Civil engineering and safety requirements for ESSnuSB at the ESS site

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Personal background and previous assignments with ESS

2006-2008 MAX-lab IV Synchrotron
2008-2011 ESS building program development
2012 Secretary for the ESS architectural competition
2013 ESS Site wide design coordinator
2014-2018 Preliminary design of ESS auxiliary buildings
2018-2021 Detail design coordinator auxiliary buildings
Civil engineering and safety requirements for ESSnuSB at the ESS site

- ESS current status
- ESSnuSB proposed layout
- Civil engineering and constraints
- Safety considerations and licensing
- Conclusion and way forward
ESS site
Constraints

- E22
- Upgrade areas for NSS
- Switchyard
- Tram depot
- Odarslövsvägen
ESSnuSB proposed area
Proposed ESSnuSB layout
Safety distance to third part
Gränsredovisning har inte rättsverkan, jämför mot beslut i lantmäterihandlingar.

Skala 1:20 000
Geology
ESSnuSB proposed area, principal compiled section

ESSnuSB Accumulator

ESSnuSB Target

ESS Klystron gallery

GW +74
ESS Geological model

Target

ESSnuSB location
Type of rock; clay shale

Dolerite trenches
Type of soil;
Clay till, moraine
Sand, silty clay
Soil depth 5-10m
Stages of building project, safety, licensing and legal process with authorities

- Legal process preparation and pre-studies
- Scientific program, TDR as basis for design
- Radiological hazard analysis
- Conceptual technical design of civil structures
- Location and preliminary planning
- Contracts for land
- Building program, room level
- Architectural competition or parallel assignments
- Building permit
- Preliminary design
- Constructions starts
- Detail design
- Completion
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<thead>
<tr>
<th>Year</th>
<th>Legal pre-study</th>
<th>Application and permit</th>
<th>Civil pre-study</th>
<th>Construction</th>
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<th>Scientific program</th>
<th>Radiological hazard analysis</th>
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Concretize ESSnuSB overall technical design

- Conceptual technical design for communication
- Involve legal advisor as the process is complex
- Civil pre-study of geotechnical, hydrological and environmental constraints
- Preparatory meetings with authorities

Purpose of this part is to ensure how the project will be handled permit wise

*Estimated time aspect 0.5-1.5 year*
Swedish Environmental Code

• Consultation process according to the Swedish Environmental Code
• Set up full application including radiation EIA and PSAR
• Hand in of application including public hearing and appeals

Purpose of this part is to obtain final permit according to Swedish law and Environmental Code and permit from the Swedish Radiation Protection Agency

Estimated time aspect 4-10 years
Civil engineering pre-study

- Desk Pre-study and planning 0.5 year
- Geological investigation on site drilling and radar 0.5-2 years
- Bedrock investigation with drilling and deformation analysis 0.5-2 years

All these investigations can be carried out in parallel and partially during construction

Estimated time aspect 2-4 years
Conclusion and way forward

• Technical baseline design of facility and civil structures
• Consider starting legal process regarding permit
• Commence civil pre-study for optimizing design of facility
• Study radiological hazard to third part outside perimeter
• Hydrological study and how to handle ground water
ESSnuSB, ESS LINAC, Accumulator ring and Target