

ACCELERATOR INSTALLATION

SAFETY SUPPORT — Strategy and lessons learned



2nd BrightnESS Best Practice Workshop – June 13 and 14

Recurrent Questions

What are the Personal Protective Equipment required to be on site?

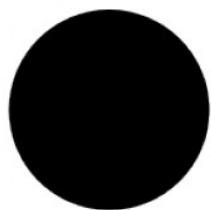
What documentation do I need to fill-in before starting installation activities?

Which kind of training do I need to follow before going on the site?

Who should I contact in case of an incident?

Who is responsible for the safety aspects during installation activities?

Etc...



In-Kind/Supplier

Main objective of this presentation: provide you with a better understanding of the pre-requisites and instructions before and during installation activities



Picture taken in May 2017

Cryogenic buildings — Helium Compressor Building, Coldbox Building, Cryogenic Transfer Line Gallery

Pictures taken on 8th June 2017

Helium Compressor Building



Accelerator Cryoplat Hall



Cryogenic Transfer Line Gallery

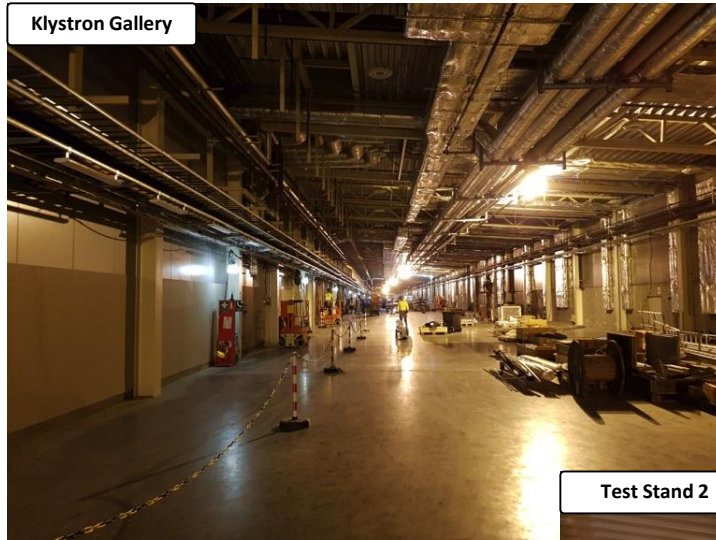


Coldbox Building



Klystron Gallery and Test Stand 2

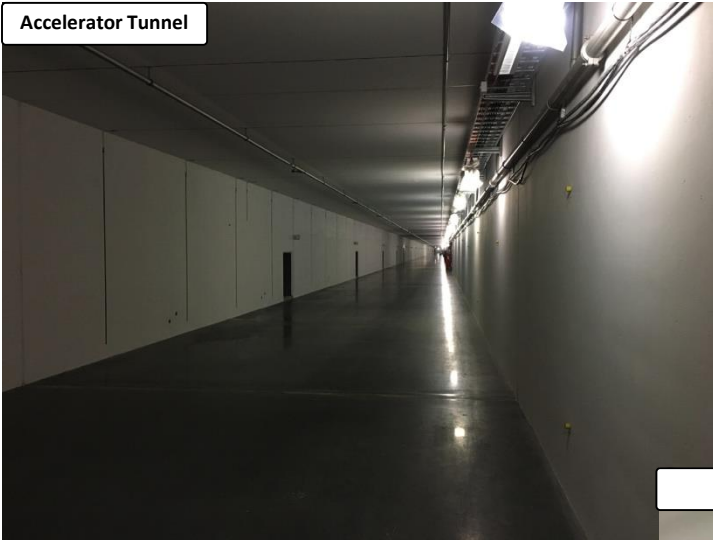
Pictures taken on 8th June 2017



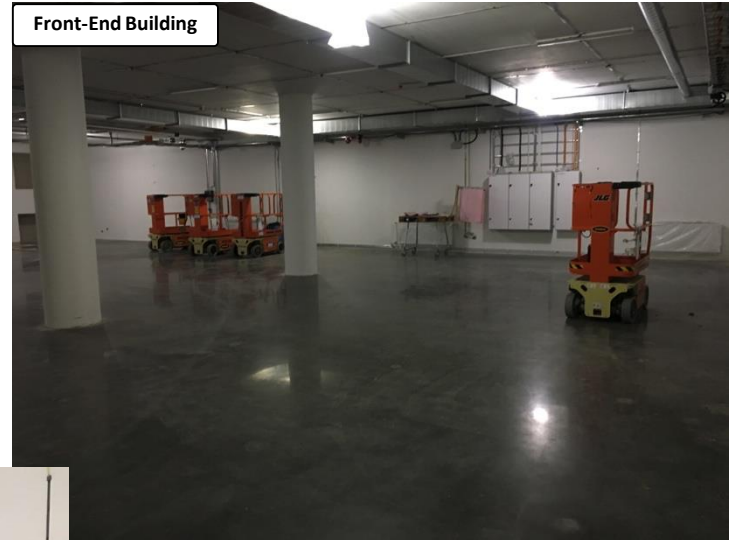
Accelerator Tunnel

Pictures taken in May 2017

Accelerator Tunnel



Front-End Building



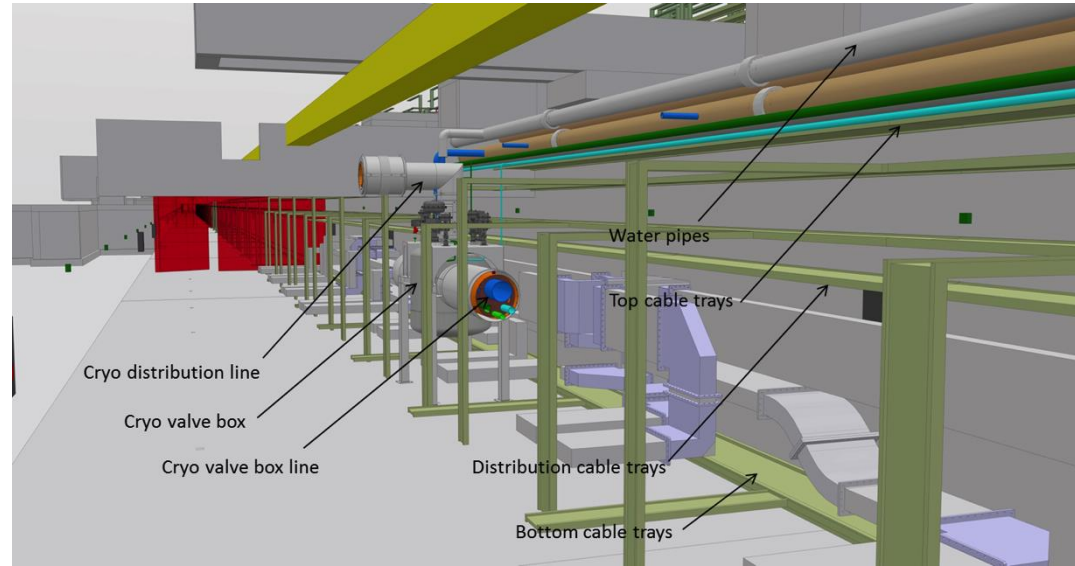
Stubs



Accelerator Tunnel

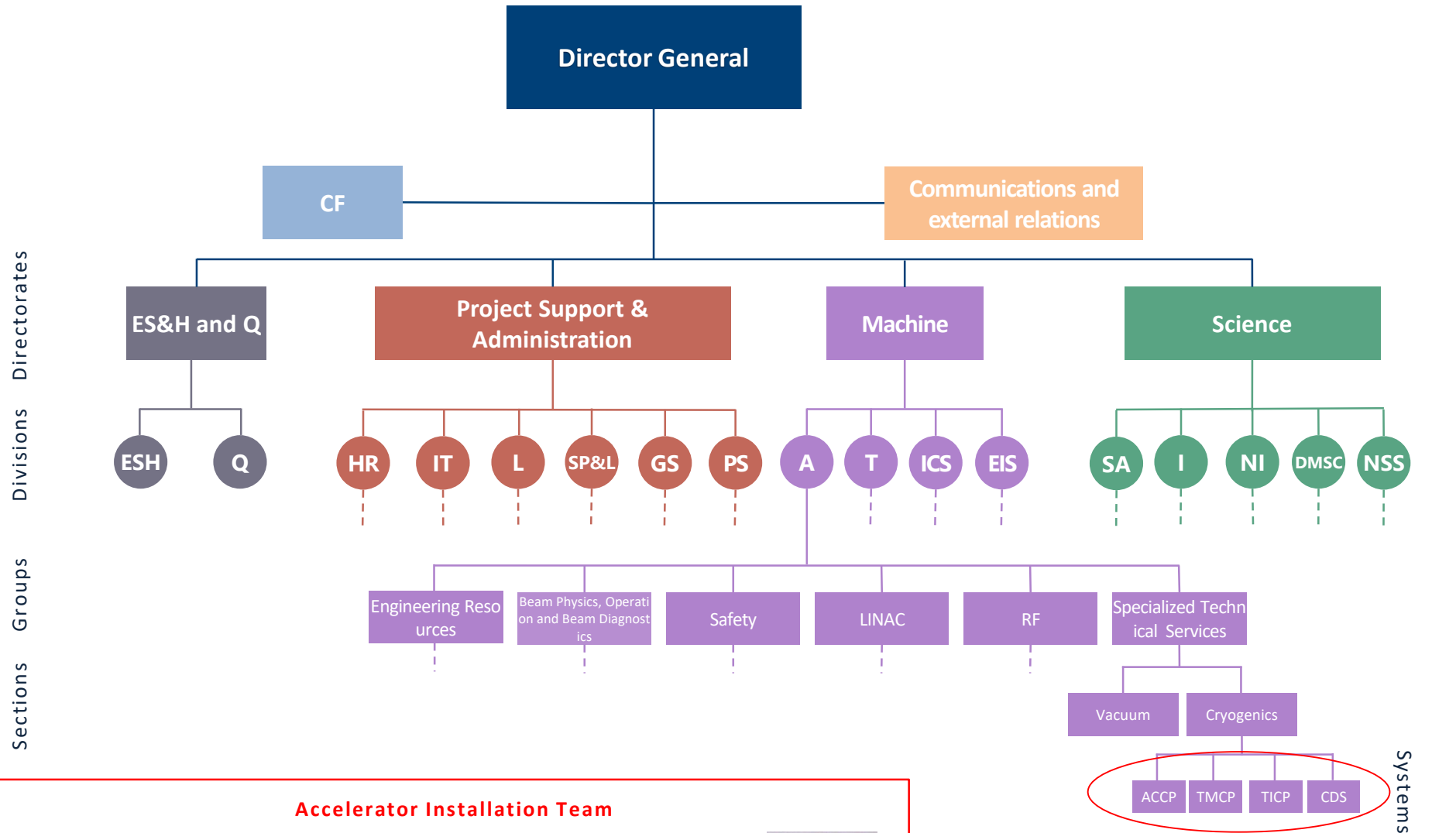


1. Marking
2. Drilling
3. Installation of cooling piping, cable trays and Grounding bus bar
4. Installation of Racks (FEB level 090)
5. Installation of Phase Reference Line
6. Installation of Ion Source
7. Installation of cables, RF waveguides in Stubs
8. Installation of Cooling skids (FEB level 100)
- 9. Commissioning of the Ion Source**
10. Installation of RF distribution wall and Cryogenics Distribution System
11. Installation of Warm LINAC
12. Installation of Cryomodules and LWU's



Main challenges

30 consecutive months of installation
Several institutes and companies present on site
Concurrent commissioning and installation
Skanska Construction Site Rules
≈30-50 people at the same time estimated



Accelerator Installation Team



Acc. Installation Manager



Safety support



QA/QC support



Area supervisors



Team assistant

Also



Installation Support Coordination



ES&H and Q



ESS Skanska H&S

Systems

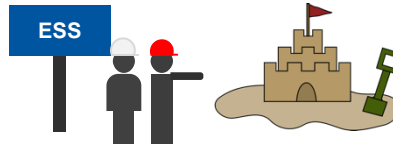
Involvement in the accelerator installation activities,

in collaboration with ES&H and Skanska

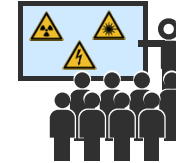
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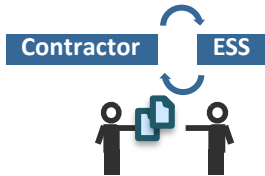
Support in the preparation of safety templates (e.g. WSCP, JHA, AHA)



Participation to the pre-work visit
(System Leader, contractor representative, Area Supervisor, Safety Team)



Coordination of safety training
(e.g. BAS-U/P, safety harness, first-aid)



Review of safety documentation (e.g. JHA, AHA, WSCP)



Support in the definition of control measures



Interface between AD, ES&H and Skanska



Participation to regular safety inspections on site



Work permit issuing

Soon



Preparation of online training courses

.....

Work and Safety Coordination Plan (WSCP)

GENERAL INFORMATION



Working hours



Duration of the activity



Contractor information



Regulatory framework

PREPATORY MEASURES



Pre-work visit



Organizational measures



Provision of services by ESS



Provision of safety measures by ESS



Description of the installation work

ESS system leader
Contractor
ESS area supervisor

Work and Safety Coordination Plan (WSCP)

REFERENCE>>

This Safety Coordination Plan is contractual and is implemented by the relevant partners; it is subject to adjustments according to changes in the work situation.

TRACEABILITY		
Role	Signature	Date
Group Leader (Last/First Name, Division/Group)		yyyy/mm/dd
Area Supervisor (Last/First Name, Division/Group)		yyyy/mm/dd
ESS Safety Representative(s) (Last/First Name, Division/Group)		yyyy/mm/dd
ESS System Leader (Last/First Name, Division/Group)		yyyy/mm/dd
Contractor Representative (Last/First Name, Company/Institute)		yyyy/mm/dd

Distribution list:
The ESS system leader is responsible for the distribution of this Work and Safety Coordination Plan:

- to the signatories of this document;
- to the ESS Health and Safety Division.

The ESS system leader shall also archive this document in CHES¹.

The contractor representative is responsible for the distribution of this Safety Coordination Plan:

- to the Health and Safety representative of his company/institute;
- to his sub-contractors;
- to all other bodies that the company/institute must report to.

HAZARD IDENTIFICATION & CONTROL MEASURES



Area Hazard Analysis (AHA)



Job Hazard Analysis (JHA)



Control documents

INFORMATION AND TRAINING



Safety trainings



First aiders



Site map



Accident/incident reporting

Status: released on May 3rd, 2017

The diagram illustrates the organizational structure for the Work and Safety Coordination Plan (WSCP) across three divisions: Accelerator Division, ES&H Division, and Skanska.

- Accelerator Division:**
 - Area supervisor (OK)
 - Group leader (OK)
 - System leader (OK)
 - Safety representative (OK)
- ES&H Division:**
 - Safety representative (OK)
- Skanska:**
 - Safety representative (OK)

Below the diagram is a sample of a Work and Safety Coordination Plan (WSCP) document. The document includes sections for:

- Work and Safety Coordination Plan (WSCP)**
- <ACTIVITY OR CONTRACT REFERENCE>**
- TRACABILITY** table:

Role	Signature	Date
Group leader		yyyy/mm/dd
Area supervisor		yyyy/mm/dd
ES&H Representative		yyyy/mm/dd
ES&H System leader		yyyy/mm/dd
ES&H Safety representative		yyyy/mm/dd
ES&H System leader		yyyy/mm/dd
ES&H Safety representative		yyyy/mm/dd

The document also includes a section for **Distribution list** and a **Signature list** with checkboxes for the Group leader, Area supervisor, ES&H Representative, ES&H System leader, and ES&H Safety representative.

Good progress in the preparation of documentation

GENERAL INFORMATION
For contractors coming on the ESS Site

ADMINISTRATIVE PREREQUISITES

Each member of the contractor's personnel performing work on the ESS site shall apply for an authorization photo card (ID06) which is compulsory for each worker. The application shall be done a few weeks prior to the start-up of the installation activity at the following address:
<http://www.nexusid06.se/om-nexus-id06/information-in-english/>

The contractor shall pre-register his own personnel at the following link before coming on site:
<https://c10portal.ess.lu.se/arc-registration-new-personnel>

WORKING HOURS

The official working hours on the ESS site are from 07:00 to 16:00 from Monday to Friday. An authorization shall be completed and addressed to the Area Supervisor for any work performed outside normal working hours and working days.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Each member of the contractor's personnel performing work on the ESS site shall wear the following PPE and equipment:

- Safety helmet (white for officers, blue for site operatives + workers +)
- Safety goggles
- Gloves
- Safety shoes/boots
- High visibility clothing (EN 471 class 2)
- ID06 card

INSTRUCTIONS IN CASE OF A SERIOUS ACCIDENT/INJURY

1. Check for any danger, casualty and if possible make the situation safe
2. Call 112 and provide the following information:
 - a) Nature of the accident/injury
 - b) Location of the accident/injury
 - c) Number and state of the injured people
 - d) Any kind of information that could be of use for the rescue team
3. Perform first aid/CPR
4. Report immediately to the Area Supervisor
5. Report immediately to the ESS System Leader
6. Report immediately to the Contractor Representative

SAFETY TRAINING & AWARENESS

Each member of the contractor's personnel performing work on the ESS site shall follow at least the following safety training courses:

- ESS site safety induction (register at <https://c10portal.ess.lu.se/arc-induction-eng>)
- Waste management (contact site.registration@ess.lu)

Additional specific safety training courses might be required depending on the areas to be accessed and/or the type of activity to be performed. For more information, contact your ESS system leader.

APPLICABLE RULES & REGULATIONS

The contractor shall comply with the applicable rules and regulations during the execution of the contract. In this context, the contractor is invited to take note of the rules and regulations available at the following links:

Swedish regulations

- Swedish Work Environment Act (SjÄML)
- Swedish Work Environment Regulations (AFS)
- Swedish Posting of Workers Act
- Building and Civil Engineering work (LMS 1999:3)

EN & Niskanen regulations

- ESS Skanska Health and Safety Plan
- ESS Skanska Guidelines for ESS Stakeholder Access
- General conduct and safety rules ESS - Conventional Facilities Worksite

IMMEDIATE INTERRUPTION OF ACTIVITIES

All persons have the duty to stop an activity if they judge that it presents an imminent and serious danger.

CONTACT PERSONS - AREA SUPERVISORS

G01, Accelerator Tunnel:
Dennis de Wit (+46722073683)

G02, Klystron Gallery:
Marcus Green (+4672504031)

G04, Cryogenic Buildings:
Ila Sjöholm (+46722478712)

In case of absence of the persons above, please contact Nick Gazi (+46721792235) or Day Phan (+46721792066)

*Nexus ESS coordination address:
Österåkersvägen 113, 225 92 Lund
try number (toll free): +46 888 3 888

ESS-0093892

RESPONSIBILITY MATRIX FOR ESS SYSTEM LEADERS, AREA SUPERVISORS AND CONTRACTOR REPRESENTATIVES DURING INSTALLATION

Objective: The main objective of the responsibility matrix is to define the roles and responsibilities of the main stakeholders involved in the accelerator installation activities to be performed on site. Please note that ESS' and contractor's responsibilities can vary from one system to another. Therefore, the document shall be filled in accordingly.

PREPARATION OF THE WORK AND SAFETY COORDINATION PLAN (WSCP)

Preparation of the site map (area of intervention, storage area, location of safety equipment, location of entrances/exits, access routes, etc.)

Preparation of system deliverables

Preparation of material list (e.g. nuts, bolts, screws, etc.)

Preparation of equipment list (e.g. lifting equipment, analysis equipment, etc.)

Request for lay-down area for temporary storage of equipment/material at the ESS site

Description of the installation processes & milestones

Preparation of the deliverable document relevant for installation

Identification of extra labour (e.g. electricians, mechanical fitters, welders, etc.) to perform installation activities

Preparation of Job Hazard Analysis (JHA)

Preparation of the Area Hazard Analysis (AHA) and identification of hazards related to parallel works

Identification of control documents to be submitted prior to the start-up of the work

Identification of safety training/awareness courses to be followed

PREPARATION OF THE WORK PRIOR TO THE START-UP OF INSTALLATION ACTIVITIES

Provision of safety training/awareness

Organisation of the pre-work visit

Implementation of worksite safety measures (e.g. lock-out/tag-out, signage, area delimitation, etc.)

Submission of the WSCP filled-out to the Area Supervisor with all necessary information and deliverables

Application for ID-06 card(s) - see <http://www.nexusid06.se/om-nexus-id06/information-in-english/>

Provision of Personal Protective Equipment (PPE)

STORAGE, TRANSPORTATION AND INSTALLATION

Transportation of goods from ESS storage facility to designated ESS site unloading zone

Unloading and temporary storage of goods at designated ESS site unloading zone

Transportation of goods from ESS site unloading zone or ESS site temporary storage area into installation area

Storage of goods in temporary storage area at ESS site if necessary

Removal and disposal of packaging prior to installation

Administrative support for return of goods from ESS to onward destination

Installation, mounting and fixing of goods

Connection to services

Testing of goods

MISCELLANEOUS SITE SERVICES

Provision of changing rooms, toilets, showers, etc.

Provision of equipment (e.g. lifting equipment, work platform, analysis equipment, etc.)

Provision of extra labour (e.g. electricians, mechanical fitters, welders, etc.) to perform installation activities

Provision of temporary services (e.g. electricity, ventilation, lighting, etc.)

Provision of support services (e.g. medical, rescue)

	ESS	Area Supervisor	Contractor (company, In-Kind)
Preparation of the site map (area of intervention, storage area, location of safety equipment, location of entrances/exits, access routes, etc.)	X	X	
Preparation of system deliverables	X		
Preparation of material list (e.g. nuts, bolts, screws, etc.)	X		
Preparation of equipment list (e.g. lifting equipment, analysis equipment, etc.)	X		
Request for lay-down area for temporary storage of equipment/material at the ESS site	X		
Description of the installation processes & milestones	X		
Preparation of the deliverable document relevant for installation	X		
Identification of extra labour (e.g. electricians, mechanical fitters, welders, etc.) to perform installation activities	X	X	
Preparation of Job Hazard Analysis (JHA)	X		
Preparation of the Area Hazard Analysis (AHA) and identification of hazards related to parallel works	X		
Identification of control documents to be submitted prior to the start-up of the work	X	X	
Identification of safety training/awareness courses to be followed	X		X
Provision of safety training/awareness	X		
Organisation of the pre-work visit	X	X	
Implementation of worksite safety measures (e.g. lock-out/tag-out, signage, area delimitation, etc.)	X	X	
Submission of the WSCP filled-out to the Area Supervisor with all necessary information and deliverables	X		
Application for ID-06 card(s) - see http://www.nexusid06.se/om-nexus-id06/information-in-english/			X
Provision of Personal Protective Equipment (PPE)			X
Transportation of goods from ESS storage facility to designated ESS site unloading zone	X		X
Unloading and temporary storage of goods at designated ESS site unloading zone	X		
Transportation of goods from ESS site unloading zone or ESS site temporary storage area into installation area	X		
Storage of goods in temporary storage area at ESS site if necessary	X		
Removal and disposal of packaging prior to installation	X		X
Administrative support for return of goods from ESS to onward destination	X		
Installation, mounting and fixing of goods	X		X
Connection to services	X		X
Testing of goods	X		X
Provision of changing rooms, toilets, showers, etc.	X		
Provision of equipment (e.g. lifting equipment, work platform, analysis equipment, etc.)	X	X	
Provision of extra labour (e.g. electricians, mechanical fitters, welders, etc.) to perform installation activities	X	X	
Provision of temporary services (e.g. electricity, ventilation, lighting, etc.)	X	X	
Provision of support services (e.g. medical, rescue)	X		

ESS-0093460



Accident/incident reporting templates

ESS-0095940

INCIDENT/ACCIDENT REPORTING FORM

Type of event: ☐ Injury ☐ Near miss ☐ Environmental incident ☐ Other, please specify:

Name of the victim: First/Last Name Date of the event: yyyy/mm/dd Time of the event: hh/mm

Location of the event: specify location of the event (e.g. building) Precise location: specify precise location of the event (e.g. room, area)

Status of the victim: ☐ ESS employee ☐ Contractor (if partner, company) ☐ Other, please specify:

Circumstances and details of the event:
Provide circumstances and description of the event

Immediate actions to be taken:
Provide the list of immediate actions and control measures taken after the event

Any other comments:
Provide any additional relevant information

Distribution list:
ESS contact person: First/Last Name – Email address
Area supervisor: First/Last Name – Email address
ESS line manager: First/Last Name – Email address
Accelerator Safety Representative: Duy Phan – duy.phan@ess.se
ESS Safety Representative: Bertil Winer – bertil.winer@ess.se
Other: First/Last Name – Email address

ESS-0093892

(temporary)

IN CASE OF SERIOUS ACCIDENT/INJURY

1. CHECK FOR ANY DANGER, CASUALTY AND IF POSSIBLE, MAKE THE SITUATION SAFE
2. CALL 112 AND PROVIDE THE FOLLOWING INFORMATION: nature of accident/injury, location of the accident/injury, number and state of the injured people, any kind of information that could be of use for the rescue team.
3. PERFORM FIRST AID/CPR
4. REPORT IMMEDIATELY TO THE ESS SYSTEM LEADER
()
5. REPORT IMMEDIATELY TO THE AREA SUPERVISOR
()
6. REPORT IMMEDIATELY TO THE CONTRACTOR REPRESENTATIVE
()

(temporary)



Area Hazard Analyses (G01, G02 & G04)

Klystron Gallery

ESS-0105581
Revision 2

AREA HAZARD ANALYSIS (AHA)

Work Area: Klystron Gallery G02 and Test Stand areas within G02

Brief description of activities to be authorized for this work area:
This AHA is to cover the general works within the G02 area. Further information regarding individual work activities are detailed within their respective Job Hazard Analysis or risk assessments.

Approver	Name	Date	Signature	Phone No.
Work Area leader	Marcus Green	2017/03/01		+46 72 3040
Line Manager	Nick Gazis	2017/04/06		+46 72 1792
ES&H Division or designated Safety Committee Rep.	Duy Phan	2017/04/06		+46 72 1792

PERSONAL PROTECTIVE EQUIPMENT (PPE) TO CONSIDER

Note: Job specific PPE and training, along with licenses, permits, procedures or any other control or mitigation measures required to deal with specific hazards are addressed in the Job Hazard Analysis for specific work activities.

ESS-0105581

Accelerator Tunnel

ESS-0105616
Revision 1

AREA HAZARD ANALYSIS (AHA)

Work Area: Accelerator Tunnel G01

Brief description of activities to be authorized for this work area:
This AHA is to cover the all general works within the G01 area. Further information regarding individual work activities are detailed within their respective Job Hazard Analysis or risk assessments.

Approver	Name	Date	Signature	Phone No.
Area Supervisor	Dennis de Wit	2017/04/10		+467220736
Line Manager	Nick Gazis	2017/04/10		+46 72 1792
ES&H Division or designated Safety Committee Rep.	Duy Phan	2017/04/10		+46 72 1792

PERSONAL PROTECTIVE EQUIPMENT (PPE) TO CONSIDER

Note: Job specific PPE and training, along with licenses, permits, procedures or any other control or mitigation measures required to deal with specific hazards are addressed in the Job Hazard Analysis for specific work activities.

ESS-0105616

Cryo buildings

ESS-0104828
Revision 1

ANNEX 2 – AREA HAZARD ANALYSIS (AHA)

Work Area: Cryogenic buildings (Helium Compressor Building - HCB, CTL gallery, Coldbox Building - CXB)

Brief description of activities to be authorized for this work area:
Transport, installation and testing of cryopumps components
Transport, installation and testing of piping
Commissioning of the cryopumps
Installation of auxiliary services (utilities, ODH monitors, civil engineering works)

Approver	Name	Date	Signature	Phone No.
Area Supervisor	Ila Sjöholm	2017/04/04		+46 72 2478712
Section Leader	Philipp Arnold	2017/04/04		+46 72 1792193
ES&H Division or designated Safety Committee Rep.	Duy Phan	2017/04/05		+46 72 1792066


PERSONAL PROTECTIVE EQUIPMENT (PPE) TO CONSIDER


Note: Job specific PPE and training, along with licenses, permits, procedures or any other control or mitigation measures required to deal with specific hazards are addressed in the Job Hazard Analysis for specific work activities.





ESS-0104828



Safety Training Matrix

 Trainings provided by ESS-Skanska on site

 Training provided by external companies

<div>Training</div> <div>Purpose</div>	HS site Induction	Site orientation training at gate	Safe lifting (slinging/rigging)	Hot work training	Fall protection and rescue training (with harness)	High voltage Electrical awareness, ESA 14	MEWP (Scissor lift, Skylift, Boom lift)	First Aid course (1 per working team)	Forklift truck training	Crane operator training for specific crane
Access to site	X									
Work on site (general)	X							X		
Access to site with vehicle/transport		X								
Performing hot work	X			X						
Performing lifting and coupling work	X		X							
Accessing energized areas, high voltage	X					X				
Working on MEWP	X				X		X			
Operating forklift	X								X	
Operating mobile crane, overhead crane, etc.	X		X							X
VALIDITY of courses (duration)	-	-	 - (Swedish certificate)	 5 years (Nordic certificate)	 - (Swedish certificate)	 3 years (Swedish certificate)	5 years (ISO 18878 certificate)	3 years	Swedish BYN or TYA validation	Swedish BYN or TYA validation

Safety trainings organized by AD in 2016/2017

BAS-U/BAS-P

Sveriges
Byggindustrier

First aid

Räddningstjänsten
Syd

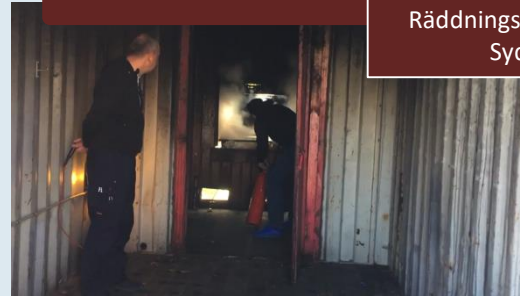
Safety Harness

Procurator



Hot Work

Räddningstjänsten
Syd



Use of overhead crane + forklift

Truckverket



And many more to come...



Personal Protective Equipment (PPE)



EN 397



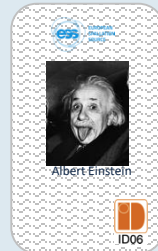
EN 166



EN 388



EN ISO 20345



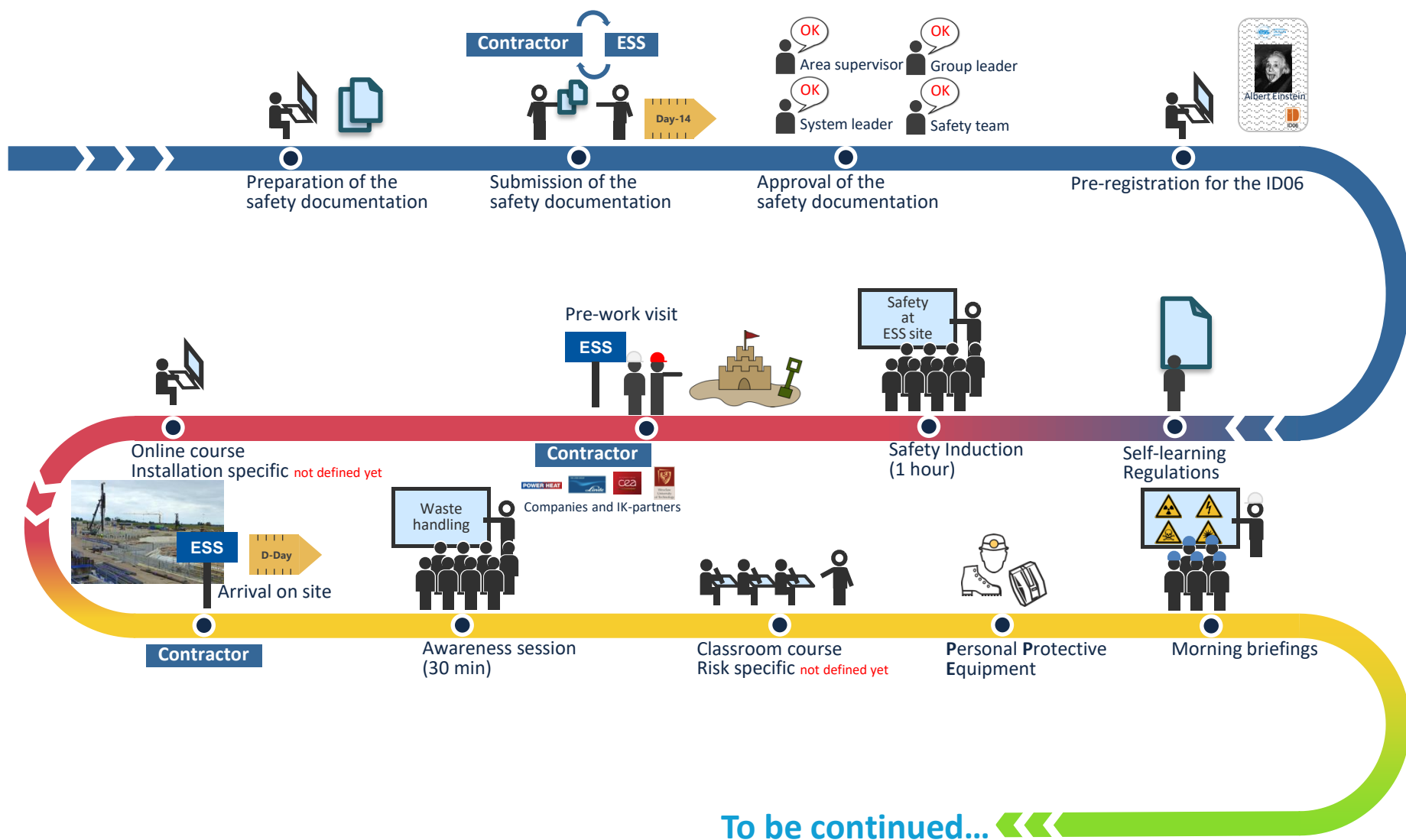
EN 471 Class 2



MANDATORY



Installation Path



To be continued...

Thank You!

Duy.Phan@esss.se