

# 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**



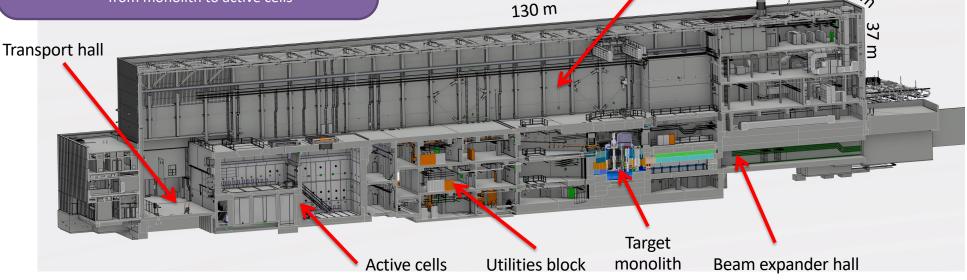
#### Remote handling systems

- 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

High bay



#### **Current Status Active Cells Facility**

Transfer Area Confinement Door

Junction Boxes

**UK Atomic** 

Energy

Authority

Waste Transfer Area

Storage Pit

√Storage Pit

PIE Cell Hatches

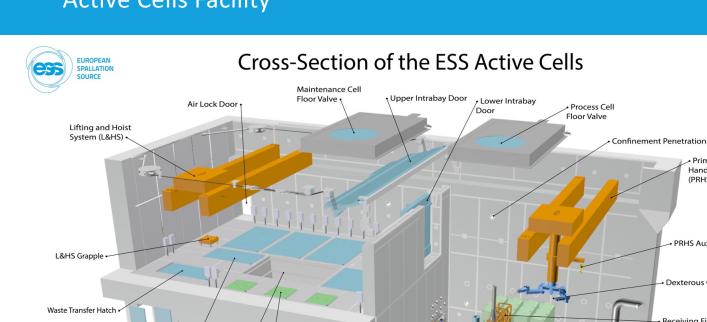
PIE Cell Plug

Transfer Hatch

↓ Bandsaw Station

Milling Station







Primary Remote Handling System

PRHS Auxiliary Hoist

Dexterous Grippers

Receiving Fixture

Lifting Adaptors

· Component Storage

HVAC Filters

• Waste Storage Baskets

#### 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

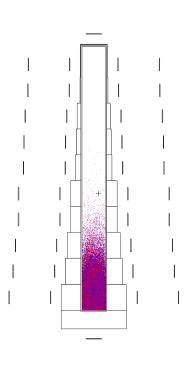
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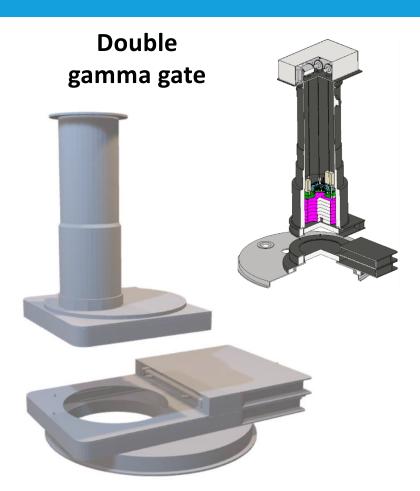
## **Current Status**

**Cask Assembly Systems** 

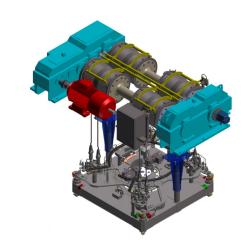


# Specific shielding profiles





#### **Internal lifting**

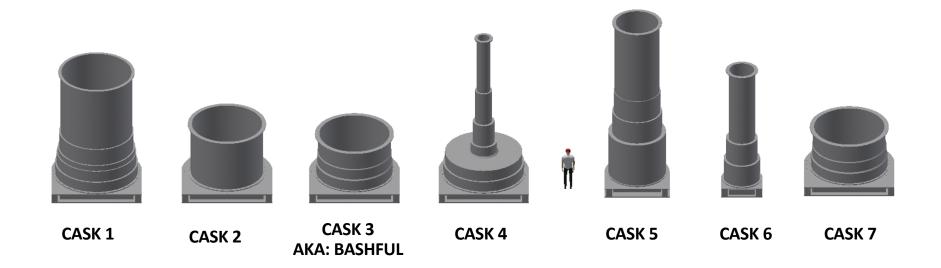




## **Current Status – Cask Assembly**

The 7 dwarfs



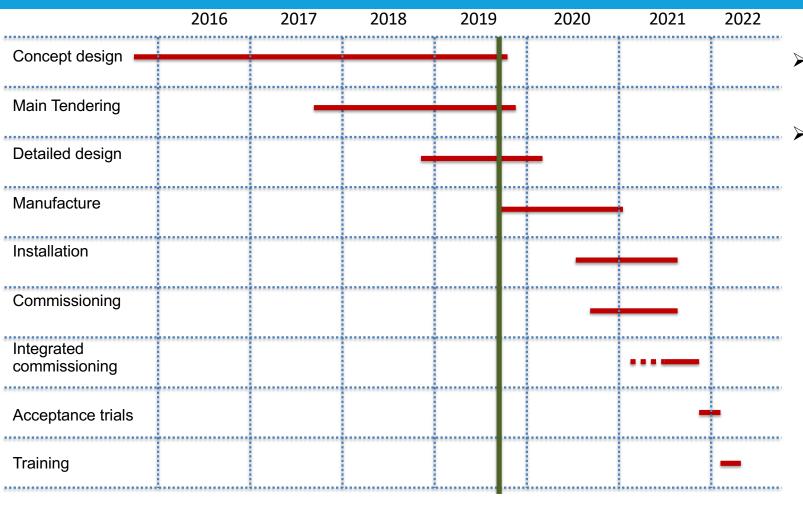


Weight range: 20 – 70 tons Component activity: Up to 1 kSv/h Maximum surface dose: 2 mSv/h Maximum lifted weight: 95 tons Maximum inner diameter: 3 m

#### **Current Status**

#### High Level Schedule – Active Cells Facility





- 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