| CONTRACTOR: | | CONTRACT NO: | | | |
|---|---|---|---|---|---|
| | | | DOCUMENT SIGN-OFF | | |
| NO | ITEM | DOCUMENT | CONTR. | TPT PROJECT TEAM | BTS |
| A | **GENERAL** | | | | |
| 01 | Module Description | | | | |
| 02 | Baseline Schedule Updated | | | | |
| 03 | Commissioning Team | | | | |
| B | **MECHANICALCOMPLETION** | | | | |
| 04 | Module Data Books/Construction Work Packages | | | | |
| OS | Request for Mechanical Completion Punch Lists | | | | |
| 06 | Contractor/ TPT/CLIENT categorized | | | | |
| 07 | Loop Checks and other required Electrical Check Certificates. | | | | |
| c | **COLD COMMISSIONING** | | | | |
| 08 | Manuals & Instructions | | | | |
| 09 | List of Commissioning/Maintenance Spares and Tools & Report of Availability | | | | |
| 10 | Safe Working Procedures | | | | |
| 11 | Lubrication Schedule | | | | |
| 12 | Request for Safety Clearance Inspection | | | | |
| 13 | Cold Commissioning QCP and Check lists, Functional Specification, Data Sheets and P&ID's, Tagged Equipment List Single Line Diagrams | | | | |
| 14 | Safety Clearance Certificate | | | | |
| 15 | Request for Cold Commissioning Certificate | | | | |
| 16 | Cold Commissioning Defects/Deficiency List | | | | |
| 17 | Cold Commissioning Certificate | | | | |
| D | **HOTCOMMISSIONING** | | | | |
| 18 | Hot Commissioning QCP & Checklists | | | | |
| 19 | Hot Commissioning Defects/DeficiencyList | | | | |
| E | **PERFORMANCETESTING** | | | | |
| 20 | Performance Trial Notification | | | | |
| 21 | Notification to Specialized Equipment | | | | |
| 22 | Notice of Acceptance/Rejection | | | | |
| 23 | Performance Test Requirements & | | | | |
| 24 | Request for Completion Certificate | | | | |
| 25 | Completion Certificate | | | | |
| F | **CLOSE-OUT** | | | | |
| 26 | Training Requirements and Reports | | | | |
| 27 | Test Requirements & Certificates | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 28 | As-built Drawings | | | | |
| 29 | Subcontractor's Document Register | | | | |
| 30 | Final Certificate | | | | |
| G | **OTHER** | | | | |
| 31 | Index of Unit Packages & Locations | | | | |
| 32 | Register of Unit Packages for Sign-out | | | | |

## Annexure 3 – Mechanical and Electrical Completion Certificate/Ready for Commissioning Certificate (RFC). Completion of Construction

| **M & E Completion Certificate No.** | | | |
|---|---|---|---|
| Date: | | Originator: | |
| Project Name: | | TPT Project Manager: | |
| Contract No: | | Contractor/Supplier: | |
| Contract Description: | | | |
| System/ Equipment: | | | |
| Defects List items outstanding? | Yes ☐ | No ☐ | If yes, attach Defects List to this certificate |
| **NOTE:** | 1.Category"A"and "B" Defects **MUST** be rectified prior to approval of this certificate<br>2.Defects List Item Nos. | | |

It is hereby certified that the Installation of Equipment defined above has been successfully Inspected. Tested, Rectified as noted above, and is released for the "Cold Commissioning" stage of the work and that the attached Defects shall be rectified by the stipulated due dates. This release in no manner relieves the Contractor and/or his sub-contractors and/or Suppliers of his Contractual obligations in terms of the Contract, and/or warranty, and/or performance guarantee. It is the Contractor's obligation to ensure that the Installation of Equipment is safe in terms of the OHS Act of South Africa to progress into the "Cold Commissioning" stage of the work. The Designer hereby declares that the Installation of the Equipment defined above is safe to use in terms of the OHS Act of South Africa and is ready to be energized and used for "Cold Commissioning" purposes.

| **DESIGNATION** | **NAME** | **DATE** | **SIGNATURE** |
|---|---|---|---|
| Principal Contractor | | | |
| ECM Project Manager | | | |
| ECM Quality Manager | | | |
| TPT Project Manager | | | |

# Annexure 4 - Completion of Cold Commissioning Certificate

| | | | |
|---|---|---|---|
| **CC Certificate No.** | | | |
| Date: | | Originator: | |
| Project Name: | | TPT Project Manager: | |
| Contract No: | | Contractor/Supplier. | |
| Contract Description: | | | |
| System/Equipment: | | | |
| **Comments:** | | | |
| Defects List items outstanding? | Yes ☐ | No ☐ | If yes, attach Defects List to this certificate |
| **NOTE:** Category "B" Defects **MUST** be rectified prior to approval of this certificate<br>2.Defects List Item Nos.: | | | |
| It is hereby certified that the System and Equipment defined above has been successfully "Cold Commissioned", Rectified as noted above and is released for the "Hot Commissioning" stage of the work and that the attached Defects shall be rectified by the stipulated due dates.<br>This release in no manner relieves the Contractor and/or his sub-contractors and/or Suppliers of his Contractual obligations in terms of the Contract, and/or warranty, and/or performance guarantee.<br>The Employer hereby accepts in good faith the above referenced System and Equipment for "Hot Commissioning".<br>The Designer hereby declares that the Installation of the Equipment defined above is safe to use in terms of the OHS Act of South Africa and is ready to be energized and used for "Hot Commissioning" purposes. | | | |

| **DESIGNATION** | **NAME** | **DATE** | **SIGNATURE** |
|---|---|---|---|
| Principal Contractor | | | |
| ECM Project Manager | | | |
| ECM Quality Manager | | | |
| TPT Project Manager | | | |

## Annexure 5 - Completion/Take-over Certificate

## COMPLETION OF HOT COMMISSIONING AND SUCCESSFUL 40 HOUR ENDURANCE TEST

| **HC Certificate No.** | | | |
|---|---|---|---|
| Date: | | Originator: | |
| Project Name: | | TPT Project Manager: | |
| Contract No: | | Contractor/Supplier. | |
| Contract Description: | | | |
| System/Equipment: | | | |
| **Comments:** | | | |
| Defects List items outstanding? | Yes ☐ | No ☐ | If yes, attach Defects List to this certificate |
| **NOTE:** 1. Category "B" Defects **MUST** be rectified prior to approval of this certificate<br>2. Defects List Item Nos.: See list attached if applicable. | | | |
| It is hereby certified that the System and Equipment defined above has been successfully "Hot Commissioned", Rectified as noted above and is hereby taken over by the Client and that the attached Defects shall be rectified by the stipulated due dates.<br>This release in no manner relieves the Contractor and/or his sub-contractors and/or Suppliers of his Contractual obligations in terms of the Contract, and/or warranty, and/or performance guarantee.<br>The Employer hereby accepts in good faith the above referenced System and Equipment.<br>The Designer hereby declares that the Installation of the Equipment defined above is safe to use in terms of the OHS Act of South Africa<br>The Contract Defects Liability starts as per the date stated below. | | | |

| **DESIGNATION** | **NAME** | **DATE** | **SIGNATURE** |
|---|---|---|---|
| Principal Contractor | | | |
| ECM Project Manager | | | |
| ECM Quality Manager | | | |
| BTS Eng. Manager | | | |
| TPT Operations Manager | | | |
| TPT Project Manager | | | |

# Annexure 6 – Commissioning Team

## Typical Commissioning Team Resource Diagram