



AUSTRALIAN RAIL TRACK CORPORATION LTD

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Discipline
Engineering Standard – NSW

Category
Signalling

Title
**Inspection and Testing of New and Altered
Signalling Works Roles, Responsibilities, Plans,
Programs and Packages**

Reference Number
SCP 07 – (RIC Standard: SC 00 41 01 00 SP)

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Note:

Personnel responsibilities referred to in this document will be altered in due course to reflect the ARTC organizational structure.

About This Standard

This Specification sets out the requirements for the implementation of an effective system for verification and assurance of the safety integrity of the signalling system, and for verification and assurance of the compliance to specification of the new and/or altered signalling system when commissioned.

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1 Introduction

1.1 General

This standard Specification applies to the inspection and testing, quality of installation and commissioning work necessary for safety assurance of new and altered signalling works on Australian Rail Track Corporation infrastructure.

Inspection and testing shall be read as including verification and validation tasks.

Particular requirements for inspection and testing of telecommunications systems associated with signalling systems are included in the Particular Specification for the Contract or within the relevant referenced standard Specifications.

Unless specifically stated otherwise in the Particular Specification, all of the inspection and testing tasks defined within this Specification shall be carried out and recorded as prescribed herein including in any appendix or attachment.

Where sentences in this standard Specification are constructed with a required action without nominating the party responsible, the sentence shall be read as if it included the words "the Contractor shall..." or "...by the Contractor" or words of similar intent, except where it is clear from the context that it is not intended the Contractor be responsible for the required action.

The "performance requirement" is for the implementation of an effective, proven, auditable process for verification and assurance of the safety integrity of the signalling system, and for verification and assurance of compliance to specification of the new or altered system when commissioned.

Safety integrity will include the reliable operation of the signalling system, as failure gives rise to use of less inherently safe systems of working.

The verification and assurance process shall include clear definition and communication of responsibilities, detailed and comprehensive planning and programming, application of proven inspection and testing practices by qualified, fit and competent personnel, using appropriate, calibrated test equipment, monitoring and control of progress, detailed recording of results, adherence to Safeworking Procedures, with the total verification and assurance process fully documented and rigorously followed.

This standard Specification SCP 07, in conjunction with standard Specification SCP 08, specifies such a verification and assurance process.

Notwithstanding the application of the certification inspections and tests specified in SCP 07 and SCP 08 these will not, in themselves, provide sufficient assurance as much of the installation will be "hidden" from these certification inspections and tests, and it is therefore imperative that the installation work be carried out by suitably qualified, fit and competent personnel and that the installation practices and workmanship be appropriately supervised and inspected during the installation.

Variation or alternatives to Specifications SCP 07 and SCP 08 shall require the Contractor to demonstrate to the satisfaction of the IWMP and ARTC that the variation or alternative will achieve the "performance requirement" to an equal or superior level without detriment. Acceptance of

variations or alternatives will not relieve the Contractor of achieving the “performance requirement” as specified.

1.2 Definitions

The following definitions are used in this Specification.

Some further definitions are included in chapter 4 paragraph 4.5.5. and a glossary of inspection and testing terms is included in standard Specification SCP 08.

Some definitions include responsibilities of the position defined.

Australian Rail Track Corporation

The Australian Rail Track Corporation of New South Wales (hereinafter referred to as “ARTC”), the owner of the infrastructure.

IWMP

The person, company, corporation or authority which, as Infrastructure Works and Maintenance Provider or equivalent, has entered into an Alliance Contract or Deed of Agreement with ARTC for infrastructure management, maintenance and construction of one or more parts of the rail system.

IWMP Representative

The person, company, corporation or authority which has been employed or contracted by the IWMP and appointed to manage the fulfilment of the works. This may involve management of more than this one contract. The term “IWMP Representative” shall to be taken to include any person authorised to act on behalf of the IWMP Representative.

In other documentation, the IWMP Representative may be referred to as the “Project Manager”.

Commissioning Engineer

The person employed or contracted by the IWMP and independent of the Contractor whose signature appears on the commissioning acceptance documents and who is responsible for checking that all required certification inspections and tests are planned and programmed and duly carried out and documented and that such documentation is readily available, and for signing the work into use when satisfied that the system has been properly designed and installed using effective quality system processes and has been fully and properly inspected and tested to prove that it will operate safely and reliably.

The Commissioning Engineer utilises reviews, audits, witnessing and acceptance inspections and tests for such assurance.

The Commissioning Engineer shall be a person accredited by ARTC to accept signalling system assurance plans, processes and performance and to sign signalling works into use.

Contractor

The person, company, corporation or authority which is contracted to implement the specified Works relating to ARTC infrastructure. The term “Contractor” shall be taken to include any sub-contractors engaged in the Works.

Project Engineer Construction

The person, employed by the Contractor, who has the responsibility to ensure that the work is carried out to design, to construction standards and to schedule.

Design Engineer In Charge

The person, employed by the Contractor, who has the responsibility to ensure design work is carried out to schedule, to provide the required system performance, and to ensure the safety and integrity of the signalling operating and control system designs.

Tester In Charge

The person employed by the Contractor, who has the responsibility of directing, controlling and ensuring that all the inspection and testing plans, procedures, activities and tasks required by this Specification are competently and correctly completed and recorded.

The Tester In Charge, on behalf of the Contractor, is responsible for signing off the safety assurance of completed works and for certifying that the systems and equipment have been properly designed and installed using effective quality system processes and have undergone and passed all tests and inspections necessary to ensure safe and reliable operation.

Tester

A suitably qualified, fit and competent person employed by the Contractor who carries out certification tests and inspections under the control and direction of the Tester In Charge. The Tester is responsible for the integrity of the inspections and tests the Tester carries out and signs-off.

Signal Design Manager

The person, employed by the IWMP, who is the IWMP Signalling Design Authority and responsible for authorising and approving design changes to the existing signalling system in accordance with ARTC design standards.

The Signal Design Manager is also responsible for the review of Contractor's designs and advising the IWMP Representative and the Commissioning Engineer of any concerns with the Contractor's designs or design process.

Equipment

The term "equipment" shall include materials, structures, cables, wiring, fuses, terminals and other devices, components, sub-systems and systems unless clearly intended in the context to be more specific.

Test

Tests and testing shall include all examinations, inspections and processes to verify and/or validate conformance to the requirement.

Certification

Certification, certification inspections and/or tests, certification inspection and/or testing, shall mean those "tests" carried out and signed off by qualified competent persons on which the safety assurance and specification compliance relies. It does not include preliminary "tests" when the safety assurance and specification compliance will be covered in later certification inspection and/or testing.

Existing signalling

The terms "existing signalling", "existing signalling system", "existing signalling equipment", "existing signalling installation" shall mean any installed and commissioned signalling equipment whether in use or booked out of use.

Witness / Team Auditor

A person, employed or contracted by the IWMP, independent of the Contractor, and accredited by ARTC or an organisation which is itself accredited by ARTC, who is appointed to carry out one or more of the following tasks.

- Witnessing of contract work carried out within existing ARTC signalling equipment locations or enclosures.
- Witnessing of certification inspections and tests.
- Booking signalling equipment into or out of use
- Witnessing all interface connections to and disconnection of existing signalling equipment and circuits (except where they have been purposely isolated to allow the Contractor to connect to or disconnect).

Witnesses have the authority to immediately stop any work under the Contract which they consider endangers the existing signalling system or railway operations. Where there are concerns which do not present an immediate risk, the witness will promptly notify both the Tester In Charge and the Commissioning Engineer or IWMP Representative of issues which require resolution.

1.3 Applicable Documents

This Specification shall be read in conjunction with the Particular Specification, any general conditions attached thereto and other standard specifications and documents comprising the Contract.

In particular, this standard Specification shall be read in conjunction with companion standard Specification SCP 08 "Signalling System Inspections and Tests"

Australian Standards AS4292.1, AS4292.4 and AS4292.5 are also applicable reference documents to this Specification.

The Contractor shall promptly bring any perceived inconsistencies or ambiguities to the attention of the IWMP Representative for resolution.

1.4 Responsibility for Signalling Safety and Certification Inspection and Testing

Signalling and train control equipment and systems provided under any contract shall be designed, manufactured and installed to be safe and reliable and shall be inspected and tested to verify and validate the systems as being safe and reliable. The Contractor shall meet these requirements and shall provide sufficient attested record, at the least not less than that required by this Specification, to prove that all necessary inspection and testing has been carried out.

Where particular designs and/or items of equipment are supplied to the Contractor through the IWMP Representative for inclusion in the Works, then unless otherwise specified, the Contractor is not responsible for the inherent

safety or reliability of the individual design or item of equipment. The

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Contractor is responsible, as defined below, for the safe and reliable integration of any such designs or equipment into the Works.

1.4.1 Contractor's Responsibilities

The Contractor shall:

- Ensure that equipment, systems or configurations of signalling or train control equipment to be used in the work are Type Approved by ARTC or an organisation accredited by ARTC to issue type approvals.
- Obtain Type Approval, in accordance with the requirements of specification SCP 14, for any new or modified equipment, systems or configurations before submission in any "designs for construction".
- Employ or contract an independent, suitably qualified, fit and competent person or organisation, accredited by ARTC, to independently check all safety related designs prior to submission for acceptance for inclusion in the Works. Safety related designs include all signalling circuit designs, control tables, signalling (or track or insulation) plans, data sets for processor or computer based interlockings together with (but not limited to) designs for signal gantries, signals, trainstop supports and equipment to operate points. (Exception: In some projects, as set out in the particular specification, the IWMP may provide the independent design checker.)
- Ensure the independence of the independent design checker is maintained throughout the conduct of the Contract.
- Within the extent and bounds of the work under the Contract, including interfaces with the existing signalling system, provide a signalling and train control system which meets all specified performance, safety and reliability requirements.
- Certify that the system is safe and operational and that all the required inspection and testing to prove the performance, safety and reliability of the system has been carried out and documented.
- When in the vicinity of, or when interfacing to, ARTC's existing signalling installation, act in a manner and to procedures which preserve the safety of the signalling system.
- Prepare an Inspection and Testing Plan and specific procedures for safety and quality assurance as required by this Specification. (Refer to Chapter 3)
- Set out, within the documented Inspection and Testing Plan, each and every test and inspection required to ensure that the signalling provided under the Contract, inclusive of all interfaces, will be safe and meets the performance and reliability levels specified. This requirement applies whether interface work related to the Contract Works is to be carried out by the Contractor or by others.

- Provide detailed step-by-step procedures for each type of inspection and/or test to be used to assure safe operation and specification compliance. In doing so comply with the procedures and practices set out in this standard Specification and standard Specification SCP 08 or justify variation to the Commissioning Engineer.
- Carry out inspection and testing in accordance with the Inspection and Testing Plan and the specific procedures for safety and quality assurance.
- Certify conformity with the final design drawings and compliance with the specified requirements by marking up and signing off test copies of the design documentation and by completing and signing off test certificates, check lists and other quality and safety assurance documentation.
- Ensure that all certification of conformity and compliance for performance and safety of the Works or any stage or part thereof has been completed before handing over to the Commissioning Engineer to sign into use.
- Provide all necessary personnel and equipment to perform the planning and implementation of the Inspection and Test plan.
- Prepare and implement a comprehensive, detailed inspection and testing program to accord with the Inspection and Testing Plan. (Refer to Chapter 2).
- Provide timely notification and allow for witnesses to be present at inspections and tests and at all work within the ARTC's existing signalling locations or enclosures and when excavating or using mobile plant in close proximity to existing signalling cable routes or equipment. Limit the requirement to the use of two witnesses at any one time, unless otherwise agreed with the IWMP Representative.
- Inform witnesses of the detailed step-by-step procedures applicable to the inspection and testing being witnessed.
- Ensure that the independent accredited design checker is present at design tests.
- Prepare the Commissioning Work Package(s) and all documentation such as notices, rosters, instructions, programs for the commissioning and all associated works for all parties required to be involved in the commissioning. This applies to any stage or part of the works to be commissioned and is to include all personnel required to be present at the commissioning whether employed by or associated with the Contractor or not.
- Ensure that systems or equipment which have undergone off site testing are re-tested for certification when installed as part of the Works. Certification shall only be signed off when the equipment or systems are installed and tested as an integral part of the Works unless the Commissioning Engineer agrees to accept specific off-site inspections and tests for certification and the system or equipment so

certified is securely protected from damage or interference, inadvertent or deliberate.

- Monitor and control the progress and performance of certification inspection and testing activities against the program and the Inspection and Testing Plan and report as required by the Commissioning Engineer. The level of information and detail which shall be provided is indicated in Part 05 of standard Specification SCP 08 'Sample Inspection and Test Forms'.
- Package inspection and test documentation into an "Installation Inspection and Test Work Package" for inspections and tests before the commissioning stage and into "Commissioning Work Packages" for inspections and tests during the commissioning stages.
- Safeguard and rigorously apply detailed documentation control procedures to the issue and distribution of design drawings and copies there-of and to all certification inspection and testing documentation. Comply with standard Specification SCP 06.
- Work only to the latest approved design drawings and utilise Modification Instruction Forms, or approved equivalent, for modification to designs.
- Strictly control any modification of issued designs or of equipment and wiring after it has been inspected or tested at any stage of the work. Re-inspect and re-test any equipment or wiring which has or could have been affected by the modification or by any interference.
- Ensure that at the completion of the Works or any significant stage thereof, all plans, drawings, circuits etc accurately reflect the "as built" status of the work or stage, including any modifications which may have occurred during commissioning, and have been checked and certified as accurate representations of the "as built" status. Forward such plans, drawings circuits etc to the person or organisation nominated in the Contract within the stipulated time period.
- Submit the Inspection and Testing Plan, the Inspection and Testing Procedures, the Inspection and Testing Program, the Installation Work Package and the Commissioning Work Package, as they are prepared, to the Commissioning Engineer for review so that the Commissioning Engineer will be able to assess the integrity of the total Inspection and Testing process.

Note:- Within the extent and bounds of the work under the Contract, it is the Contractor's responsibility to provide, and ensure by sufficient inspection, testing and certification, the provision of safe and reliable signalling and train control systems.

The Contractor shall not place reliance on the provision or issue of type approvals, reviews, checks, approvals, audits, supervision witnessing, acceptance tests, and the like by ARTC

or the IWMP, or their representatives or agents, to ensure his compliance with the contract requirements.

The Contractor's responsibility for the provision of safe and reliable signalling and train control systems shall not be reduced by acceptance of or issue of accreditation for any of the Contractors staff or sub-contractors by ARTC or the IWMP, or their representatives or agents, nor by their acceptance of any of the work under the Contract, nor by the signing into use of any of the Works by the Commissioning Engineer.

1.4.2 Contractor's Personnel

The Contractor shall:-

- Appoint suitably qualified, fit and competent, and accredited persons to the positions of Design Engineer In Charge, Project Engineer Construction, and Tester In Charge.
- Ensure that persons appointed to these positions and to any other position which will involve sign-off, or authorisation for use, of designs, or certification and/or verification of correct installation and of inspection and testing, are suitably experienced and of proven ability for the activity at the level of responsibility and knowledge required. Persons who have been appointed at lower levels of complexity or responsibility shall not be appointed to activities at higher levels unless they have successfully undergone further qualification and assessment of fitness and competence.

(Guidelines for the minimum qualifications required to perform certification inspections and tests are set out in table 1.4.2. The Contractor shall adhere to these guidelines unless approval to do otherwise is obtained from ARTC's General Manager ISP or nominated Signalling representative.)

- Ensure that the sign-off of all inspection and test forms and reports and certificates provided to the Commissioning Engineer, other than design checking and the design integrity test, is carried out by the Tester In Charge or Testers under the control and direction of the Tester In Charge. Design checking and the design integrity tests shall be the responsibility of the Design Engineer and the independent design checker.

Where persons are assisting Testers in carrying out certification inspections and/or tests and there is reliance on their competence and knowledge to ensure the integrity of the inspection or test, then ensure that these persons also are qualified, fit and competent to the level required for the particular inspection or test.

- Ensure that any person who has installed vital signalling equipment or circuits does not carry out the certification inspection and tests of the particular equipment items or circuit elements that they have installed.
- Provide evidence of the process for assurance of the competence and fitness of individuals conducting or assisting in certification

inspection and testing. Evidence should include selection criteria,

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training, documented procedures, restrictions on working excessive hours.

Submit to the Commissioning Engineer the relevant details of all persons conducting, or assisting in, certification inspection and testing of signalling installations and designs including advice of their particular role(s) and responsibilities. Details would include; relevant qualifications, record of training, work history, references from previous employers.

Ensure that, for all certification inspection and testing, the identity of the Tester conducting and the person(s) assisting each inspection and/or test are traceable through the documentation in terms of the specific details of their activities. A register of names against signatures shall be kept.

The Tester In Charge and Testers together with any personnel whose competence the Tester or Tester In Charge will rely on, are subject to acceptance by ARTC and the IWMP.

ARTC on the IWMP may require Contractor's personnel who are conducting or assisting in certification inspection and testing to attend and pass an examination based on the contents of this Specification. Such examination will be arranged by the IWMP Representative.

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Table 1.4.2 Qualification Requirement Guidelines for New and Altered Works

CERTIFICATION INSPECTION AND TEST ACTIVITY	ASSIST IN TEST	INSPECT, TEST AND CERTIFY
Insulation Testing	*Elec Mechanic/Fitter	*Signal Maintainer/Installer Electrical
Wire/Null Count	*Elec Mechanic/Fitter	*Tester
Bell Continuity Test	*Elec Mechanic/Fitter	*Tester (Note 1)
Relay/Equipment/Wire Analysis	*Elec Mechanic/Fitter	*Tester
Strap and Function Test	*Elec Mechanic/Fitter	*Tester
Through Test	*Elec mechanic/Fitter	*Tester
FPL and Detection	*Signal Maintainer/Installer Electrical/Mechanical	*Tester
Mechanical Interlocking	Suitable Staff	*Tester
Control Tables	Suitable Staff	*Tester
Aspect Sequence	Suitable Staff	*Tester
Track Circuit Adjustment	*Signal Maintainer/Installer Electrical	*Tester
Points Correspondence	*Signal Maintainer/Installer Electrical	*Tester
Track Insulation (Bonding)		*Tester
Signalling Plan (Track Plan/Working Sketch)		*Tester

* A suitably fit, competent and experienced person accredited for the activity involved either by an approved documented accreditation process or by the Tester In Charge on a temporary basis.

Note 1 A signal maintainer/installer may carry out and certify this test of a circuit provided that a Tester is to carry out a Strap and Function Test on the circuit.

Testers for new and altered field works shall normally be signalling field engineers or, exceptionally, may be experienced signalling supervisors; for control table function testing, design integrity testing and aspect sequence testing, Testers shall normally be signalling design engineers.

1.4.3 IWMP Representative's Role

In the context of this Specification, the IWMP Representative's role includes the review or overview of the Contractor's work under the Contract and liaison between the Contractor and the IWMP, including;

- Checking that material and equipment supplied and installation work carried out meets the relevant specifications and is Type Approved.
- Checking that work on or adjacent to operating tracks (including maintaining clearances from live overhead wiring) is carried out in a safe manner from both the train and public safety and Contractor's employees points of view.
- Checking that Contractor's staff or sub-contractors employed to carry out certification inspection and testing are accredited to the level required by the certification tasks they are empowered to sign off by the Contractor.
- Making Witnesses and Team Auditors available when necessary. (The length of prior notice of the Contractor's requirement for witnesses is to be determined and agreed as part of the Contract Installation and Testing and Commissioning Plans)
- Co-ordinating the activities of the Commissioning Engineer.
- Co-ordinating the activities of the Signal Design Manager.
- Actively directing the manner in which work is carried out when:-
 - ~ There is any interference with working signalling circuits or equipment.
 - ~ It is necessary to install or test any equipment and/or wiring outside the limits of the Contract (as defined in the particular specification) to fully integrate the new work with the existing system.

1.5 Inspections and Tests

Generally inspections and tests for signalling works shall include the following typical physical and functional tests of the installation, programmed to cover the trackside apparatus, the trackside control equipment locations, the main interlocking rooms, the operator control centre, the power supplies and transmission systems, individually and as an integrated whole, in an ordered manner over the installation and commissioning phases of the project.

Refer to standard Specification SCP 08 for detail requirements for inspections and tests and also to chapters 2,3 and 4 of this Specification.

TYPICAL INSPECTIONS AND TESTS TO VERIFY PHYSICAL & FUNCTIONAL COMPLIANCE

Verify correct configuration, type, colour, labelling, inscriptions, positioning, clearances, rating, warding/pincoding/indexing, tightness, secureness, lock-up security, damage free, quality workmanship, no loose wires, extraneous items/material removed, temporary wiring/bridging removed, stagework removed.

Verify correct number of conductors on terminals, also tightness and termination workmanship.

Verify no conductors on spare terminals.

Megger test insulation of conductor to earth, frame, cable core to screen/drain, cable core to spare cores,

Bell/meter test for conductor continuity between wire termination points.

Verify conductor runs directly (ie no intermediate connections) between two wire termination points by hand tracing.

1. Test apparatus operates correctly from its local controls and power source and indicates its status correctly to local indications; 2. verify apparatus operates its contacts in correct correspondence and adjustment 3. verify mechanisms operate freely and within specified tolerances and in correct adjustment and that lights are correctly illuminated and focused/aligned.

(1. local operation and correspondence test, 2. contact proving test, 3. adjustment test)

Test apparatus opens and closes its contacts in correct correspondence and adjustment.

Test the circuit function energises and de-energises when its control devices change state and when fuses, links, are removed and replaced.

Test the circuit function is energised and de-energised by the specified contacts of its control devices when those individual contacts open and close; also when fuses, links are removed and replaced.

Test that functions interlock and/or control one another, in accordance with the control table.

Circuit function test the completed circuit over outgoing/incoming cable links and verify correct correspondence.

Test correspondence from initial input to final output for controls and indications combined.

Test track relay is dropped away when the track circuit is shunted by a train (Train Shunt Check) or by a fixed shunt of the correct value at the relay end (Fixed Shunt Check) or by a fixed shunt at all extremities (Fixed Shunt Test).

Test for polarity reversal at block joints between adjoining track circuits, at all extremities.

Test power supply polarity is correct and has not been reversed when transformers are changed or when wiring is interfered with.

Test that power supply busbars are free of earths. Test that power supplies busbars are not interconnected.

Test mechanical locking (to Locking Table, Locking Diagram, Working Sketch) of interlocking frames, release switch locks, electric locks, releasing keys, annett locks, pilotman's locks, half pilot staff locks, staff instruments, staff contact boxes, bolt locks, bracket locks, mechanical detectors/selectors, train bars, depression bars, facing point lockbars, emergency switch machine locks, etc

1.6 Pre-Site Testing

Equipment cabinets, location cases, relay racks or equipment racks which are wholly or partly pre-wired before delivery to site shall be inspected and tested prior to delivery for conformance to design and to construction standards in respect of both equipment content (and location where relevant) and wiring of circuits.

The inspections and tests should include: General Apparatus Inspection; Bell Continuity Test; Insulation Test; Wire Count; Null Count;

This should be done as a quality control check, not a certification inspection and test, carrying out and recording the inspections and tests in the standard manner but using the “approved for construction” design drawings.

Once all pre-site testing has been completed and all the drawing sheets have been signed as an indication that all tests have been completed, hand over the marked up design drawings to the Commissioning Engineer as a record of work completed prior to on-site installation and testing.

Also complete a copy of the respective standard Pre-site Test Certificate and submit the Pre-site Test Certificate to the Commissioning Engineer prior to dispatch of the equipment to site. A copy of this Pre-site Test Certificate is to be attached to the equipment.

If any part of the certificate cannot be completed due to missing equipment or internal wiring then these deficiencies must be listed on the respective drawing and on the Pre-site Test Certificate.

In exceptional cases, if it is agreed with the Commissioning Engineer that the pre-site inspection and testing will be accepted as the certification inspection and testing, then arrange for the inspection and testing being performed by the Tester to be witnessed by persons appointed by the IWMP Representative (unless otherwise determined by the Commissioning Engineer) and marked up on Test Copies of the design drawings. In such case the equipment and circuits shall be wholly completed without defects and then shall be adequately secured and protected (until commissioned) from the possibility of alteration by persons not fully aware of the certified conditions. Also, the equipment and circuits shall be protected from the possibility of damage, degradation or other condition that could impair their certified integrity. In these cases, mark the Pre-site Test Certificate as the certification test certificate.

1.7 Installation, Interface and Temporary Work:- Requirements for Assurance of Safety

In order to ensure the safety of the new signalling system and of ARTC’s existing signalling system the Contractor shall ensure that there is a clear definition and understanding of the work and the division of responsibilities at interfaces.

Temporary work and stage work shall be carried out to standards which will not compromise the safety of any operating part of the signalling system.

Where the minimum standards for temporary or stage works are not laid down in this or any other ARTC specification, the minimum standards to be employed shall be “as new” standards or standards agreed with the IWMP Representative.

1.7.1 Temporary Work, Stage Work and Interfaces

Unless specifically stated otherwise in the Particular Specification for the Works, the Contractor shall be responsible for:

- Ensuring that any division of work at interfaces is clearly understood by all involved parties.
- Co-ordinating the work at interfaces.
- Limiting the track possessions requirements for commissionings by carrying out inspection and testing prior to commissioning where practical .
- Ensuring that at interfaces any inspection and testing required of ARTC’s existing signalling installation and the details of the changeover are included in the detailed Inspection and Test plan.
- The planning, design, provision of materials for, and implementation of any stage works, temporary works or interfacing work, and the production of all necessary documentation to clearly identify the scope of the work to be carried out, new equipment to be commissioned and old equipment to be removed or placed out of use.
- In cases where equipment which will form part of the Works is installed by others but is required to be inoperative and by-passed until commissioning to allow the existing system to operate, making provision for such work by others. Also arranging for the removal of any temporary bridging during commissioning.
- Where necessary for the progress of the Works, carrying out any alteration, relocation, adjustment, reconfiguration or protection of existing infrastructure. Any such work shall be submitted for approval and shall be carried out fully in accordance with relevant parts of this Specification and other Contract Documents applicable to work with existing infrastructure, including relevant parts of the Signalling Maintenance Procedures Manual SMP 00 and any ARTC Safeworking Procedures which are applicable during the duration of the Contract.
- Inspecting and testing, in the presence of a witness, any alteration, relocation, adjustment or reconfiguration to existing equipment before certifying its suitability to be restored to use
- Arranging stage work and interface designs so that there is a minimum of interference to existing equipment or wiring, in particular within relay rooms, huts or locations.

For temporary works, minimising the amount of equipment temporarily mounted within, and work carried out within an existing location using,

where practical, temporary enclosures mounted adjacent to the existing location.

Similarly for work at interfaces which are or will be part of the final, minimising the new equipment and work in the existing location using, where practical, new permanent equipment enclosures mounted adjacent to the existing location, unless otherwise specified or determined under the contract.

- Arranging positive identification between commissioned items of equipment or circuits situated in housings with other items of equipment or circuits which have not yet been commissioned.
- Identifying all temporary works as such, in a manner that is immediately clear and obvious to any interested observer.
- Unless otherwise approved by the IWMP Representative, carrying out temporary works to the standards required by the respective ARTC standard specifications.
- As soon as temporary works are no longer required, restoring the situation to the condition applying before the temporary works were carried out, or, if this is not possible, to the satisfaction of the IWMP Representative
- At final interfaces between the work under the Contract and ARTC's existing installation providing:-

all of the designs, materials, equipment and work, including inspection and testing, necessary to complete the interface irrespective of the percentage of work outside the defined renewal area, and,

all track circuit equipment necessary for alteration to any existing track circuit adjacent to the renewal area to ensure compatibility of track feeds/relays, power mains phasing, traction tie-ins etc at and over the interface.

1.7.2 Connections at Interfaces

Existing signalling equipment or circuits shall not be interfered with, disconnected or connected to except where specified under explicitly stipulated conditions.

Existing signalling equipment and circuits shall be taken to mean any installed and commissioned equipment and circuits whether in use or booked out of use.

Only IWMP personnel who are suitably qualified, or closely supervised by a suitably qualified person, are permitted to connect to, disconnect or interfere with signalling working circuits or equipment.

Except during the commissioning of the Works, any new wiring which is run into an existing location or item of equipment shall be insulated and isolated from all working wiring and terminals so that there is no possibility under any conditions that electrical connection can be made between the new wiring and the existing working wiring or terminals, including no possibility of mistaken connection. Suitable insulating devices shall be used to securely insulate the

exposed ends of loose wiring, but, where practical and permissible, the wiring should be terminated on terminals isolated for the purpose.

All such new wiring shall be fully tested and results recorded and it shall be clearly and distinctly identified and labelled as being new work yet to be commissioned.

Any existing spare terminals shall be confirmed to be voltage free and isolated from the working signalling system before being used to terminate new wiring.

New wiring shall not be connected to spare terminals of existing items of signalling operating or processing equipment unless the item and all connected circuits are disconnected and booked out of use except where rigorous detailed procedures are documented and specifically approved with the connection to the spare terminals made by IWMP personnel who are suitably competent, qualified and authorised. The existing item may be restored to use after the connection to the spare terminal is securely made and prior to commissioning the new wiring, but only provided each new wire is properly insulated and clearly and reliably isolated at its other end until the new circuit is commissioned.

Where applicable, existing items of signalling equipment must also be mechanically disconnected by IWMP qualified personnel to prevent its movement before any electrical connections are made.

New wiring may be connected to spare terminals of link terminations for cable or wiring runs provided the terminals are proved spare and are clearly and reliably isolated with the link securely disconnected or removed entirely.

Existing traction bonding shall not be disconnected unless or until:

The new traction bonding is installed ready for changeover and is a direct like for like replacement of the old

The track circuits concerned have been disconnected and booked out of use and, if required, the traction overhead power has been isolated and "permits to work" have been issued.

1.7.3 Accuracy of Existing Signalling Plans and Circuit Diagrams

Prior to designing or commencing any work at interfaces the Tester In Charge, in association with the IWMP Representative, the Commissioning Engineer and the Signal Design Manager, shall confirm that the existing plans and circuit diagrams accurately reflect the "as built" condition of the signalling infrastructure to which the new work is to connect.

If there is reasonable cause to doubt that existing signal plans and circuit diagrams are accurate, then the existing equipment and circuits, which are to be altered to connect with the new work, will be tested and certified to correlate with the existing plans and diagrams.

Discrepancies found are to be referred to the Signal Design Manager before any modifications are made.

Where any discrepancy is found, all of that part of the existing equipment and circuits affected by the discrepancy are to be tested, and an "as built" circuit or drawing prepared. If the discrepancy is potentially unsafe, the IWMP Representative shall be advised and shall take immediate steps to have the situation made safe and the defect corrected.

Unless otherwise specified the accuracy of existing drawings at final interfaces is the responsibility of the IWMP.

1.7.4 Site Integrity

A Site Integrity Agreement shall be negotiated between the Contractor and IWMP Representative prior to the commencement of any work which interferes with or could affect or interfere with any existing ARTC equipment or circuits.

Prior to any significant alteration, addition, renewal, change out, or site work being commenced, a detailed site assessment of the condition of the location and the ability of the existing signalling wiring and equipment to withstand disturbance is to be carried out by the Contractor and the IWMP Representative.

All precautions to minimise disturbance to the existing equipment and damage to buried cables are to be agreed and documented.

The methods of work and procedures to be employed shall be fully documented and shall be signed off by both the Contractor and IWMP Representative.

Any interference with or damage to existing equipment or circuits shall be immediately protected and made safe and the IWMP Representative shall be immediately advised of details of the incident.

All work which interfaces with, interferes with or affects or alters any existing ARTC equipment or circuits shall be carried out by accredited personnel and shall comply with ARTC's Safeworking Procedures.

Only persons who are properly instructed and who are specifically authorised by the IWMP are permitted to work in existing equipment locations and relay rooms without being closely supervised by suitably qualified IWMP staff.

Testing Environment and Cleanliness

Signalling equipment buildings, relay rooms and signal control centres shall be considered to be clean areas. These areas shall:

Be maintained free of rubbish and debris at all times

Be smoke free areas (this requirement is extended to all areas within buildings whether clean areas or not)

Meal rooms and facilities and change rooms/ablution blocks shall be provided external to these areas.

Suitable secure (lockable) storage for test equipment, circuit books, track plans and records shall be provided.

Test Documentation and Records

1.9.1 Test Documentation

The Test Copy of the design details shall be the primary auditable record of inspection and testing achievement.

Test Certificates and check-lists, as shown in chapter 4 of this Specification and in standard Specification SCP 08 or as otherwise approved by the Commissioning Engineer, shall be used as necessary to demonstrate that all certification inspection and testing activities have been fully carried out.

The progress of the testing shall be monitored. The current status of what has been completed and what is still to be done shall be clearly visible.

Prior to the commencement of certification inspection and testing, issue the respective inspection and testing documents, and comply with the requirements of standard Specification SCP 06.

For greater control, limit the number of Test Copy sets of design drawings to just enough to facilitate the testing and meet the testing program.

The Test Copies of design drawings shall be used by the Testers for the certification inspections and tests and they shall be based on the "Approved for Construction" status drawings updated to include any corrections and permitted alterations and additions found necessary during pre-site inspection and testing or installation of the works.

Check the Test Copy control pages of circuit books for all amendments and cross check with the Register of Modification Instruction Forms. Check that other Test Copy design drawings are the latest version updated copies.

Hold the "Test Copy Master" in safe custody and progressively mark up the completed inspections and tests and include any testing comments.

Issue the "Test Copy Master – Duplicate for Commissioning Engineer" to the Commissioning Engineer and keep it marked up to be the same as the Test Copy Master. Duly stamp and sign.

The installation is to be inspected, tested and certified to the "Test Copy" sets by the Testers appointed by the Tester In Charge.

Separately identify each set clearly and permanently, by the area to be covered by the testing.

Register the details of the issue of each set including the name of the Tester responsible for its safe keeping.

Clearly mark in each set the extent and limits of the testing to be carried out by the Tester issued with that set.

Allocate the respective set to the Tester responsible for inspecting and testing these areas of work.

Record individual inspections and tests on the Test Copies using check marks and annotations as shown in standard Specification SCP 08 or as otherwise approved by the Commissioning Engineer.

As each circuit or item is inspected and tested, each completed or partly completed sheet is to be signed and dated by the Tester who carried out the respective inspection and testing, and countersigned by the witness appointed by the IWMP Representative, where in attendance. The Tester In Charge is also to countersign the sheet as verification of his/her satisfaction that the inspection and testing performance is correct.

At the completion of each day's testing, transfer all testing comments and satisfactory completion notations to the "Test Copy Master" sets and attach copies of tested and certified Modification Instruction Forms to the respective "Test Copy" sets and to both "Test Copy Master" sets.

Endorse the "Test Copy" sets with the Contractor's Representative's signature and date to confirm that this has been done.

On each sheet the following endorsement shall appear:

Tested By -

Tester Signature Date

Witnessed By -

Witness Signature Date

Testing Complete and Comments Transferred to both "Test Copy Master" sets -

Tester In Charge Signature Date

The Tester In Charge shall closely examine all the completed "Test Copy" sets and verify that each and every circuit and item of equipment requiring inspection and testing to the drawings has been fully inspected, tested and signed off by the Tester, and the IWMP Representative's witness, when in attendance; and certify to this on the particular Test Copy and also on both the "Test Copy Master" and "Test Copy Master – Duplicate for Commissioning Engineer".

In cases where some certification inspection and testing to design documents cannot be completed until the commissioning stage (eg; when installation or changeover work is carried out), then, where practical, carry out and record those inspections and tests in a separate Test Copy set held for the Commissioning stage, rather than holding over a Test Copy set which has been partly used for certification inspections and tests in the installation stage.

All modifications not included in the Test Copy design drawings shall be inspected, tested and certified on Test Copies of the respective Modification Instruction Form.

Once the required inspections and tests for a particular Test Copy set are completed, the Tester in Charge shall endorse the relevant sheets and ensure that only the inspections and tests completed are recorded as completed, and shall then handover the particular Test Copy set to the Commissioning Engineer. The Commissioning Engineer will keep the set in safe custody and thereafter make it available for reference by the Tester In Charge as requested.

All signalling design changes, including corrections of detail, shall be authorised and recorded using discretely numbered Modification Instruction Forms, as described in standard Specification SCP 06. The Test Copy Master shall also be used to update the design drawings with relevant amendments arising from the inspection and testing and marked up on Test Copies.

1.10 Test Log and Status Certificate

A Log shall be used to formally record any queries, discrepancies or deficiencies arising out of the conduct of certification inspection and testing. The Log shall also

include all certification inspection and testing activities, tasks and events not covered by Work Instruction.

Each item shall be given a separate item number when entered on the Log.

The Tester shall initially fill in the Log detailing the problem as it is perceived. The symptoms shall be clearly identified and where necessary, shall give guidance to the person from whom the response is required.

Any design modifications necessary shall be set out on Modification Instruction Forms and shall be independently checked by a competent person before approval. All resulting modifications shall be subject to retesting which shall include all parts of the installation which could have been affected by the alteration.

During the installation stage a specific Installation Inspection and Testing Log should be created whereas, at commissioning, the Commissioning Log provided for the purpose may be used to also record commissioning reports and events not specifically related to the certification inspection and testing.

An Installation Inspection and Testing Status Certificate shall be completed to certify that all planned certification inspections and tests to be carried out during the installation stage are properly completed except for any nominated inspections and tests to be carried over to the commissioning stage and included with other inspections and tests planned for the commissioning stage. Acceptance of the Installation Inspection and Testing Status Certificate by the Commissioning Engineer will be a prerequisite to approval for the Commissioning Work Package. The Status Certificate shall document lists of uncompleted Work Instructions and uncompleted actions from the Installation Inspection and Testing Log and lists of any approved variations to the Inspection and Testing Plan or to Standards or Procedures.

1.11 Advertising of the Works

Except where otherwise agreed with the Commissioning Engineer, the Contractor shall prepare the Weekly Notice Inspection or Circular which describes the operational extent of, and any specific operating requirements for, the Work to be commissioned.

This shall be provided to the Commissioning Engineer a minimum of nine (9) weeks prior to the date of commissioning except as otherwise agreed.

The advertising arrangements shall meet the requirements of ARTC's Safeworking Procedures.

1.12 Commissioning the Works

1.12.1 Plans and Programs

The Contractor shall prepare plans and programs for the commissioning of the Works and shall co-ordinate, direct and control the commissioning stage of the Works in close liaison with, and to the satisfaction of, the Commissioning Engineer.

The plans and programs for commissioning of the Works or any part thereof shall provide for all work to be carried out in compliance with ARTC's possession requirements and Safeworking Procedures.

These plans and programs shall include rosters and work instructions for all persons engaged in the commissioning. Rosters shall take into account maximum working hours for staff engaged in safety related work and rosters and procedures shall comply with all relevant Occupational Health and Safety legislation and regulations applying in New South Wales.

The plans and programs for the commissioning shall allow adequate time and resources to complete the work and shall include risk minimisation strategies and contingencies for any undesirable eventualities that can reasonably be anticipated within the allocated possession time. Eventualities that can reasonably be anticipated include inclement weather, additional rail traffic through the possession area, delays in obtaining overhead power isolation and 'permits to work', plant breakdown, equipment failure and damage, faults detected in previously untested work, and staff illness or injury.

Refer to chapters 2, 3 and 4 for detail requirements of inspection and testing plans and programs and for work documentation packages inclusive of Work Instructions, Registers, Logs and Test Certificates for controlling and recording the work, in particular the Commissioning Work Package and its associated procedures.

1.12.2 Operational Requirements

It is desirable that all field activities associated with the de-commissioning, changing-over and testing works, and commissioning, be carried out in a non-train running environment. If train running is unavoidable, any testing that is going to disrupt the train running shall be carefully planned and completed in the time available. All hazards during testing and commissioning shall be identified and appropriate contingency plans shall be put in place.

Communication paths between the Tester-in-charge, The Commissioning Engineer and the person in charge of train operations shall be clearly defined and agreed at all times.

There shall be a clear understanding and agreement between all involved parties of the safeworking systems to be employed during the period from the shut down of the old system to the commissioning of the new system.

1.12.3 Testing and Certification

All inspection, testing and certification carried out during the commissioning shall be recorded and the records shall be available for audit at any stage of the commissioning.

1.12.4 Liaison

Close liaison with the Commissioning Engineer shall be maintained throughout the commissioning. In particular the Commissioning Engineer shall be kept informed of the progress and performance of the work and shall be immediately advised if there arises any potential for delay in completion of the

commissioning or if it is likely that only part of the commissioning can be completed, or if a change in scope or methodology is required.

1.12.5 Interfaces

At interfaces, after connection and integration of the new work with the old, certification through tests of each complete circuit and equipment function shall be carried out.

1.12.6 Design Modifications

If any design modifications are found to be necessary during the commissioning, the requirements of Specification SCP 06 shall be strictly applied, using the Modification Instruction Forms.

1.12.7 Commissioning Certificate

When satisfied that all required installation, inspection, testing and certification is complete, and all redundant equipment has been decommissioned and made safe, and the Works, or the relevant part thereof, are fit for purpose and ready for use, are in accordance with the Contract requirements, and meet all rail safety requirements, the Contractor shall issue a Commissioning Certificate to the Commissioning Engineer. This certificate shall be signed by the Tester in Charge and shall be equivalent to the sample Commissioning Certificate shown herein.

COMMISSIONING CERTIFICATE		NO.	
		Sheet	of
PROJECT:		STAGE:	
INSPECTION AND TESTING PLAN REFERENCE NO. :		WORK PACKAGE NO.:	
Location		Contractor	
Weekly Notice No.		Circular No.	
ITEM	WORK ACTIVITY	STATUS	SIGNATURE
1.0	INSTALLATION COMPLETE		
	WORK INSTRUCTIONS ALL CHECKED AND ACTIONED		
	COMMISSIONING LOG ALL ENTRIES CHECKED AND ACTIONED		
	OTHER		
2.0	SIGNALLING APPARATUS INSPECTION & TESTING COMPLETE		
	SIGNALS		
	POINTS MACHINES/GROUND FRAMES		
	TRAINSTOPS		
	TRACK CIRCUITS		
	LEVEL CROSSINGS		
	POWER SUPPLIES/SURGE PROTECTION/EARTHING		
	CABLES		
	EQUIPMENT LOCATIONS/RELAY ROOMS		
	CONTROL CENTRE/OPERATOR INTERFACE		
	TELEMETRY		
	TELECOMMUNICATIONS		
	SAFEWORKING INSTRUMENTS		
	OTHER		
(See over page for completion of Commissioning Certificate)			

(Commissioning Certificate No		Continued)	
ITEM	WORK ACTIVITY	STATUS	SIGNATURE
3.0	CONTROL TABLE FUNCTION TEST/DESIGN INTEGRITY TEST CERTIFICATION COMPLETE		
	MECHANICAL INTERLOCKING		
	RELAY BASED INTERLOCKING		
	COMPUTER BASED INTERLOCKING		
	AUTO SECTION		
	BLOCK/STAFF SECTIONING		
	LEVEL CROSSINGS		
	ASPECT SEQUENCE		
	OTHER		
4.0	DOCUMENTS CHECKED, COMPLETE AND CERTIFIED		
	TYPE APPROVAL		
	LATEST ISSUE DESIGN DOCUMENTS (LIST IN DETAIL, ATTACH SHEET IF NECESSARY)		
	MODIFICATIONS (LIST FIRST AND LAST NO.S)		
	MASTER SHEETS TRACK CIRCUIT		
	TEST CERTIFICATES, CERTIFICATION INSPECTION AND TESTING CHECKLISTS		
	C.B.I CERTIFICATES (LIST IN DETAIL, ATTACH SHEET IF NECESSARY)		
	OTHER		
5.0	REDUNDANT EQUIPMENT DECOMMISSIONED AND MADE SAFE.		
6.0	EXCEPTIONS (INCLUDE LIST OF DETAILS OF ANY PLANNED WORK NOT TO BE COMMISSIONED INTO USE, ATTACH SHEET IF NECESSARY)		
COMMISSIONING STATEMENT			
I CERTIFY THAT THE WORK BEING COMMISSIONED HAS BEEN FULLY INSPECTED AND TESTED AND IS FUNCTIONAL, FIT FOR PURPOSE, AND IN ACCORDANCE WITH THE SPECIFIED REQUIREMENTS, AND READY TO BE BROUGHT INTO USE			

TESTER IN CHARGE :

NAME :

SIGNATURE :

DATE : **TIME :**

Superseded

1.12.8 Decommissioning and Disposal

De-commissioning and disposal shall be planned as part of the testing and commissioning activities, and safe and efficient disposal should be a condition of the completion of the project.

It shall be responsibility of the Tester In Charge (in liaison with the Commissioning Engineer) to:

- establish the impact of decommissioning and disposal on any system or external facility associated with the system to be de-commissioned;
- plan the decommissioning, including the establishment of procedures for:
 - the identification and removal of all de-commissioned and redundant equipment;
 - the safe shut down of the system and any associated external facility;
 - the safe dismantling of the system and any associated external facility;
 - the assurance of continued functioning and safety integrity of any systems or external facility affected by the decommissioning of the system.

All redundant materials, structures and equipment including wire and cable shall be removed during the commissioning wherever such equipment will impinge on the operation of the new work or could lead to confusion or distraction of train drivers, operators or maintainers. Train staffs, annett keys and locks, "Fortress" keys (on ESML or EOL systems) and locks shall be handed to the Commissioning Engineer and a receipt obtained.

1.12.9 Requirements for Commissioning to Proceed

The commissioning of the Works or any part thereof will not proceed until:

- Applicable spares, tools, test equipment are available on site or at an agreed location
- All applicable training courses for operations and maintenance staff have been completed
- Applicable circuit diagrams, plans, drawings, manuals and handbooks have been provided to maintenance staff. Where any modification has been necessary during the commissioning, a copy of the Modification Instruction Form shall be attached to the relevant circuit diagram, plan etc provided to maintenance staff.

1.13 Test Equipment

All instruments and apparatus used in inspections and tests shall be calibrated to the extent required to provide consistent measurement and the degree of accuracy

required by the inspection or test for which they are used. Calibration, where necessary, shall be carried out by a recognised authority and records of calibration shall be maintained and be available for audit at any time.

1.14 Equipment or Materials Supplied by the IWMP Representative

The Contractor shall be responsible for examining any equipment or material supplied by the IWMP Representative to ensure that it conforms to the Specifications and is in an undamaged condition when received.

If any deficiencies or defects are found, advise the IWMP Representative in writing, quoting model and serial numbers where relevant, as soon as possible after detection of the defect.

1.15 Acceptance of the Work for Commissioning into Use

The acceptance by the Commissioning Engineer of the work under the Contract as fit for purpose and ready to commission into use for traffic operations is conditional upon submission of proof of:

- conformity with the design documents
- compliance with the specification requirements
- safe operation of the Works, or phase, section or stage of the Works, including safe decommissioning and disposal of redundant equipment.

as evidenced by the progressive inspection and testing of the work under the Contract, the signed off inspections and tests on the relevant design documents, and the records, certifications and verifications in the Inspection and Testing records in the Installation and Commissioning Work Packages.

2 Program For Inspection, Testing, And Commissioning

2.1 Works Program

Refer to the Particular Specification regarding the contract Works Program programming requirements.

2.2 Program for Inspection, Testing, and Commissioning

Prepare and provide to the Commissioning Engineer an Inspection, Testing, and Commissioning Program as part of the Inspection and Testing Plan and as a detailed sub network to the contract Works Program.

The Inspection, Testing, and Commissioning Program should be developed and detailed in successive issues of the Inspection and Testing Plan (see chapter 3) and updated copies shall be provided to the Commissioning Engineer.

2.3 Progress Reporting of Inspection and Testing

Make provision in the Inspection, Testing, and Commissioning Program for the

provision to the Commissioning Engineer of reports on the status of each of the planned Inspection and Testing activities. Provide progress reports on a weekly basis unless otherwise approved.

2.4 Notification of Inspections and Tests

During the development of the Inspection and Testing Detailed Plan, ascertain from the Commissioning Engineer the specific inspections and tests which do not require notification to the Commissioning Engineer for the purpose of review of test documents and/or witnessing the inspection or test. Include the activities requiring notification in the Inspection, Testing, and Commissioning Programs and ensure that the Commissioning Engineer is formally notified as stated in the Inspection and Testing Plan and at least 14 calendar days before the due date of the inspection or test. The IWMP Representative or the Commissioning Engineer or persons appointed by them may witness any inspection or test activity without prior notice.

2.5 Commissioning Engineer's Review of Inspection and Test Plan

Submit each of the three stages (Strategy, Outline, Detail) of the Inspection and Testing Plan for review to the Commissioning Engineer.

Submit the Inspection and Testing Strategy to the Commissioning Engineer for review on the due date for submission of the contract Works Program, unless another time is specified.

Submit the Inspection and Testing Outline Plan to the Commissioning Engineer for review within 2 calendar months following the due date for the submission of the contract Works Program, unless another time is specified.

Submit the Inspection and Testing Detailed Plan for installation inspection and testing to the Commissioning Engineer for review 28 calendar days before the commencement of the installation stage certification inspection and testing activities, unless another time is specified.

Submit the Inspection and Testing Detailed Plan for commissioning inspection and testing to the Commissioning Engineer for review 28 calendar days before the commencement of the commissioning stage certification inspection and testing activities, unless another time is specified.

Utilise forms shown in Chapter 3 or agreed equivalent when submitting the various stages of the Inspection and Testing Plan.

Any subsequent changes to the Inspection and Testing Plan are to be submitted to the Commissioning Engineer for review 14 calendar days before the changes are programmed to be carried out.

All inspection and testing activities are to be so arranged as to be completed a minimum of 14 calendar days prior to the programmed commissioning of a designated area except, where necessary, for inspections and tests that cannot be performed before some particular installation and changeover work is completed during the commissioning stage.

2.6 Witnessing of Inspections and Tests

Include in the Inspection and Testing Plan a procedure for the witnessing of certification inspections and tests by appointed witnesses.

Inspection and testing shall be programmed so that not more than two witnesses are required at any time except at commissionings or as otherwise agreed by the Commissioning Engineer.

2.7 Reporting Defects and Irregularities Found During Testing

Promptly report to the Commissioning Engineer defects and irregularities found during or after certification inspection and testing. Investigate and establish the cause of the defect or irregularity.

Submit the proposed action to rectify the defect or irregularity to the Commissioning Engineer for review and permission to proceed.

The nature of the defect or irregularity shall be considered in relation to the extent of sub-standard work it could be representative of and consequently the depth and breadth of investigative and corrective action required.

Use standard Inspection and Test Form ITF 12 in SCP 08, or agreed equivalent, for notification by the Contractor and for obtaining the permission of the Commissioning Engineer.

Similarly should function tests, or other later events, reveal errors in the physical installation which earlier had been certified as correct, then this shall be immediately reported to the Commissioning Engineer, recorded in detail, and fully investigated and corrective action taken to the satisfaction of the Commissioning Engineer.

2.8 Attendance immediately following Commissioning

Make suitable persons readily available for 24 hours per day for up to five days following the commissioning into use of the Works, or phase, section or stage of the Works, in order to assist with failures or deficiencies, unless otherwise stipulated in the Particular Specification or agreed with the IWMP Representative.

Unless otherwise specified, these persons shall be available on site between 06.00 and 19.00 hours in the area bounded by Macarthur, Emu Plains, Cowan, and Waterfall.

Outside this area the times shall be as agreed with the IWMP Representative.

3 Inspection And Testing Plan

The Inspection and Testing Plan shall be formulated and prepared by the Tester in Charge in staged parts in accordance with the format below and utilising forms as illustrated, or in accordance with an equivalent process and documentation agreed with the Commissioning Engineer.

3.1 Identification

- i) Project Description
- ii) Register Number - This number will be provided by the Commissioning Engineer.

iii) Version number and date

3.2 Parts

The Inspection and Testing Plan is prepared in three staged parts which require review by the Commissioning Engineer:

- Part 1** Inspection and Testing Strategy
- Part 2** Inspection and Testing Outline Plan(s)
- Part 3** Inspection and Testing Detailed Plan(s)

3.3 Inspection and Testing Strategy

The Inspection and Testing Strategy is a written general description of the approach to the inspection and testing requirements and the general scope of work, methods and resources required for significant aspects, and should cover the following areas.

- Implementation Strategy for the Works
- Strategy for Inspection and Testing for Safety Certification and Quality Assurance aligned with the Implementation Strategy for the Works.
- Strategy for Quality Assurance.
- Identification of Inspection and Testing of Stage Work and Interface Work
- Scope, methods and resourcing of Inspection and Testing at all Interfaces
- Practices to be used to confirm the condition of any existing systems to be modified eg site integrity agreement, design correlation check, identification of standards
- Existing signalling required to be booked out of use or removed.

Provision for booking out of use or removing existing signalling as a prerequisite for planned Inspection and Testing.

- Possession requirements for inspection and testing.

Provision for obtaining possession of signalling sites in accordance with the Works Program and for ascertaining train operation and safeworking arrangements.

- Inspection and Testing Staff Required
- Organisation Chart for the Inspection and Testing Programme
- IWMPs Involvement

Statement of the levels of involvement of the IWMP Representative's nominated appointees.

- Access Requirements.

List of special access requirements to the ARTC sites for the purpose of

conducting inspections and tests.

- Co-ordination with other works

Procedure for identifying other works, liaison with responsible parties, and identification of responsibilities for the co-ordination activities.

- Test Equipment and Communication Requirements

List of test equipment and communication facility requirements for each part of the Inspection and Testing program including test instruments, specialist tools, test trains, portable radios.

- Training and accreditation requirements for inspection and testing personnel
- Special Considerations

List of matters which need to be resolved with the IWMP Representative regarding the implementation of the Inspection and Testing Program

- Reviews and Approvals Required

Schedule of reviews and approvals required from the IWMP Representative such as:

- Documentation reviews
- Inspection and testing personnel review
- Possession approvals
- Access approvals
- Equipment and/or system Type Approvals
- Hazards and management of their risk
- Occupational Health and Safety issues.

An Inspection and Testing Strategy matrix checklist form is included herein as a checklist of inspection and testing activities to be addressed.

INSPECTION AND TESTING PLAN NO.			INSPECTION AND TESTING STRATEGY : CHECKLIST								
PROJECT NAME:	TYPE APPROVAL	DESIGN CONTROL			SITE INTEGRITY AGREEMENT protection of existing altered & new work	ACCEPT TESTING OF EQUIPT	INSPECTION OF APPARATUS		CIRCUIT TESTING	APPARATUS FUNCTION TESTING	SYSTEM FUNCTION TESTING
		Correlation of Existing to Documents	Document Status Control	Document Certification			GENERAL	WARDING/ INDEXING/ PIN CODING			
TESTER IN CHARGE											
SYSTEM / APPARATUS											
1 Train Describer											
2 Remote Control Panel											
3 Remote Diagram											
4 Telemetry System (Control, Indication)											
5 Local Control Panel											
6 Local Diagram											
7 Communications (Voice / Data) External											
Local											
8 Interlocking											
9 Distributed Controls											
10 Interfaces At Limit of Work											
Within Limit of Work											
11 Distributed Indications / Data Capture											
12 Electrical Power Supply											
Distribution											
13 Compressed Air Supply											
Distribution											
14 Cable Routes											
15 External Cabling											
16 Locations Earthing / Surge Protection											
D.C. Power supplies											
A.C. Power Supplies											
Relays											
Wires / Cables / Terminals											
Structure											
17 Apparatus Signals											
Train Stops											
Points											
Releasing Arrangements											
Track Circuits											
Level Crossings											
Indicators / Notice Boards											
Safeworking Phones											
18 Mechanical Ground Frames											

3.4 Inspection and Testing Outline Plan

Inspection and Testing Outline Plans for each stage of the work should be presented in the form of a matrix or as otherwise agreed with the Commissioning Engineer. A sample matrix format is included herein.

INSPECTION AND TESTING PLAN No: _____ **OUTLINE PLAN STAGE: Version** _____ **Date** _____
PROJECT NAME: _____ **STAGE:** _____ **TESTER IN CHARGE:** _____

ACTIVITY	SYSTEM/ APPARATUS	CERTIFIED BY	CERTIFICATION DOCUMENTS	STANDARDS/ PROCEDURES	TIME
Superseded					

Sample Matrix Format

Each Inspection and Testing Outline Plan should provide an overview of the individual inspection and testing activities to be performed on the particular systems and apparatus that constitute the Works, the sequencing of those inspections and tests, the general resourcing for those inspections and tests, and is described by the following:

3.4.1 Activity

Inspection and testing activities nominally fall into the following categories:

- Design Control
- Site Integrity Agreement

- Acceptance Inspection and Testing of Manufactured Equipment including Type Approvals
- General Inspection of Apparatus
- Circuit Testing
- Apparatus Function Testing
- System Function Testing

These are further broken down into stand alone units of work that are applicable to individual systems or apparatus.

3.4.2 System/Apparatus

These are the system elements identified in the Inspection and Testing Strategy described in more detail.

At this stage it is not necessary to identify each individual element, but rather the types and quantities of each element.

3.4.3 Certified By

Describes the category and competency of the person who will certify the completion of an activity.

3.4.4 Certification Documents

Describes the document types that will be provided to document the certification of an activity.

3.4.5 Standards and Procedures

Describes the reference documents for the performance of an activity.

3.4.6 Time

Describes the approximate start time and duration planned for an activity, and is related to the program for the project.

3.5 Inspection and Testing Detailed Plan

The Inspection and Testing Detailed Plan shall be based on the Outline Plan and shall attend in detail to the Inspection and Testing requirements of this specification and shall include, but not be limited to, the following:

- Inspection and testing activities as described in Chapter 2 of SC00 410200 SP "Requirements for Inspection and Testing" broken down into stand alone units of work applicable to individual items of apparatus or systems.
- Inspection and testing standards and inspection and testing procedures to be used for each Inspection and Testing work activity.

- Work Packages where the inspection and testing documentation is to be stored viz.

Installation Inspection and Testing Work Package
Commissioning Work Package

- Names and qualifications of personnel who are to certify the signalling item or installation in regard to safety.
- Certification documentation for each inspection and testing activity
- An inspection and testing description for each separate inspection and testing activity.
- A breakdown of the apparatus to be inspected and tested into the particular elements that are individually numbered or identified on Working Drawings
- The time that an inspection and test activity involves in terms of:
Installation phase or commissioning phase

Date, time, depending on the nature of the activity

Duration in terms of days or hours depending on the nature of an activity

- Resources to be allocated to each activity in terms of:

Team number

Special equipment required

Number of people in team

Category of personnel in the team including names and competency accreditation

- Number of the Work Instruction describing the activity

Superseded

4 Inspection And Testing Documentation Work Packages

4.1 Documentation Structure

Manage the certification inspection and testing of the total scope of the work by the use of a structured set of documentation Work Packages.

Utilise the Work Package structures, procedures and forms as described hereinafter, or equivalent agreed with the Commissioning Engineer.

For any equivalent proposed the division of responsibilities between the Contractor and the IWMP shall be the same as specified, individual responsibilities shall be clearly set out, and the quality of the Work Package and the quality control and assurance provided by it shall in no way be less than that achieved by the Work Package arrangements described hereinafter.

The Work Packages shall consist of the following and shall be available at any time for safety and quality surveillance and audit by the Commissioning Engineer.

The following work packages are required:

Installation Inspection and Testing Work Package

Commissioning Work Package

Each Work Package shall be registered with a discrete Work Package number provided by the Commissioning Engineer and shall include the same Project Description as provided for the Inspection and Testing Plan.

Submit each of the Work Packages, when prepared and approved by the Tester In Charge, for review and approval in principle by the Commissioning Engineer and, in the case of the Commissioning Work Package, for review and approval in principle by the IWMP Representative also.

4.2 Installation Inspection and Testing Work Package

The Installation Inspection and Testing Work Package procedures shall be similar to and adapted from the Commissioning Work Package procedures described in section 4.5 hereinafter, and shall be the medium for integrating the practical details of inspection and testing with the Installation Works Program. The work package shall be based on the Detailed Inspection and Test Plan.

Prepare and implement installation inspection and testing procedures, work instructions, checklists, certificates and other records to provide the necessary quality control and safety assurance as required by the specifications.

The Installation Inspection and Testing Work Package shall contain all safety and quality assurance records for signalling items manufactured for subsequent installation at site.

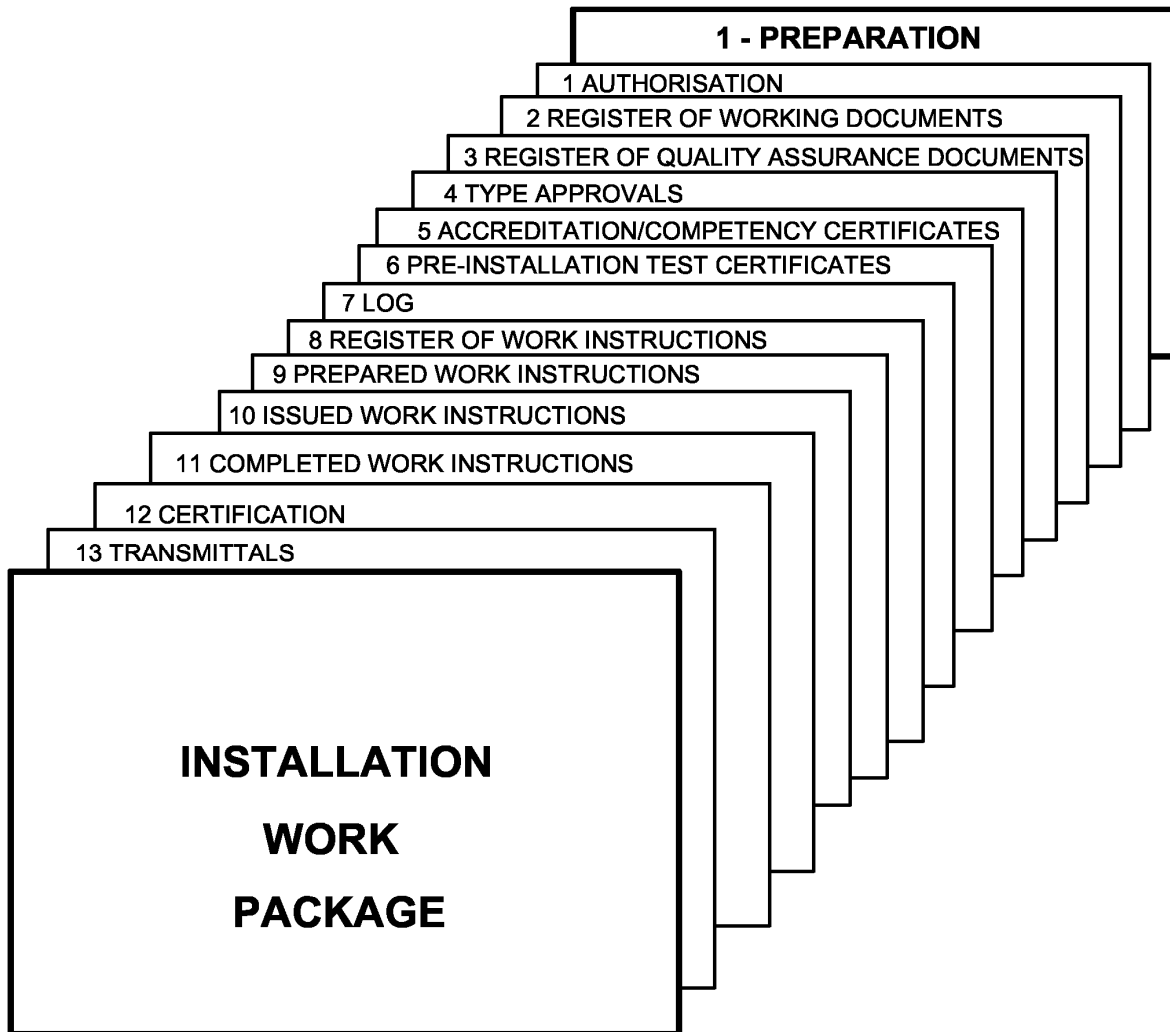
Carry out such tests and procedures recommended by the manufacturer of equipment.

The original of Test Certificates, provided by material or equipment manufacturers or suppliers to the Contractor, shall be forwarded to the Commissioning Engineer prior to the installation of the respective equipment, and copies included in the Installation Work Package.

Requirements and structure for the Installation Inspection and Testing Work Package are illustrated and described as follows: Samples of associated forms requiring sign off are included in section 4.8.

Superseded

4.3 Installation Inspection and Testing Work Package Structure



1 Authorisation of Package

2 Register of Working Documents

Complete the register of working documents, and update progressively as soon as information becomes available, showing the current version with earlier versions clearly designated as “superseded” in the Register, and include the following ;

Construction Copies of Working Drawings including :

- Circuit Book
- Signalling Plan
- Track Plan
- Track Insulation Plan (Bonding Plan)
- Working Sketch
- Locking Table
- Locking Diagram
- Modifications (Modification Instruction Forms)

Signal Sighting Forms

Detailed Site Survey Plans

Site Installation Drawings

- Equipment Layout
- Equipment Design
- Modifications

Sign off that all "as built" drawings are included in the Handover Documentation Package.

Equipment and Operating Manuals

Test Copies of Working Drawings

3 Register of Quality Assurance Documentation

Quality Assurance documentation covers inspection and testing activities that are not included as part of the safety certification records.

- Site Inspection Reports (Quality) eg. references Detailed Site Survey, Spec SCP 21, etc
- Acceptance of Manufactured and/or Installed Equipment

- Manufacturer's inspection and testing certificates

Superseded

- Off site inspection and testing certificates eg., Pre-Site Test Certificate
- On site inspection and testing certificates
- Ready for Test Certificates

4 Type Approvals Specific for Project

(Required from Signal Standards Engineer, ARTC)

5 Accreditation/Competency Certificates

6 Pre-Installation Acceptance of Equipment and Software

- Inspection and testing certificates involving bell continuity testing or wire counting, null counting, not repeated after installation
- Inspection and testing certificates involving function or system testing, not repeated after installation.

7 Installation Inspection and Testing Log

8 Register of Installation Work Instructions

9 Prepared Installation Work Instructions

10 Issued Installation Work Instructions

11 Completed Installation Work Instructions

12 Certification of Installation Work Package

- The Installation Work Package is signed off 2 weeks before the commissioning to enable authorisation of the Commissioning Work Package. Uncompleted activities are transferred to precommissioning work instructions in the Commissioning Work Package. Installation Inspection and Testing Status Certificates are completed and signed off.
- This also includes variations to the Inspection and Testing Plan and approved variations to Standards.

13 Transmittals

Copies of Document Transmittal Forms for transmittals of all documents related to the Installation Work Package are inserted in the Section 13 of the Installation Work Package.

4.4 Commissioning Work Package

Prepare a Commissioning Work Package for commissioning of the Works, or each phase, section or stage of the Works as identified in the Works Program,

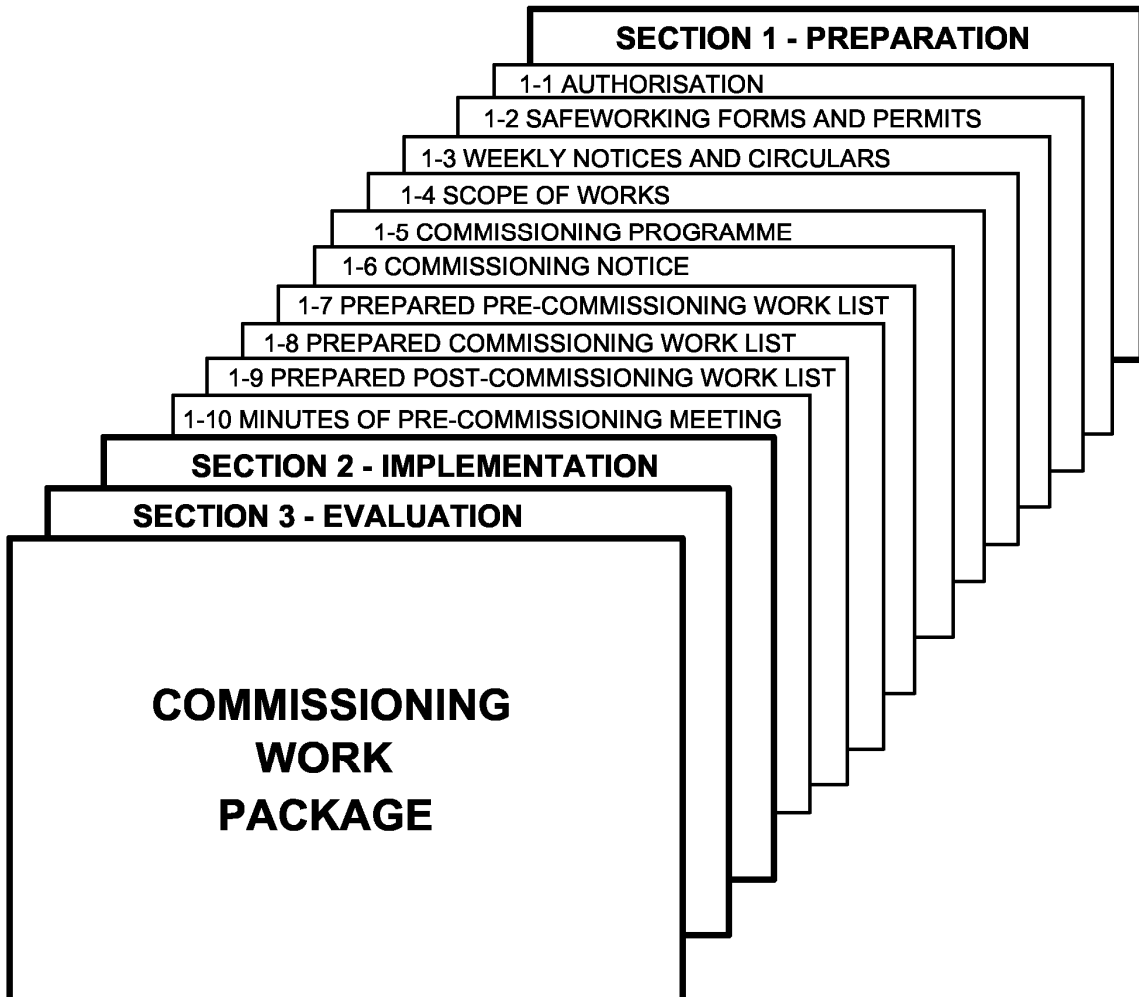
unless otherwise determined by the Commissioning Engineer.

Superseded

The requirements, responsibilities and procedures for a Commissioning Work Package are described as follows in three sections. Samples of associated forms requiring sign-off are included in section 4.8. The contents of the Commissioning Work Package are set out as follows:

SECTION 1 – PREPARATION	REFERENCE
AUTHORISATION	1-1
SAFeworking FORMS & PERMITS	1-2
WEEKLY NOTICES AND CIRCULARS	1-3
SCOPE OF WORKS	1-4
COMMISSIONING PROGRAMME	1-5
COMMISSIONING NOTICES	1-6
PREPARED PRE-COMMISSIONING WORK INSTRUCTIONS	1-7
PREPARED COMMISSIONING WORK INSTRUCTIONS	1-8
PREPARED POST-COMMISSIONING WORK INSTRUCTIONS	1-9
MINUTES OF PRE – COMMISSIONING MEETING	1-10
SECTION 2 – IMPLEMENTATION	REFERENCE
REGISTER OF PRE-COMMISSIONING WORK INSTRUCTIONS	2-1
REGISTER OF COMMISSIONING WORK INSTRUCTIONS	2-2
REGISTER OF POST-COMMISSIONING WORK INSTRUCTIONS	2-3
COMPLETED PRE-COMMISSIONING WORK INSTRUCTIONS	2-4
COMPLETED COMMISSIONING WORK INSTRUCTIONS	2-5
COMPLETED POST-COMMISSIONING WORK INSTRUCTIONS	2-6
SECTION 3 – EVALUATION	REFERENCE
COMMISSIONING CERTIFICATE	3-1
COMMISSIONING LOG	3-2
ATTENDANCE BOOK	3-3
REPORT OF POST-COMMISSIONING MEETING.	3-4
TRANSMITTALS	3-5

4.5 Commissioning Work Package - Phase 1 Preparation Before Commissioning



4.5.1 Purpose

The purpose of this procedure is to provide directions for the preparation of the Commissioning Work Package.

4.5.2 Scope

This procedure covers the steps to be taken during Phase 1, the Preparation Phase for the Commissioning Work Package. This phase is called the Pre-Commissioning Period which starts with the preparation before commissioning and ends when the existing equipment is "booked out of use".

4.5.3 Applicability

This procedure is applicable to all commissionings.

It is a requirement that a Commissioning Work Package as described in this procedure is prepared for all commissionings. This requirement may be modified or reduced with the written approval of the Commissioning Engineer in special circumstances or if it is considered that the scope of the work is too small.

4.5.4 Responsibility

IWMP

The IWMP will arrange track possession and work co-ordination planning conferences and for the publication of Operations Documents as requested by the Contractor through the IWMP Representative.

Commissioning Engineer

The Commissioning Engineer will review and authorise the Commissioning Work Package in accordance with this procedure or an equivalent agreed procedure. The Commissioning Engineer will issue the register number for each Commissioning Work Package and will also arrange for the publication of the Weekly Notice insert and/or Circular and Driver's Diagram.

Tester in Charge

The Tester in Charge is responsible for arranging pre-commissioning conferences and briefings, preparation of the Work Package, preparation of the Weekly Notice insert and/or Circular and Driver's Diagram, documenting the scope of works to be covered by the commissioning; formulating the management and team structure; identifying teams required; preparing the program; preparing the Commissioning Notice; preparing the Work Instructions; preparing staffing details; providing personnel to perform activities; delivering updated asset register; obtaining approval in principle to use the Work Package; authorising and registering Pre-Commissioning Work Instructions; issue, use and completion of Pre-Commissioning Work Instructions; receiving, checking and actioning Pre-Commissioning Work Instructions, completion of the Register of Work Instructions.

Team Leaders

The Team Leaders are responsible for performing the work detailed on the Pre-Commissioning Work Instructions; completing, signing and returning Work Instructions to the Commissioning Headquarters.

Team Auditors

The Team Auditors are responsible for monitoring and witnessing the work of the team to which they are attached; completing, signing and returning Work Instructions pertaining to monitoring and witnessing tasks.

4.5.5 Definitions

Commissioning

Commissioning is that stage of the work where there is the bringing into use of any new work; stagework; alteration to existing equipment or wiring; replacement of existing equipment or wiring.

This excludes like for like or wire for wire replacements which involve no wiring changes.

Pre-Commissioning Period

The Pre-Commissioning Period coincides with the preparation phase of the Commissioning Work Package and ends when the Commissioning Period starts.

Commissioning Period

The Commissioning Period starts when the existing equipment is "booked out of use" and ends when the new work is "brought into use".

Post-Commissioning Period

The Post-Commissioning Period starts when the Commissioning Period finishes and ends with the Post-Commissioning meeting.

Team Auditors

The Team Auditor is a person nominated as such by the Commissioning Engineer.

Activity

An Activity is defined by the following:

1. A stand-alone unit of work.
2. Work required on a piece of equipment or apparatus that is individually numbered or that is identified on a Working Drawing.
3. Equipment Brought Into Use or Taken Out of Use.
4. Testing as set out in Standards and Procedures.
5. Safeworking requirements.
6. Documentation requirement.

Task

A task is one of a number of elements of work that are required to complete an Activity.

Authorising Officer

Person who has authority to prepare and issue a Work Instruction, ie, Tester in Charge or deputised Tester in Charge for Contractor's work, Commissioning Engineer or deputised Commissioning Engineer for IWMP work.

4.5.6 Associated Procedures

Procedure for Implementation of Commissioning Work Package

Procedure for Evaluation of Commissioning Work Package

4.5.7 Procedure for Preparation of Work Package

Track Possession and Work Co-ordination Conferences

The Commissioning Engineer identifies other Engineering works associated with or affecting the work under the contract, that will be occurring during the Commissioning. The Commissioning Engineer maintains liaison with the other personnel in charge and arranges with the Tester In Charge for Work Instructions to cover inter-related activities.

Pre-Commissioning Conference

The Tester in Charge arranges the Pre-Commissioning Conference in accordance with the procedure for this activity and produces and issues the minutes of this meeting and inserts a copy of the minutes in the Work Package in Section 1-10.

Starting the Work Package

At the same time as the minutes of the Pre-Commissioning Conference are prepared, the preparation of the Commissioning Work Package document based on the applicable Inspection and Testing Detailed Plan shall commence.

Each Commissioning Work Package has a number that is recorded in a register maintained by the Commissioning Engineer. The Tester in Charge obtains a register number to be shown on the cover of the Work Package. The Work Package is also identified by the Project name, the stage of the Project, and the Commissioning dates.

A sturdy A4 sized PVC binder with four "D" shaped ring binders is utilised to contain the Commissioning Work Package.

Preparation of Weekly Notice Insert

The Tester in Charge arranges for the preparation of the write up for the Weekly Notice insert, and/or Circular, including the Drivers Diagram in accordance with the specification.

The Commissioning Engineer initiates the publication of the Weekly Notice Insert by completing and issuing safeworking form SWF S4 306. A copy of the form is inserted in Section 1-2 of the Commissioning Work Package.

Copies of the write up for the Weekly Notice insert and/or Circular and the Drivers' Diagram are inserted in Section 1-3 of the Commissioning Work Package.

Communications Systems

The requirements of the communications systems for the commissioning, including considering issues such as area of coverage, number of channels, number of handsets, battery life / number of battery charges possible, are determined by the Contractor and the system necessary to meet these requirements is provided by the Contractor .

The Contractor shall also provide radios, mobile phones etc. for IWMP Representative's personnel, witnesses and auditors.

All applicable documentation is inserted into Section 1-6 of the Work Package.

Scope of Works

The Tester in Charge documents the scope of works of the commissioning. This is done by means of a list of Activities which is broken down into the three phases of the commissioning and covers all activities as follows:

1. Pre-Commissioning period activities
2. Commissioning period activities
3. Post-Commissioning period activities

Reference to the applicable activities in the Inspection and Testing Plan are included in the scope of works

Applicable Installation Work Package(s) are reviewed to identify any incomplete activities and includes these in the scope of works.

A list of Working Drawings that are applicable is also compiled. The list identifies each drawing by description, title, number and revision. Drawings include the following categories:

1. Circuit Book
2. Track Plan
3. Track Insulation Plan
4. Working Sketch
5. Locking Table
6. Locking Diagram
7. Lever Nameplates
8. Detailed Cable Plan

9. Detailed Site Survey Drawing
10. Signal Sighting Form
11. CBI Documentation

The list of Working Drawings is submitted for review to the Commissioning Engineer.

The list of Activities is checked against the Working Drawings, the Inspection and Testing Plan and the Installation Work Packages, and as a check of completeness, is discussed in detail by the Tester in Charge and the Commissioning Engineer. However, the completeness of the list of Activities remains the sole responsibility of the Tester In Charge.

The list of Activities signed by the Tester in Charge and the list of Working Drawings signed by the Tester In Charge are inserted into Section 1-4 of the Commissioning Work Package by the Contractor.

The Commissioning Engineer completes the form, "Safeworking Forms and Permits" and checks and signs the form. If a "1500 Volt Overhead Wiring Permit to Work" is required, the Commissioning Engineer prepares the associated personnel register. The Commissioning Engineer provides these documents for insertion in Section 1-2. Activities associated with these documents are included in the scope of works.

The documentation of the scope of works is to be completed 6 weeks before the scheduled start date of the commissioning.

Contractor's Management and Team Structure

The Contractor formulates the management and team structure.

This describes the organisational structure that will be put into place for the commissioning and is documented in the form of an organisation chart. This chart and any explanatory notes are inserted in Section 1-6 of the Commissioning Work Package by the Contractor.

Identification of Teams

The Tester In Charge identifies the teams that will be required.

The Commissioning Engineer approves the list of teams.

The Tester In Charge nominates the level of expertise required for team leaders and team members for each team. This is approved by the Commissioning Engineer.

The list of teams and expertise requirements are inserted in Section 1-6 of the Commissioning Work Package by the Contractor

Preparation of Commissioning Program

The Tester In Charge prepares the Commissioning Program. This activity includes obtaining the program for design testing which is to be integrated into the Commissioning Program. The Program is inserted in Section 1-5 of the Commissioning Work Package by the Contractor.

Preparation of Draft Commissioning Notice

The Tester In Charge prepares the Draft Commissioning Notice in accordance with the standard format. This notice is as complete as is possible at this stage. Certain details such as exact staffing will not be complete as this is dependant on determination of the roster. The Notice is inserted in Section 1-6 of the Commissioning Work Package.

Review of Commissioning Work Package

The Tester In Charge reviews the Work Package with the Commissioning Engineer. The objective of this review is to determine any changes that may be required in order to authorise the Commissioning Work Package. As part of the review agreement is reached as to the work required to be completed to achieve Practical Completion. The Commissioning Engineer documents this review in the form of minutes, distributes a copy to those present and provides a copy for insertion by the Contractor in Section 1-1 of the Commissioning Work Package. This activity is completed 4 weeks before the scheduled start date of the commissioning.

Preparation of Work Instructions

The Tester In Charge documents all applicable commissioning activities onto Work Instructions using a standard form.

Work Instructions fall into three categories:

1. Pre-Commissioning
2. Commissioning
3. Post-Commissioning

A Work Instruction defines an activity in terms of tasks that are to be performed by an individual or team. Each team has a Team Leader.

A task is one of a number of elements of work that are required to complete an activity.

Each Work Instruction is entered on the applicable Register of Work Instructions and allocated a Register Number using the standard form. There are three registers to cover Pre-Commissioning, Commissioning and Post Commissioning Work Instructions.

Approved Standard Work Instructions may be used, however these must be used as a guide or checklist only and each Work Instruction must be tailored to suit the particular application.

Each Work Instruction shall be set out so that each task can be checked off by the Team Leader and that the number of activities on a Work Instruction can reasonably be expected to be completed in the time allocated.

When more than one team is working on the same apparatus, the Work Instruction includes the requirement for the Team Leader to verify with the Commissioning Headquarters that a previous activity has been completed.

Each Work Instruction clearly identifies the scope of work of the Instruction.

If the "Work Description" requires more than one page, a second sheet is used.

If there is a large number of Work Instructions, consideration should be given to rationalising the Work Instructions to a more manageable number.

Preparation and implementation copies of Work Instructions should be differentiated by colour coding, eg white for preparation, yellow for implementation.

Prepared registers are inserted in Section 2 of the Commissioning Work Package. Prepared Pre-Commissioning Work Instructions are inserted in Section 1-7, prepared Commissioning Work Instructions are inserted in Section 1-8, prepared Post-Commissioning Work Instructions are inserted in Section 1-9.

Preparation of Staffing Details

The Tester In Charge allocates personnel from the Contractors resources to perform the required activities. Documentary evidence of the suitability of the nominated personnel for their nominated activities is provided to the Commissioning Engineer.

The Commissioning Engineer nominates personnel to perform activities allocated to the IWMP Representative's personnel, including witnesses and team auditors.

All personnel in the management and team structure from the Commissioning Engineer and the Tester In Charge down to the level of team leader are to be covered by a current Competency Certificate. Copies of the Certificates are inserted in Section 1-6 of the Commissioning Work Package by the Tester In Charge.

The Tester In Charge documents staffing details on the commissioning roster. The roster is inserted into Section 1-6 of the Commissioning Work Package by the Contractor.

When preparing the roster, the Tester In Charge is to take note of ARTC policy and procedures with respect to excessive amounts of overtime.

Preparation of Final Commissioning Notice

The Tester In Charge amends and completes the Draft Commissioning Notice to produce the final Commissioning Notice which is inserted in Section 1-6 of the Commissioning Work Package.

Included in the Notice is the date and time of the Post-Commissioning Meeting.

The Notice also includes equipment requirements, identifying equipment supplied by the Contractor and equipment to be provided by team members.

The Tester In Charge sends a copy of the Notice to the Operator's Signal Trouble.

Publication of Operations Documents

Following the provision of the write up for the Weekly Notice insert and/or Circular by the Contractor, the arrangements for publication of the Weekly Notice and the Safeworking Circular is the responsibility of the Commissioning Engineer.

The Tester In Charge obtains proof and final copies of these documents and inserts them in Section 1-3 of the Commissioning Work Package.

Pre-Commissioning Conference and Meeting

The Tester In Charge arranges a further Pre-Commissioning Conference not less than two weeks prior to the commissioning start date in order to establish that all arrangements are in place to ensure a successful commissioning. This is attended by the Tester in Charge, IWMP Representative, Commissioning Engineer and (possibly) other representatives of the IWMP.

Following the Conference, a Pre-Commissioning Meeting is held. This is attended by the Team Leaders, the Commissioning Engineer, Tester In Charge and (possibly) representatives of the IWMP. At this meeting the Commissioning Notice and white copies of the Work Instructions are issued.

If a Team Leader cannot attend the Pre-Commissioning Meeting (allowed only in special circumstances), the Contractor briefs the Team Leader before the Team Leader starts work and retains a record of the briefing.

The Commissioning Engineer also ensures that representatives of other disciplines working within the commissioning area attend the Pre-Commissioning Meeting. If this is not possible, the Commissioning Engineer briefs these representatives before they start work, and retains a record of the briefing.

The Tester In Charge records attendance for the meeting and prepares minutes of the conference and meeting and distributes them to those present and any other parties referred to in the minutes. A copy of each set of minutes and attendance list for the meeting is inserted in Section 1-10 of the Commissioning Work Package.

This conference and meeting are held two weeks before the scheduled start date of the commissioning and the minutes are distributed within 3 working days of the meetings.

Asset Register

At least two weeks before the Commissioning, the Contractor delivers the updated Asset Register to the IWMP Representative in the standard format required by the Signals Standards Engineer, ARTC. A copy is inserted into the Handover Documentation Package.

Authorisation of Commissioning Work Package

The Tester In Charge, the Commissioning Engineer and the IWMP Representative authorise the Work Package on the standard form. This authorisation is based on the review performed previously. The completed authorisation form is inserted in Section 1-1 of the Commissioning Work

Package by the Contractor.

This activity is completed two weeks before the scheduled start date of the commissioning.

Pre-Commissioning Work Instructions

The Tester In Charge ensures and expedites the issue, use and completion of the Pre-Commissioning Work Instructions. Any Work Instruction that is issued for implementation is registered and signed off by the Authorising Officer and is a yellow copy. The Tester In Charge issues each Work Instruction to the applicable Team Leader and at the same time records the "date" and "time" in the Pre-Commissioning Work Instruction Register and verifies that the correct Team Leader is recorded on the register. The Team Leader expedites the completion of the Work Instruction. When the Team Leader returns the Work Instruction, the Tester In Charge checks that the Work Instruction has been signed off by the Team Leader that all tasks have been completed and that all supporting documentation is provided and is complete, and where applicable, the Work Instruction has also been signed off by the Team Auditor.

If the Work Instruction has not been fully completed the Tester In Charge reviews the uncompleted tasks with the Team Leader and determine the appropriate actions required.

When all tasks have been completed, the Tester In Charge signs the Received, Checked, Action statement and completes the Register, both the "Complete" and "Checked" columns.

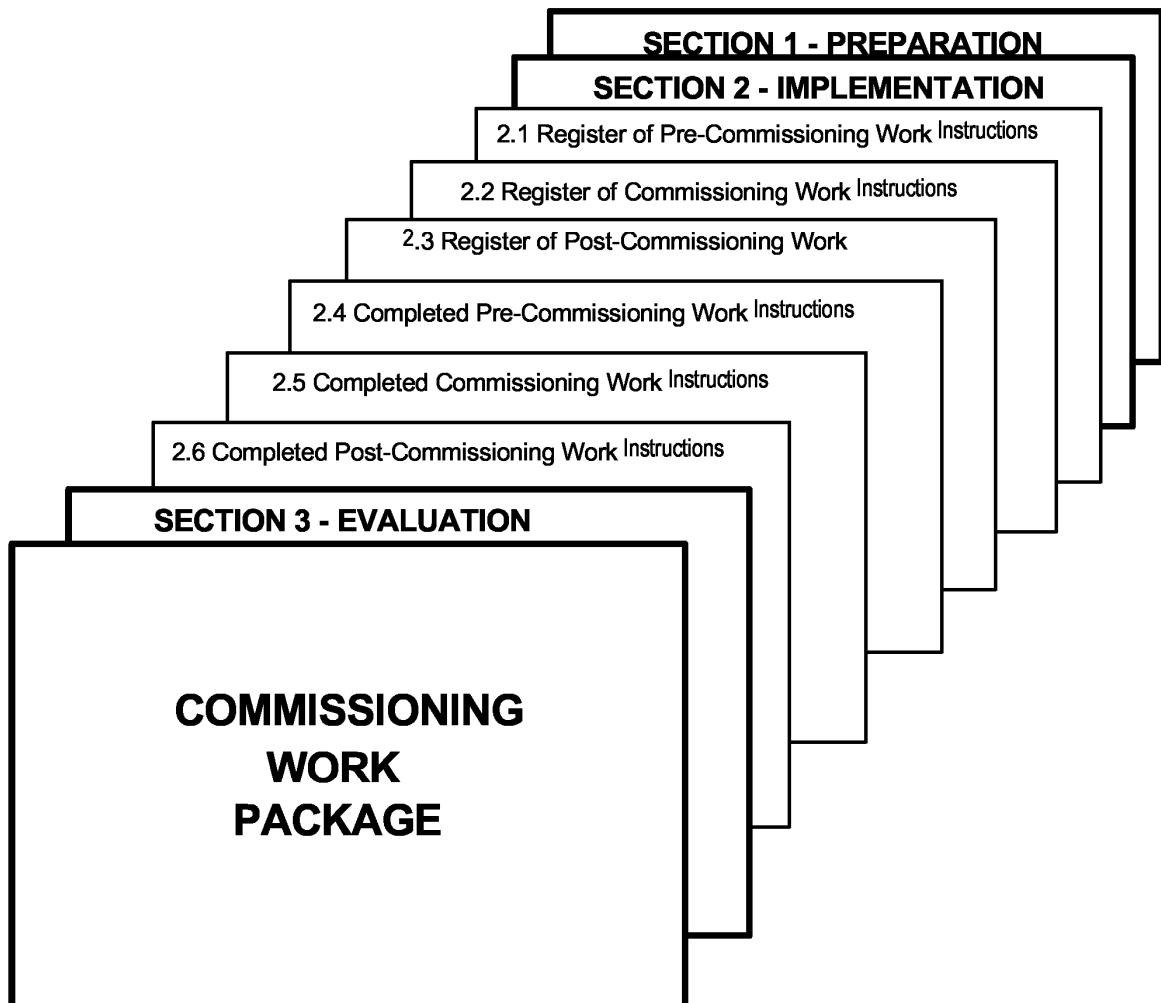
Completed Work Instructions are inserted into Section 2 of the Work Package. To enable a particular Work Instruction to be signed off, uncompleted tasks can be transferred to a new Work Instruction and this fact noted on the Work Instruction from which they were taken.

New Work Instructions prepared by the Tester In Charge are to be registered in the Register with the date and time of issue inserted in the Work Instruction Register at the time of issue.

If the activity involved in the Commissioning is work that is the responsibility of the IWMP Representative or IWMP, the Commissioning Engineer is responsible for the preparation of the Work Instructions (in liaison with the Tester In Charge), for authorising the Work Instructions, for arranging inclusion of the Work Instructions on the Register of Work Instructions by the Tester In Charge, for the issue, use and completion of the Work Instructions, for registering the issue and completion of the Work Instructions, for signing the Received, Checked, Action statement of returned Work Instructions, and for the preparation of any new Work Instructions (in liaison with the Tester In Charge.)

All Pre-Commissioning Work Instructions are to be completed and signed off before the commencement of the Commissioning. All uncompleted Pre-Commissioning tasks must be transferred to Commissioning Work Instructions or Post-Commissioning Work Instructions.

4.6 Commissioning Work Package – Phase 2 Implementation During Commissioning



4.6.1 Purpose

The purpose of this procedure is to provide directions for the implementation of the Commissioning Work Package.

4.6.2 Scope

This procedure covers the steps to be taken during Phase 2, the Implementation Phase for the Commissioning Work Package. This phase is called the Commissioning Period, which starts when the existing equipment is "booked out of use" and ends when the new work is "brought into use".

4.6.3 Applicability

This procedure is applicable to all commissionings performed by Contractors.

It is a requirement that a Commissioning Work Package as described in this procedure is implemented for all commissionings. This requirement may be modified or reduced with the written approval of the IWMP Representative in special circumstances or if it is considered that the scope of the work is too small.

4.6.4 Responsibility

IWMP Representative

The IWMP Representative will review the Contractor's implementation of the Commissioning Work Package in accordance with this procedure or with an equivalent procedure agreed with the Commissioning Engineer.

Commissioning Engineer

The Commissioning Engineer will; monitor progress; accept the Contractor's Commissioning Certificate; obtain the ARTC's permission to book into use; book into use the Works, or phase, section or stage being commissioned, in accordance with the ARTC's SafeWorking Procedures.

If the activity involved in the Commissioning is work that is the responsibility of the IWMP Representative or IWMP, the Commissioning Engineer is responsible for the preparation of the Work Instructions (in liaison with the Tester In Charge), for authorising the Work Instructions, for arranging inclusion of the Work Instructions on the register of Work Instructions by the Tester In Charge, for the issue, use and completion of the Work Instructions, for registering the issue and completion of the Work Instructions, for signing the Received, Checked, Action statement of returned Work Instructions, and for the preparation of any new Work Instructions (in liaison with the Tester In Charge.)

Tester In Charge

The Tester In Charge is responsible for control of the Work Packages, control of the Register of Work Instructions, control of the Commissioning Log; registering all Work Instructions; authorising and registering the issue of Work Instructions; issuing Work Instructions; for receiving, checking and actioning returned Work

Instructions, updating the register and filing completed Work Instructions, and for preparing new Work Instructions. For work under the Contract, the Tester In Charge shall issue the authorised Work Instruction to the Team Leader and record the issue in the Register.

Contractor

Other than work which is the responsibility of the IWMP Representative or IWMP, the Contractor is responsible for performing all of the work detailed in all of the Work Instructions issued for the commissioning.

Team Leaders

Team Leaders are responsible for performing the work detailed on the Work Instructions; reporting on progress; reporting problems; completing, signing and returning Work Instructions.

Team Auditors

The Team Auditors are responsible for monitoring and witnessing the work of the team to which they are attached; reporting problems; completing, signing and returning Work Instructions as pertaining to monitoring and witnessing tasks.

Work Package Controllers

When the commissioning is considered large or complex, the Tester In Charge includes a Work Package Controller in the Management Structure.

Work Package Controllers must be familiar with the procedures for the Commissioning Work Package and the technical aspects of signalling.

The Work Package Controller reports to the Tester In Charge and assists with the control of the Work Package documentation.

4.6.5 Definitions

Refer to Clause 4.5.5

4.6.6 Associated Procedures

- Procedure for Commissioning Work Package Phase 1 : Preparation Before Commissioning
- Procedure for Commissioning Work Package Phase 3 : Evaluation

4.6.7 Procedure for Implementation of Work Package Signing on Duty

At the beginning of each shift all personnel sign on for duty at the location nominated in the Commissioning Notice and sign on against their name in the Attendance Book.

The Contractor provides each person signing on for their shift with personnel identification name tags coded for restricted access to particular locations around the Commissioning site.

Issue of Commissioning Work Instructions

Each Team Leader and Team Auditor reports to the Tester In Charge at the Commissioning headquarters.

The Tester In Charge issues the Team Leader with the applicable prepared Commissioning Work Instruction(s) from Section 1-8 of the Work Package. Included with each Work Instruction is all the documentation required by the Team Leader such as blank forms, Circuit Books, Track Plans, Track Insulation Plans.

Where applicable, the Commissioning Engineer issues the Team Auditor with the applicable prepared Commissioning Work Instruction(s) from Section 1-8 of the Package. Included with each Work Instruction is all the documentation required by the Team Auditor such as blank forms, Circuit Books, Track Plans, Track Insulation Plans.

Any Work Instruction that is issued for implementation is signed off by the Authorising Officer.

The Tester In Charge/Commissioning Engineer gives the Team Leaders /Team Auditors any final instructions and the Team Leaders/Team Auditors clarify with the Tester In Charge/Commissioning Engineer any uncertainties they may have concerning the Work Instruction(s).

The Tester In Charge retains a white copy of the prepared Work Instruction in Section 1-8 of the Work Package.

The Tester In Charge records the "Date/Time Issued" in the Register of Commissioning Work Instructions in Section 2-2 of the Work Package and at the same time verifies that the correct Team Leader is recorded on the Register. The Commissioning Engineer records the "Date/Time Issued" in the Register for Work Instructions for work that is the responsibility of the IWMP Representative or IWMP.

Commissioning Log

The Tester In Charge opens the Commissioning Log. The first entry is made from the time that the first shift signs on for duty.

The last entry in the Log is at the completion of the last shift of the Commissioning. This includes "stand by" shifts.

The Tester In Charge closes the Commissioning Log.

All activities and events not covered by Work Instructions are to be entered into the Log by the Tester In Charge. This includes all reports made by Team Leaders.

All activities or events that require further action are entered into the Log and the "Action" column completed.

The Tester in Charge is responsible for the entry of information and the control of the Log. A suitable recorder may be selected to control the Log and enter information.

Performance of Work

The Team Leaders deploy their teams to perform the tasks detailed on the applicable Work Instructions.

The Team Leaders ensure that each task is completed including the completion of associated documents and records.

As each task is completed the time is recorded on the Work Instruction.

Tasks that have not been completed or are partly completed are noted by giving full details in the "Work Not Completed" section of the Work Instruction.

Surveillance of Work

The Team Auditors accompany their allocated teams and monitor the work performance and witness tests.

The Team Auditors ensure that each task on their Work Instructions is completed including the completion of associated documents and records. As each task is completed the time is recorded on the Work Instruction. Tasks that are not completed are noted by giving full details in the "Work Not Completed" section on the Work Instruction.

Team Leaders of teams to which a Team Auditor has been allocated, ensure that every facility is given to the Team Auditor to monitor the activities of the team. In particular, this applies to the witnessing of testing.

Report on Progress

Team Leaders provide timely reports on their progress to the Commissioning headquarters in accordance with the requirements of the Commissioning documents.

Report Problems

Team Leaders promptly report any problems encountered to Commissioning Headquarters.

Team Auditors promptly report to Commissioning Headquarters any activities that in their opinion are a problem.

Monitor Progress

The Commissioning Engineer and the Tester in Charge monitor progress of the commissioning by reviewing reports of activities completed in the Commissioning Log.

Exception activities are reported in the Log.

Communications Systems

The Contractor provides technical support including management of batteries during the Commissioning.

Prepare, Register and Issue New Work Instructions

The Tester In Charge registers all new Commissioning or Post-Commissioning Work Instructions.

New Work Instructions for work under the Contract are prepared, authorised, issued and recorded in the Register of Work Instructions by the Contractor, while new Work Instructions for work which is the responsibility of the IWMP Representative or IWMP are prepared, authorised, issued, and their issue and completion recorded in the Register of Work Instructions, by the Commissioning Engineer.

These new Work Instructions are for activities or tasks that are not covered by existing Work Instructions due to omission or matters that have arisen during the Commissioning that require further action.

These Work Instructions also detail uncompleted activities or tasks that are transferred from existing Work Instructions.

Master prepared Commissioning Work Instructions are stored in Section 1-8. Prepared Post-Commissioning Work Instructions are stored in Section 1-9 of the Commissioning Work Package.

Complete and Return Work Instructions

Team Leaders complete their Work Instructions and note any uncompleted tasks and any comments on the applicable Work Instruction.

Team Leaders complete and sign off the "Work Status Statement".

The Team Auditors complete their Work Instructions and note any uncompleted tasks and any comments on the applicable Work Instruction.

Team Auditors complete and sign off the "Work Status Statement".

Team Leaders and Team Auditors report to the Tester in Charge / Commissioning Engineer at the Commissioning Headquarters with their Work Instructions and all associated documents and records.

Receive, Check, Action Returned Work Instructions

The Tester In Charge and the Commissioning Engineer check that the Work Instructions have been signed off by the Team Leader and the Team Auditor (where required), that all tasks have been completed and that all supporting documentation is provided and is complete.

The Tester in Charge signs the "Received, Checked, Action" statement on each Work Instruction and completes the Register of Commissioning Work Instructions by filling in the "complete date", "complete time", "checked date", "checked time" columns.

In the case of Work Instructions that are for work which is the responsibility of the IWMP Representative or IWMP, the Commissioning Engineer signs the Received, Checked, Action statement.

Transfer Incomplete Tasks to New Work Instructions

If a Work Instruction including the applicable supporting documentation is incomplete, the Tester In Charge/Commissioning Engineer review the uncompleted task(s) with the Team Leader and Team Auditor as applicable.

As a result of this review the appropriate follow up action(s) are determined.

Only when all tasks on a Work Instruction are completed satisfactorily does the Tester In Charge signs the "Received, Checked, Action" statement. To enable a particular Work Instruction to be signed off, uncompleted task are transferred by the Tester In Charge to new Commissioning or Post-Commissioning Work Instruction(s). This fact is noted on the Work Instruction from which they were transferred.

If the activity involved in the Commissioning is work that is the responsibility of the IWMP Representative or IWMP, the Commissioning Engineer is responsible for the preparation of the Work Instructions (in liaison with the Tester In Charge), for authorising the Work Instructions, for arranging inclusion of the Work Instructions on the register of Work Instructions by the Tester In Charge, for the issue, use and completion of the Work Instructions, for registering the issue and completion of the Work Instructions, for signing the Received, Checked, Action statement of returned Work Instructions, and for the preparation of any new Work Instructions (in liaison with the Tester In Charge.)

New Work Instructions for work under the Contract transferred from an incomplete Work Instruction, are to be registered and authorised by the Tester In Charge before issue. The date and time of issue are recorded in the Register.

Newly prepared Commissioning Work Instructions are registered and filed in Section 1-8. Newly prepared Post-Commissioning Work Instructions are registered and inserted into Section 1-9 of the Commissioning Work Package.

All Commissioning Work Instructions are to be completed and signed off before the end of the Commissioning period. All uncompleted tasks must be transferred to Post-Commissioning Work Instructions by the Tester In Charge.

File completed Commissioning Work Instructions

The Tester In Charge files completed Commissioning Work Instructions in Section 2-5 of the Commissioning Work Package.

The corresponding white copies are removed from Section 1-8 and disposed of.

Signing Off Duty

Team Leaders and Team Auditors complete their duties only after all the Work Instructions for which the applicable Team is responsible have been signed off as received, checked and actioned.

The Tester In Charge then release the Team Leader , the Commissioning Engineer releases the Team Auditor, and the Team Leader, Team Auditor and the team sign off duty.

Signing into use the New and Altered Signalling

The Commissioning Engineer and the Tester In Charge check the Work Instructions, the Register of Work Instructions, and the Commissioning Log.

The Commissioning Engineer and the Tester In Charge separately determine that inspection and testing is complete.

The Tester In Charge, when satisfied the work under the Contract which is being commissioned is inspected and tested, fit for purpose and safe to be commissioned into use, issues a Contractor's Commissioning Certificate to this effect to the Commissioning Engineer.

For any signalling work performed by the IWMP Representative or IWMP, the Commissioning Engineer, when satisfied that the work is inspected and tested, certified, fit for purpose and safe to be commissioned into use, completes an IWMP Commissioning Certificate, and inserts both certificates into Section 3-1 of the Commissioning Work Package.

The Commissioning Engineer liaises verbally with Operations and other disciplines.

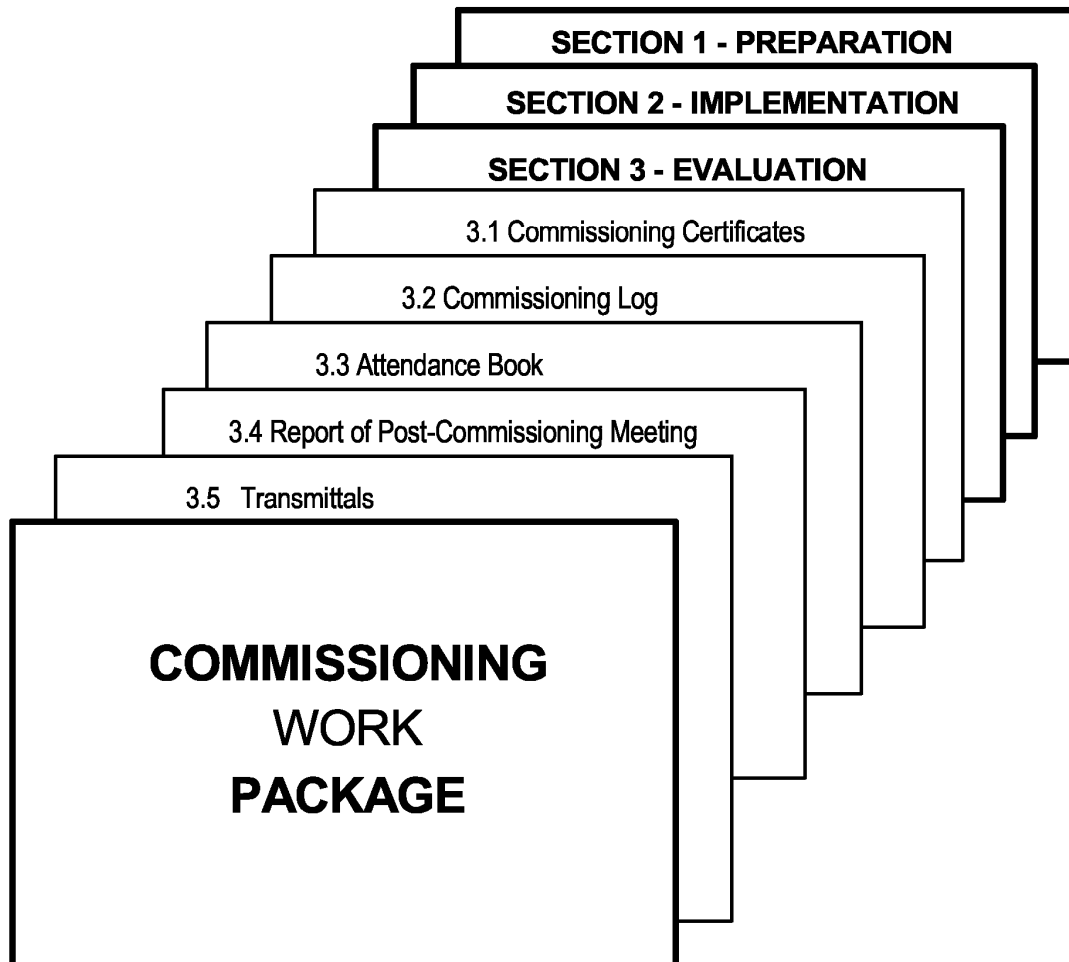
The Commissioning Engineer obtains the approval of ARTC and arranges removal of protection and restoration and signing equipment into use.

The Commissioning Engineer completes and issues SWF. SA.4.300, SA.430 and SWF S4.302 and inserts copies into Section 1-2 of Work Package.

The Commissioning Engineer completes an entry in the Train Register Book or similar Recording Device and signs the work into use.

Superseded

4.7 Commissioning Work Package – Phase 3 Evaluation



4.7.1 Purpose

The purpose of this procedure is to provide directions for the evaluation of the Commissioning Work Package.

4.7.2 Scope

This procedure covers the steps to be taken during Phase 3, the Evaluation Phase for the Commissioning Work Package.

4.7.3 Applicability

This procedure is applicable to all commissioning performed by Contractors.

It is a requirement that all Commissioning Work Packages are evaluated in accordance with this procedure or with an equivalent procedure agreed with the Commissioning Engineer.

4.7.4 Responsibility

IWMP Representative

The IWMP Representative will evaluate the Commissioning Work Package in accordance with this procedure; delivery of the Package to the IWMP.

Commissioning Engineer

The Commissioning Engineer will check that copies of all Safeworking Forms and Permits are in the Package; check the Commissioning Log.

If the activity involved in the Commissioning is work that is the responsibility of the IWMP Representative or IWMP, the Commissioning Engineer is responsible for the preparation of the Work Instructions (in liaison with the Tester In Charge), for authorising the Work Instructions, for arranging inclusion of the Work Instructions on the register of Work Instructions by the Tester In Charge, for the issue, use and completion of the Work Instructions, for registering the issue and completion of the Work Instructions, for signing the Received, Checked, Action statement of returned Work Instructions, and for the preparation of any new Work Instructions (in liaison with the Tester In Charge.)

Tester In Charge

The Tester In Charge will insert a copy of the Attendance Book in the Package; authorise, and register new Post Commissioning Work Instructions; issue, use and completion of Post Commissioning Work Instructions; update the Register and file completed Post-Commissioning Work Instructions; receiving, checking and actioning returned Work Instructions; review the work status; preparation of new Post-Commissioning Work Instructions; conduct the Post-Commissioning Meeting; sign off the Package; deliver the package to the Commissioning Engineer.

Team Leaders

The Team Leaders are responsible for performing the work detailed on the Post-Commissioning Work Instructions; completing signing and returning Work

Instructions.

Team Auditors

The Team Auditors are responsible for monitoring and witnessing the work of the team to which they are attached; completing, signing and returning Work Instructions.

4.7.5 Definitions

Refer to Clause 4.5.5

4.7.6 Associated Procedures

- Procedure for Preparation of Commissioning Work Package
- Procedure for Implementation of Commissioning Work Package

4.7.7 Procedure For Evaluation Of Work Package

Safeworking Forms and Permits

The Commissioning Engineer checks that copies of all Safeworking Forms and Permits (complete and signed off) are included in Section 1-2.

The Commissioning Engineer utilises the Checklist in Section 1-2 to ensure that all Forms and Permits are included.

Check Commissioning Log

The Commissioning Engineer and Tester In Charge check the Commissioning Log to ensure that all entries that require follow up action are recorded as having being completed.

The Tester In Charge follows up all activities that are not recorded as having been completed.

To assist in the completion of these activities, where appropriate, an uncompleted activity is transferred to a Post-Commissioning Work Instruction. Details are noted in the Commissioning Log.

The Tester In Charge inserts the Commissioning Log into Section 3-2.

Attendance Book

The Tester In Charge inserts a copy of the Attendance Book for the commissioning into Section 3-3.

Post-Commissioning Work Instructions

The Tester In Charge ensures and expedites the issue, use and completion of the Post-Commissioning Work Instructions.

The Tester In Charge issues each Work Instruction to the applicable Team Leader (The Commissioning Engineer issues Work Instructions to Team Auditors where

applicable) and at the same time records the "date issued" and "time issued" in the Post-Commissioning Work Instruction Register and at the same time verifies that the correct Team Leader is recorded on the Register.

Any Work Instruction that is issued for implementation is signed off by the Authorising Officer

The Contractor ensures and expedites the completion of the Work Instructions. When the Team Leader and Team Auditor return their Work Instructions, the Tester In Charge and Commissioning Engineer check that the respective Work Instructions have been signed off by the Team Leader and the Team Auditor where applicable, that all tasks have been completed and that all supporting documentation is provided and is complete.

The Tester In Charge signs the "Received, Checked, Action" statement on each Work Instruction and completes the Register of Post-Commissioning Work Instructions by filling in the "complete date", "complete time", "checked date", "checked time" columns.

In the case of Work Instructions that are for work which is the responsibility of the IWMP Representative or IWMP, the Commissioning Engineer issues and expedites the use and completion of the Work Instructions, and signs the Received, Checked, Action statements.

The Tester In Charge files completed Post-Commissioning Work Instructions in Section 2-6.

All Post-Commissioning Work Instructions are to be completed and signed off before the Post-Commissioning Meeting.

Review of Work Status

The Commissioning Engineer and the Tester In Charge check

- the status of all Pre-Commissioning, Commissioning and Post-Commissioning Work Instructions
- the Commissioning Log and the Commissioning Certificate(s).
- the remainder of the Work Package for completeness.

All uncompleted tasks and activities are compiled in a list which is tabled at the Post-Commissioning Meeting.

Post-Commissioning Meeting

Within two weeks of the end of the Commissioning Period, the Tester In Charge holds the Post-Commissioning Meeting.

The purpose of the meeting is to identify, review and record all uncompleted activities and tasks and to identify dates and responsibilities for their completion.

The meeting is attended by the IWMP, the IWMP Representative, the Commissioning Engineer, Tester In Charge, Contractor, Team Auditors, Work Package Controllers and any other key personnel identified by the Commissioning Engineer or Tester In Charge.

The Tester In Charge prepares the Report of the Meeting and issues a copy to those present within three days of the Meeting. A copy is inserted in Section 3-5.

The Commissioning Engineer delivers the completed Work Package to the IWMP Representative.

Delivery of Work Package

Within 4 weeks of the end of the Commissioning Period, the IWMP Representative reviews and delivers the Commissioning Work Package to the IWMP.

This is done under cover of a Document Transmittal signed by the IWMP Representative and a signed receipt acknowledgment is obtained.

The IWMP Representative may make a copy of the Package for his own records prior to delivery.

Storage of Work Package

The IWMP stores the Commissioning Work Package in a secure place. The register of Commissioning Work Packages is updated accordingly.

4.8 Examples of Forms Required with Work Package Documentation Procedures

Examples of the forms listed below are included herein

- Safeworking Forms and Permits
- Authorisation of Installation Work Package
- Installation Inspection and Testing Log
- Installation Inspection Testing Status Certificate
- Installation Inspection Testing Status Certificate
 - Uncompleted Tasks/Actions
- Installation Inspection Testing Status Certificate
 - Approved Variations to Inspection and Testing Plan
- Installation Inspection Testing Status Certificate
 - Approved Variations to Standards and Procedures
- Work Instruction
- Register of Work Instructions
- Authorisation of Commission Work Package

SAFeworking FORMS AND PERMITS

PROJECT:			STAGE:	
INSPECTION AND TESTING PLAN REFERENCE NO. :			WORK PACKAGE NO.:	
FORM No	REQUIRED		PERMITS	REQUIRED
			HIGH VOLTAGE FEEDERS ISOLATION ORDERS	YES/NO
SWF.SA.4.300	YES/NO		WORKING HIGH VOLTAGE INSTRUCTION	YES/NO
SWF.SA.4.302	YES/NO		MAINS ACCESS PERMIT	YES/NO
			SUBSTATION ACCESS PERMIT	YES/NO
S.F.S.4.304a/b	YES/NO		LOW VOLTAGE ACCESS PERMIT	YES/NO
S.F.S.4.304c	YES/NO		AUTHORITY FOR REMOVAL OF SUPPLY FROM 1500VOLT SECTIONS	YES/NO
S.4.306	YES/NO		1500 VOLT OVERHEAD WIRING PERMIT TO WORK	YES/NO
			ADVICE OF ALTERATIONS TO ELECTRICAL SYSTEM OPERATING DIAGRAMS	YES/NO
			INSTALLATION TEST REPORT	YES/NO
			LOCAL SUPPLY AUTHORITY NOTIFICATION OF ELECTRICAL WORK	YES/NO
CHECKED BY:				
NAME:				
POSITION:				
SIGNATURE:			DATE:	

AUTHORISATION OF INSTALLATION WORK PACKAGE

PROJECT:

STAGE:

**INSPECTION AND TESTING PLAN
REFERENCE NO. :**

**WORK PACKAGE
NO.:**

This INSTALLATION WORK PACKAGE is approved for use.

Signature: _____

Name: _____

Date: _____

Tester In Charge (Approved)

Signature: _____

(Work Instruction No. Continued)

COMMENTS FOR POST REVIEW MEETING
REPORTING INSTRUCTIONS:
<p>Team Leaders are to report to the Headquarters at intervals shown on the front of this work instruction to advise progress and any problem that will delay completion of allocated activities and problems not directly related to your activities.</p>

COMMUNICATIONS DIRECTORY	
Headquarters:	Emergency Numbers
Signal Boxes:	Police:
Locations:	Ambulance:
Signal Post Telephones:	Hospitals:
	Operations Control:
	Elec Trouble:

WORK NOT COMPLETED				
ACT	TASK	DETAILS	TRANSFERRED	
			Log Line Item	WI No.

AUTHORISATION OF INSTALLATION WORK PACKAGE

PROJECT:

STAGE:

**INSPECTION AND TESTING PLAN
REFERENCE NO. :**

**WORK PACKAGE
NO.:**

**This Commissioning Work Package prepared for the Commissioning
of _____
on _____ is approved for use.**

Signature: _____

Name: _____

Date: _____

Tester In Charge (Approved)

Signature: _____

Name: _____

Date: _____

Commissioning Engineer (Approved in principle)

Signature: _____

Name: _____

Date: _____

IWMP Representative (Approved in principle)

5 Handover Package

The Contractor shall hand over to the Commissioning Engineer a package of signed off documents certifying that all contract deliverables have been provided except for minor defects listed and programmed for rectification.

The hand over package shall include copies of Transmittal Documents and acknowledgment receipts for

- Updated Asset Register
- Interim Maintenance Copies of Design Documents
- Commissioning Copies
- Test Copies containing any test markings and/or signatures
- Spare Equipment
- Commissioning Work Package complete
- Final design documents, drawings and software.

The hand over package shall also include;

- Copy of Certificate of Practical Completion
- Copy of current Defects List and Contractor's Rectification Program.

A copy of an Acceptance Certificate signed with the Commissioning Engineer when all known defects and omissions have been satisfactorily rectified and completed, shall be provided and added to the package when available.