Accelerator Integration Group (AIG) Internal Vertical Design Reviews (IVDRs)

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Integrated Technical Design (ITD)

- AIG is responsible for the ITD of the ESS Linac
  - The ITD is defined by set of requirements and specifications organized in an hierarchical structure.
  - The main task of AIG is to:
    - Ensure a complete set of requirements and specifications for the ITD is available.
    - Verify that the complete set of requirements and specifications for the ITD are met in the specific engineering design of the ESS Linac sub-systems.
- ESS is currently transitioning from the design stage to the construction phase
  - Civil construction is well underway
  - In-kind partner contracts are being prepared
  - Work Package Critical Design Reviews are being held

Level 4 Requirements Authors

- The Level 4 Requirements and Specifications
  - which describe the specifications for the engineering disciplines
  - are the responsibility of the Lead Engineers
  - reside in DOORS
- The Level 4 Interface Requirements and Specifications
  - which describe how engineering disciplines will interact
  - are the responsibility of the workpackage leaders
  - reside in DOORS

L4 Requirements and In-Kind Contracts

- The Level 4 Requirements and Interface Requirements and Specifications will be major component of the technical annexes of the in-kind contracts
- The in-kind contracts cannot be considered complete until these requirements and specifications are written

Internal Vertical Design Reviews (IVDRs)

- ESS has held two CDRs in the past 6 months with three more planned in the next 4 months. At the first two CDRs,
  - The list of requirements and specifications were incomplete.
  - The interface specifications between Accelerator Disciplines were non-existent, incomplete or not ready.
- To avoid these types of gaps of information at future CDRs, the Chief Engineer will hold an internal review of the AIG prior to every CDR
  - The internal review will focus on the Level 3 system that is the subject of the CDR
  - The review will be vertical in nature; all L4 disciplines will be examined, but this also includes L4 interfaces

IVDR Organization

- The Accelerator Integration Section Leader will organize the review.
- The review committee will consist of the following:
  - Chief Engineer (Dave McGinnis)
  - System Engineer (Eugene Tanke)
  - Accelerator Integration Section Leader (Steve Molloy)
  - Lead Mechanical Integration Engineer (Nick Gazis)
- Review will span 2 days

IVDR Format

- One hour report by the L3 Lead Engineer
  - System description and overview
    - List of equipment with main specifications
    - Location of tunnel and gallery equipment
  - Description of L3 requirements
- 10 one hour interviews of the Engineering L4 Disciplines
  - Interviewee is the Work Package leader responsible for the engineering discipline
  - Interview is open to the public
  - Interview content
    - 15 minutes on L4 requirements and specifications
    - 15 minutes on design overview
    - 15 minutes on interface requirements and specifications
    - 15 minutes on questions (interleaved through talk)

IVDR Report

- The Accelerator Integration Section Leader will write a report:
  - Contain an executive summary
  - Contains direct and concise answers to the charge
  - Provide recommendations to correct identified shortcomings
  - Report delivered to ACCSYS Project Manager (Mats Lindroos)
- The draft of the report will be available in Confluence
  - Comments open to the division
  - Comments to be included in final report
- The final report will be in CHESS

IVDR Charge

1. Are all L3 and L4 requirements, including interface requirements, baselined in DOORS?
2. Are the L3 requirements and specifications complete and traceable?
3. Are the L4 requirements and specifications complete and traceable?
4. Are the interfaces between Level 4 disciplines documented?
5. Are the interfaces between the Level 4 disciplines and the physical space understood?
6. Does the current state of the detailed design meet the L4 requirements and specifications?

Agenda

- (09:00-09:15) Executive Session
- (09:15-10:15) Lead Engineer report
- Discipline reports (Day 1)
  - (10:30-11:30) Electromagnetic Resonators EMR
  - (11:30-12:30) Beam Line Magnets and Deflectors BMD,
  - (13:30-14:30) Proton Beam Instrumentation PBI
  - (14:30-15:30) Vacuum VAC
- Discipline reports (Day 2)
  - (09:00-10:00) Radio Frequency Systems RFS
  - (10:00-11:00) Cryogenics CRYO
  - (11:15-12:15) Water Cooling WTRC
  - (13:15-14:15) Power Convertors PWRC
  - (14:15-15:15) Cabling and Conventional Power CNPW
  - (15:30-16:30) Controls ICS

Lead Engineers

ISRC - A. Ponton

LEBT - A. Ponton

RFQ - E. Sargsyan

MEBT - A. Ponton

DTL - E. Sargsyan

SPK - S. Molloy

MBL - S. Molloy

HBL - S. Molloy

HEBT - I. Alonso

A2T - S. Molloy

DMP - I. Alonso

Example Letter to Discipline Leader

Hello Anders

There will be an AIG internal vertical design review (IVDR) of the RFQ accelerator system on April 17, 2015. The charge and agenda are in the enclosed file. Would it be possible for you to speak at the review about the RF system needed for the RFQ? Specifically, the committee would like to hear about the requirements and specifications that define the RFQ RF system. The committee would also like to hear about the interface specifications you have with other AD disciplines such as power converters, controls, water cooling, etc. Finally the committee would like to understand the design of the RF system with respect to these specifications and requirements. We have allocated an hour for your talk. A proposed outline for your talk would be:

- Level 4 requirements and specifications for the RFQ RF system (15 min)
- RFQ RF system design overview (15 min)
- RFQ RF system interface requirements and specifications (15 min)
- Questions (interleaved through talk) (15 min)