

CHARGE DOCUMENT FOR TARGET STATION AND BUNKER PERSONNEL SAFETY SYSTEMS CRITICAL DESIGN REVIEW



Critical Design Review (CDR)
29-30 April 2024, Lund, Sweden

Charge for the CDR

UNCONTROLLED COPY. ESS-5337078, Rev. 3, Released, 2024-04-25, Internal. 1 file. , page (1/5)
<https://chess.ess.lu.se/enovia/link/ESS-5337078.3/21308.51166.20335.20590>

1. PURPOSE OF THIS CDR

The CDR assesses if the design meets all system requirements with acceptable risks within cost and schedule constraints. The design is reviewed against all design inputs, including technical and interface requirements, and design specifications. It checks that technical risks and safety aspects are appropriately covered by the architecture. The review demonstrates that the maturity of the design is appropriate to support proceeding with integration, testing, operation, and maintenance.

2. SUPPLEMENTARY DOCUMENTATION

The expected outputs of detailed design, which should be presented and reviewed in this CDR, are covered in the following documents:

2.1. Target Station PSS

2.1.1. High-level and requirements:

- Risk assessment for Target PSS (ESS-4121077)
- Concepts of Operations for Target Station Personnel Safety System (ESS-4770860)
- Accelerator, Target and Bunker PSS Key Exchange Requirements Specification (ESS-4787361)
- SIL Assessment for Target Personnel Safety System (ESS-4747698)
- Safety Requirement Specification for Target Station Personnel Safety System (ESS-5301078)
- System Architecture Specification for Personnel Safety Systems (ESS-3739363)
- ESS Personnel Safety Systems Preliminary Design Review Report (ESS-4927155)

2.1.2. ICDs (supporting documentation to ConOps and Electrical Design):

- Interface Control Document for Accelerator PSS and REMS (ESS-4246185)



2.1.3. *Detailed Design:*

- System Requirement Specification for Target Station Personnel Safety System (ESS-5301083)
- Detailed Design Specification for Target Station Personnel Safety System (ESS-5301086)
- Verification and Validation Plan for Target Station and Bunker Personnel Safety Systems (ESS-5337079)

2.1.4. *Electrical Design:*

- Target PSS IO-List (ESS-5108591)
- Target PSS Electrical and Mechanical Drawings (ESS-5119313)
- Target PSS Label List (ESS-5152286)
- Target PSS cable pulling list (ESS-5152285)
- EQUIPMENT LAYOUT =ESS.TS.SPS.F01 (ESS-5152281)
- Electrical Verification Report Target PSS (ESS-5152288)

2.2. Bunker PSS

2.2.1. *High-level and requirements:*

- Conventional and Radiological Hazard Analysis and Risk Assessment of NSS Bunker Area (ESS-3999144)
- Bunker Access Management Working Group Report (ESS-5063342)
- Concepts of Operations for Bunker Personnel Safety System (ESS-4470664)
- Accelerator, Target and Bunker PSS Key Exchange Requirements Specification (ESS-4787361)
- SIL assessment for Bunker Personnel Safety System (ESS-5298477)
- Safety Requirements Specification for Bunker Personnel Safety System (ESS-5342379)
- System Architecture Specification for Personnel Safety Systems (ESS-3739363)
- ESS Personnel Safety Systems Preliminary Design Review Report (ESS-4927155)

2.2.2. *ICDs (supporting documentation to ConOps and Electrical Design):*

- ICD Light Shutter System – PSS (ESS-3249703)
- Interface Control Document for PSS and ESS Access Control System (ESS-4787360)
- Interface Control Document for Accelerator PSS and Electronic Personal Dosimeter (EPD) (ESS-4755449)

2.2.3. *Detailed Design:*

- System Requirement Specification for Bunker Personnel Safety System (ESS-5309114)
- Detailed Design Specification for Bunker Personnel Safety System (ESS-5355884)
- Verification and Validation Plan for Target Station and Bunker Personnel Safety Systems (ESS-5337079)

2.2.4. *Electrical Design:*

- Bunker PSS South East IO-List (ESS-5157068)
- Bunker PSS North West IO-List (ESS-5157069)
- Bunker PSS SEB Electrical and Mechanical Drawings (ESS-5312927)
- Bunker PSS NWB Electrical and Mechanical Drawings (ESS-5119345)
- Bunker PSS SEB Label List (ESS-5312930)
- Bunker PSS NWB Label List (ESS-5161533)

- Bunker PSS SEB cable pulling list (ESS-5312929)
- Bunker PSS NWB cable pulling list (ESS-5161532)
- EQUIPMENT LAYOUT =ESS.NSS.F01.F01.F03.F02 (ESS-5312928)
- EQUIPMENT LAYOUT =ESS.NSS.F01.F01.F03.F01 (ESS-5161531)
- Electrical Verification Report Bunker PSS SEB (ESS-5312931)
- Electrical Verification Report Bunker PSS NWB (ESS-5161534)

3. CDR COMMITTEE AND OBSERVERS

The CDR committee consists of:

- Joanna Weng (chairperson), ZHAW, Functional Safety Assessor
- Ana Cintas, ESS, Radiation Protection Expert
- Ralf Trant, CERN, Safety Expert
- Günter Muhrer, ESS/Target, Group Leader for ESS Spallation Physics
- Giuseppe Aprigliano, ESS/NSS, Group leader for NSS Technical Projects and NSS integration
- Reza Foroozan, ESS/ICS, Electrical Design Expert
- Sölve Slettebak, ESS, Control Room Shift Lead
- Marcin Zmuda, ESS/ICS, Safety Control Systems Expert

Observers:

- Ari Benderly, ESH&S, Chief Information Security Officer
- Ulrika Agnvik, ESH&S, Senior Security Officer
- Atefeh Sadeghzadeh, Target, Control Engineer
- Piotr Slawik, Target, Interface Coordinator Engineer
- Jaime Arriagada, Target, Commissioning engineer
- Dawid Patrzalek, EIS, Lead Mechanical Engineer
- Senad Kudumovic, EIS, Lead Production Engineer
- Esko Oksanen, NSS, Instrument Scientist
- Fredrik Tidholm, ESH&S, Radiation Protection Engineer

4. AGENDA

The agenda and presentations will be available on the following Indico page:

<https://indico.ess.eu/event/3500/>

Day 1: 2024-04-29 (Monday):

- 08:30 Committee discussion (closed)
- 09:00 Introduction and follow-up from PDR & ESS PSS overview
 - *Presented by: Morteza Mansouri*
- 09:30 Target Risk Assessment and High-Level Requirements
 - *Presented by: Morteza Mansouri*
- 09:40 Coffee break
- 09:55 Target Station PSS Concepts of Operations
 - *Presented by: Afshin Farshidfar*
- 11:10 TS PSS SIL Assessment and Safety Requirements
 - *Presented by: Jonathan Gale*
- 11:40 Lunch Break
- 12:30 Report from working group for Bunker access management
 - *Presented by: Morteza Mansouri*
- 12:45 Bunker PSS Concepts of Operations
 - *Presented by: Yaser Takzare*
- 14:00 Coffee break
- 14:15 Bunker PSS SIL Assessment and Safety Requirements
 - *Presented by: Jonathan Gale*
- 14:45 TS PSS & Bunker PSS: Architecture & Electrical and Mechanical Design
 - *Presented by: Anton Andersson*
- 15:30 Coffee break
- 15:40 TS PSS & Bunker PSS Software
 - *Presented by: Artem Petrushenko*
- 16:00 – 16:15 Project schedule and risks
 - *Presented by: Ahmed Abujame*

Day 2: 2024-04-30 (Tuesday):

- 08:30 Q&A (Optional)
- 09:00 Committee discussion (closed)
- 10:30 – 11:00 Closeout
 - *Presented by: Joanna Weng*

5. COMMITTEE CHARGE

The committee is asked to consider the following questions:

1. Are all or a sufficient coverage of requirements, safety mitigating measures and specifications within the scope of this CDR documented and understood?
2. Have all of the recommendations from the PDR been satisfactorily addressed?
3. Does the TS PSS and Bunker PSS safety analysis satisfactorily verify that the system design meets the required safety integrity levels?
4. Are the TS PSS concepts of operation and its integration into ESS operating procedures that are described in the TS PSS Concepts of Operation (ConOps) clear and properly documented?
5. Are the Bunker PSS concepts of operation and its integration into ESS operating procedures that are described in the Bunker PSS Concepts of Operation (ConOps) clear and properly documented?
6. Does the system architecture and electrical and mechanical design meet the requirements within the scope of this CDR?
7. Are there any outstanding agreements to be made or other actions necessary to allow the PSS team to transition to hardware, software and integration testing, installation, and commissioning phases?

The report may also provide findings, comments, and recommended actions.

All actions should be clearly categorized as one of the following:

- Shall be addressed before CDR is considered closed.
- Shall be addressed prior to the system verification.
- Shall be addressed at some time during the project.