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EXTERNAL REFERENCE / VERSION

Technical Specifications (In-Cash Procurement)

Tech_Specs_Requirement propagation support for PPD

The purpose of this contract is to support the needs of the Port Plug and Diagnostics Integration Division (PPD) of ITER for requirement propagation in the form of updates of SRDs, creation and updates of Sub-SRDs (S-SRDs), technical requirement documents for suppliers and Design Compliance matrices at the system and sub-system level for the ITER PBS 55 Diagnostics, PBS 57 In Vessel Viewing System (IVVS) and PBS 58 Port Plug Test Facility (PPTF) in the period between middle of 2018 and middle ...

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1 Purpose

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ITER shall establish nuclear fusion as a highly reliable, efficient and safe option for future energy production. It shall for the first time reach operation regimes where 10 times more fusion power is produced than external heating is injected – for periods of the order of 400 secs continuously. It is presently under construction in southern France at a scale similar to conventional nuclear power plants. About 50 % of the construction effort is presently achieved. The construction phase shall be followed by first plasma operation which is targeted for end of 2025.

PPD shall deliver PBS 55, PBS 57 and PBS 58 to ITER.

PBS 55 Diagnostics shall provide during the construction phase all the (presently 50) diagnostics sub-systems, and all the (presently 18) diagnostic port plugs and associated interspace and port-cell structures for ITER and to develop the interfaces for their integration into ITER. The diagnostics shall provide during the operation phase the bulk of the measurements for machine protection, plasma and wall control and scientific exploitation of ITER.

PBS 57 shall provide the IVVS and to develop its interfaces during the construction phase for its integration into ITER. This system shall deliver during the operation phase viewing and metrology of the plasma facing components inside the Vacuum Vessel.

PBS 58 shall provide during the construction phase the Port Plug Test Facilities for ITER and to develop the interfaces for their integration into the buildings where they shall be installed. These systems shall be used during the commissioning and operation phase to test whether port plugs for diagnostics, heating-systems and tritium breeding are fit for purpose before installing them in the Vacuum Vessel.

Requirement propagation for PPD shall ensure that applicable top level requirements (e.g Project requirements (PR) v5.3 [1]) – including in particular the so called defined requirements by the nuclear operator - are propagated in a traceable way (IO uses links in DOORS for this) to lower level requirement documents [2] - e.g. SRD 55 v 5.2 [3], SRD 57 [4], SRD 58[5] and then to Sub-SRDs, PAs etc. of the individual sub-systems – while ensuring that the specific functional requirements of the lower level systems are included as appropriate, that the requirements are well adapted and that compliance with the requirements is verifiable (see fig. 1).

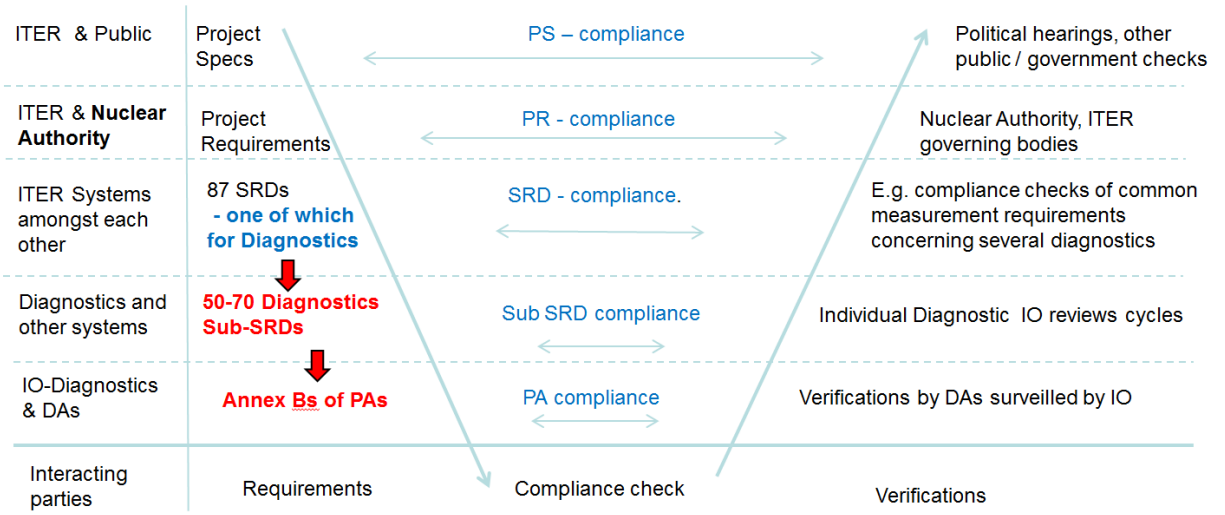

Figure 1: Requirement/Compliance/Verification V illustrating the requirement propagation and management for PBS 55 Diagnostics

SRD 55v5.2 [3], has been approved by the end of 2017 including the propagation of all requirements from the upcoming new version of the PR [6] that were available at the time of its approval. The corresponding new versions of SRD 57 [4] and SRD 58 [5] are expected to enter the reviewing/approval cycle before middle of 2018. Some minor upgrades will still occur thereafter since the new PR is not approved yet and changes will occur through Project Change Requests (PCRs). In the case of SRD 55 the main future updates expected concern refinements of the measurement requirements in the area of Dust, Erosion and Tritium and those emerging through the Sub-SRD work.

For PBS 55 there are 4 Sub-SRDs which are past the first development step (agreement on the Requirement Propagation Matrix (RPM) with System Engineering and Safety ROs) and presently in the status of developing the formulations of the requirements themselves. It is assumed that they will be in the review/approval cycle level before middle of 2018. These are the systems:

55.EF	Charge Exchange Recombination Spectroscopy (CXRS) Pedestal
55.B4.D0	Neutron Flux Monitor (NFM) #7 Support Structure
55.G1	Equatorial Visible Infrared Wide Angle Viewing Systems (EWAVS)
55.NE.X0	Ex Vessel Electrical Services (NEX)

These will serve as pilot projects for the following SubSRDs.

For the system 55.G1 and for 6 other systems requirement propagation negotiations are ongoing or expected to start in Q2 of 2018. The corresponding systems are:

55.F3	Plasma position reflectometer (PPR)
55.D1	Bolometer
55.G3	Diagnostics Pressure Gauges (DPG)
55.NE.D0	Electrical services Divertor
55.B1	Radial Neutron Camera (RNC)
55.E1	Charge Exchange Recombination Spectroscopy (CXRS) Pedestal

For 55.G1 and 55.F3 it is necessary to use an ad-hoc version of the SRD 55 RPM (defined by PCR-m378) [7] as first step and then to upgrade to SRD55v5.2 in the future. The latter is also true for other recently signed PAs with F4E affecting the following systems:

55.Q1	Equatorial Port Integration EP #01

55.QA Equatorial Port Integration EP #10
55.U1 Upper Port Integration UP #01
55.U3 Upper Port Integration UP #03
55.UH Upper Port Integration UP #17
55.NE. V0 Electrical services In Vessel

Another issue for the requirement propagation to Procurement Arrangements is the handling of handbooks and the applicable requirements contained within. In some cases it will be possible to make the handbooks entirely applicable complementary documents and in other cases it will be necessary (Vacuum handbook [8], the Plant Control Design Handbook (PCDH) [9] , the Tritium handbook [10] and potentially others like the EEE Nuclear Radiation compatibility Handbook [11]) to extract individually applicable requirements. This will require effort to ensure that no applicable requirements are lost in the process.

During the Diagnostics Design Reviews – mainly PDRs – in 2017 it became apparent that the systems presented needed updates of their requirements to the level of SRD 55v5.2 and their own Sub-SRDs. The most recent example had been:

55.G6 Divertor Infrared Thermography system

Between mid 2018 and mid 2019 a large part of the PPD system will undergo Design Review mostly at PDR level. Not to get Cat 1 chits on the requirements it will be necessary to have individual Sub-SRDs at the level of SRD 55v5.2 or higher.

In the course of the SRD and Sub SRD development and the negotiation of the requirement propagation to PAs it became apparent that a systematic, ideally rule based, approach is needed and it is necessary to communicate general rules and explain the logic for the propagation to the various stakeholders in the form of specific training.

The purpose of this contract is to develop further the SRDs and Sub-SRDs and Requirement propagation needed for PPD and to provide Training to the stakeholders. The scope of the contract covers the needs of PPD in the period of middle 2018 to middle 2019 which is the lion part of the needs of PPD in this area and should allow the treated systems to fully benefit from the improved requirement situation. The work is needed as foundation for all further stages of the lifecycle of the concerned subsystems.

2 Scope

The scope of the contracts covers the needs for requirement propagation work of PPD in the period from middle of 2018 to middle of 2019.

The detailed scope is described in the Annex. There are four principle scope types in the vertical direction of the table:

- SRD updates
- SSRD production (with several sub types)
- Requirement propagation from handbooks
- Training on requirement propagation

In the horizontal direction 4 categories are used – corresponding to tasks with similar amount of work per work-unit within the same category.

- S-SRD Family-Leader (cat 1 work units)

- S SRD Family-Follower (cat 2 work units)
- SRD updates and Hand-books (cat 3 work units)
- Training (cat 4 work units)

The distinction between the S-SRD Family leader and the S-SRD family follower is that the follower in the same family of diagnostics are significantly easier to produce the leader which are first of a kind in a family. On average it is assumed to have about two such leaders per family to cover for remaining variety within. The IO estimate is that the amount of work in a work-unit of a leader is about 3-5 times more than the work for a follower. It is also assumed that the work to prepare a training unit (presentation duration with questions around 1 hour per unit) is somewhere between the amount of work for a leader and a follower. The work on a unit in the S-RD and Handbook category is estimated to somewhat higher than the work on a SSRD leader.
For cases on which there is already significant amount of relevant work is done, only fractions of work-units are counted.

3 Definitions

For the general list of ITER abbreviations see [12]

DOORS:	acronym for the database in which SRD requirements are kept
IO-CT:	**I**TER **O**rganization **C**entral **T**eam
IO-DA:	**I**TER **O**rganization **D**omestic **A**gency
KOM:	Kick-Off Meeting
PBS:	**P**lant **B**reakdown **S**tructure
PD:	Plant Description
PPD:	**P**ort **P**lug and **D**iagnostic
RO:	Responsible Officer
SRD:	**S**ystems **R**equirement Document
S-SRD:	Sub- **S**ystems **R**equirement Document
Supplier:	In this document the word Supplier is a short form for the service provider who has successfully bid for this contract and his acting agent(s)

4 References

[1] Project Requirements (PR) (27ZRW8 v5.3)
[2] ITER_D_UMDLWC - Plan for SRD's update
[3] SRD-55 (Diagnostics) from DOORS (28B39L v5.2)
[4] ITER_D_29NC9X - SRD-57 (was 23-04) (In-Vessel Viewing Systems) from DOORS
[5] SRD-58 (Port Plug Test Facility) from DOORS (2N49WQ v2.5)
[6] DRAFT Project Requirements document (UHDW3Y v1.1)
[7] SRD55v5 reference version for PCR-m378 (UMEA6E v1.1)
[8] ITER_D_2EZ9UM v2.3 - ITER Vacuum Handbook
[9] ITER_D_2LAJTW v1.4 - ITER Tritium Handbook
[10] ITER_D_27LH2V v7.0 - Plant Control Design Handbook (PCDH)
[11] ITER_D_U65BH5 - EEE Nuclear Radiation compatibility Handbook
[12] ITER Abbreviations (2MU6W5 v1.15)
[13] ITER Procurement Quality Requirements (ITER_D_22MFG4).
[14] Procurement Requirements for Producing a Quality Plan (ITER_D_22MFMW))
[15] Quality Assurance for ITER Safety Codes (ITER_D_258LKL).
[16] PRELIMINARY ANALYSIS OF THE IMPACT OF THE INB ORDER - 7TH FEBRUARY 2012 (AW6JSB v1.0)

5 Estimated duration

The maximum duration for this work is 12 months.

6 Work description

The project team shall be formed from all concerned PPD ROs including IT team, and the Supplier shall initially evaluate the capabilities and resources of PPD and update in agreement with the project manager assigned from PPD if needed the work-break-down indicated in the Annex during the KOM. This may also become necessary during the contract due to the ITER project nature. Such decisions shall be reported in Monthly steering meeting report.

The work-description is listed in tabular form in the Annex and with more detail in the following 4 sections.

The Supplier is also requested to prepare a transition plan for the project manager assigned from PPD, and the plan should be presented and executed at the very last month of the project to make sure the remaining work be carried out smoothly.

6.1 SRD updates

For SRD 55 the scope is:

- Measurement requirement updates - mainly from SSRD feedback. This means that the details that have been worked out for the measurement requirements in the S-SRDs need to be incorporated into the SRD. This work will be accumulative over the time of the contract.
- PCR driven updates. Experience shows around 3- 5 PCRs per year have an impact on the SRDs. Generally change notices have to be produced to account for the changes requested.

For SRD 57 the scope is:

- Requirement propagation update to PA. The SRD will have been updated already but the PA will still need the corresponding propagation.
- PCR driven updates. Same as for PBS 55.

For SRD 58 the scope is:

- PCR driven updates. Same as for PBS 55 and PBS 57.

6.2 S-SRDs

The S-SRD scope comprises:

- S-SRD Pilot cases;
- S-SRDs needed for PAs;
- S-SRDs of already signed PAs needing update to SRD 55.5.2.
- S-SRDs needed for systems going through CDRs.
- S-SRDS for Systems going through PDRs.
- S-SRDs needed for systems going through FDRs.

The work scope contains generally for each of the S-SRD cases the following elements:

- Formulation of a small number of essential system specific functional requirements.
- Propagation of SRD requirements in two steps:
    - Applicability matrix construction;
    - Text formulation of selected propagated requirements.
- Elaboration of better defined measurement requirements.
- Formulation of Instrumentation and Control use cases.

The workflow follows the workflow and need dates of PPD. This should assure that the ROs of the systems which are needed to work on the S-SRDs are available for the job. In some cases significant work is already done on some systems but not finished yet. In that case the work units are estimated to be smaller than 1. This is in particular the case for S-SRDs which are subject to PCR-m378 as indicated in the Annex.

6.3 Handbooks

The work-scope on the handbooks is to compare existing requirement selection and propagation done by a D with the handbooks and to see in particular whether important requirements are missing or the chosen ones are lacking something. Not all Handbooks are equally complex, that is why different relative workloads are indicated in the Annex.

6.4 Training

The training objective is that the ROs shall be coached to effectively propagate requirements to S-SRDs and PAs. The training content can be divided in two different groups.

The first group comprises general rules on different topics that apply to all Systems:

- Training on functional analysis of diagnostics systems to derive a set of concise requirements applicable to the mission of the respective system
- Training on how to condense similar technical requirements which are under review by System Engineering (SIS)
- Training on how to propagate requirements under review by Safety
- Training on how to write requirements for instrumentation and control use cases
- Training on how to expand measurement requirements at the system level

These training sessions should be attended by all ROs involved in S-SRD or PA production and it shall be conducted in an ex-cathedra style.

The second group comprises of a condensed return of experience from having done S-SRDs for different groups of Diagnostic families. The training will comprise the following families:

- Optical Diagnostic
- Electrical Services
- Microwave Diagnostic
- Neutronics Diagnostics
- Mobile Diagnostics
- Port Integration
- Laser Diagnostics
- Vacuum ext. Port Diagnostics
- Distributed Diagnostics
- Protection Important Components (PIC) Subsystems
- In Vessel Electrical Diagnostics

These training sessions should be attended by the ROs involved in S-SRD or PA production for systems in the respective families. It should be a mix of an ex-cathedra presentation and a workshop approach.

The order and the timing given in the annex are indicative and can be re-arranged at the Kick-Off Meeting (KOM).

As a general rule attendance sheets need to be signed by training participants and evaluations of sessions for future improvements shall be requested. Trainings and training contents need to

be in English.

7 Responsibilities

7.1 Supplier's Responsibilities

In order to successfully perform the tasks in these Technical Specifications, the Supplier shall:

• Strictly implement the IO procedures, instructions and use templates;

• Provide experienced and trained resources to perform the tasks;

• Supplier's personnel shall possess the qualifications, professional competence and experience to carry out services in accordance with IO rules and procedures;

• Supplier's personnel shall be bound by the rules and regulations governing the IO ethics, safety and security IO rules.

7.2 IO's Responsibilities

The IO shall:

• Nominate the Responsible Officer to manage the Contract;

• Organise a monthly meeting(s) on work performed;

• Provide offices at IO premises.

8 List of Deliverables and Due dates

8.1 Detailed Work Schedule

See Annex.

8.2 Transition plan and execution summary

If needed, the project management transition plan shall be presented, and brief summary report of transition execution should be reported at the end of the project period.

8.3 Monthly Steering Meeting report

At the end of each month, a brief summary of the progress and an update of the scope table of the project has to be submitted.

8.4 Deliverable and due date

A single deliverable is expected at the end of the contract period covering the scope indicated in the Annex – amended if needed throughout the period of the contract.

9 Acceptance Criteria

Acceptance of the deliverable is given by compliance with the last update of the scope table which shall be reviewed by the RO of the contract or his delegate for acceptance.

10 Specific requirements

The majority of the work is on-site in IO-CT.

The starting date of the work in ITER Organization should be 2 to 3 weeks after the decision to activate the contract corresponding to the date at which the company has been informed.

The deliverable should use the ITER official template and be uploaded to the specific IDM location at the end. Original digital files described using Microsoft software has to be delivered in time.

The Supplier shall be able to demonstrate the experience and abilities within the team involved in providing the service:

- Experience in system engineering such as requirements analysis, functional breakdown analysis, risk analysis, RAMI analysis;
- Experience in the field of large scientific experiments or equivalently complex high technology projects;
- Experience in Nuclear Fusion/Fission is very important including experience with safety regulations;
- Experience in the technology and norms regarding Vacuum, Tritium, Instrumention and Control, Electrical Engineering are an advantage;
- Experience with using DOORS or an equivalent requirement management system is a clear advantage;
- Ability to work in multidisciplinary, international team environment;
- Knowledge of Quality Assurance systems and their practical application;
- Fluency in English language, both written and oral.

11 Work Monitoring / Meeting Schedule

The progress of the work shall be monitored monthly, and it shall be reviewed at monthly steering meeting, which is primary scheduled at the end of each month. ITER and the contractor may discuss to revise the meeting schedule in accordance with the project progress.

12 Delivery time breakdown

It is expected that the delivery of the individual S-SRDs in particular listed in the Annex follows closely the indicated need dates – unless otherwise agreed at the KOM or following monthly meetings.

13 Quality Assurance (QA) requirements

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

The general requirements are detailed in [13].

Prior to commencement of the task, a Quality Plan must be submitted for IO approval giving evidence of the above and describing the organisation 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 [14]).

Documentation developed as the result of this task shall be retained by the performer of the task or the DA 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 [15].

14 Safety requirements

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

For Protection Important Components and in particular Safety Important Class components (SIC), 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 [16].

15 Annex

Item #	Short titles	Details	Family	PCR-m378	S-SRD Family Leader (cat 1 work units)	S SRD Family Follower (cat 2 work units)	SRD updates and Hand-books (cat 3 work units)	Training (cat 4 work units)	Present schedule need date
	SRD updates								
1	SRD 55 measurements	Measurement requ. updates mainly from SSRD feedback					2		T0 + 12 month
2	SRD 55 PCR updates	PCR driven updates					1		T0 + 12 month
3	SRD 57 requ. propagation	Requiremeent propagation update to PA					2		T0 + 12 month
4	SRD 57 PCR updates	PCR driven updates					1		T0 + 12 month
5	SRD 58 PCR updates	PCR driven updates					1		T0 + 12 month
	SSRD Pilot cases								
6	55.EF	Charge Exchange Recombination Spectroscopy (CXRS) Pedestal	Optical Port based Diagnostic			0			done already
7	55.B4.D0	Neutron Flux Monitor (NFM) #7 Support Structure	Neutronics diagnostics			0			done already
8	55.G1	Equatorial Visible Infrared Wide Angle Viewing Systems	Optical Port based Diagnostic	x	0.25				15/06/2018
9	55.NE.X0	Ex Vessel Electrical Services (NEX)	Ex Vessel Electrical services		0.25				15/06/2018
	SSRDs needed for PAs								
10	55.F3	Plasma position reflectometer (PPR) PA	Microwave Diagnostic	x	0.25				15/06/2018
11	55.D1	Bolometer	In Vessel Electrical Diagnostic		0.25				15/09/2018
12	55.G3	Diagnostics Pressure Gauges (DPG)	In Vessel Electrical Diagnostic			1			15/09/2018
13	55.NE.D0	Electrical services Divertor	Divertor Electrical services		1				15/11/2018
14	55.B1	Radial Neutron Camera (RNC)	Neutronics diagnostics		1				15/10/2018
15	55.E1	Charge Exchange Recombination Spectroscopy (CXRS) Pedestal	Optical Port based Diagnostic			1			15/10/2018
	SSRDs of already signed PAs needing update to SRD 55.5.2								
16	55.UB	PPPL - U11 - Global Preliminary Design Review	Port integration			1			29/11/2018
17	55.UE	PPPL - U14 - Global Preliminary Design Review	Port integration			1			29/11/2018
18	55.Q8	Preliminary Design Review for Q8 Equatorial Port Plug 08	Port integration			1			11/12/2018
19	55.NE.V0	Electrical services In Vessel	Electrical services	x	0.25				T0 + 12 month
	Handbooks to analyse for req. propagation								
20	Handbook 1	(ITER_D_2DSPT6 - Electrical Design Handbook (EDH) - done)					0.2		T0 +1 month
21	Handbook 2	ITER_D_2LAJTW v1.4 - ITER Tritium Handbook					0.2		T0 +1 month
22	Handbook 3	ITER_D_27LH2V v7.0 - Plant Control Design Handbook (PCDH)					1		T0 +1 month
23	Handbook 4	ITER_D_2EZ9UM v2.3 - ITER Vacuum Handbook					0.6		T0 +1 month
24	Handbook 5	ITER_D_U65BH5 - EEE Nuclear Radiation compatibility Handbook					1		T0 + 6 month

Item #	Short titles	Details	Family	PCR-m378	S-SRD Family Leader (cat 1 work units)	S SRD Family Follower (cat 2 work units)	SRD updates and Hand-books (cat 3 work units)	Training (cat 4 work units)	Present schedule need date
	SSRDs needed for systems going through CDRs								
25	55.GF	CDR for GF (Toroidal Field mapping)	In Cryostat electrical Diagnostic		1				29/05/2018
26	55.GB	CDR meeting for ECH sensors	In Vessel Electrical Diagnostic			1			27/06/2018
27	55.BE	BE - CDR meeting	Neutronics diagnostics			1			21/09/2018
28	55.AQ	AQ CDR meeting	In Vessel Electrical Diagnostic Safety Rel		1				02/10/2018
29	55.B9	CDR Review Meeting	Neutronics diagnostics			1			25/10/2018
30	55.GE	Flow Monitor CDR	Optical Port based Diagnostic			1			02/11/2018
31	55.GL	CDR In Vessel Lighting	Optical Port based Diagnostic			1			15/12/2018
	SSRDS for Systems going through PDRs								
32	55.G9	Final Design Review for G9 Dust Monitor part1 (In-Vessel components) (combined PDR / FDR)	Mobile in vessel optical Diagnostic		1				19/03/2018
33	55.F2	PPPL - LFS PDR - Preliminary Design Review Meeting	Microwave Diagnostic		1				25/06/2018
34	55.NE.C0/D0/V0 55.AM	Preliminary Design Review Meeting for Feedthroughs (PDR meeting)	SIC Electrical services		1				19/07/2018
35	55.G2	Thermocouples Preliminary Design Review	In Vessel Electrical Diagnostic			1			09/10/2018
36	55.EC	Preliminary Design Review EC CXRS Based On DNB (Edge)	Optical Port based Diagnostic			1			20/11/2018
37	55.Q9	PPPL - Complete E09 Global Preliminay Design Review PDR Meeting	Port integration			1			28/01/2019
38	55.QC	Final Design Review Meeting for EPP12	Port integration		1				04/04/2019
39	55.F1	PPPL - ECE (A, B, C, D, & E09 Drawer #2) - Preliminary Design Review	Microwave Diagnostic			1			05/12/2018
40	55.B4.A0/B0/C0	Preliminary Design Remaining NFMs Review Meeting	Neutronics diagnostics		1				07/12/2018
41	55.U4/U5/U6	PDR Review	Port integration			1			15/04/2019
42	55.FC	Preliminary Design Review for 55.FC ECE Transmission Receivers	Microwave Diagnostic			1			13/12/2018
43	55.GA	Sub1 - WAV - [PDR] GA Preliminary Design Review Meeting	Optical Port based Diagnostic			1			13/12/2018
44	55.G8	Preliminary Design Review for G8 Erosion Monitor	Divertor Optical Diagnostic		1				14/12/2018
45	55.C7	Preliminary Design Review Meeting for Front-End components (Waveguides, Mirrors & Horns) (PDR meeting)	Laser Diagnostic		1				21/12/2018
46	55.C5	PPPL - TIP - Participate in PDR	Laser Diagnostic			1			11/01/2019
47	55.U9	Preliminary Design Review for UP#09	Port integration		1				17/04/2019
48	55.E8	NPA Post PA\FDR#1 Meeting on EQ Port Block	Vacuum ext port diagnostic		1				12/09/2018
49	55.GC	Titium Monitor GC Preliminary Design Review Meeting	Laser Diagnostic			1			21/03/2019
50	55.U1	Preliminary Design Review Meeting for UP01 - T04	Port integration			1			17/05/2019
51	55.Q1	Preliminary Design Review Meeting for EQ01 - T04	Port integration			1			16/07/2019
52	55.QA	Equatorial Port Integration EP #10	Port integration	x	1				T0 + 12 month
53	55.A8	WP - preliminary design for A8 back end	In Vessel Electrical Diagnostic			1			29/05/2019
54	55.G7	Preliminary Design Divertor Langmuir Probe Review Meeting	In Vessel Electrical Diagnostic			1			13/06/2019
55	55.FA	Captive components PDR / FDR Review	Laser Diagnostic			1			24/06/2019
56	55.F9	Post PA/Preliminary Design Review Meeting on F9 REFL MP HFS	Microwave Diagnostic			1			27/06/2019
57	55.E7	Final Design Review Meeing for Radial X-Ray Camera	Vacuum ext port diagnostic		1				15/10/2018
58	55.B3	HP - Preliminary Design Review B03 MFC Detectors and ExV Components	Neutronics diagnostics			1			28/06/2019
59	55.U3	Upper Port Integration UP #03	Port integration	x	0.25				T0 + 12 month

Item #	Short titles	Details	Family	PCR-m378	S-SRD Family Leader (cat 1 work units)	S SRD Family Follower (cat 2 work units)	SRD updates and Hand-books (cat 3 work units)	Training (cat 4 work units)	Present schedule need date
	SSRDs needed for systems going through FDRs								
60	55.B8	Final Design Review of NAS - NAS - VS/L3 captive components	Distributed diagnostic			1			07/03/2018
61	55.ED.spectrometer	Preliminary Design Review for XRCS Survey System	Vacuum ext port diagnostic			1			01/02/2019
62	55.E3	Final Design Review of E3 VUV	Vacuum ext port diagnostic			1			04/04/2019
63	55.NW	Final Design Review for NW Windows	Windows		1				30/01/2019
64	55.EE	HXR monitor Final Design Review	Vacuum ext port diagnostic			1			03/05/2019
65	55.UH	Upper Port Integration UP #17	Port integration	x		0.5			T0 + 12 month
66	55.E4	DIM PDR input document package available on IDM for PDR-2 meeting	Vacuum ext port diagnostic			1			28/06/2019
67	55.B8	Final Design Review of NAS - NAS - EP11, LP12/18, L3 non-captive components	Distributed diagnostic		1				07/05/2019
68	55.E2.EQ	Final Design Review E2 H-Alpha (+ Visible Spectroscopy) EQ	Optical Port based Diagnostic			1			02/07/2019
	Traning								
69	Training 1	Training on functional Analysis						1	T0 +1 month
70	Training 2	Traning on lessons leraned from SIS interaction						1	T0 +1 month
71	Training 3	Traning on lessons leraned from Safety interaction						1	T0 + 2 month
72	Training 4	Training on use cases						1	T0 + 2 month
73	Training 5	Training on measurement						1	T0 + 2 month
74	Training 6	1 Optical Diagnostic						1	T0 + 3 month
75	Training 7	2 Electrical Services						1	T0 + 3 month
76	Training 8	3 Microwave Diagnostic						1	T0 + 4 month
77	Training 9	4 Neutronics Diagnostics						1	T0 + 4 month
78	Training 10	5 Mobile Diagnostics						1	T0 + 5 month
79	Training 11	6 Port Integration						1	T0 + 5 month
80	Training 12	7 Laser Diagnostics						1	T0 + 6 month
81	Training 13	8 Vacuum ext Port Diagnostics						1	T0 + 6 month
82	Training 14	9 Distributed Diagnostics						1	T0 + 7 month
83	Training 15	10 PIC Subsystems						1	T0 + 7 month
84	Training 16	11 In Vessel Electrical Diagnostics						1	T0 + 7 month