

## Technical Specifications (In-Cash Procurement)

# Technical Specification of Framework Contract for CPSS Commissioning Assistance and Maintenance Services

The document outlines the specifications of the services relating to the provision of the commissioning assistance and maintenance Contract for all CPSS Systems, Structures, and Components on the ITER site. The principal objective of this Contract is to preserve and maintain CPSS SSCs once they have been handed over from the installation team, as well as to provide the commission assistance during the Component Commissioning period.

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# 1 Purpose

The purpose of this document is to define the requirements of a framework contract for the provision of services to the ITER Organization regarding on-site engineering activities related to CPS Systems, Structures and Components (SSC). The principal objective of this Contract is to preserve and maintain CPS SSC once they have been handed over from the installation team, as well as to provide the commission assistance during the component-commissioning period. The service types could be categorized as described below:

- Commissioning assistance;
- Periodic inspection;
- Preventive maintenance include preservation;
- Corrective maintenance;
- Miscellaneous services.

This contract is to ensure that the required safety and performance standards are achieved while components reliability meets the expected level. Therefore, the Contractor shall be responsible for providing a complete engineered and managed support that will encompass the provision of the following means up to needed level in order to achieve defined targets:

- Labour and other personnel with appropriate technical skills, engineering and management expertise for commissioning assistance, preservation and maintenance.
- To be coordinated by other stakeholders required to perform requested activities.
- All non-specific materials, consumables, tools, transports, chemicals and whatever other materials to execute the scope of work.
- Test instruments needed for the scope of work.
- Engineering support for the production of documentation and procedures updates.
- Commissioning Assistance and Maintenance planning and scheduling activities.

## 2 Scope

### 2.1 Geographical Scope

The large-scale CPS system receives AC power from 400 kV High Voltage grid and supplies controlled DC current up to 68kA to the magnets for plasma initiation, plasma current, shape and position control. It includes the RPC&HF system, AC/DC power converters, SNU's, FDU's, PMS/MS's, complex DC busbar and earthing circuits, and the associated I&C, cooling water, pneumatic systems, etc. The complex operational strategies (which are not common in other industrial applications) such as 2-Quadrant, 4-Quadrant and sequential control operation strategies are applied to the PF, CS, CC and VS1 converters with associated current closed-loop or voltage open-loop control will be tested to guarantee the functionalities of plasma operation.

This Technical specification covers the services for the commissioning assistance, preservation and maintenance of all the SSCs marked as the First Plasma as shown in Figure 2-1.

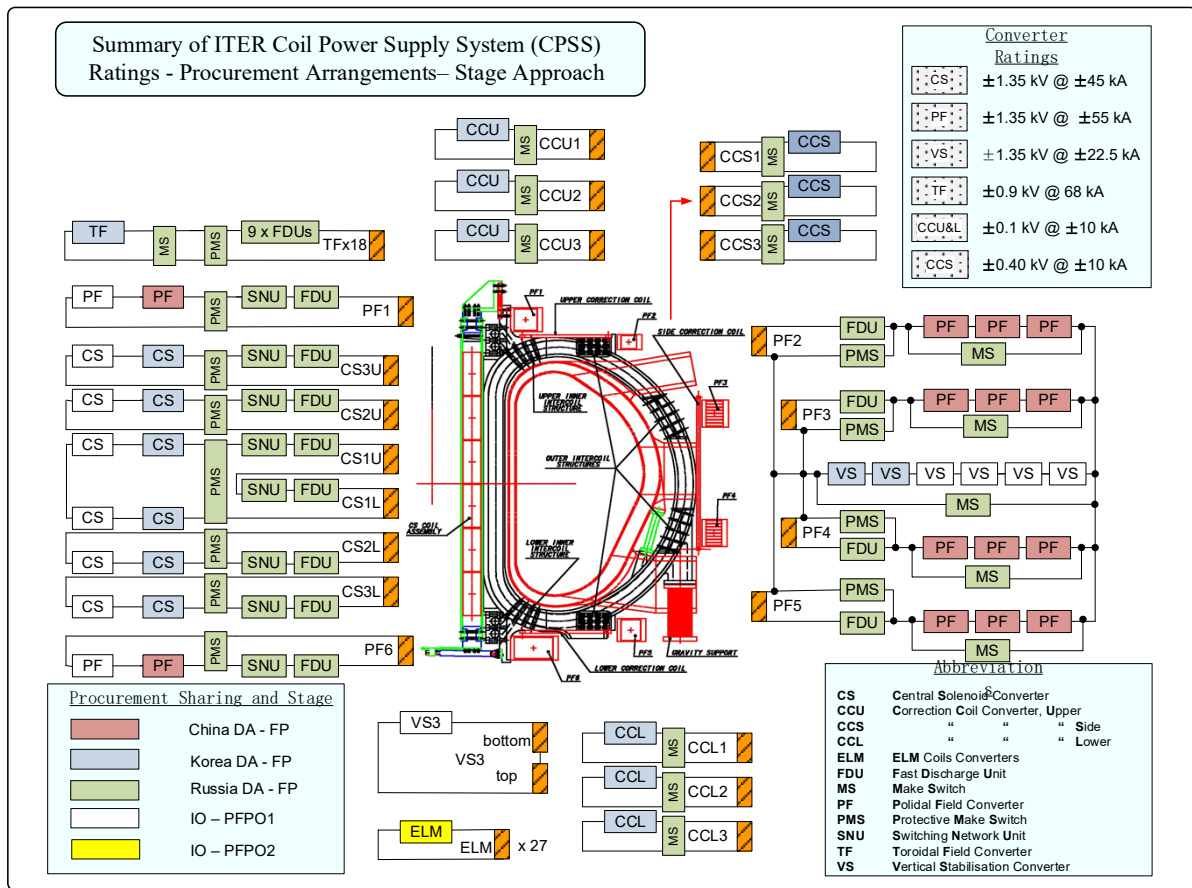


Figure 2-1 Coil Power Supply System overview

The layout and main SSCs covered by this contract are shown in Figure 2-2.

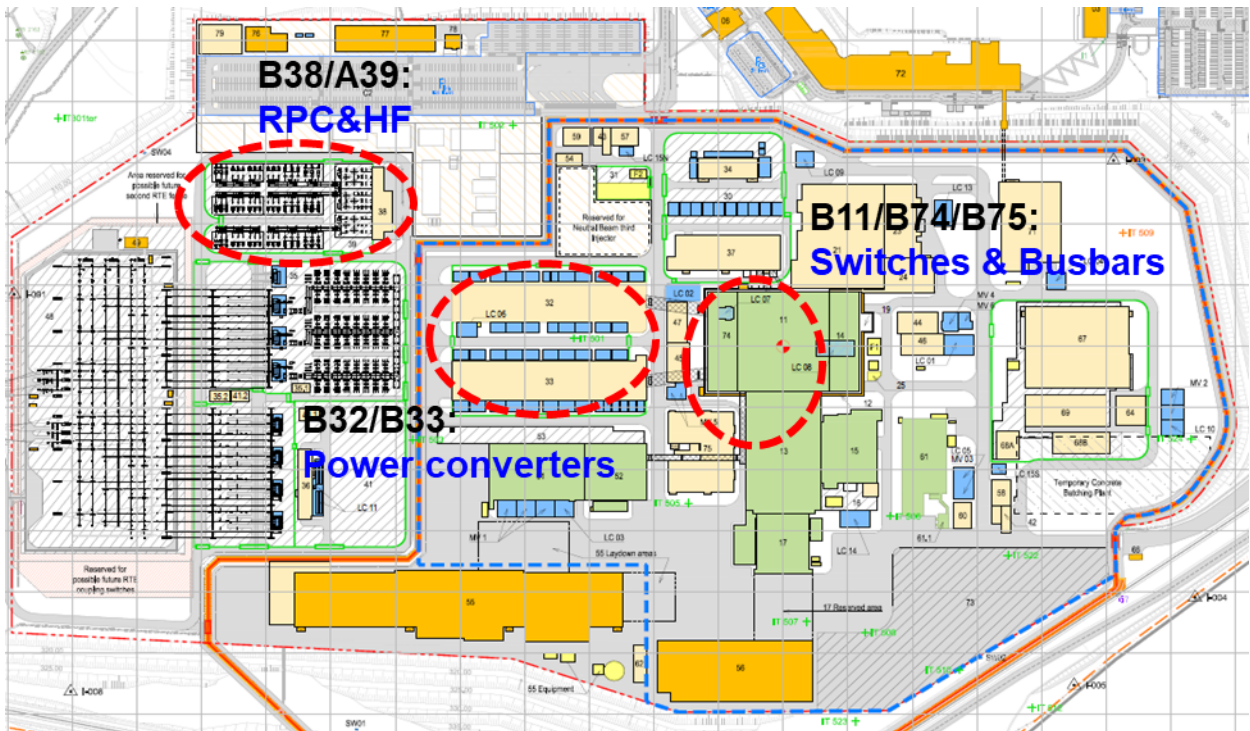


Figure 2-2 Layout of CPSS SSCs installed before FP

## 2.2 Work scope

The following Work Plans are specified in this contract to provide the service for the CPSS commissioning assistance, preservation and maintenance.

- Work Plan 1: Preservation and maintenance services for Power Converter AC SSCs;
- Work Plan 2: Preservation and maintenance services for Power Converter DC SSCs;
- Work Plan 3: Preservation and maintenance services for Switches & Busbars;
- Work Plan 4: Preservation and maintenance services for RPC&HF systems;
- Work Plan 5: Assistant services for CPSS commissioning with Dummy Load;
- Work Plan 6: Provision of services for the corrective maintenance.

For each Work Plan, the services provided under the Contract are broken down into the following groups of activities:

- Commissioning assistance and maintenance (include preservation) work preparation;
- Commissioning assistance and maintenance (include preservation) work execution;
- Interface management with other contractors and Works coordination
- Spare parts management and general parts & consumables purchase;
- Reporting and technical documentation management;
- On-call services;
- Miscellaneous services.

## 3 Definitions and acronyms

### 3.1 Definitions

For general definitions relating to M&I as applied in the ITER Project see [3].

Term	Definition
Commissioning assistance and Maintenance record	Part of commissioning assistance and maintenance documentation which contains the history of all related data for an item. The history may contain records of all failures, faults, costs, item availability, up time and any other relevant data.
Commissioning assistance and Maintenance task	An activity or series of activities to be undertaken on target equipment in order to achieve some Commissioning, maintenance or inspection objective. The task shall typically belong to the dedicated TO or ITP, and involve the invocation of a one or more written procedures.
Commissioning assistance and Maintenance task preparation	Supplying of all of the necessary information and identifying the required resources to enable the task to be carried out
Commissioning and Maintenance support	Provision of resources, services and management necessary to carry out commissioning and maintenance activities. The provision may include, for example, personnel, test equipment, workrooms, spare parts, documentation, tools, etc.
Condition Based Maintenance (CBM)	Form of preventive maintenance performed continuously or at intervals governed by observed condition to monitor, diagnose or trend a SSC's condition indicators; results indicate present and future functional ability or the nature of and schedule for planned maintenance.
Consumable item	Item or material which is expendable, may be regularly replaced and generally is not item specific. Generally, consumable items are relatively low cost compared to the item itself.

Corrective maintenance	Actions that restore, by repair, overhaul or replacement, the capability of a failed structure, system or component to function within acceptance criteria.
Deferred maintenance	Maintenance which is not immediately carried out after a fault detection but is delayed in accordance with given rules.
Deliverables	all DOCUMENTS, MATERIAL, reports and information to be delivered under the FRAME AGREEMENT or the respective ORDER.
Documents	all information, data, software and documents to be delivered or produced by the CONTRACTOR for the execution of the WORKS.
Lock Out Tag Out (LOTO)	The placement of a lock and red tag on the energy-isolating device, indicating that the energy isolating device shall not be operated until removal of the lock and red tag, in accordance with an established work instruction.
Maintenance	The organized activity, both administrative and technical, of keeping structures, systems and components in good operating condition, including both preventive and corrective aspects.
Maintenance management	All activities of the management that determine the maintenance objectives, strategies and responsibilities, and implementation of them by such means as maintenance planning, maintenance control, and the improvement of maintenance activities and economics
Maintenance objective	Target assigned and accepted for the maintenance activities.
Maintenance plan	A structured and documented set of maintenance tasks that include the activities, procedures, resources and the time scale required to carry out maintenance.
Maintenance procedure	Written instructions provided to maintenance workers directing them on how to execute a specific maintenance activity. The level of detail of these instructions is based on the complexity of the task, special engineering considerations/specifications, and skill levels of the workers performing the task.
Maintenance strategy	Management method used in order to achieve the maintenance objectives
Maintainability	Ability of an item under given conditions of use, to be retained in, or restored to, a state in which it can perform a required function, when maintenance is performed under given conditions and using stated procedures and resources.
Minor maintenance	Work of such a simple nature that a detailed Work Package is not required. Typically, correction of deficiencies on equipment where: <ul style="list-style-type: none"> <li>• A lockout/tagout is not required</li> <li>• The component is not important to safety</li> <li>• The integrity of the component will not be violated</li> <li>• Welding is not required</li> <li>• Disassembly of the component or part will not be required</li> <li>• Post-Maintenance Testing is not required</li> </ul>
Periodic maintenance	Form of preventative maintenance consisting of servicing, parts replacement, and surveillance or testing at predetermined intervals of

	calendar time, operating time or number of cycles.
Planned maintenance	Form of preventative maintenance consisting of refurbishment or replacement that is scheduled and performed prior to unacceptable degradation of a SSC.
Post Maintenance Test (PMT)	Applicable and appropriate testing performed following maintenance to verify that a particular SSC, piece of equipment, or process performs its intended function based on its design criteria and that the original deficiency has been corrected and no new deficiencies created. In some cases, the extent of a particular PMT may extend beyond the component or piece of equipment that has been repaired, replaced or modified to complete systems or processes, depending on the type of maintenance action performed and the affect that the component or piece of equipment has on the total system or process.
Preventive maintenance	Actions that detect, preclude or mitigate degradation of a functional structure, system or component to sustain or extend its useful life by controlling degradation and failures to an acceptable level.
Permit to work (PTW)	Document used to record authorization for named persons to perform specific works when ensuring that: <ul style="list-style-type: none"> <li>• all concerned parties are aware of significant work in progress on the systems;</li> <li>• appropriate safety measures are in place;</li> </ul> Necessary approvals have been given prior to the commencement of work
Ready for execution Work package (RFEWP)	Work preparation file compiling all the information or data/document required to execute the work such as task lists, procedures, PTW, ...
Remote maintenance	Maintenance (or inspection) activity that is in-acted from a location remote from the target components, typically for the purpose of eliminating or reducing the need to send workers into hazardous environments.
Repair	See “Corrective Maintenance”
Spare part	An item intended to replace a corresponding item in order to retain or maintain the original required function of the item.
Works	All obligations and work to be performed by the CONTRACTOR as well as all DELIVERABLES to be delivered in accordance with the present SERVICE CONTRACT, and the relevant ORDER, including Day-to-Day Works and Projects
Task Order (TO)	The primary document used to manage commissioning assistance and maintenance tasks. It may include such information as a description of the work required; the task list, task priority; the procedure to be followed; and the parts, materials, tools, and equipment required to complete the job.
Work dossier	A package of documents used by the maintenance management that contains all the necessary procedures, instructions and requirements to safely and effectively perform a maintenance task.
Work request (WR)	The primary document (paper or electronic) submitted by personnel to request the initiation of a commissioning assistance and maintenance



	task. It is an input into definition, planning, and execution of activities. This is usually converted to a Task Order or ITP after the work request has been planned.
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### 3.2 Acronyms

For a complete list of ITER abbreviations, refer to: [ITER\\_D\\_2MU6W5 - ITER Abbreviations](#)

Acronym	Definition
ALARA	As Low As Reasonable Achievable
CBM	Condition Based Maintenance
CC	Correction Coil
CISSCT	Collège Inter-Entreprises de Sécurité, de Santé et des Conditions de Travail
CM	Condition Monitoring
CMMS	Computerized Maintenance Management System
CODAC	Control, Data Access and Communication
CPSS	Coil Power Supply System
CU	Converter Unit
CS	Central Solenoid
DC	Direct Current
DS	Disconnection Switch
ES	Earthing Switch
HAE	Human Assisted Equipment
HF	Harmonic Filter
HIRA	Hazard Identification and Risk Assessment
HPSC	Health Protection and Safety Coordinator
I/A	Incident or Accident
IDM	Document Management System
INB	Installation Nucléaire de Base
IO	ITER Organization
ISI	In-service Inspection
ISR	In-service Requalification
ITP	Instruction To Proceed
JA	Circuit Breaker
JR	Surge Arrester
JT	Earthing Switch
JU	Combined Line Switch and Earthing Switch
LTM	Long Term Maintenance
M&I	Maintenance & Inspection
MWO	Maintenance Work Order
O&M	Operation and Maintenance
OCTC	Off Load Tap Changer
OEM	Original Equipment Manufacturer
OHS	Occupational Health & Safety
ORE	Occupational Radiological Exposure
PGCSPS	Plan Général de Coordination en matière de Sécurité et de Protection de la Santé – General plan for coordination of safety and health protection
PA	Procurement Arrangement
PF	Poloidal Field
PIA	Protection Important Activity

PIC	Protection Important Component
PM	Preventative Maintenance
POS	Plasma Operations State
PPSPS	Plan Particulier de Sécurité et de Protection de la Santé – Specific plan of safety and health protection
RAMI	Reliability, Availability, Maintainability, Inspectability
RoX	Return on Experience
RH	Remote Handling
RPC	Reactive Power Compensation
RTE	Réseaux de Transport d’Energie
SPV	Single Point of Vulnerability
SQEP	Suitably Qualified and Experienced Person
SSC	Structures, Systems and Components
STM	Short Term Maintenance
TCS	Testing and Conditioning State
TDFC	Technical Document Family Card
T.E	Task Execution
TGCS	Tokamak Global Coordinate System
TLS	Task List Schedule
TF	Toroidal Field
TR	Transformer
VS	Vertical Stability
WP	Work Plan

## 4 References

### 4.1 Applicable Documents

- [1] ITER Maintenance Management Procedure ([VH9LAB](#))
- [2] ITER Working Instruction for System M&I Plans ([YH3TFW](#))
- [3] ITER Maintenance Glossary ([X83TV8](#))
- [4] Working Instruction for Scoping and Identification of Critical Components for Operations ([39DWTY](#))
- [5] ITER Concept of Operations ([S7T73E](#))
- [6] ITER Numbering System for Components and Parts ([28QDBS](#))
- [7] Procedure for Occupational Health and Safety Hazard Identification and Assessment ([AJLQRF](#))
- [8] Safe Access for maintainability ([RUGWUK](#))
- [9] Protective equipment and hostile environment layout ([RBYZ42](#))
- [10] Remote Handling Compatibility Procedure ([2NRTWR](#))
- [11] Basic Human Factors Design Requirements for ITER Maintenance and Local Operations ([YQSQ46](#))
- [12] Guidelines for ALARA Implementation ([W6655F](#))
- [13] Sign-Off Authority for Project Documents ([2EXFXU](#))
- [14] Nuclear Regulatory Framework for INB ITER ([2WBB8P](#))
- [15] General Technical regulations applicable to INB ([7GJHSE](#))
- [16] ITER Quality Assurance Program (QAP) ([22K4QX](#))
- [17] MQP Documentation Management Procedure ([7M445D](#))
- [18] Policy for ITER Plant Maintenance ([FFTH8A](#))
- [19] ITER Maintenance Program ([S7THN6](#))

- [20] ITER Procurement Quality Requirements ([22MFG4](#))
- [21] ITER Quality Plan ([22MFMW](#))
- [22] Requirements for Deviations and Non-Conformances ([22F53X](#))
- [23] ITER Internal Regulations ([27WDZW](#))
- [24] Working conditions On the ITER Organization Site ([2EQ9JM](#))
- [25] Contractor safety management procedure ([Q2GBJF](#))
- [26] ITER Site access Procedure ([S3893D](#))
- [27] ITER Site work - General Safety Rules Vol 0 ([2NUEYG](#))
- [28] ITER Site access Procedure ([S3893D](#))
- [29] Organization and conduct required in case of alert on the ITER Worksite ([34YMYF](#))
- [30] Procedure to Follow in Case of Emergency ([43QPRE](#))
- [31] Environmental protection requirements – ITER Worksite ([97WRFP](#))
- [32] Work authorisation request procedures for ITER site ([7K66XB](#))
- [33] Conditions of Use of the Spoil Disposal Area ([Q4SYDM](#))
- [34] Internal Regulations ([27WDZW](#))
- [35] PGC Annex 1 - Specific measures for preventing the spread of Covid-19 on the worksite ([36M2XY](#))
- [36] ITER Site Permit to Work Overarching Procedure ([3E8289](#))

## 4.2 Reference Documents

- [37] Commissioning Management Procedure ([VH9352](#))
- [38] System Commissioning Master Schedule ([WEUTLA](#))
- [39] Maintenance Management Procedure ([3HZ4CU](#))
- [40] ITER Policy on Safety Security and Environment Protection Management ([43UJN7](#))
- [41] Procedure for management of Nonconformities ([22F53X](#))
- [42] Procedure for the management of Deviation Request ([2LZJHB](#))
- [43] Procedure for the Preservation of Equipment ([WML9CF](#))
- [44] SRD-41 (Coil Power Supply and Distribution) from DOORS ([28B6XQ](#))
- [45] DEF-01 SDDD for TF and CS AC/DC Converters ([NVMPG9](#))
- [46] System Design Description Document (SDDD) for PF Converter ([Q2J2EL](#))
- [47] DEF-01 SDDD for VS and CC AC/DC Converters ([HEJFM9](#))
- [48] CPSS - risk assessment table ([MTUCHG](#))
- [49] DEF-02 TF and CS AC/DC Converters RAMI Analysis and Spare Parts ([HPZAAX](#))
- [50] RAMI Summary Report for PF Converter Units ([Q3KGE9](#))
- [51] DEF-02 VS and CC AC/DC Converters RAMI Analysis and Spare parts ([HD5XJL](#))
- [52] Equipment Data Sheets
- [53] ITER Site Master Plan ([27X5FM](#))
- [54] ITER General Installation Layout ([3CMMDL](#))
- [55] Buildings and worksite areas location plan – 2/2015, ref. 70-00-00-0001 ()
- [56] Land parcels locations plan, ref. 70-00-00-0002 ()
- [57] SSEN & PPEN Maintenance Plan 2017-2019 ([SEV5EK](#))
- [58] Power Distribution Plant Operation & Maintenance Services on the ITER site - Technical Specification ([SEZLBZ](#))

## 5 Estimated duration and schedule

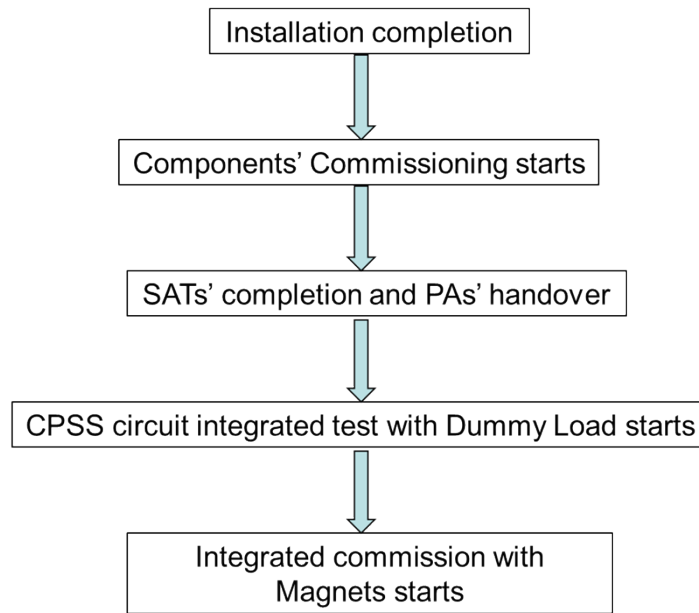


Figure 5-1 Breakdown of the contract duration

This contract will provide the services during the period of CPSS component commissioning with Dummy Load. The breakdown of this period is shown in Figure 5-1. And the arrangements of the contract are summarized in Table 5-1.

Table 5-1 Contract arrangement

Work Plans	Year	Task Orders and Instruction To Proceed	Task list
<b>Work Plan 1:</b> Preservation and maintenance services for Power Converter AC SSCs <b>Work Plan 2:</b> Preservation and maintenance services for Power Converter DC SSCs <b>Work Plan 3:</b> Preservation and maintenance services for Switches & Busbars <b>Work Plan 4:</b> Preservation and maintenance services for RPC&HF systems <b>Work Plan 5:</b> Assistant services for CPSS commissioning with Dummy Load <b>Work Plan 6:</b> Provision of services for the corrective maintenance	2023	ITP List	Task list for each ITP
	2024		
	2025	TO List	Task list for each TO

**Note:**

- 1) Task Order: The work is firm with clear deliverables, prices and dates.
- 2) Instruction to proceed type 1: The scope of some work is clear but date unsure, which will be released by ITP for date only.
- 3) Instruction to proceed type 2: Both scope and date of some work are unclear, which will be released by ITP for both price and date.

The specific explanations and terms are listed below:

- The duration of the contract will be 3 years, with an option to extend it up to two more years, in accordance with the provisions set out in the Contract;
- The WP number is none related to the sequence in which each service provision is started;

- Each WP will have a detailed specification to include all the tasks, which have clear scope and deliverables. For the tasks without both clear scope and date, the cost evaluation will be done individually through ITPs;
- Each TO or ITP could include the activities from different WPs, and the starting time of each Task Order could be different and to be decided by the actual needs;
- Each Task Order will be allowed to be suspended no more than 4 months with being distributed at most two times, the contractor should not declare additional budget for the suspending period.

## 6 Work description

Six Work Plans have been defined in this framework contract to have the services for commissioning assistance and maintenance during the component commissioning and circuit commissioning with dummy load. Since there are joint responsibilities between DAs and IO during the contract period as shown in Figure 5-1, it is significant to specify the clear scope of the contract to cover only IO’s scope according to different periods.

- Period of component commissioning with dummy load before handover from DAs to IO. In this period, the DAs’ suppliers responsibility, which defined in the Procurement Arrangements (PA), are not finished, the main commissioning and maintenance activities are within DAs’ suppliers’ scope. This contract covers IO’s responsibility for each Work Plan as described in Table 6-1.
- Period of circuit commissioning with dummy load from PAs’ handover to integrated commissioning with Magnets. As defined in the PAs, the circuit integration tests, which would involve operation of other components, are not belong to the PAs. These tests are subjected to the commissioning of the integrated circuit under the responsibility of IO. Then this contract need to provide the full commissioning assistance and maintenance services for all the Work Plans.

Table 6-1 Contract service scope during component commission for each Work Plan before handover from DAs to IO

Work Plan	Contract service scope during component commission
Work Plan 1: Preservation and maintenance services for Power Converter AC SSCs.	1) Full preservation and maintenance service for PF Converter AC SSCs; 2) Preservation and maintenance service needed for the other Converter AC SSCs before SAT, which are not in the scope of PAs and the IO direct service contract.
Work Plan 2: Preservation and maintenance services for Power Converter DC SSCs.	1) Full preservation service for PF Converter DC SSCs between installation completion and component commissioning; 2) Preservation and maintenance service needed for PF Converter DC SSCs during component commissioning before handover, which are not in the scope of the IO direct service contract; 3) Preservation and maintenance service needed for the other Power Converter DC SSCs, which are not in the scope of PAs and the IO direct service contracts.
Work Plan 3: Preservation and	Full preservation and maintenance services

maintenance services for Switches & Busbars.	for all the SSCs of Switches & Busbars.
Work Plan 4: Preservation and maintenance services for RPC&HF systems.	Preservation and maintenance service needed for RPC&HF systems, which are not in the scope of PA and the IO direct service contract.
Work Plan 5: Assistant services for CPSS commissioning with Dummy Load.	1) Limited commissioning assistance services for all the Power Converters and RPC&HF systems; 2) Full commissioning assistance services for all the Switches & Busbars.
Work Plan 6: Provision of services for the corrective maintenance	Corrective maintenance services needed for CPSS SSCs, which are not in the scope of PA and the IO direct service contract.

Note: The table only clarifies the simplified scope for each Work Plan. The each Work Plan specifications will define the detailed scope together with the TOs or ITPs.

## 6.1 Commissioning assistance services

The Contractor shall guarantee to provide on-call or continuous services to support the commissioning activities at the following two aspects.

- Labours with appropriate technical skills to execute on-site commissioning assistance activities.
- Personnel with engineering and management expertise to support commissioning management and interface coordination.

## 6.2 Maintenance services

The Contractor shall guarantee to provide on-call or continuous services to plan and execute the maintenance activities at the following two aspects.

- Labours with appropriate technical skills to execute on-site maintenance activities.
- Personnel with engineering and management expertise to support maintenance management and interface coordination.

### 6.2.1 Periodic inspection

The periodic inspection will be started with dedicated Task Orders created and approved, and the Contractor shall guarantee continuous services of the concerned facilities for all users. To this end, in order to monitor the SSCs' general condition and anticipate any abnormal situation or deviation, the Contractor shall perform periodical checks on components focusing on environmental conditions and technical parameters depending on equipment technology. The frequency of those periodical checks shall be adjusted according to Condition Based Maintenance principles and mainly include following aspects.

- Functional checks of the Electrical Installations including controllability for equipment which so require (circuit breakers, switches, I&C systems, etc.).
- Repetition of factory/site checks according to the definition in the Work Plans and the reference maintenance procedures.
- Other checks which ITER or Contractor identify as the essential items.

Specific inspection program and sheets shall be created for all these operations where are described the actions performed (measurement protocol used, servicing procedure applied, etc.).

The most of these checks have to be performed on routine basis and without unavailability of the concerned part of plant; for each component will be given a table indicating the type of check and its periodicity. Within the frame of this technical specification such type of controls will be indicated as “off-line checks”.

The results of these checks shall be recorded in the IDM. Any corrective and preventive maintenance operations which may prove necessary after these checks shall be input in IDM in the form of a request.

## *6.2.2 Preventive maintenance include preservation*

### *6.2.2.1 Preventive maintenance*

The Contractor shall take all the necessary steps, which defined in the Work Plans and procedures or through on-site investigation, to guarantee maximal availability rate and compliance to applicable legislation of the components. This preventive maintenance shall be carried out in order to reduce the probability of equipment failure and degradation of the service provided or the specified condition. To do so, the Contractor shall draw-up the forecast schedule, as well as launch and execute the preventive maintenance Tasks in due time with respecting the work schedule. Once planned, each operation must be the input and monitored in the IDM in order to make it possible to check proper performance.

The maintenance process layouts and associated documents shall be modified and adapted depending on experience feedback, and the manufacturer’s recommendations and where necessary created for equipment which so require. Said process layouts shall be complemented by maintenance operating procedures for complex technical operations, and/or the IO’s recommendations. The Contractor is also requested, based on their return of experience, to propose any optimization of any preventative maintenance plan defined by IO. The improvement should be recorded in the improvement proposals, which will be delivered to IDM and uploaded monthly for each TO or ITP, then the related Plans and Procedures revision is out of the contractor’s scope.

### *6.2.2.2 Preservation*

In case that some of the components would have been isolated during the periods of transition as defined below:

- Transition period from installation completion to component commissioning started;
- Transition period when the SSCs’ commissioning finished and isolated;
- Transition period from component commissioning finished to circuit commissioning with dummy load started;
- Transition period from circuit commissioning with dummy finished to integrated commissioning with Magnets started.

The related preventive maintenance activities will be replaced by scheduled preservation activities proposed by the manufacturers or IO, the contractor should also provide the support for defining the preservation activities with its experience.

At least the following aspects need to be considered during the preservation period:

- General visual control;
- Nameplate;
- Integrity of equipment;
- Assembly (Handle, Bolt, Nut) status;
- Abnormal attachment;
- Grounding connections;
- Painting;

- Status of welding;
- Tightening screws in the terminal strips;
- Cleaning;
- Other preservation works which ITER or Contractor identify as the essential items.

### 6.2.3 Corrective maintenance

A Corrective maintenance ITP is launched when a failure or defect is found. The aim of corrective maintenance is to restore operation of the affected component in a temporary or permanent manner during the commissioning under IO’s scope. There are two activities involved:

- Troubleshooting (temporary repairs): Troubleshooting is mainly comprised of temporary actions, which then followed by permanent repairs.
- Repairs: The scope of work includes all the operations which are needed to restore nominal performance of the SSC, including replacement of any failed or defect parts when needed.

The corrective maintenance process layouts and associated documents are modified and adapted depending on experience feedback and manufacturer recommendations and where necessary created for equipment which so require. For complex technical operations, these process layouts shall be supplemented.

### 6.2.4 Requirements

#### 6.2.4.1 Scheduling

Based on preventive maintenance Task list, the Contractor shall draw-up a high level forecast schedule every 3 months for the quarter T+1 relating to the preventive maintenance activities as well as for the periodic inspections and tests. This schedule shall be reviewed by IO every month during the Contract monthly progress follow-up meeting. The Contractor shall also report any encountered problem or specific point that could affect Preventive Maintenance program implementation during this meeting.

Adherence to schedule performance shall comply with the following requirements:

Periodicity/Authorized range of delay * (around due date)	
Weekly	+/- 1 day
Monthly	+/- 3 days
Bimonthly	+/- 5 days
Quarterly	+/- 7 days
Half-yearly	+/- 15 days

(\*) in case the periodicity would have been set according to some statutory requirements, no delay is allowed

#### 6.2.4.2 Policy

In order to ensure that the facilities entrusted are constantly remain compliant with the applicable regulations, the Contractor shall:

- Monitor all its equipment and tools (inventory, date of last inspection, conformity reports, and schedule for bringing into compliance, etc.),
- Assist inspectors by presenting the associated documents and material, opening or disassembling the protection devices required for performing inspections, etc...
- Perform itself all the inspection operations that do not need to be performed by an accredited body in accordance with the regulations. Whenever the regulations stipulate that an inspection must be carried out by an accredited body, the Contractor shall be



responsible for monitoring the actions recommended by the body in the scope of its regulatory inspections irrespective of whether said actions are directly carried out by the Contractor or by a third party.

The Contractor shall also propose any upgrade or modification of components in order to optimize its safety, reliability or integrity level. These proposals shall be submitted to IO using a detailed template, which will encompass:

- A detailed description of the improvement proposal
- Any relevant drawing, picture, sketch ...
- A cost estimate for the study and the implementation of recommended solution

#### 6.2.4.3 Reports

A report will be drawn-up in the IDM for any task in the scope of commissioning assistance, preventive and/or corrective maintenance. A comprehensive file of the maintenance actions shall be compiled including all the elements pertaining to the TO or ITP, including:

- Safe isolation certificates and work authorisation (LO/TO documents, as required).
- Commissioning assistance or maintenance sheets.
- Associated operating procedures.
- Report, inspection or measurement sheets.
- Non-conformity sheet, technical anomaly sheet and improvement proposal.
- File for drawings subject to modifications (layout drawings for cabinets, equipment, cabinet drawings, automation drawings, emergency shutdown, etc. including sensors).

The comprehensive files relating to commissioning assistance, preventive and corrective maintenance actions must be available on site.

## 7 Work preparation and execution

### 7.1 Contract preparation phase

This phase should enable the Contractor to get a better understanding of the missions which are part of the contract and to propose a Quality Assurance and Safety Plan including applicable procedures from the start of the execution phase of the contract.

Within the framework of this activity, the Contractor shall:

- Take full knowledge of the ITER facilities being under its responsibility scope;
- Participate in inspections of the facilities or worksite;
- Review and propagate towards its staff any relevant documentation supplied by the IO and applicable legal rules to be followed;
- Be familiar with all the specific computerized tools (in particular with Document Management System – IDM);
- Be familiar with work process and related tools;
- Start the detailed planning of the activities executed in the first week of the execution period of the contract.

At the end of this period, the Contractor shall be responsible and demonstrate that their staff have acquired all the necessary training and clearance and have all required accreditations/certifications through the personnel training records and certificates, which could be needed to execute the commissioning assistance and maintenance services.

## 7.2 Overall Planning for each TO and ITP

The Contractor shall prepare deliverables such as work schedules and ready for execution all the TOs and ITPs for all the various required actions issued in IDM according to Work management Process. This includes:

- Management of ITP and TOs backlog;
- Preparation and coordination with all involved parties for the implementation of requested activities as commissioning assistance, inspections, corrective maintenance and preventive maintenance including preservation;

The contractor need to define all activities, tools, materials & spare parts and resources required for the execution of all the tasks including the necessary subsidiary works if any for each TO or ITP.

In order to confirm the technical scope of each TO or ITP, the contractor shall check during an on-site visit the potential constraints and pre-requisites including all the means to consolidate the first diagnosis in the case of corrective maintenance.

The main deliverable of this step is the provision of a comprehensive Ready for execution TOs or ITPs, which will be used as a reference for potential Risk assessment and initiate basic scheduling step taking into account potential co-activity concerns, as well as to be the key inputs for initiating each task execution associated to current TO or ITP.

### 7.2.1 TO and ITP with associated task list

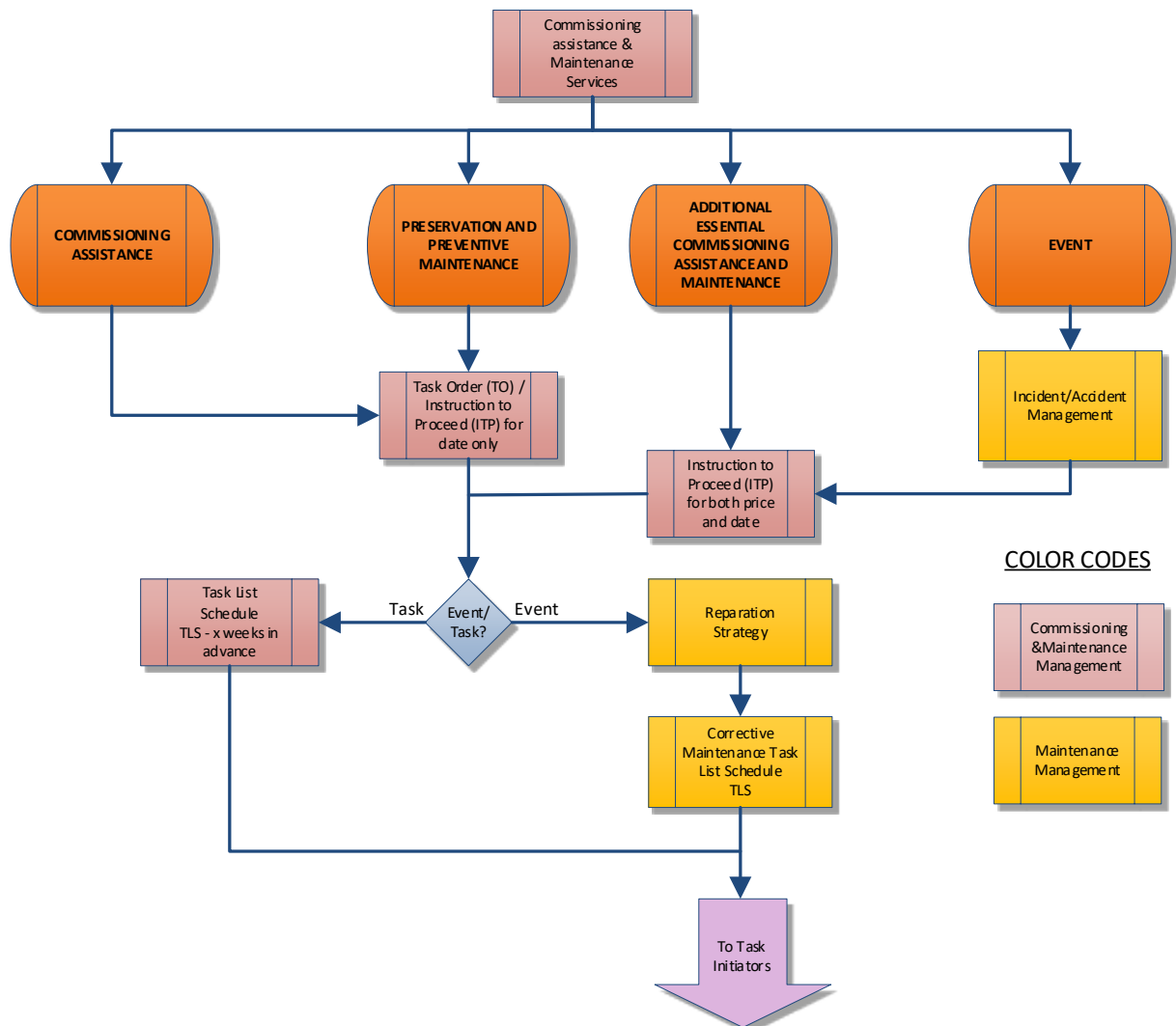


Figure 7-1 Commissioning assistance and maintenance workflow – TO/ITP overall planning

As shown in Figure 7-1, the workflow have been considered three kinds of initiators for any Commissioning Assistance and Maintenance TO or ITP, the contractor need to prepare a detailed corresponding Task List Schedule (TLS) to each TO and ITP, classified as part of Commissioning Assistance, Preventive Maintenance, and “Event” as part of Corrective Maintenance.

For any TO or ITP on IDM, it must be decided how many weeks or days in advance to start the activity (x in the workflow). The purpose of this period is to have enough time to set the Commissioning or Maintenance Strategy.

Corrective Maintenance Activities are initiated by an Event. This event is launched when a monitoring system shows any kind of alarm, or also, when onsite supervision realizes about any dis-function or trouble in the component/system.

The event detection is followed by a corrective Maintenance. A Corrective Maintenance need be performed when the system or component shall be handled or repaired in order to avoid a failure to keep its function and integrity. As well as to be performed when the system or component has already loose its function or integrity, dis-functions, anomalies, faults, break-downs, etc. The events that are discovered and alarmed by any person in the plant, but mainly the electrical commissioning operators and site supervisors who continuously monitor the electrical and process parameters.

In case of an Event, the ITP shall be released. If the event is consequence of an Incident (I) or an Accident (A), before releasing the ITP, an I/A management process (defined in the following Section) shall be initiated. This should be made immediately after the knowledge of the I/A.

### 7.2.2 Incident/Accident (I/A) Management

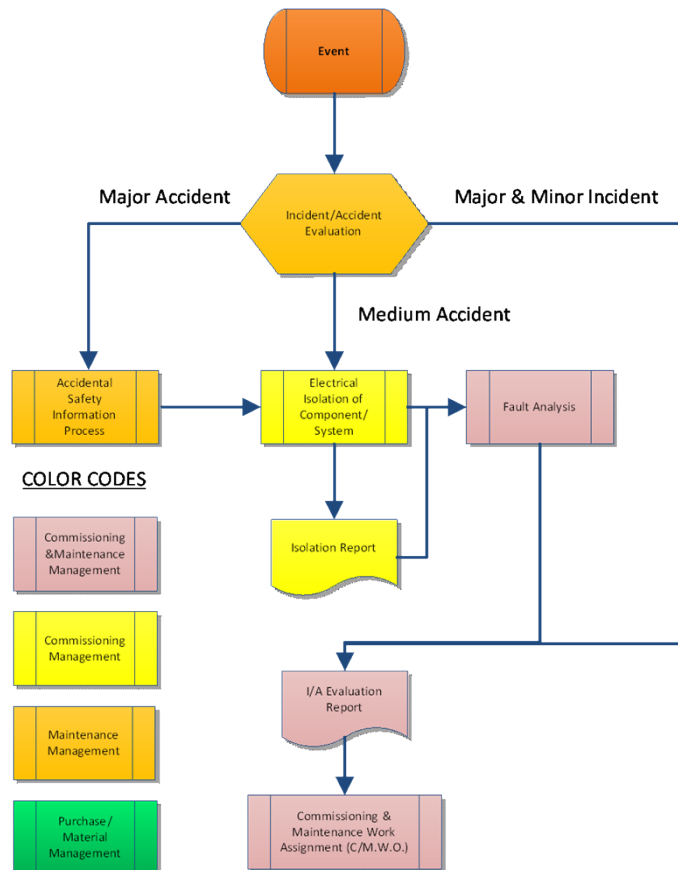


Figure 7-2 Incident and Accident management workflow

The knowledge of any kind of electrical incident or accident shall be immediately advised to the Electrical Site Manager, or his delegation, in order to start the process shown in Figure 7-2 by I/A committee. In this committee, a quick evaluation shall be made to select the criticality of the event. A proposed selection of this criticality could be:

- Major accident: if there are people injured or affected.
- Medium accident: if there are components or materials affected with loose of integrity.
- Major incident: if the electrical system cannot provide its main function.
- Minor incident: if one or some electrical parameters are over-below the desired margins.

In case of a Major Accident, the Electrical Safety Information Process shall be initiated. This process consists on informing the adequate and selected persons about the electrical accident. It must be dependent of High Level Accidental Plan, for all accidents that can happen in the facility. This is the plan involving: safety teams, firefighters, ambulances, and so on.

If the evaluation of the accident reaches to the conclusion that the electrical system must be isolated from the power source, the electrical commissioning team must be informed and act consequently. The isolation will avoid further consequences and will allow safety teams to work in the area without undesired reenergizing risks.

After the isolation of the component or system, a fault analysis shall be performed in order to find the source of the accident.

It is important that at this stage, the isolation of the component or system is not removed. Once the component/system is driven to a steady and stable condition, the I/A evaluation process will be considered completed. An ITP shall be raised to start the Corrective Maintenance. In this ITP, a summary report of the accident shall be introduced as an input.

In case of an Incident, the evaluation must be recorded in a summary report that will be deeply analyzed in the next steps once the ITP has been released as for the accident case.

## **7.3 Initiators of each Task associated to each TO or ITP**

### *7.3.1 Task initiators work flow*

The Figure 7-3 shows the workflow of the initiators for each task associated to the dedicated TO or ITP, the workflow is the sequence of processes that indicate the commissioning assistance, preservation and preventive maintenance, as well as resolve a component failure and restore continuity of service after appropriate maintenance.

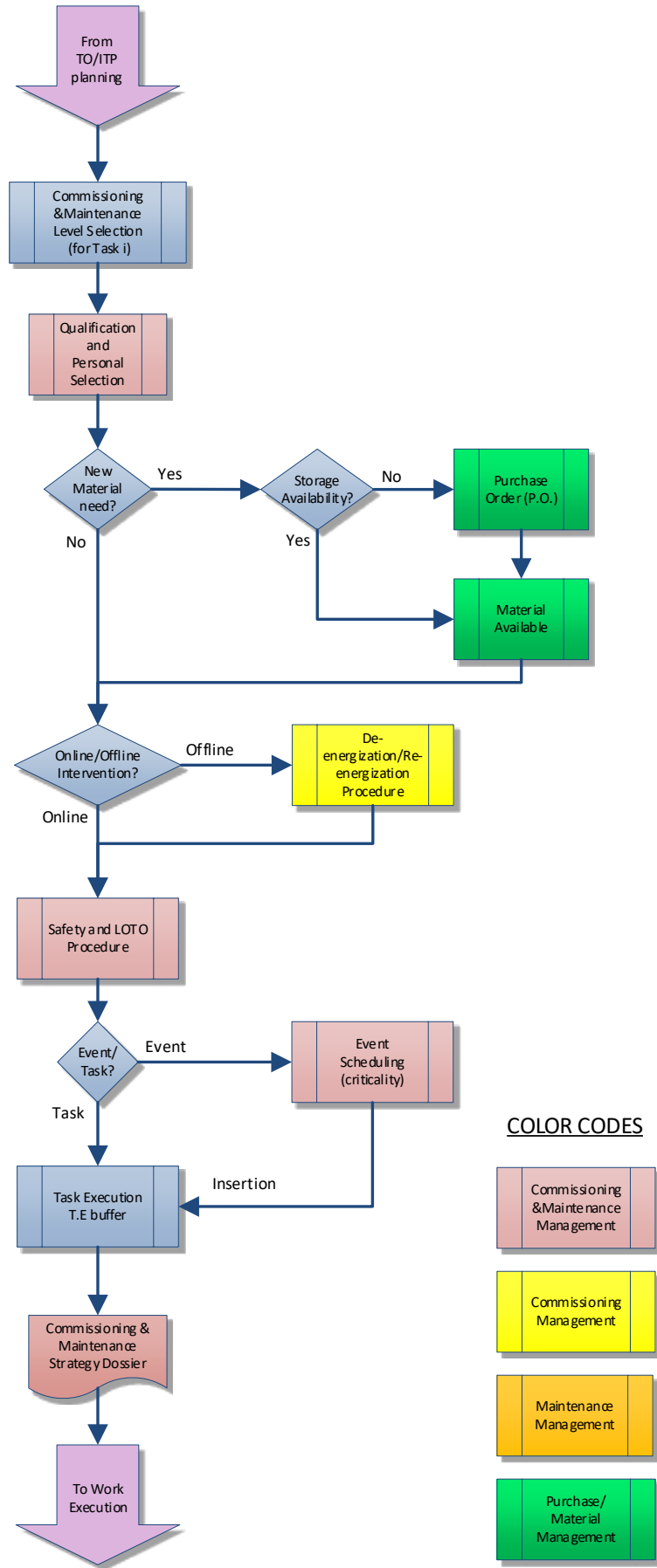


Figure 7-3 Commissioning assistance and maintenance workflow – task initiators

### 7.3.2 *Commissioning and maintenance strategy*

Once a Task is introduced, a maintenance definition strategy is started. The main steps in this process are described below:

- **Level and Qualification:** To choose the Commissioning Assistance and Maintenance Level Classification. The labour involved in the activity must be decided. For a Preventive Maintenance, all these classifications are already set in each Work Plan. For a Corrective Maintenance, similar classification depending of the activity must be used to particularize the activity with respecting to the event.
- **Materials:** Exhaustive lists of materials that are going to be used in the maintenance activity need to be developed at this stage. The availability or not of the material to be used will induce that the Purchase Department launch the corresponding Purchase Order. The detailed materials procurement scope has been defined in Section 7.6.
- **Energization and Safety Procedures:** In case the activity needs to be performed Offline (with the Component/System energized), a De/Re-energization procedure must be selected and/or adequate to the activity. For all cases, Online/Offline intervention, a Safety and LO/TO procedure must be selected and/or adequate too.
- **Event Scheduling:** In case of a Corrective Maintenance, and depending on its criticality, a scheduling of the activity must be performed. Date, time and duration of sub activities must be analysed. This schedule need to be inserted in the T.E buffer depending on the criticality in comparison with Preventive Maintenance Activities.
- **Strategy Dossier:** Is a summary of all decision and documents created in the previous steps. This dossier, which is prepared by the contractor with the essential inputs provided by IO, is unique for each activity and will be handed over to the site manager to directly execute the works with his team.
- **T.E buffer:** This buffer is a list of tasks to be executed that are feed by the Maintenance Strategy process. The buffer will release one or several tasks to be executed by the site execution team according to the programed schedule. In a more general way, the buffer will release in order (First In, First Out) all predefined maintenance task (from TLS), except if any Event happened. In this case, the criticality evaluation has decided the insertion of the reparation activity at the beginning or between any preventive maintenance activities.

## 7.4 **Execution of each Task associated to each TO or ITP**

As described in previous Section, one to two weeks before starting the TO or ITP, the contractor need to prepare a detailed Task List Schedule (TLS) in agreement with IO based on priority levels and due dates indicated to be attached to the TO or ITP. The Contractor is then responsible for scheduling and on time completion of the task specified in the TLS.

- The Contractor shall manage in a safe and efficient manner the execution in the field of the commissioning assistance and maintenance activities defined in each TO or ITP with assignment and coordination of needed level of skilled resources to achieve target dates defined in the TLS.
- The Contractor shall take full responsibility in the implementation of OHS measures defined in PPSPS and PTW or any other complementary documents such as hot works permit or confined spaces permit. All activities necessary to have a PTW prepared and released in due time are part of the Contractor's scope.
- The Contractor shall take every needed measure in order to ensure that the required quality level is met, and then that their work is free from defects.

- The Contractor shall take into account that other companies can also work at the same time in the same area during the execution of its work. The Contractor must consider this in its work weekly and daily schedules (integrated schedules principle).
- The Contractor shall schedule and coordinate its work in such a way that third parties are not unnecessarily impeded in their performance and that no persons or material are put at risk. The scheduling of the maintenance work shall also respect the commissioning schedule of the system, and shall be coordinated closely with the IO.
- The Contractor is obliged to adhere to the times and intermediate deadlines indicated in the execution schedules and to report the status of the work to IO through a report.

The contractor should deliver all the instructions to its Site Execution Team through the Task Initiators report that includes the Strategy Dossier to know how to perform the task, and then follow up the process shown in Figure 7-4 to start the work.

- The Site Commissioning Team (out of this contract scope) performs all operation activities and responsible for energizing or de-energizing the systems. In the case of one task needs to be executed, a online/offline request need to be raised from the Contractor to the Site Commissioning Team and must be tracked and reported.
- The contractor shall execute all the Preventive and Corrective Maintenance, which are defined in the TOs or ITPs. In case the work cannot be completed for any reason, a Not Completeness Report must be issued and analysed by the Management. The T.E remain the same, but a redefinition of the strategy and a rescheduling will follow before come back to its Site Execution Team.
- Waste Material management: all material or electrical components removed during the works need to be tracked and handle back to the Purchase/Material Department.
- All the steps in the process must be specifically recorded thus allowing the traceability of the T.E. Final dossier for the T.E must include Strategy Dossier, Task Execution Reports, Material traceability. As soon as the final dossier is completed, the T.E can be considered as closed.

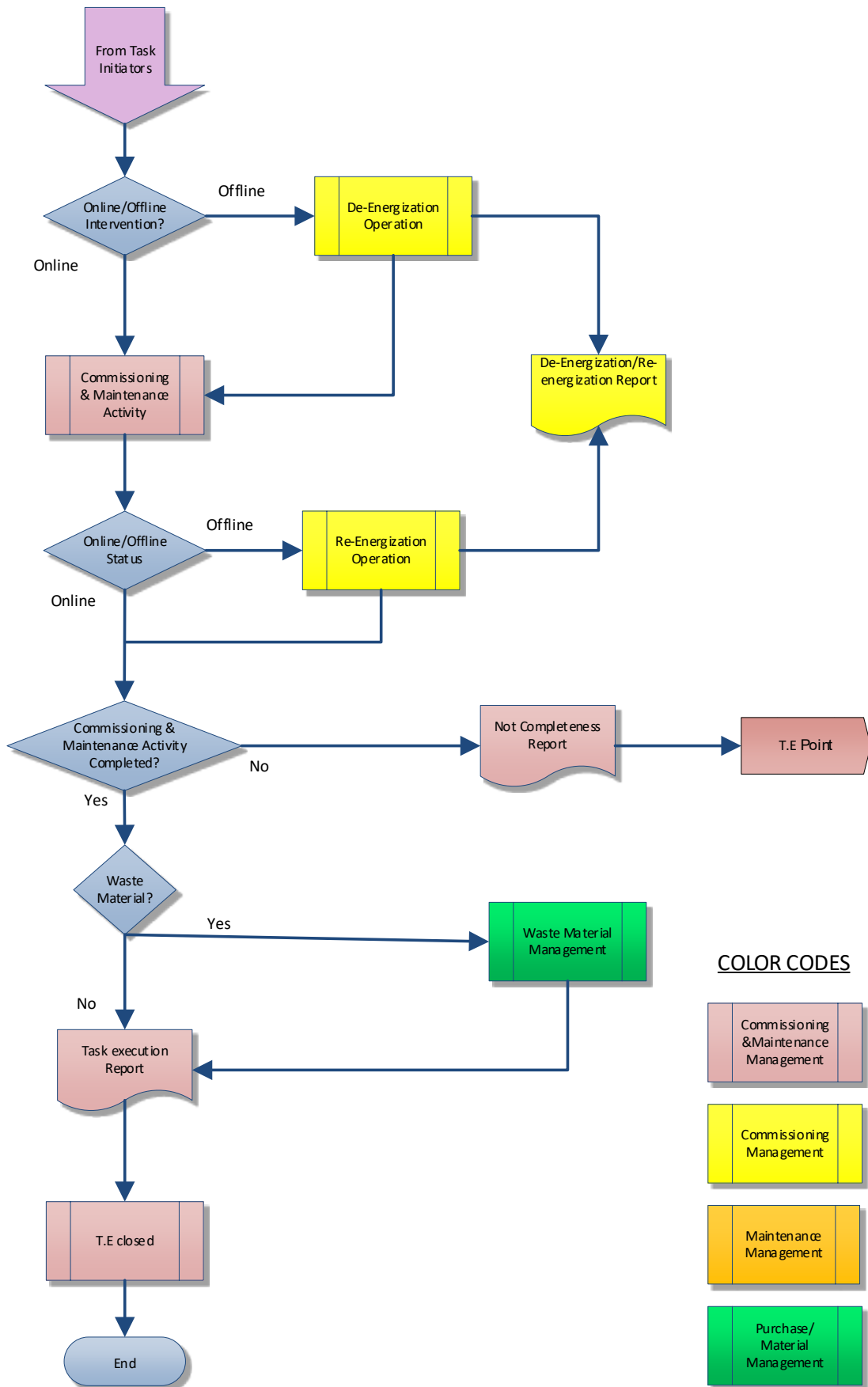


Figure 7-4 Commissioning assistance and maintenance workflow – work execution



## **7.5 Interface management with sub-contractors and Works coordination**

Whenever the Contractor directly calls on other entities/companies or coordinate some IO subcontractors in the scope of its services, said companies shall comply with the process based on the procedures of its services (Permits to work, service report and document update, ..).

The operational steering of these services shall be incumbent upon the Contractor who shall plan, coordinate, supervise and receive all the sub-contracted activities.

The hereafter lists main directly subcontracted activities:

- Insulation;
- Lifting/ crantage;
- Painting / sand blasting works;
- Fireproofing;
- Scaffolding;
- Civil Works / Excavation;
- Industrial cleaning.

In case of failure of IO Framework contractor, these services will have to be subcontracted by the Contractor upon Unit prices given as an Option in the Contract.

## **7.6 Spare parts management and general parts & consumables purchase**

The Contractor shall be given access to the stock of spare parts available on site for the equipment part of his scope at the start date of the contract and suitable at least for the Contract duration. Given the consumption linked to undertaken activities (maintenance and commissioning assistance), this stock is likely to change.

The type of spare parts and the minimum number to store which are set by the ITER Organization will be reviewed by the Contractor in order to propose needed adjustments according to his experience and knowledge.

The Contractor shall manage stock levels and inform the ITER Organization of any additional spare part to be purchased (at IO's cost).

In case of stock shortage or non-stored parts, the Contractor shall propose the solution to supply needed spare parts via their own supply chains, or timely inform IO to procure the shortage spare parts. Consequently, the Contractor may not claim any inventory shortage to explain any failure to comply with its contractual obligations, especially regarding those related to reliability aspects.

In the scope of this Contract, the Contractor shall also provide all consumable products required for the achievement of their activities in due time when complying with applicable standards and legislation. This notably includes (but not limited to):

- “Administrative” supplies;
- Lubricants, paints and varnishes, solvents, drain cleaners...
- Light bulbs, technical lights and indicators...
- Mechanical Fasteners such as screws, nuts, bolts, washers, glue, thread locks...
- All other non-specific materials, consumables, tools, transports, chemicals and whatever other materials to execute the scope of work.

The Contractor shall remove any worn parts or waste materials stemming from its activities. As applicable, it shall destroy them or recycle them with respect to the procedures applicable on site. It shall supply all the documents for following up said destruction or recycling.

The tools required by the Contractor for its own purpose shall be the responsibility of the Contractor. The Contractor shall be responsible for managing any stock generated by these items.

### **7.7 On-call services**

An on-call system (in accordance with the organization chosen by the Contractor) shall be implemented by the Contractor. The exact start date and the staffing of on-call services will be also linked to the progress of turnover process of the systems handed over from installation.

The on-call schedule shall be provided to the IO on a monthly basis. This schedule shall indicate, for every week, the names of the staff members on call and their mobile phone numbers.

It shall be possible to reach the staff on-call at any time.

For the on-call services, if there is off the shelf service ready on site, the response time must not exceed 24 hours, if not, it must not exceed 72 hours.

### **7.8 Miscellaneous services**

The following miscellaneous services not directly linked to the maintenance activities, can be requested to the Contractor and paid as a variable part of the contract on the basis of hourly rates:

- Assistance to the preparation and coordination of specialized services (e.g. vendors assistance);
- Assistance for Spare parts purchase;
- IO's electrical tools maintenance;

The preparation and global coordination of those activities from a safety and technical point of view shall be handled by the Supervisory team put in place by the Contractor to manage Maintenance activities part of the Contract.

## **8 List of deliverables and due dates**

The Contractor is responsible for the completion of all documentation and reports linked to preparation, scheduling and execution of his work and the archiving of those elements within IO's documentation management system (IDM).

In any case, it shall be responsible for updating the various existing registers. All the applicable legal requirements shall be duly identified during the Appropriation phase.

For all equipment provided by the Contractor, the entire management of the commissioning assistance and maintenance services documents is incumbent upon the Contractor (including creation, amendment, checking and annual update, input, duplication, centralization, preservation, archiving).

The Contractor shall request from its suppliers any missing or additional documents that are required for proper performance of the services.

All documents shall be copied onto an IO server and it must be possible to consult and edit them from any authorized station connected to the site general IT network. All existing, created or modified documents remain in the possession of the IO. The same applies to all computer developments.

The list of expected deliverables and issuance frequencies are defined in the here under tables for each activity:

**Table 8-1 List of expected deliverables**

Activities	Expected deliverables	Periodicity
Contract preparation phase - Appropriation phase	General preparation period report	30 days after contract signature
	Personnel training records and certificates	
	Quality Assurance and Safety Plan	
	PPSPS	
	Draft procedures relating to the processes of the contract activities and IDM usage	
	Ready for execution work list for the activities part of the first month basic schedule	
TO&ITP preparation phase - planning	Task list and associated weekly basic overall plan and schedules (TLS)	1 or 2 weeks before each TO/ITP starts, keep monitoring weekly and revising on condition.
	Preparation of ready for execution for each TO or ITP (includes all the tasks, prerequisites, procedures, tools, materials & spare parts, resources, etc.)	1 week before each TO/ITP starts, keep revising on condition
	Incident and Accident report	Upon event (out of this contract scope)
	Root Cause Analysis Reports	Upon event (out of this contract scope)
	Backlog status	Bi-weekly
	List of overdue tasks	Bi-weekly
	Service and quality indicators	Monthly
	High level forecast quarterly schedule Quarterly	Quarterly
Regulatory activities schedule and progress report	Monthly	
Task - initiators	Task initiator report (activities list, level, personal selection, materials, strategy dossier, T.E buffer, etc.)	7 days before each task starts.
	Activities list associated to this task and the corresponding detailed schedule	3 days before each task starts, keep monitoring up to weekly and revising on condition.
Task - Execution	PTW ready for execution	up to 2 weeks
	Schedule progress report	Weekly
	Confirmation of completed activities or not completeness report	Weekly
	Energization or De-energization request	3 days before task starts

	Improvement proposals	Monthly
	Task Execution report	Weekly
	Waste material management report	On condition
	Update of technical repository (IDM)	Monthly
	Service, activity and quality monthly report	Monthly
	Updated drawings (in case of modification)	Upon needs
Spare parts management and General parts & consumables purchase	Issuance of spare parts reservation form	Upon needs
	Archiving of technical documents/certificates	Upon needs
	Quality checks of prepared parts	Upon needs
	Stock levels follow-up report	3 Months
	Stock adjustments recommendations	Upon needs
On-call services	On call schedule with names	Monthly
	Services report with time spent	3 Months

Note:

- Any new document shall be drawn-up in electronic format in Word, DXF, DWG or XLS or any other compatible format.
- The official language of the ITER Organization is English. Therefore all input and output documentation relevant for this Contract shall be in English. The Contractor shall ensure that its team supervising this Contract have an adequate knowledge of English, to allow efficient communication and adequate drafting of technical documentation.
- Waste Material management: all material or electrical components removed during the maintenance works need to be tracked and handle back to the Purchase/Material Department.

## 9 Service and key performance indicators

The Contractor's service will be evaluated based upon service and quality indicators detailed in the paragraphs here below.

The Contractor is also responsible for the preparation of KPI's part of weekly and monthly follow-up Maintenance performance reviews. Most of these KPI's shall be directly extracted from IDM.

### 9.1 Service indicators

The applicable service indicators are defined here below.

#### **Backlog management**

IS 1: Number of TOs and ITPs assigned to the Contractor within a month

IS 2: Number of TOs and ITPs assigned to the Contractor completed within a month (with distinction of legal inspections)

#### **Planning management**

IS 3: Number of Ready for execution tasks prepared within a month

#### **Scheduling management**

IS 4: Number of TOs and ITPs integrated in a month.

IS 5: Number of scheduled TOs and ITPs completed in due time with reference to monthly report.

### **Incident management**

IS 6: Monthly number of open and closed incidents

IS 7: Monthly number of incidents due to Contractor

### **On-call**

IS 8: Number of on-call interventions with spent hours

## **9.2 Specific Quality Indicators**

### *9.2.1 Indicator 1 (IQ1): Percentage of non-accepted deliverables*

All deliverables provided by the Contractor are subject to validation.

Indicator IQ1 consists of calculating (for each TO or ITP) the percentage of non-accepted deliverables at first issue.

The Contractor shall provide to IO and update a summary table, every 3-month interval showing:

- Number of deliverables related in Chapter 8 produced (NbL);
- Number of deliverables identified as IQ1 related in Chapter 8 non approved at first issue (Nb).

Indicator 1 is calculated according to the following formula:  $IQ1 = Nb / NbL * 100$ .

A target is set for the whole duration of the Contract at 10% maximum.

In case of exceedance of that target, the Contractor shall propose a corrective action plan to respect the target from the following month.

### *9.2.2 Indicator 2 (IQ2): Percentage of activities with unmet deadlines*

Indicator IQ2 consists of calculating for the percentage of Tasks whose deadline or periodicity was not met.

For each TO or ITP, the Contractor shall permanently update a monthly summary table:

- Total number of approved Tasks (NbT);
- The number of approved Tasks not completed within deadlines (NbTnC).

Indicator 2 is calculated per activity according to the following formula:  $IQ2 = NbTnC / NbT$ .

A target is set for the whole duration of the Contract at 10% maximum.

In case of exceedance of that target, the Contractor shall propose a corrective action plan to respect the target on the next month.

## **10 Crisis management**

In case of alert on site (for example loss of electrical power networks, etc.) the Contractor shall take all steps to immediately respond by adapting the current activities and making himself available to the crisis management cell.

The Contractor shall adapt its human resources according to the circumstances and the existing applicable procedures for such a situation.

The activities accumulated during the shutdown phases shall be rescheduled and, as required, taken into account in the service indicator management process.

## **11 Facilities and equipment**

All facilities and all the equipment (with the associated documents – drawings, manufacturer documents, etc.) supplied within the framework of this contract by the IO shall be object of a joint inventory:

- When the Contractor takes over his duty,
- When the Contractor hands over to the IO upon termination of the contract.

The schedule of condition checks and the inventory shall be updated by the Contractor on a permanent basis (update in the IDM for the concerned equipment).

Upon termination of the contract, the Contractor shall replace or overhaul the equipment missing or damaged in consideration of the inventory and of the schedule of condition, at its own expense.

For the installation of their offices and their workshop (at the contractor's expense), the Contractor shall be provided by IO a worksite area with water, electricity, phone lines and internet connections.

The utilities required for the performance of the services set out in these specifications are supplied by IO and shall be specifically monitored on a monthly basis (water, electricity, telephone).

Upon commencement of the service, the Contractor undertakes to have a technically substantiated monthly water, telephone and electricity consumption estimate. During the performance of the contract, said consumption shall be invoiced to the Contractor on pro-quota basis.

All the resources required for the entire performance of the activities under this contract are under the full responsibility of the Contractor.

In particular, the Contractor shall provide all its agents with suitable vehicles complying with the regulations in force and required for the performance of their missions anywhere within the activity area, in any weather conditions.

## **12 Skills and qualifications**

### **12.1 Skills**

The Contractor shall ensure the safety of individuals and goods within the facilities entrusted to it. Therefore, everyone must ensure a minimum service and perform his/her tasks even in case of social problems at the national scale or within the company.

Therefore, the Contractor undertakes to meet the following requirements:

- To implement the supervisory and preparation structure required to meet the objectives of the contract, the supervisory team shall have, at least:
  - 10 years' experience in team management and mechanical/electrical skills;
  - 5 years' experience in commissioning and maintenance service areas and type of assets/equipment technologies covered by the contract.
- To execute the requested activities with expected autonomy level, the team shall have at least 5 years of experience in the discipline(s) linked to the work to be performed.
- To ensure regular attendance on site for all activities, without any interruption, during normal working hours.
- To improve the training level of its staff in the field related to its function.
- To ensure that its staff has proper knowledge of the facilities and equipment in order to ensure Technical efficiency in terms of Quality, Security and Safety.
- To implement a dynamic and flexible organisation, taking the possible workload variation into account for the whole term of the contract. This organisation must make its possible to meet the set objectives and deadlines.
- Ensure the qualification of the operators for each task.

### **12.2 Qualifications**

The Contractor's onsite team shall have a perfect knowledge of the French Electrical regulation (labour code) and of the related Standards (in particular NF C18-510), due to the nature of the

scope, each member of the Contractor's team shall possess a valid French electrical certification (Habilitation Electrique).

The Contractor shall provide its staff with the working authorizations or risk training certificates required according to the type of works (particularly Electrical Certifications) and support all costs pertaining to training, qualification, upgrading, safety audits, etc. The Contractor undertakes to maintain these qualification levels for the whole term of the contract.

The main standards, authorizations or basic trainings are reminded below (non-restrictive list):

- Electrical safety as per requirement of documents NF C18-510, NF C15-100, NF C13-200, NF C18-501;
- Light vehicle driver's license;
- Work at height (French Labour Code R.4323-31 and 32, Decree 2008-244 of 7 March 2008, European Directive 2001/45/CE, 95/63/CE, Decree 98-1084, etc.);
- First aid training (Certificate in first aid - AFPS, (Attestation de Formation aux Premiers Secours) for at least one member of the Contractor's staff if staff workforce is above 20 people;
- CACES certification or equivalent (French Certificate of aptitude for safe driving of lifting vehicles such as forklift, ...)
- Others under needs.

The Contractor shall ensure that qualification certificates, job sheets, medical monitoring, working authorizations and type of contract are in place for its staff members.

The Contractor shall take the constraints of this contract into account, especially all the risks involved. The Contractor's staff members must be medically certified fit to perform their functions.

The Contractor shall permanently make sure that skills in specific fields are clearly qualified and not provided by a single person.

The organization implemented shall compensate for holiday, sick leaves, seasonal variations of the workload, etc.

### 12.3 Anticipated level of requirements

The anticipated level of support is driven by the commissioning schedule before the integrated commissioning with Magnets. The anticipated level of support corresponding to each of the profiles described in above Sections is given as guidance. The numbers quoted correspond to the estimated workforce needed for all six Work Plans are considered as shown in Table 12-1. However, this level of anticipation could not accurate since the corrective maintenance could not precisely estimated during the life of the contract. The details of the workforce and corresponding services for each TO or ITP will be included in the dedicated documents.

Table 12-1 The list of workforce and equivalent duration

No.	Labour and service items	Quantity	Equivalent estimated duration for the Contract (Month)
1	Electrical Senior Engineer (Supervisor of the Contract)	1	36
2	Lifting Established	1	6
3	Mechanical Technician	2	18
4	Electrical Technician	2	24
5	Instrumentation Technician	2	36

6	Preservation services (cleaning, painting, etc.), QA/QC, HSE.	1 set	/
7	non-specific materials, consumables, tools, transports, chemicals, etc.	1 set	/
8	Contingency for unexpected items as unplanned corrective maintenance	1 set	/

## 13 Acceptance Criteria

Acceptance criteria for each activity described in Chapter 6 and 7 will be defined by IO representatives.

## 14 Quality Assurance (QA) requirements

The organization conducting these activities should have an ITER approved QA Program or an ISO 9001 accredited quality system.

The general requirements are detailed in [ITER Procurement Quality Requirements \(ITER\\_D\\_22MFG4\)](#).

Prior to commencement of the task:

- A Quality Plan must be submitted for IO approval giving evidence of the above and describing the organization for this task;
- The skill of workers involved in the study;
- Any anticipated sub-contractors; and giving details of who will be the independent checker of the activities (see [Procurement Requirements for Producing a Quality Plan \(ITER\\_D\\_22MFMW\)](#)).

Documentation developed as the result of this task shall be retained by the performer of the task or the organization for a minimum of 5 years and then may be discarded at the direction of the IO. The use of computer software to perform a safety basis task activity such as analysis and/or modelling, etc. shall be reviewed and approved by the IO prior to its use, in accordance with [Quality Assurance for ITER Safety Codes \(ITER\\_D\\_258LKL\)](#).

### 14.1 Quality Plan

The Contractor Quality Plan shall cover whole scope of the contract including services performed by suppliers/subcontractors and address all activities performed in connection with the contract. It shall be brief and to the point, while giving sufficient visibility on the control of the activities to be carried out. It will remain live document and will be updated regularly.

The Contractor organization shall be described precisely, including at least:

- Description of the measures implemented to answer to the IO requirements,
- In case of a consortium, a clear description of the roles and responsibilities of the different constituting companies as well as the way the interfaces between companies are managed,
- Organization procedures,
- Site organization chart,
- Approval and acceptance of procedures,
- Coordination procedures,
- Reports, certificates,



- Deviation Request reports,
- Non-conformance reports.

The Contractor shall ensure that suppliers and subcontractors do not start services or works without a Quality Plan in place that has been accepted and approved by the IO.

## **14.2 Subcontractor Quality Plan**

For each proposed subcontractor whose scope of work upon the Engineer's request, the Contractor shall submit the subcontractor's quality plan as a separate document.

For other proposed subcontractors, the Contractor shall submit a Subcontractor's statement of compliance with the Contractor's quality plan, the quality manual of the subcontractor and an organization note describing at least the following items:

- A full and clear definition of the subcontractor's scope of work.
- The organization of the subcontractor and his links with the Contractor's organization.
- The communication (in particular documentation) exchanges between the subcontractor and the Contractor.
- The way the subcontractor will control his activities and the way the Contractor will supervise the activities performed by the subcontractor.

## **15 Safety requirements**

### **15.1 Regulatory Framework**

ITER is a Nuclear Facility identified in France by the number-INB-174 ("Installation Nucléaire de Base").

For Protection Important Components (PIC), the French Nuclear Regulation must be observed, in application of the Article 14 of the ITER Agreement.

In such case the Suppliers and Subcontractors must be informed that:

- The Order 7th February 2012 applies to all the components important for the protection (PIC) and the activities important for the protection (PIA).
- The compliance with the INB-order must be demonstrated in the chain of external contractors.
- In application of article II.2.5.4 of the Order 7th February 2012, contracted activities for supervision purposes are also subject to a supervision done by the Nuclear Operator.

For the Protection Important Components, structures and systems of the nuclear facility, and Protection Important Activities the contractor shall ensure that a specific management system is implemented for his own activities and for the activities done by any Supplier and Subcontractor following the requirements of the Order 7th February 2012 [19].

### **15.2 Coordination of safety of and health protection**

For the areas/buildings listed in section 2.2, it is the direct responsibility of the IO to nominate a Health Protection and Safety Coordinator (HPSC).

Overall coordination between the different areas and construction sites will be provided through a general HPSC contracted by the IO; general HPSC will establish a coordination committee comprising the IO representatives as well as officials from the major companies working in the office areas.

The Contractor has a legal obligation as an employer for the organization of safety for his own team and shall:

- Elaborate occupational health and safety policy objectives.

- Give risk prevention proper organization and means.
- Identify hazards and risks for his employees by risk assessment (Document Unique).
- Elaborate and implement an action plan aiming to mitigate the risks at an acceptable level.
- Control implementation and results of the action plan.
- Review and update it regularly.
- Contractors working on IO site are obliged to respect all current French Labour Code.
- Failure by the Contractor to enforce the applicable safety rules will result in the suspension of the works until such time as the failure is rectified.
- Furthermore, the Contractor's failure to comply with the safety regulations may result in the imposition of sanctions and may also lead to the Contractor being denied access to IO site and to the termination of the contract in accordance with the Framework Contract.

The Contractor shall perform a hazards analysis before each step of the works. Collective protection shall be implemented as a first line priority. The Contractor shall equip his own staff with appropriate safety protection equipment according to the site rules, the specific risks identified and assessed. The following standard PPEs shall be supplemented according to the results of the aforementioned risk analysis:

- Safety shoes or boots;
- Safety helmet;
- Noise protection;
- Protective goggles;
- High visibility jacket (colour code as per the Site Rules, Contractor's handbook);
- Gloves;
- Overall type clothes, parkas, etc.;
- Specific protections linked to chemical or any other risk
- Face masks to protect workers from COVID

All Contractor personnel shall undergo a dedicated safety induction training, provided by IO, prior to be granted a permanent access permission, where they will be explained the main safety rules they shall comply with at all times. No personnel will be allowed on site prior to participation to this safety training.

The Contractor shall provide a Specific Health and Safety Protection Plan (PPSPS). This document shall be sent to the ITER Safety Coordinator before the joint inspection within the following time frame (and always before the start of work) :

- 30 days after reception of the contract or 30 days before the start of work on IO site.
- Sub-Contractors, and for any work involving special risks: 30 days after reception of the Framework Contract fully signed on Contractor's side or at the latest during the kick off meeting (KOM).
- Sub-Contractor where the work has no specific risks: 8 days after reception of contract.

The PPSPS is prepared with respect to:

- Work related risks, clear identification of the working area.
- All applicable rules and regulations relating to general occupational health and safety.
- Rules to manage co-activity or superimposition of the juxtaposed tasks involved.
- Observations and information made at the time of the joint inspection.

The PPSPS must indicate all foreseeable risks linked to the methods, tools and equipment used, the site organization and circulation plan to remove the risks. Tools and equipment shall carry prove of good working conditions. As mentioned before, PIC activities are excluded.

The PPSPS must contain contact and administrative details of the contracting company and must be kept up to date. All Contractors working on IO site have the possibility of obtaining the PPSPS of any other contactor from the ITER Safety Coordinator.

All Contractors have to be made aware that copies of their PPSPS can be sent to the relevant French work safety offices via IO. In this case, a French version shall be asked to the Contractor.

The Common Site Rules include instructions on health and safety coordination and general site management/ construction organization. The Contractor and its supply chain shall comply with the IO site.

The Contractor (or its subcontractors) shall be required to issue its PPSPS for assessment by the IO or IO representative and submission to the HSPC for validation according to ITER Site Rules.

The Contractor shall follow the Permit to Work Procedure.

The Contractor shall comply with the ITER Site access procedure in order to get access on site. Coordination of safety is ensured by the HPSC designated by the building owner. Like every contracted company, the Contractor shall prepare and approve a specific plan of safety and health protection (PPSPS, Plan Particulier de Sécurité et de Protection de la Santé). Taking into account the PGCSPS (Plan Général de Coordination en matière de Sécurité et de Protection de la Santé) for each of the areas mentioned above and attend meetings of the Collège Inter-Entreprises de Sécurité, de Santé et des Conditions de Travail (CISSCT).

### **15.3 Site Monitoring: Access Rights**

The Contractor shall ensure that access rights are granted to IO personnel at all locations where IO personnel fulfil the access requirement. (Proper training, PPE, etc...)

In case of concerns regarding the quality of production, the IO reserves the right to perform unscheduled inspections. Planned and documented audits will be performed by the IO to verify compliance with the technical and quality requirements of the Contract.

Moreover, the IO reserves the right to take photographs of the Contractor's works during the contract life.

### **15.4 First Aiders**

The Contractor shall implement the permanent presence of one occupational first-aider per 10 persons throughout the site. This rule applies to all Contractors on the site. Each first-aider shall be clearly identified.

Amongst first aiders the Contractor shall identify the ones that will be the contact persons for the IO emergency response team to guide them to the incident/accident spots in case of intervention.

French Labor Code Articles R4224-14 to R4224-24 legislates for First aid training, material and signalization.

### **15.5 Alert Procedures**

The Contractor shall follow the Alert procedure on ITER construction site. The Contractor shall liaise with IO to identify the most suitable confinement place to shelter his personnel in case of external threats such as nuclear accidents.

During exercises/drills, the Contractor shall ensure participation of relevant personnel and incorporate any corrective actions into their procedures.

## **15.6 Environmental Protection**

In order to manage the environmental performances for ITER construction site, IO or IO representative has developed an environmental management system. This system includes the organizational structure, planning, functions and responsibilities, practices, procedures and processes, means and resources.

The ITER Worksite must be exemplary from a quality, safety and environmental viewpoint.

The Contractors must implement suitable measures in order to eliminate or at least reduce to a minimum any environmental impacts generated by their activities. A continual improvement policy shall be applied.

IO or IO representative will ensure that the environmental requirements are respected on site through regular site visits. In case of deviations or anomalies, observation sheets or non-conformance reports will be issued by IO according to the severity and frequency of the deviations or anomalies.

IO has developed Environmental Requirements (IDM\_D\_97WRFP), which define the environment protection requirements to be met by Contractors within the framework of the ITER worksite. All the Contractors working on ITER site shall follow the requirements in this document.

## **15.7 Site Rules for HSE**

The Contractor must comply with the following documents:

- ITER Lock-Out Tag-Out Instruction (ITER\_D\_34Q3GJ)
- APA-65-GC-0H-003-HS v5 – PGCSPPS Vol 1 – French.
- Overall Site Organization and Safety Coordination and Environmental Protection during ITER Construction (ITER\_D\_EC8ALD).

## **15.8 Canteen and Medical Facilities**

The Contractor will be authorized to use the Site Canteen that has been established by Fusion for Energy. In order to do so, the Contractor will need to sign the Collective Convention. The Canteen is not subsidized and is managed as a commercial operator by an external company. The Contractor shall be authorized to use the medical facility located on the construction site.

## **16 Work Monitoring and Meeting Schedule**

### **16.1 Contract Responsible Officers (CRO)**

ITER CRO: Mr. Renjing Fan / e-mail address: [Renjing.Fan@iter.org](mailto:Renjing.Fan@iter.org)

Contractor CRO: TBD

### **16.2 Meeting Schedule**

The contractor shall attend weekly coordination meetings as instructed by IO. The Contractor shall liaise with IO to decide which meetings it needs to attend to honor its result-based commitments embodied by deliverables owed under the activities defined in the Chapter 6 and 7.