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| Work and Safety Coordination Plan (WSCP) |
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|  |

|  | Name | **Role/Title** |
| --- | --- | --- |
| **Owner** | Øystein Midttun | ESS System Leader of Ion Source and LEBT |
| **Authors** | Øystein Midttun  Dennis de Wit  Lorenzo Neri,  INFN-LNS | ESS System Leader of Ion Source and LEBT  ESS Area Supervisor of Accelerator tunnel  Contractor Representative of Ion Source and LEBT |
| **Reviewers** | D.Phan  A.Johannesson  B.Winer | ESS Accelerator Safety Engineer  SEC HS Lead/Occupational Safety Engineer  ESS ES&H Safety Representative |
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**Diffusion list (for information):** Edgar Sargsyan, Frank Hellström.

|  |  |  |
| --- | --- | --- |
| Work and Safety Coordination Plan (WSCP) | | |
| ESS accelerator installation  IOn source and LEBT | | |
| **Purpose:**  This Work and Safety Coordination Plan (WSCP) is the contractual binder document and shall be implemented by the ESS staff, their relevant In-Kind Contribution (IKC) partners and/or contractors.  The main purpose of that document is to identify the list of preparatory and organizational measures required prior to the start-up of the installation activity to be carried out by the contractor, as well as the list of associated hazards and safety control measures to be implemented.  The WSCP shall be subject to adjustments and updates adapting to the on-going ESS accelerator installation activity. | | |
| traceability | | |
| **Role** | **Signature** | **Date** |
| **Group Leader**  Håkan Danared, Accelerator/LINAC |  | yyyy/mm/dd |
| **ESS Safety Representative(s)**  Duy Phan, Accelerator Safety |  | yyyy/mm/dd |
| **Area Supervisor**  Dennis de Wit, Accelerator/Engineering Resources |  | yyyy/mm/dd |
| **ESS System Leader**  Øystein Midttun, Accelerator/LINAC |  | yyyy/mm/dd |
| **Contractor Representative**  Lorenzo Neri, INFN-LNS |  | yyyy/mm/dd |
| The ESS System Leader is responsible for the redaction of the WSCP, its update relevant to the system of his/her responsibility, and its distribution to the signatories of this document.  Note that the WSCP shall be filled in English.  The ESS System Leader shall also archive and update this WSCP in CHESS[[1]](#footnote-1).  The Contractor Representative is responsible for the distribution of this WSCP:   * To the Health and Safety responsible of his company/institute; * To his sub-contractors; * To all relevant bodies that the company/institute shall report to. | | |

At the initiative of European Spallation Source ERIC and in order to ensure coordination and safe execution of the contract or activity, this WSCP is established:

**Between:**

|  |  |
| --- | --- |
| European Spallation Source ERIC |  |
|  |  |
| * Address: | Box 176, 221 00 Lund, Sweden |
|  |  |
| * Represented by: | Håkan Danared |
| Division/Group: | LINAC |
| Acting as: | Group Leader on behalf of the Division Head |
|  | Tel: +46 46 888 3046  Mobile: +46 72 179 2046 |
|  | E-mail: Hakan.Danared@esss.se |
|  |  |
| * ESS System Leader: | Øystein Midttun |
|  | Tel: +46 46 888 3299  Mobile: +46 72 179 2299 |
|  | E-mail: Oystein.Midttun@esss.se |
|  |  |
| * Area Supervisor(s) | Dennis de Wit |
| *(To be repeated if different areas are involved)* | Mobile: +46 72 207 3683 |
|  | E-mail: Dennis.deWit@esss.se |
|  |  |
| * Electrical Operation Leader | First/Last Name |
|  | Tel: (+46 46 888 xxxx)  Mobile: (+46 72 179 xxxx) |
|  | E-mail: ([FirstName.LastName@esss.se](mailto:FirstName.LastName@esss.se)) |
|  |  |

**And:**

|  |  |
| --- | --- |
| Contractor | INFN-LNS |
|  |  |
| * Address: | Via S. Sofia, 62, 95125 Catania CT, Italy |
| * Represented by: | Lorenzo Neri |
| Title: | fill in |
|  | Tel: +39 095 542 581  Fax: fill in |
|  | E-mail: neri@lns.infn.it |
|  |  |
| * Safety representative of the contractor: | First/Last Name |
|  | Tel: fill in  Fax: fill in |
|  | E-mail: fill in |
|  |  |
| * Contract/Agreement: | ESS-0038119 |
|  |  |

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# Purpose

This WSCP is the contractual binder document and shall be implemented by the ESS staff, their relevant In-Kind Contribution (IKC) partners and/or contractors.

The main purpose of that document is to identify the list of preparatory and organizational measures required prior to the start-up of the installation activity to be carried out by the contractor, as well as the list of associated hazards and safety control measures to be implemented.

The WSCP shall be subject to adjustments and updates adapting to the on-going ESS accelerator installation activity.

# Introduction

European Directives & Regulations, Swedish national regulations as well as European Spallation Source ERIC Safety rules apply on the entire site of the ESS facility and shall be respected by the contractors and In-Kind Contributors (IKC). For easiness of use, in the current document the term *contractor* shall refer to contractors, IKC or any other ESS collaborating party.

The present WSCP is prepared in accordance with the applicable ESS safety rules for the coordination of Safety aspects and is specific to the contract mentioned at the front page.

# Commitment

The Contractor Representative, signatory of this document, is committed to:

* Enforce the application of the provisions of this document by its personnel; justify in writing that its staff has been trained in all of these provisions;
* Forward this WSCP and all related documents, for application, to all its sub-contractors and any person or entity intervening on his behalf on the ESS site in the context of the contract subject of this document;
* Collaborate in the Safety process within the framework of the implementation of the contract on the ESS site by:
* Informing the ESS System Leader of any changes in operating methods associated with the contract/activity;
* Participating in regular meetings related to the contract/activity;
* Enforcing specific requirements notified through amendments or pre-work visits;
* Reporting risk observations (accidents and/or near misses);
* Contributing to the update of this document as often as necessary.

# Applicable documentation and regulatory framework

The following regulations and documents related to Safety in the context of the contract execution on the ESS site by the contractor shall be followed:

**Swedish regulations**

* [Swedish Work Environment Act (AML), Reference No.: SFS 1977:1160](http://www.government.se/government-policy/labour-law-and-work-environment/19771160-work-environment-act-arbetsmiljolagen/);
* [Swedish Work Environment Regulations (AFS)](https://www.av.se/en/work-environment-work-and-inspections/publications/foreskrifter/);
* [Swedish Posting of Workers Act, Reference No.: SFS 1999:678](http://www.government.se/government-policy/labour-law-and-work-environment/1999678-posting-of-workers-act/);
* [Building and Civil Engineering work (AFS 1999:3)](https://www.av.se/en/work-environment-work-and-inspections/publications/foreskrifter/building-and-civil-engineering-work-afs1999-3eng-provisions/).

**ESS & Skanska regulations and applicable documentation**

* ESS-Skanska Health and Safety Plan [1];
* ESS-Skanska Guidelines for ESS Stakeholder Access [2];
* General conduct and safety rules ESS – Conventional Facilities Worksite [3];
* ESS Rules for Electrical Safety [4];
* Procedure for Authorizing Work in ESS workspaces [5];
* General information for contractors coming on the ESS site [6];
* Installation responsibility matrix [7];
* ESS accident/incident reporting form [8].

# Work Coordination Plan

## General information

General information regarding the activity

|  |  |
| --- | --- |
| **Start date of the activity:** 2017/11/01 | **End date of the activity:** 2017/11/17 |

**Description of the activity (summary):**

Produce a detailed summary of the information in the tender including:

1. System deliverables (e.g. DTL, RFQ, RF distribution system, etc.) – see [Annex 5](#_Annex_5_–)
2. Equipment list (e.g. lifting equipment, analyzation equipment, etc.) – see Annex 6
3. Installation processes & milestones and deliverable documentation – see [Annex 7](#_Annex_7_–_2)

**Working hours:**

Normal working hours on the ESS site are from 07:00 to 16:00 from Monday to Friday - working days.

**Arrangements for organizing the work outside normal working hours:**   
to be completed if necessary

Note: An authorisation shall be completed and addressed to the Area Supervisor for any work performed outside normal working hours and working days. This notice has to be further approved by the Skanska ESS construction site management.

### Installation/implantation map

The installation/implantation map shall be available (and up-to-date) by the contractor, after the approval of the System Leader.

The installation/implantation map shall include patterns and detailed information for the drilled holes/threaded inserts or other fixations of the system with the floor, with its exact location with respect to the physical plant (walls etc.).

The alignment strategy of the contractor, including the relevant fiducialization procedure of the components (when applicable), shall include the verification of the installation/implantation map.

### Information concerning the contractor

All the information (such as personnel list, operational procedures, provisions for training, etc) concerning the contractor, its sub-contractors can be found in [Annex 4](#_Annex_4_–_1) of this document.

### Sub-contractors

|  |  |  |
| --- | --- | --- |
| Will the contractor sub-contract any activities? | YES | NO |

Table 1 - List and type of sub-contracted work

|  |  |  |
| --- | --- | --- |
| Sub-contractor name | Type of work sub-contracted | Contact person on site/ tel. |
| fill in | fill in | fill in |
| fill in | fill in | fill in |
| fill in | fill in | fill in |

\* Personnel list can be found in [Annex 4](#_Annex_4_–_3).

Note: more details regarding the duration of the activities sub-contracted can be found in the installation schedule from the contractor.

## Preparatory measures

### Pre-work visits

A pre-work visit of workplaces, facilities and equipment made available to the contractors and their sub-contractors is carried out prior to the execution of the work in the presence of all the intervening stakeholders (see [Annex 8](#_Annex_8_–)). The main purpose of this visit is to validate on-site the safety measures as defined in the WSCP.

Minimum participation: ESS System Leader and Contractor Representative, Area Supervisor, Work Leader(s)/Supervisor(s) (if any) and Safety Representative(s) (ESS & SEC).

### Declaration of works and services

Certain types of works and services might be subject to a request for authorization before the start-up of the intervention. The work and services can be realized only after obtaining all the necessary signatures. It is important to note that in all sectors (such as the Accelerator Tunnel (AT), Klystron Gallery (KG), Target area, etc.) the access is subject to specific access procedures and regulations.

## Organizational measures during the installation activity

### General organizational measures

Table 2 - General organizational measures

|  |  | Action to be taken by | Remarks |
| --- | --- | --- | --- |
| **Delivery to site** | | | |
| Delivery of system/equipment to site | Yes  No | AS  SL  CR  Other | Any delivery to site shall be coordinated with the transport & logistics group ([logistics@esss.se](mailto:logistics@esss.se)) |
| Workplace | | | |
| Identification of the area of intervention | Yes  No | AS  SL  CR  Other | See site map ([Annex 1](#_Annex_1_-)) |
| Physical delimitation of the area of intervention | Yes  No | AS  SL  CR  Other |  |
| Access roads to the area of intervention | Yes  No | AS  SL  CR  Other | See site map ([Annex 1](#_Annex_1_-))  Logistics |
| Risk associated with parallel works | | | |
| Identification of these areas. | Yes  No | AS  SL  CR  Other | See AHA ([Annex 2](#_Annex_2_–_1)) |
| Physical delimitation of these areas | Yes  No | AS  SL  CR  Other | See AHA ([Annex 2](#_Annex_2_–_1)) |
| Storage (lay-down) areas | | | |
| Identification of those locations | Yes  No | AS  SL  CR  Other | See site map ([Annex 1](#_Annex_1_-)) |
| Marking of the storage areas | Yes  No | AS  SL  CR  Other |  |
| Waste management | | | |
| Needs for dumpsters | Yes  No | AS  SL  CR  Other | To be coordinated with Skanska during the waste management training |
| Equipment or machines used | | | |
| Equipment/machines used by the contractor | Yes  No | AS  SL  CR  Other | HEBT loading bay crane |
| Other | Yes  No | AS  SL  CR  Other |  |
| REMINDER  Any modification of general organization shall be reported immediately to the ESS System Leader and Area Supervisor.  AS: Area Supervisor  SL: ESS System Leader  CR: Contractor Representative | | | |

### Participation of ESS to the work

Table 3 - Participation/provisions of ESS to the work

|  |  | Action to be taken by | Remarks |
| --- | --- | --- | --- |
| Provision of services by ESS | | | |
| Electricity | Yes  No | AS  SL  CR  Other | 230 V, single phase, 3 kW |
| Water | Yes  No | AS  SL  CR  Other |  |
| Lighting | Yes  No | AS  SL  CR  Other |  |
| Drainage | Yes  No | AS  SL  CR  Other |  |
| Compressed air | Yes  No | AS  SL  CR  Other | 1 output near the working area. 5-6 bars with general regulation. |
| Changing rooms, toilets and shower | Yes  No | AS  SL  CR  Other | To be coordinated with Skanska |
| **Provision of staff by ESS** | | | |
| Staff provided by ESS | Yes  No | AS  SL  CR  Other | Crane operator, electrical installations, water cooling, and vacuum installation. |
| **Provision of equipment /machines by ESS** | | | |
| Equipment/machines provided by ESS | Yes  No | AS  SL  CR  Other | Specify in equipment list (Annex 7) |
| Other | Yes  No | AS  SL  CR  Other | 2-3 Hotdesks |
| **REMINDER**  Any modification of the participation of ESS to the work shall be validated by written agreement between the ESS System Leader and the Contractor Representative.  AS: Area Supervisor  SL: ESS System Leader  CR: Contractor Representative | | | |
|  | | | |

### Preliminary measures taken/to be taken by ESS

Table 4 - Preliminary measures taken/to be taken by ESS

|  |  | Action to be taken by | Remarks |
| --- | --- | --- | --- |
| Worksite safety measures  Lock-out/tag-out of electricity, water, gas, cryogenic fluids, etc. | Yes  No | AS  SL  CR  Other | Lock out electricity of racks, HV power supply, and isolation transformer. Lock out cooling water. |
| Lock-out/tag-out of mechanical installations/equipment | Yes  No | AS  SL  CR  Other |  |
| Preparatory work  Extraction of equipment, area delimitations, signage, etc. | Yes  No | AS  SL  CR  Other | Occupy HEBT loading bay for 1 day |
| Other | Yes  No | AS  SL  CR  Other |  |
| Please note that all lock-  AS: Area Supervisor  SL: ESS System Leader  CR: Contractor Representative out/tag-out activities shall be performed in accordance with the ESS rule for lock-out/tag-out [9]. | | | |
|  | | | |

# Safety Coordination Plan

## Assessment of occupational hazards and control measures

The risk assessment shall identify the work situations that are dangerous and/or likely to cause interference between activities, facilities and equipment.

### Hazards related to the work environment, facilities and activities of ESS (Area Hazard Analysis)

Hazards inherent to the work environment, facilities and activities of ESS as well as compensatory measures have to be identified and evaluated prior to the start-up of the work activity by the Area Supervisor. This Area Hazard Analysis (AHA) [5] shall be included in [Annex 2](#_Annex_2_–) of the present document.

### Hazards related to the interference of activities (parallel works)

Table 5 - Hazards related to the interference of activities

| Interference type |  | Description of the mitigation measure | Action to be taken by |
| --- | --- | --- | --- |
| Overlapping works | Yes  No |  | AS  SL  CR  Other |
| Adjacent works | Yes  No | Weekly/daily meetings | AS  SL  CR  Other |
| Transport/handling | Yes  No | Weekly/daily meetings | AS  SL  CR  Other |
| Sharing of specific access/passages | Yes  No | Weekly/daily meetings | AS  SL  CR  Other |
| Other types of interference | Yes  No |  | AS  SL  CR  Other |
| AS: Area Supervisor  SL: ESS System Leader  CR: Contractor Representative | | | |

Note: more information regarding the hazards related to parallel works can be found in the minutes of the weekly coordination meetings on site.

If cases of parallel works other than the ones mentioned in the AHA ([Annex 2](#_Annex_2_–)) are revealed during the works, the contractor shall:

* Temporarily stop the activity,
* Immediately report the unplanned co-activity to the Area Supervisor.

The ESS System Leader shall, in collaboration with the contractor and the other intervening entities performing parallel works, decide on additional measures to be implemented.

Each intervening entity shall bear the protections or the measures to be put in place to minimize the risks generated by its activities with respect to other intervening entities.

### Hazards related to the work activities of the contractor

#### Job Hazard Analysis (JHA) provided by the contractor

Hazards inherent to the contractor’s work activities as well as compensatory measures are to be identified and evaluated prior to the start-up of the work by the ESS System Leader and the Contractor Representative. This Job Hazard Analysis (JHA) [5] shall be included in [Annex 3](#_Annex_3_–) of the present document.

#### Specific supplements and ESS requirements following the analysis of the activity of the contractor

To be completed or specified that there are no additional requirements.

### Control documents to be submitted to the Area Supervisor

Control documents to be provided to the Area Supervisor prior to the start-up of the work are listed below:

|  |  |  |
| --- | --- | --- |
| YES | NO |  |
|  |  | Lock-out/tag-out permit: electrical, mechanical, fluids, etc. |
|  |  | Fire/hot work permit (including alarm inhibition) |
|  |  | Confined space work procedure |
|  |  | Work authorization for specific areas **(Supervised Area)** |
|  |  | Authorization for the use of lifting equipment |
|  |  | Other: |

## Arrangements for information and training of personnel

### Safety awareness/training related to the activities on the ESS site

The contractor must continuously ensure that its personnel working on the ESS site has followed appropriate Safety training and awareness as well as associated refresher courses.

Regardless of its activity, and before working on the ESS site, each member of the contractor personnel must follow the awareness sessions mentioned below:

ESS site Safety induction (contact [site.reception@esss.se](mailto:site.reception@esss.se) to book a training session)

ESS site waste management (contact [site.reception@esss.se](mailto:site.reception@esss.se) to book a training session)

In addition, the contractor personnel\* must follow specific awareness sessions depending on the areas to be accessed and/or the type of activity to be performed:

Radioprotection

Electrical Safety - Awareness

Cryogenic Safety – Awareness

Interventions in confined spaces

Work at height

Safety harness

First-aid training

Lifting equipment

Hot work

Other:

\* These provisions also apply to sub-contractors as well as to any person intervening on a temporary or ad hoc basis.

Note: all applicable control documents and training certificates referred in 6.1.4 and 6.2.1 shall be attached to the present WSCP.

### First aid training

It is requested by ESS that the minimum number of first-aiders at the worksite corresponds to one per working team. In addition, ESS recommends that all contractors performing electrical works on site, follow a First Aid Training (AED) including Electrical Injuries.

### Provisions for training and information of contractor personnel

See [Annex 4](#_Annex_4_–).

## Site map (worksite/area layout)

A site map prepared by the Area Supervisor shall be provided to the contractor prior to the start-up of the work. The site map shall contain at least the following information (see [Annex 1](#_Annex_1_-_2)):

* perimeter of the activity to be carried out;
* lay-down areas for equipment and materials;
* location of the emergency exits and assembly points;
* location of the fire extinguishers, first-aid kits, etc;
* location of entrances/exits for personnel and equipment;
* location of utilities (e.g. waste container, toilets, etc.);
* access routes for personnel and equipment.

An editable version of the digital document can be found at [10].

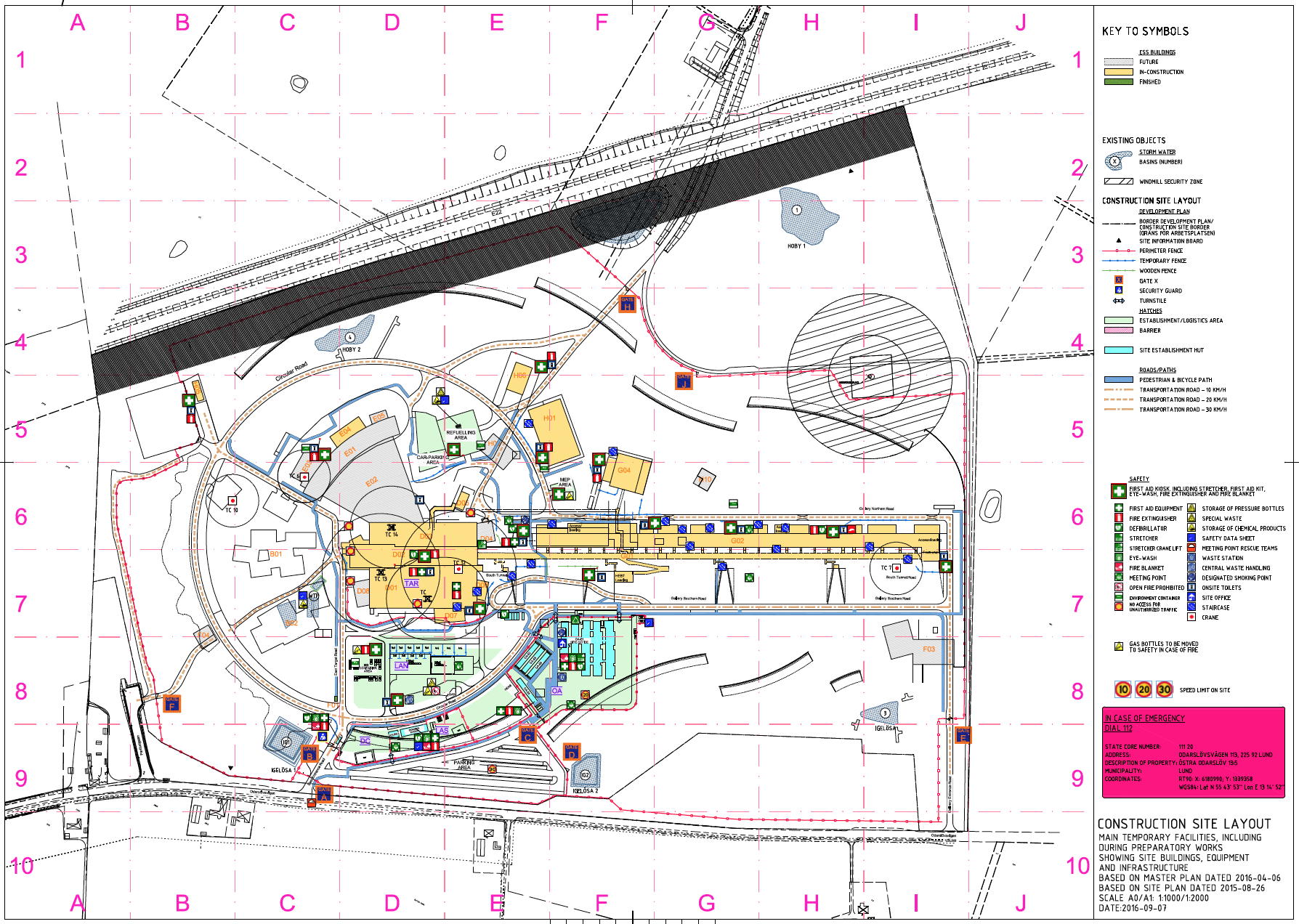
## Reporting in case of an accident/incident

Any accident that caused bodily injury with or without work interruption on the ESS site, including when traveling on the ESS site, shall be immediately reported to the ESS System Leader. This reporting shall be made in written (see [Annex 9](#_Annex_9_–) and [Annex 10](#_Annex_10_–)).

The document shall be completed by the contractor and addressed to the national authority and the insurance company of the victim.

The ESS System Leader shall notify the ESS ES&H Division ([bertil.winer@esss.se](mailto:bertil.winer@esss.se)) with an internal accident report including relevant documentation provided by the contractor as attachment.

# Annex 1 - Site Map (worksite/area layout/drawing)



# Annex 2 – Area Hazard Analysis (AHA)

Please refer to the Area Hazard Analysis of the Accelerator tunnel (G01) - ESS-0105616

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Work Area:** specifiy the location | | | | |
| **Brief description of activities to be authorized for this work area:**  provide a detailed description of the installation activities to be performed | | | | |
| **Approvers** | **Name** | **Date** | **Signature** | **Phone No.** |
| **Area Supervisor** | First/Last Name | yyyy/mm/dd |  | Phone No. |
| **Line Manager** | First/Last Name | yyyy/mm/dd |  | Phone No. |
| **ES&H Division or designated Safety Committee Rep.** | First/Last Name | yyyy/mm/dd |  | Phone No. |
| **Division Head** | First/Last Name | yyyy/mm/dd |  | Phone No. |

**Hazard Identification**

Please mark with a cross any potential hazards that could be present in the work area:

| **Potential Hazard** | **Present in Area?** | **Present in adjacent work area?** | **HAZARD description** |
| --- | --- | --- | --- |
| **Biological Safety** | | | |
| Biological agents |  |  |  |
| Legionella |  |  |  |
| **Chemical Safety** | | | |
| Asbestos |  |  |  |
| CMR |  |  |  |
| Corrosive |  |  |  |
| Dangerous for the environment |  |  |  |
| Explosive |  |  |  |
| Flammable |  |  |  |
| Harmful |  |  |  |
| Irritant |  |  |  |
| Oxidizing |  |  |  |
| Toxic |  |  |  |
| **Cryogenic Safety and Oxygen Deficiency Hazards (ESS-0038692)** [11] | | | |
| Cryogenic fluid |  |  |  |
| Inert gases |  |  |  |
| **Electrical and Electromagnetic Safety (ESS-0012721)** [4] | | | |
| Electricity |  |  |  |
| Magnetic field |  |  |  |
| Static electricity |  |  |  |
| **Ionizing radiation** | | | |
| Open sources |  |  |  |
| Closed sources |  |  |  |
| Activated material |  |  |  |
| Radioactive waste |  |  |  |
| Particle beam |  |  |  |
| **Non ionizing radiation** | | | |
| Laser (class to be specified) (ESS-0044704) [12] |  |  |  |
| Microwaves (300 MHz-30 GHz) |  |  |  |
| Radio frequency (1MHz-300MHz) |  |  |  |
| UV Light |  |  |  |

| **Potential Hazard** | **Present in Area?** | **Present in adjacent work area?** | **HAZARD description** |
| --- | --- | --- | --- |
| **Mechanical Safety** |  |  |  |
| Lifting equipment |  |  |  |
| Machinery |  |  |  |
| Mechanical energy (moving parts) |  |  |  |
| Mechanical properties (sharp, rough, slippery) |  |  |  |
| Pressure |  |  |  |
| Surface temperature |  |  |  |
| Vacuum |  |  |  |
| **Workplace** |  |  |  |
| Confined spaces |  |  |  |
| Dust |  |  |  |
| Fall from height |  |  |  |
| Falling objects |  |  |  |
| Fall on the same level |  |  |  |
| Lone working |  |  |  |
| Obstruction in passageways |  |  |  |
| Traffic |  |  |  |
| Working at height |  |  |  |
| **Structural Safety** |  |  |  |
| Structures (inadequate design or condition) |  |  |  |
| **Ergonomics** |  |  |  |
| Air quality |  |  |  |
| Lighting |  |  |  |
| Manual handling |  |  |  |
| Mental overload (ESS-0048472) [13] |  |  |  |
| Moisture |  |  |  |
| Noise |  |  |  |
| Repetitive activity |  |  |  |
| Temperature |  |  |  |
| VDU work (Visual Display Unit) |  |  |  |
| Vibrations |  |  |  |
| **Worksite** |  |  |  |
| Co-activity |  |  |  |
| Hot work (welding, flame cutting, brazing, sparks, etc.) |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Potential Hazard** | **Present in Area?** | **Present in adjacent work area?** | **HAZARD description** |
| **Environment** |  |  |  |
| Discharge of effluents to sewage |  |  |  |
| Emission of noise harmful for the environment |  |  |  |
| Emission of substances into the atmosphere |  |  |  |
| Generation of vibrations harmful for the environment |  |  |  |
| Historical site pollution (chemical) |  |  |  |
| Odors |  |  |  |
| Soil activation (radioactive) |  |  |  |
| Use/storage of potentially polluting substances (gases, liquids, solids) |  |  |  |
| Waste generation |  |  |  |
| **Others** |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PERSONAL PROTECTIVE EQUIPMENT (PPE) TO CONSIDER** | | | | | | | | | | | | | | | | | |
| **A** | http://www.hse.gov.uk/workplacetransport/images/mandatory-gloves-2.gif  Safety gloves (EN 388, EN 420) | **B** | http://www.hse.gov.uk/workplacetransport/images/mandatory-helmet-2.gif  Safety helmet  (EN 812, EN 397, EN 14052 or EN 13087) | **C** | http://www.hse.gov.uk/workplacetransport/images/mandatory-boots-2.gif  Safety shoes (EN 345, EN 346 or EN 347) | **D** | http://www.hse.gov.uk/workplacetransport/images/mandatory-ear-2.gif  Ear protection  (EN 352) | **E** | http://www.hse.gov.uk/workplacetransport/images/mandatory-face-2.gif  Face protection  (EN 166) | **F** | **http://www.hse.gov.uk/workplacetransport/images/mandatory-eye-2.gif**  Eye protection (EN 166) | **G** | High visibility clothing  (EN 471 class 2)Macintosh HD:Users:duyphan:Downloads:download.png | **H** | http://www.modernsignsdigital.co.uk/image/cache/data/Masks%20Mandatory/Respiratory-Protection-Symbol-500x500.jpg  Respiratory protection  (EN 149) | **I** | Other, please specify: |
| 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 Hazards Analysis for specific work activities. | | | | | | | | | | | | | | | | | |

# Annex 3 – Job Hazard Analysis (JHA)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Job:** Installation of ion source and LEBT | | | | | |
| **Number of people performing the job:** 11 | | | | | |
| **Start date:** 2017/11/01 | | | **End date:** 2017/11/24 | | |
| **Location/Work Area:** G01 and FEB | | | | | |
| **Approvers** | **Name** | **Date** | | **Signature** | **Phone No.** |
| Area Supervisor:  System Leader: | Dennis de Wit  Øystein Midttun | yyyy/mm/dd | |  | +46722073683  +46721792299 |
| If work is considered to be hazardous or new  ES&H Div or designated Safety Committee Rep:  Division Head: | Duy Phan | yyyy/mm/dd | |  | +46721792066 |
| Note: The JHA shall be regularly reviewed and updated if necessary as indicated in [5]. A copy of this JHA shall be kept in the location at the premises where the job shall be performed. | | | | | |

| **Work Tasks/Steps** Identify work steps/tasks in sequence when such sequencing contributes to safety, security, and/or environmental protection. | **Associated Hazards**  Identify activity hazards for each step. | **Controls, Preventive Measures, and Actions** Specify compensating measure for each hazard | **Time estimation**  Specify the time estimated to perform each task/step of the work activity |
| --- | --- | --- | --- |
| Lower support frame and HV platform into G01 with HLB crane. | HV platform weighs 1600 kg. Support frame weighs 1800 kg.  🡪 Risk of falling objects, pinching, crushing | Trained operator will use the crane.  Stay clear of the HLB.  Use mandatory PPE.  Barrier off the area. | 1 day  2017-11-01 |
| Install the feet in anchors in floor | 🡪 Risk of pinching, crushing |  |
| Roll the support frame and HV platform in place. Attach the frame to feet in the floor. Lift the HV platform on ceramic insulator with forklift or equivalent. | HV platform weighs 1600 kg. Support frame weighs 1800 kg.  🡪 Risk of falling objects, pinching, crushing | Trained operator will use the crane.  Use mandatory PPE.  Barrier off the area. |
| Align the base support with the HV platform | - |  | 2 days  2017-11-02 – 2017-11-03 |
| Lower boxes, racks, and HV power supply into FEB with elevator. | The boxes weigh up to 500 kg.  🡪 Risk of falling objects, pinching, crushing | Use mandatory PPE.  Barrier off the area. |
| Install HV rack components (if not done before shipping). | 🡪 Risk of pinching, cuts | Use mandatory PPE. | 3 days  2017-11-06 –  2017-11-08 |
| Install racks, and HV power supply in FEB | Use of forklift. The racks are prefilled and weigh approximately 300 kg each. The HV power supply weighs 520 kg.  🡪 Risk of falling objects, pinching, crushing | Trained operator will use the forklift.  Use mandatory PPE. |
| Install RF components | - |  |
| Install pumping box with the extraction electrodes | Use of movable lifting device. Weight ~100 kg.  🡪 Risk of falling objects, pinching, crushing | Trained operator will use the crane.  Use mandatory PPE. | 1 day  2017-11-09 |
| Align pumping box | - |  |
| Mount the extraction column with the isolation part | Use of movable lifting device. Weight ~100 kg.  🡪 Risk of falling objects, pinching, crushing | Trained operator will use the crane.  Use mandatory PPE. |
| Attach the plasma chamber | - | Use mandatory PPE. |
| Check alignment of plasma chamber | - |  |
| Install the magnetic trap (3 coils around the plasma chamber) | Use of movable lifting device. Weight ~150 kg.  🡪 Risk of falling objects, pinching, crushing | Trained operator will use the crane.  Use mandatory PPE. | 1 day  2017-11-10 |
| Install the matching transformer and the wave guide | - |  |
| Install commissioning tank support | Use of movable lifting device. Weight ~200 kg.  🡪 Risk of falling objects, pinching, crushing | Trained operator will use the crane.  Use mandatory PPE. |
| Install commissioning tank | Use of movable lifting device. Weight ~400 kg.  🡪 Risk of falling objects, pinching, crushing | Trained operator will use the crane.  Use mandatory PPE. |
| Align the commissioning tank | - |  |
| Install permanent tank | Use of movable lifting device | Trained operator will use the crane.  Use mandatory PPE. | 1 day  2017-11-13 |
| Align permanent tank | - |  |
| Install solenoids | Use of movable lifting device. Weight ~300 kg each.  🡪 Risk of falling objects, pinching, crushing | Trained operator will use the crane.  Use mandatory PPE. |
| Align solenoids | - |  |
| Connect beam pipe of solenoid 1 to pumping box | - | Use mandatory PPE. | 1 day  2017-11-14 |
| Install the iris with gate valve | Use of movable lifting device. Weight ~400 kg.  🡪 Risk of falling objects, pinching, crushing | Trained operator will use the crane.  Use mandatory PPE. |
| Align the iris and connect flanges | - |  |
| Install beam pipe of solenoid 2 | - | Use mandatory PPE. | 1 day  2017-11-15 |
| Install collimator between the commissioning tank and beam pipe of solenoid 2 | Use of movable lifting device. Weight ~100 kg.  🡪 Risk of falling objects, pinching, crushing | Trained operator will use the crane.  Use mandatory PPE. |
| Install the ground shielding plate | Use of movable lifting device. Weight ~150 kg.  🡪 Risk of falling objects, pinching, crushing | Trained operator will use the crane.  Use mandatory PPE. |
| Install water cooling pipe for HV platform with the support | Use of movable lifting device. Weight ~100 kg.  🡪 Risk of falling objects, pinching, crushing | Trained operator will use the crane.  Use mandatory PPE. | 1 day  2017-11-16 |
| Install ion source gas injection system (H2) | Installation of 1 hydrogen gas bottle (5 l, 200 bar).  🡪 Risks associated with pressurized and explosive gases | Follow installation procedure.  Barrier off area.  Use mandatory PPE. |
| Install LEBT gas injection system (N2, H2) | Installation of gas bottles:   * 1 hydrogen bottle (5 l, 200 bar). * 1 nitrogen bottle (50 l, 200 bar)   🡪 Risks associated with pressurized and explosive gases | Follow installation procedure.  Barrier off area.  Use mandatory PPE. |
| Install vacuum components | Use of movable lifting device. | Trained operator will use the crane.  Use mandatory PPE. |
| Grounding connections | Electric shock. | Lock out electricity. | 1 day  2017-11-17 |
| Connect cables | Electric shock. | Lock out electricity. |
| Connect compressed air | - | Lock out compressed air pipe. |
| Connect cooling water | Water leak.  🡪 slippery floor | Lock out water. |
| Install high voltage protection cage | Installation of lead shielding walls of ~100 kg each. Use of movable lifting device.  🡪 Risk of falling objects, pinching, crushing | Trained operator will use the crane.  Use mandatory PPE. | 2 days  2017-11-20 –  2017-11-21 |

# Annex 4 – Complementary information

**Contractor**: INFN-LNS

**Provisions for the information and training of personnel**

* **Radio Protection**

Exposed or unexposed INFN-LNS personnel performing on-site or off-site activities with ionizing radiation risk have adequate training in relation to their role and work type.

**Personnel list of the contractor**

|  |  |  |  |
| --- | --- | --- | --- |
| First/Last Name | Role1 | Certification/ Authorization | First aider  YES/NO2 |
| Calabrese Giuseppe | Mechanical Technician |  | YES |
| Castro Giuseppe | Tecnologo INFN |  | NO |
| Celona Luigi | WU Leader |  | YES |
| Chines Francesco | HV Technician |  | YES |
| Gammino Santo | WP3 Leader |  | NO |
| Leonardi Ornella | BrightnESS IK FC Deputy |  | YES |
| Manno Giovanni | Mechanical Technician | C.N.C. milling  Vacuum basic | YES |
| Miraglia Andrea | BrightnESS IK FC Deputy |  | YES |
| Neri Lorenzo | WU Technical Coordinator  WU Deputy Leader |  | YES |
| Pastore Giuseppe | Vacuum Technician | Vacuum Basic  Orbital welding | NO |
| Vinciguerra Salvatore | Vacuum Technician | Vacuum advanced  Sealing and Leak Test  Orbital welding | YES |
| 1: It is requested by ESS that the minimum number of English speakers corresponds to one per working team.  2: It is requested by ESS that the minimum number of first-aiders at the worksite corresponds to one per working team.  CR: Contractor Representative | | | |

# Annex 5 – System Deliverables (e.g. DTL, RFQ, RF distribution system, etc.)

| **Item name** | **Description** | **Quantity** |
| --- | --- | --- |
| Ion source high voltage platform | High voltage platform containing: plasma chamber, 3 solenoids, magnetron, waveguide, H2 gas bottle, cooling water manifold, and controls rack. | 1 |
| High voltage power supply | Placed in the rack area. | 1 |
| Isolation transformer | Placed in the rack area. | 1 |
| Low energy beam transport | Consists of: pumping box, 2 solenoids, iris, 2 gate valves, diagnostics box, and collimator. | 1 |
| Support | Consists of: one common frame for ion source and LEBT, and a LEBT support. | 1 |
| Racks | Two racks for instrument controls, and power supplies. Placed in the rack area.  One rack for the EMU controls. | 3 |
| Vacuum equipment | Covered by WP 12. Consists of 6 turbo molecular pumps, 2 primary pumps, 1 manifold, 6 pressure gauges, 2 mass flow controllers, 1 leak detector, 1 helium bottle (10 l, 200 bar), and 1 nitrogen bottle (10 l, 200 bar). | 1 |
| Instruments | Covered by WP7. Consists of: Faraday cup, Doppler shift monitor (with spectrometer), emittance measurement unit, 2 pairs of non-invasive profile monitors, AC current transformer. | 1 |
| Cables | Cables between racks will be delivered together with the racks. Other cables are covered by WP15. | - |
| SL: ESS System Leader  CR: Contractor Representative | | |

# Annex 6 – Equipment List (e.g. lifting equipment, analyzation equipment, etc.)

| **Item name** | **Description** | **Quantity** | **Unit cost** |
| --- | --- | --- | --- |
| Ref: ESS-0056725 | Lists the installation requirements | - | - |
| SL: ESS System Leader  CR: Contractor Representative | | | |

# Annex 7 – Installation Processes

| **Installation process** | **Description** | **Start date** | **End date** |
| --- | --- | --- | --- |
| Unpacking and transportation within the installation area | Lowering all boxes into G01 with the HLB crane. Ion source will be lowered onto the support frame with the HLB crane. | 2017/11/01 | 2017/11/03 |
| Installation, mounting and fixing | Installation of the ion source and LEBT using a movable crane. | 2017/11/06 | 2017/11/24 |
| Connection to services | Connection of cables, compressed air, water, and gas injection systems. | 2017/11/16 | 2017/11/17 |
| Testing | Hardware testing. |  |  |
| Removal of material and equipment from the installation area | Waste should be removed continuously during the installation. Installation equipment such as tools and movable crane should remain in G01/FEB in case there is a need to do small repairs after the installation. | 2017/11/01 | 2017/12/08 |
| SL: ESS System Leader  CR: Contractor Representative | | | |

| **Document required for installation and service/maintenance** | **Yes** | **No** |
| --- | --- | --- |
| to be filled-in by the SL and CR |  |  |
| to be filled-in by the SL and CR |  |  |
| to be filled-in by the SL and CR |  |  |
| to be filled-in by the SL and CR |  |  |
| SL: ESS System Leader  CR: Contractor Representative | | |

# Annex 8 – Minutes of the pre-work visit

| **Activity:** indicate main activity of the contract | **Date:** yyyy/mm/dd |
| --- | --- |
| **Participants**:  ESS System Leader: First/Last Name  Contractor Representative: First/Last Name  Area Supervisor: First/Last Name  Safety representative(s): First/Last Name, First/Last Name, First/Last Name | |
| **Main findings:**  provide description of main findings | |
| **Mitigation actions:**  provide description of mitigation actions to be taken | |

# Annex 9 – Instructions in case of a serious accident/injury

**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:
   1. Nature of the accident/injury
   2. Location of the accident/injury
   3. Number and state of the injured people
   4. 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** (Dennis de Wit, +46 72 207 36 83).
5. REPORT IMMEDIATELY TO THE **ESS SYSTEM LEADER** (Øystein Midttun, +46 72 179 22 99).
6. REPORT IMMEDIATELY TO THE **CONTRACTOR REPRESENTATIVE** (Lorenzo Neri, +39 095 542 581).

ADDRESS TO BE COMMUNICATED TO THE RESCUE TEAM:

**ODARSLÖVSVÄGEN 113, 22592 LUND**

# Annex 10 – Accident/incident reporting form

| ACCIDENT/INCIDENT 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 (IK-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 additiona 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  Divisional Safety Representative: Duy Phan – [duy.phan@esss.se](mailto:duy.phan@esss.se)  ESS Safety Representative: Bertil Wíner – [bertil.winer@esss.se](mailto:bertil.winer@esss.se)  Other: First/Last Name – Email address | | | | | | | | |

# References

|  |  |
| --- | --- |
| [1] | «Health and Safety Plan,» ESS-0020522. |
| [2] | «Guidelines for ESS Stakeholder Access,» ESS-0062090. |
| [3] | «General conduct and safety rules - ESS Conventional Facilities Worksite,» ESS-0063375. |
| [4] | «ESS Rules for Electrical Safety,» ESS-0012721. |
| [5] | «Procedure for authorizing work in ESS workspaces,» ESS-0064035. |
| [6] | «General information for contractors coming on the ESS site,» ESS-0093892. |
| [7] | «Installation responsbility matrix,» ESS-0093460. |
| [8] | «ESS accident/incident reporting form,» ESS-0095940. |
| [9] | «ESS rule for lock-out/tag-out (LOTO),» ESS-0059903. |
| [10] | «ESS construction site layout,» ESS-0093979. |
| [11] | «ESS Guideline for Oxygen Deficiency Hazard (ODH),» ESS-0038692. |
| [12] | «ESS Procedure for Laser Safety,» ESS-0044704. |
| [13] | «ESS Guideline for countering stress,» ESS-0048472. |

# Document Revision history

| Revision | Reason for and description of change | Authors | Date |
| --- | --- | --- | --- |
| 1 | First issue | First/Last Name | yyyy/mm/dd |
|  |  |  |  |
|  |  |  |  |

1. ESS Document Management System (<https://chess.esss.lu.se/>). [↑](#footnote-ref-1)