European Spallation Source
Remote Handling Systems
Big Science Sweden Conference - 2019

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Outline

• Current Status
• Upcoming Challenges
• Needed Competences and Capabilities of Suppliers
• Upcoming Procurements
• Summary
Current Status
Target Station Overview

Remote handling systems
- Large active cells for safe storage and processing of spent radioactive target components
- Shielded casks for transfer of spent components from monolith to active cells

Target Monolith
- 11 meter diameter cylinder with steel and concrete shielding
- Rotating Solid Tungsten Target – 36 sectors – Helium Cooled – 11 tons
- Moderators with liquid hydrogen @ 17K – and room temperature water – 18 tons
- Proton Beam Window and beam diagnostics

Transport hall
High bay
130 m
22 m
37 m
Active cells
Utilities block
Target monolith
Beam expander hall
Current Status
Active Cells Facility

Cross-Section of the ESS Active Cells

- Main Features:
  - Built to handle waste in kSv/h range
  - 30x15x12 (LxHxW)
  - 1.3 m High Density Concrete
  - No windows
  - Process Cell
  - Maintenance Cell
  - Waste storage
  - Waste shipment
Current Status
Cask Assembly Systems

Specific shielding profiles

Double gamma gate

Internal lifting
Current Status – Cask Assembly

The 7 dwarfs

Weight range: 20 – 70 tons
Component activity: Up to 1 kSv/h
Maximum surface dose: 2 mSv/h
Maximum lifted weight: 95 tons
Maximum inner diameter: 3 m
Current Status
High Level Schedule – Active Cells Facility

- Concept design
- Main Tendering
- Detailed design
- Manufacture
- Installation
- Commissioning
- Integrated commissioning
- Acceptance trials
- Training

- Majority of the procurement is completed
- Entering into manufacturing phase
Upcoming Challenges

• Installation
  – Parallel access with construction and system sub-suppliers
  – In-kind sub-supplier deliveries
  – Installation frameworks – supporting site organization

• System Integration
  – A multitude of sub-suppliers need to adhere to common rules and processes

• Interface Management
  – Continues challenge, a lot to do with “Green Field Facility Construction” and a lot of parallel work
Needed Competences and Capabilities of Suppliers

- In the near future, we have done all of our major procurements
- Long term, we are probably looking at:
  - Peak periods where we need to get skilled and trained personnel on site to do maintenance of highly radioactive systems
  - Delivery of a variety of stainless steel waste packages
  - Support in design and production of receiving fixtures and such like
  - Control room VR/AR integration and development
  - System development (Robotic handling, cameras, drones etc)
- Even longer term
  - A suit of smaller hot cells to be able to run our own Post Irradiation Examination program
Upcoming Procurements

• For the construction phase – All major system procurements are now done

• For installation
  – Services might be needed (Lifting, electrical installations, pipe fitting, welders, etc)
Summary

• The next big phase is fast approaching – Installation - which will challenge the organization in many ways
• All major procurements has been done at this stage
• We have to start thinking about the future and how we will operate the facility – we will need help and interaction with industry to develop our systems