

# The Tollgate 4 in the instrument construction project

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NSS Project Division

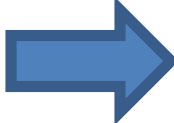
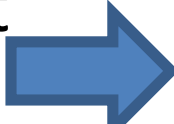
[www.europeanspallationsource.se](http://www.europeanspallationsource.se)

12<sup>th</sup> September 2018

# Tollgate 4 – main reference documents (1/2)



- **Technical Annex;**
- **ESS-0051706** - Process for Neutron Instrument Design and Construction;
- **ESS-0194761** - NSS Guideline for Instrument Construction Projects - Tollgate 4 Review and Decision;
- **ESS-0099061** - Neutron Instrument Design and Construction - Phase 4 Technical Data Package Specification

- **ESS 0115727** - Information requirements on instrument projects for integration and verification activities.  *Install. Readiness Review, Binders, Installation Packages*
- **ESS-0115143** - NSS Instrument Project Schedule Guideline  *Installation Plan*

*Documents already mentioned in the TG3 preparation, to provide an outlook about the installation process*

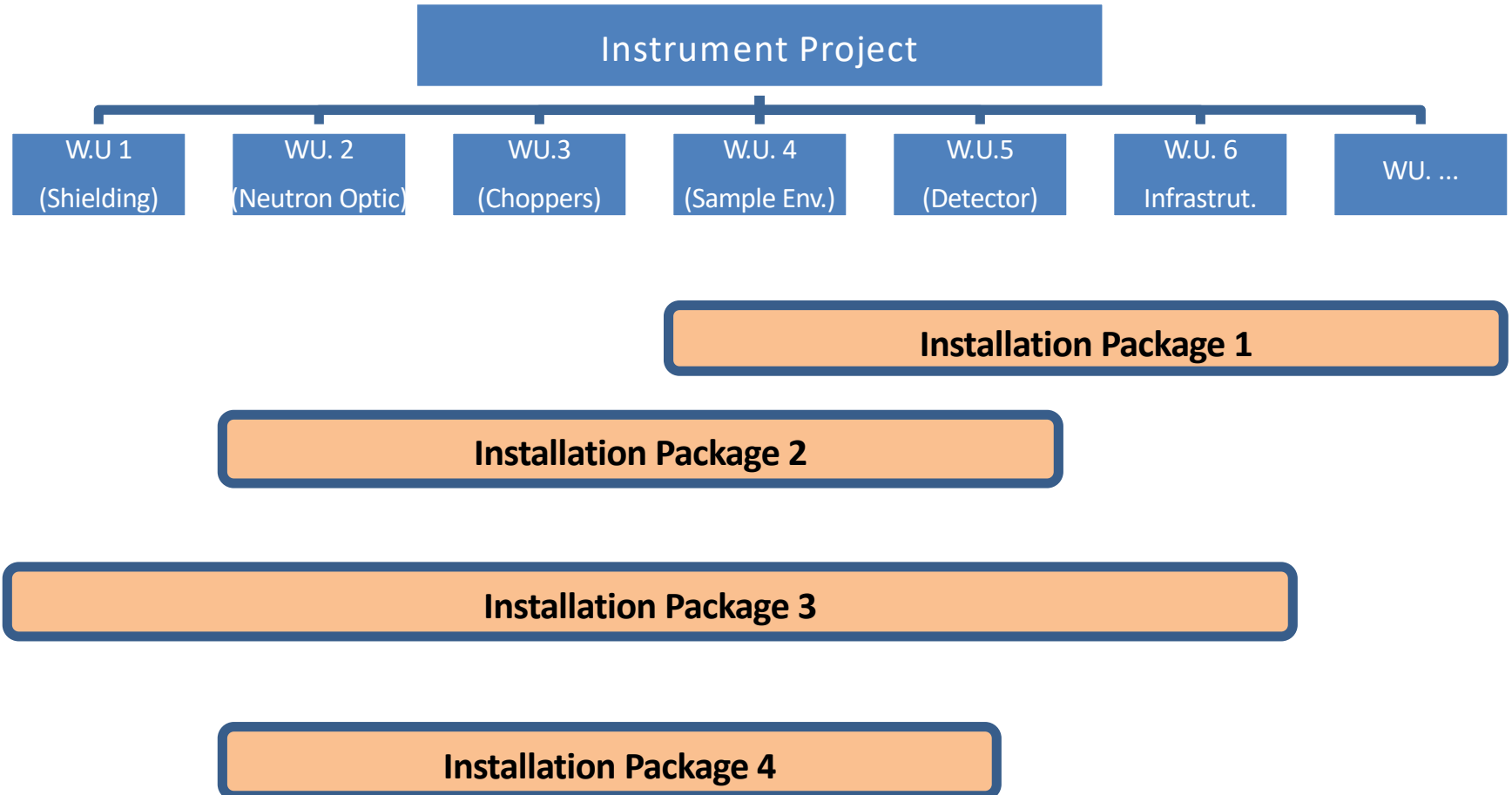
The purpose with **Installation Readiness Review** is to make necessary preparations have been performed and the supporting documentation are in place for the upcoming installation package.

An **Installation Package** is manageable discreet piece of the complete installation (size of package depending on many factors).

Each installation package shall require NSS approval before the installation can take place.



# Work Units vs. Installation Packages (I.P.)

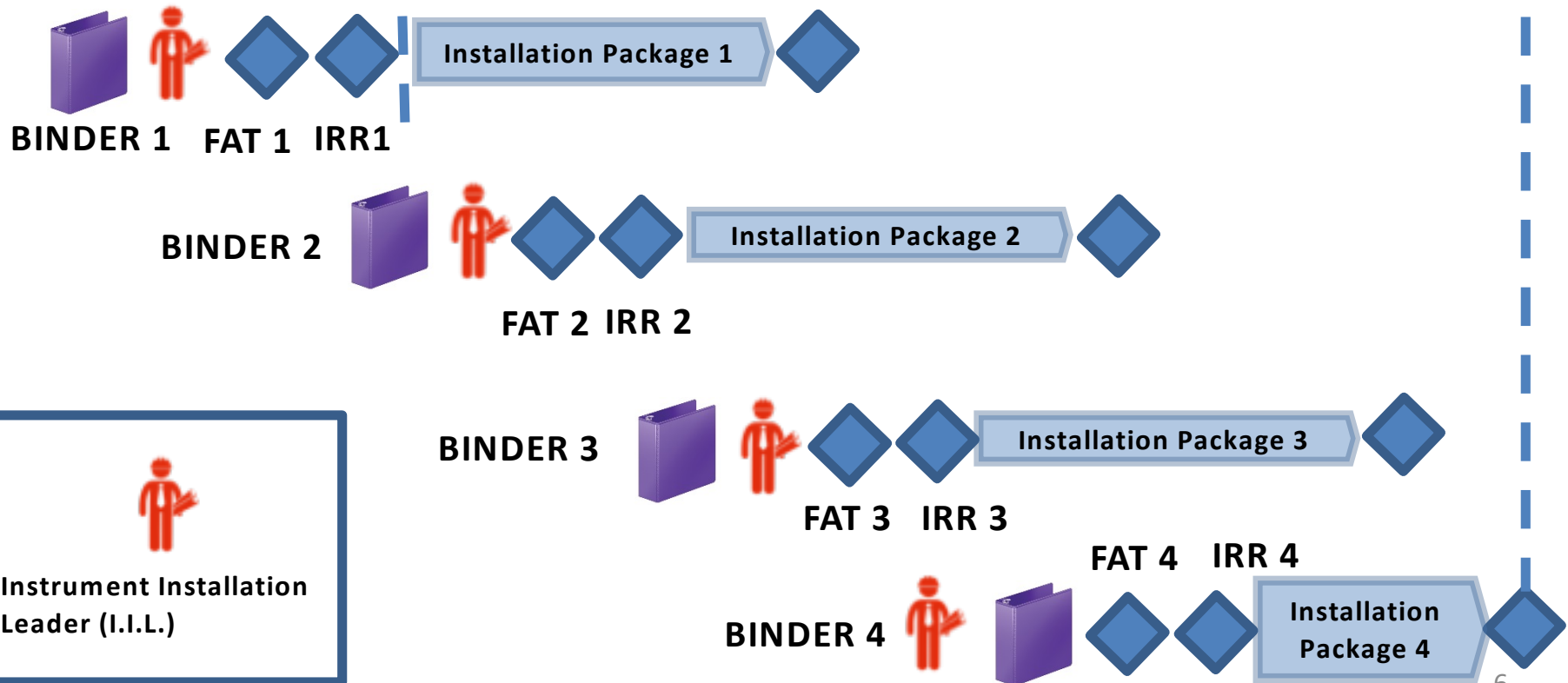


# Process: Binders and Installation Packages

NSS Installation Coordinator



## Phase 4 – Instrument Installation and cold commissioning



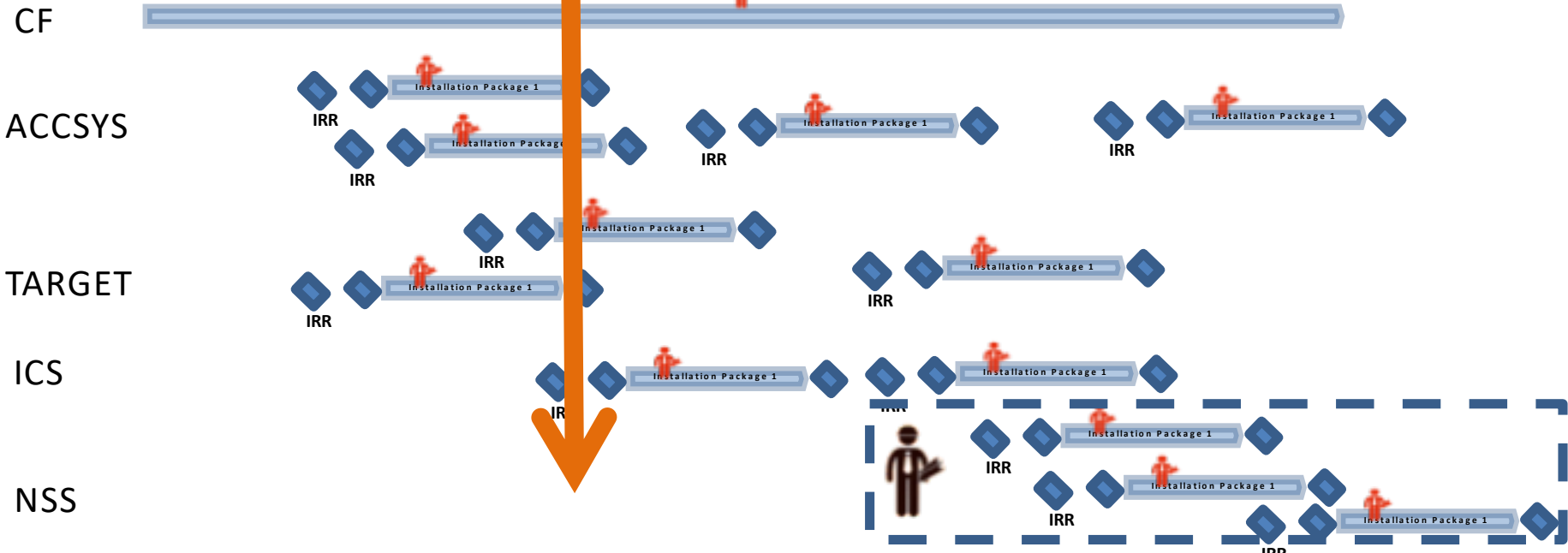
# Process – ESS Installation Manager

## ESS Installation Manager



### *Responsible for:*

- Coordinating installation between projects, incl resolving conflicts and make prioritizations
- Coordinate support needs
- Help drive development of installation process



# Roles and Responsibilities (1/2)

## **ESS Installation Manager**

- Overall Site Coordinator

## **NSS Installation Coordinator**

- Coordinates NSS installation works

## **Instrument Installation Leader (Lead Engineer/Lead Scientist)**

- This person is appointed by the Instrument Team to lead/manage the on-site instrument installation works
- Responsible/owner of Installation binder.

## **In-Kind / Contractor**

- Responsible for the installation work.
- Responsible for the contents of the installation preparation documents to include into the installation binder.





## NSS Installation Coordinator

### *Responsible for*

- An IRR is conducted and passed before installation starts for a package;
- Schedule and coordinate Installation packages within project;
- Installation Packages follow rules and regulations, including health and safety regulations
- Coordinate support needs for installation packages;
- Resolve conflicts, including prioritize, between different installation packages within project
- Make sure there's a sign-off for the installation package (before it's regarded complete).



## Instrument Installation Leader

### *Responsible for*

- The installation binder is ready for IRR
- The actual installation on site for that package
- The installation follow rules and regulations
- Safety and Health during installation

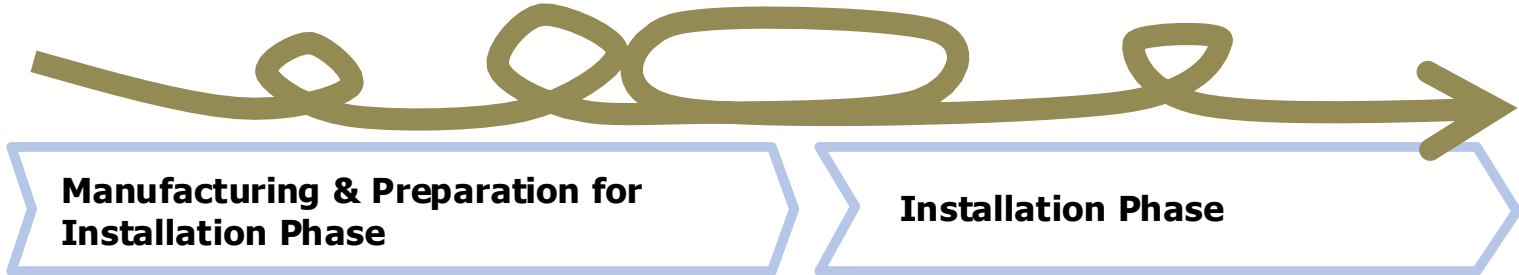
# Installation Binder

**Purpose : Control of installation Documentation.**

**Each binder refers to a specific I.P.**



- 00 List of Documents
- 01 Scope of work
- 02 Organisation
- 03 Time Schedule
- 04 Work Instructions & Job Hazard Analysis
- 05 Temporary services
- 06 Drawings
- 07 Installation Procedures
- 08 Work Permits
- 09 Daily Diary
- 10 NCR Non Conformity Report
- 11 QC - Installation & Test Documentation
- 12 List of Components & Material
- 13 Reference Documents
- 14 Commissioning plans



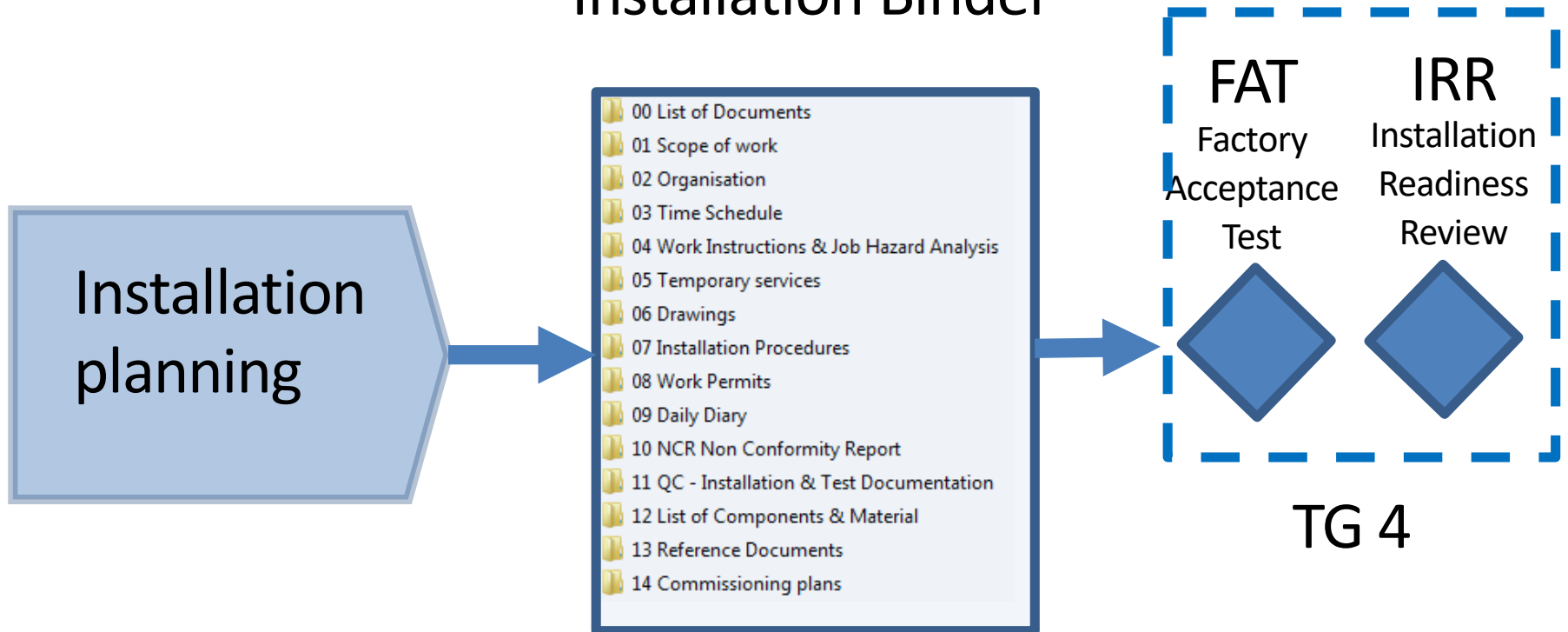
CDR

IRR

TRR

# Installation Readiness Review & Installation Binder

## Installation Binder



- Necessary Documentation before installation starts
- Collected in one place and maintained during the installation

# Installation Binder

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- 14 TRR Test Readiness Review

## 00. List of Documents

- Issuer: Installation Lead Engineer/Scientist
- Reviewer: TG 4 Committee
- Release: TG 4 Committee
- Table of content including document revision

Installation Reference Documents			
ESS-0085649	2	✓	Work and Safety Coordination Plan (WSCP)
ESS-0147100	1	✓	Safety Training Matrix for Installation Activities on Site
ESS-0147094	1	✓	Responsibility of Electrical Safety - Permanent ESS Electrical System
ESS-0150853	1	✓	Nödanslag
ESS-0147103	2	✓	General Information
ESS-0147093	1	✓	Fire Safety Plan
ESS-0147101	1	✓	ESS Site Logistics
ESS-0012721	1	✓	ESS Rules for Electrical Safety
ESS-0147089	1	✓	ESS Guidelines for Accessing and Performing Work on Site
ESS-0147099	2	✓	Emergency Notice
ESS-0150450	1	✓	Emergency Contingency Plan
ESS-0147096	1	✓	Electrical Safety Plan - Temporary Electrical Installations
ESS-0129610	1	✓	BE01BS-CSHSPDA—General conduct and safety rules-2.pdf
ESS-0020522	3	✓	BE01AA-CSHSPDA—Health and safety plan.pdf
ESS-0020522	2	✓	BE01AA-CSHSPDA—15 GP01 Health and safety plan.docx

ESS 0115727 – paragraph 6 (Information requirements on instrument projects for integration and verification activities)

# Installation Binder

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## **01. Scope of work**

Description of work.

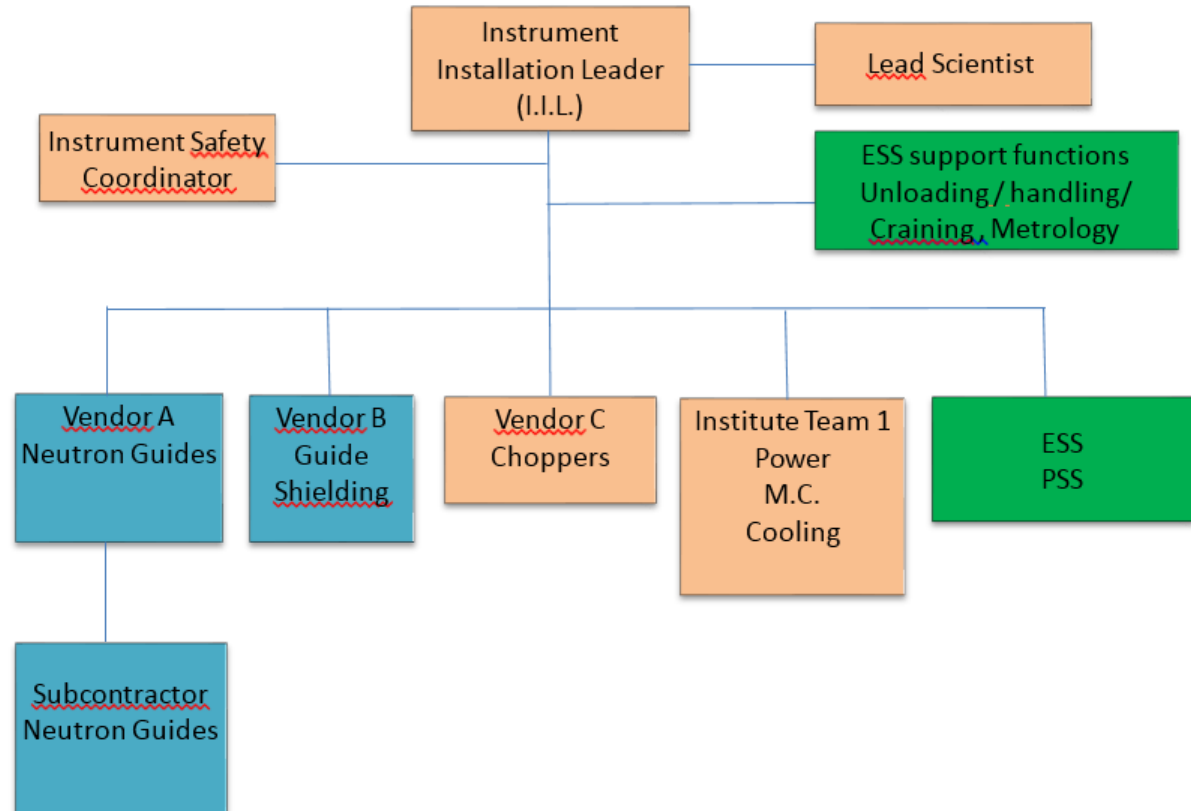
Interfaces.

Boundaries (baseplates, light shutter installed, instrument power available.....)

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## 02. Organisation / List of Contact

In-kind/Contractor Site Organisation  
Telephone / mail list to all site

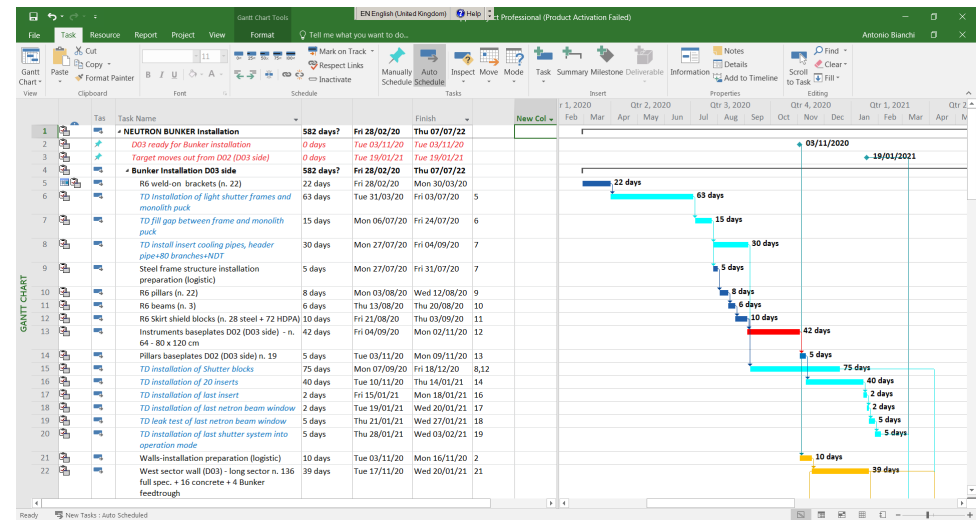


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## 03. Time Schedule (Instrument Installation plan)

Installation plan will be specifically updated with reference to the specific Installation Package



ESS-0115143 - NSS Instrument Project  
Schedule Guideline

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## 04. Risk Assessment and Method Statement (**RAMS**)

- Installation sequence
- Transportation route interference check
- Job Hazard Analysis
- Equipment & resources
- Etc.

**Template available (more details in the specific session)**



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## 05. Temporary Services

- Scaffolding;
- Laydown Areas (Storage)
- Site logistics;
- Lifting;
- Temporary Power and fluids;
- ESS workshop support;



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## 06. Drawings

### Only installation drawings!

- Cave drawings;
- Neutron guides and shielding;
- Choppers;
- Detector;
- Cable layout;
- P&ID
- Etc.

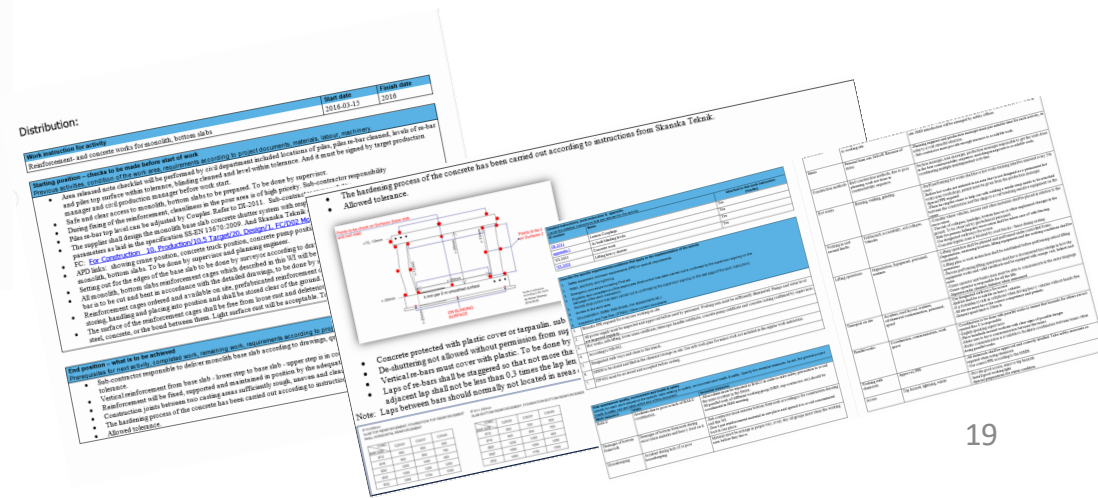
– **They will be linked to CHES !**

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## 07. Installation Procedures

- Welding Procedure Specifications;
- Electrical procedures;
- Anchor bolt installation procedures;
- Etc.



**Distribution:**

Start date	Finish date
2016.03.12	2016

**Work instruction for rebar**  
Reinforcement and concrete works for month, bottom slab

**Rebar installation - check to be made before start of work**  

- Areas where noise checks will be performed by end of day and at night.
- Rebar and steel reinforcement must be checked before work starts.
- Rebar and steel reinforcement must be checked before work starts.
- Rebar and steel reinforcement must be checked before work starts.

**Rebar layout diagram**  

- Rebar layout diagram showing the arrangement of rebar in the slab.
- Rebar layout diagram showing the arrangement of rebar in the slab.

**Concrete hardening process**  

- The hardening process of the concrete has been carried out according to instructions from Skanska Teknik.
- Allowed tolerance.

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## 08. Work Permits

- Certificates
  - Hot work
  - Fork lift
  - Electrical
  - Etc.
- Permits
  - Hot work
  - Electrical work
  - Ladder
  - Etc.

Safety Training Matrix

Training Purpose	Training provided by ESS Mandate on site											
	HS site induction	Site orientation training at gate	Safe lifting (slings/ RIGGING)	Hot work training	Fall protection and rescue training (swish harness)	Electrical safety instructions (EIA, I&L, etc. site ID certificate)	Electrical safety training (EIA, I&L, etc. site ID certificate)	MWP (Swedish, British, Roman site)	First Aid course including Electrical injuries	Forklift training	Crane operation training for specific crane	Training and medical examination
Estimated cost (SEK/person)	-	-	2000	5200	2200	6000	-	2500	2000/yr.	3000	5200	4000
Access to site	x								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									
Work on site (accessing energized areas, performing electrical work)	x								x			
Accessing energized areas, performing electrical work	x					x	x		x			
Working on MWP	x					x		x				
Operating forklift	x									x		
Operating cranes	x			x							x	
Working with explosives or other allergenic chemical												x
VALIDITY of courses (duration)	-	-	Swedish certificate	3 years (Swedish certificate)	3 years (Swedish certificate)	3 years	3 years	3 years (ISO 28424 certificate)	3 years	Swedish EFA or TFA evaluation	Swedish EFA or TFA evaluation	Swedish certificate 3 years

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## 09. Daily diary

**When the installation is on-going.....**

Daily diary will track the on-going work from the kick-off meeting up to the end of the I.P.

This section will become relevant when the installation takes place.

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## 10. NCR Non Conformity Report

- Non conformity reports;
- Follow up list;

*When the installation is on-going.....*

The section will store the non-conformities. NSS Technology Groups and ESS Quality Division will be involved in this section. During the planning phase the section is not relevant.

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## 11. QC - Installation & Test documentation

- **Factory Acceptance Test and CE declaration of conformities** for the applicable components/systems will be collected into this section.
- The section will include further relevant documentations about all the planned test/quality control to be execute in the I.P. from the instrument team.
  - Inspection plans
    - Mechanical installations
    - Electrical installations
    - Pressure Test Programs
  - Protocols
    - Welding protocol
    - X-ray Protocol
    - Pressure test report
    - Anchor installation protocol
    - Visual inspection protocol
    - Marking Identification
  - FAT and CE

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## 12. List of components & material

- List of Materials;
- Valve list;
- Cable list;
- Etc.



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## 13. Reference Documents

- Sketches;
- Manuals;
- Data sheets;

Supporting/reference documents,  
needed during installation

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## 14. Cold Commissioning Plans

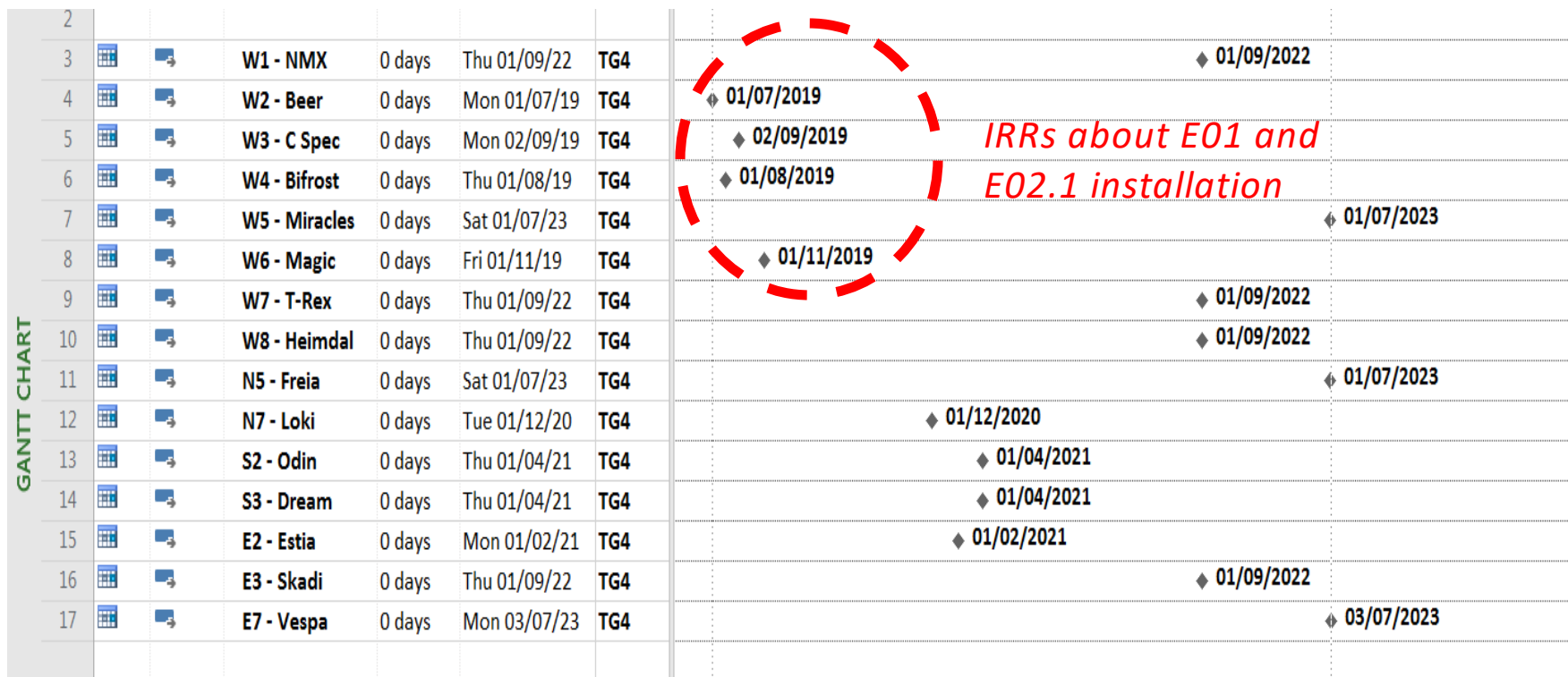
This section is relevant to describe the planned cold commissioning plans able to demonstrate the components/systems will be able to transit in the Phase 5 (hot commissioning).

- Functional tests;
- System tests;
- Integrated system tests;

# IRR Timing

Typically **about 2 months** before the installation starts

- Too early, preparations and documentation not in place
- Too late, potential issues can not be addressed in time



# Who participates at an IRR?

Typical **candidates** to participate:

- Installation Coordinator;
- Instrument Installation Leader (Lead Engineer);
- Instrument Lead Scientist;
- Instruments Commercial Partners/Suppliers;
- Technology groups representatives;
- ESS Metrology group;
- ICS/DMCS representatives;
- ES&H representative;

## **Mandatory members:**

- NSS Project Leader;
- NSS Installation Coordinator and NSS Management team (including NSS safety);
- NSS technology groups (NOSG, Chopper group, Motion Control, Detectors), according to the specific components to install;
- DMSC Division Responsible/Representative;
- ICS/PSS Division Responsible/Representative;

## **Optional members according to the specific I.P. might be also:**

- ESS Installation Manager;
- EH&S Division Responsible/Representative;
- ESS Quality Division Representative;
- ESS metrology group;

# Outcomes of an IRR

Examples of outcomes:

1. **Good shape** – Proceed
2. **Minor things** to fix before start – Keep start date
3. **Only part of the Package is approved**– Split package
4. **IRR** has to be rescheduled,

The IRR outcome will be documented with a checklist with comments saved (linked/attached to IRR web page)

# Upcoming IRRs

- Upcoming IRRs (coming 3 months) visible
  - Web page where upcoming IRRs are visible
  - Link to reference documentation (ie to the Installation binder)

ACCSYS Technical Reviews

**SPACE SHORTCUTS**

- Meeting notes
- ACCSYS Technical Reviews Home
  - CDRfor "open issues"/ IRR G02/G04
  - Medium Beta Cavities
  - Meeting notes
  - Review of proposed ACCSYS Installation Costs
  - RF Gallery Water Cooling Systems
  - TRR1 for CDS-EL & CDS-LTS2
  - WP02. Beam Dynamics and Lattice Review
  - WP02. Beam Physics High Level Applications Review
  - WP03.CDR #2 for RFQ machining-manufacture
  - WP3.CDR for Buncher #1 & PDR for Quad # 1
  - WP03. CDR for Buncher #1 and Quad 1
  - WP03.CDR ISrc+LEBT
  - WP03.DTL ESS CDR Approval
  - WP03. MEBT CDR1
  - WP03.RFQ Review CDR
  - WP04/WP05.Cryomodule safety
  - WP05.CDR (goal: Launch of series High-Beta cavitil...
  - WP05.CDR (goal: Launch of series Medium-Beta c...
  - WP05.Medium Beta Cryomodules
  - WP5.PDR.Medium Beta Cavities
  - WP05.TRR for first High-Beta Cryomodule (Goal: qu...
  - WP06.CDR for beam delivery for starting procurement
  - WP06.CDR for starting the manufacturing
  - WP06.PDR Gamma Blockers
  - WP06.Prelim TRR review

Pages

## ACCSYS Technical Reviews Home

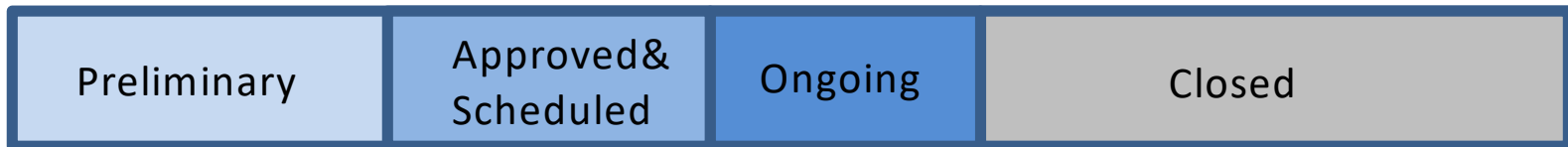
Created by Hinko Koccevar, last modified by Gunilla Jacobsson on Jun 08, 2018

mTable column legend:

- **Date**: review planned or actual date as found in Primavera plan. If blank, then **Date** has not been set.
- **Status**: review current status
  - *Empty*: review is planned to be held on **Date**
  - *Held*: review was held on the **Date** shown
  - *Missed*: review was not held on the planned date
- **Work Package**: work package to which review belongs to
- **Type**: review type
  - *PDR*: Preliminary Design Review
  - *CDR*: Critical Design Review
  - *TRR*: Test Readiness Review
  - *IRR*: Installation Readiness Review
- **Review Title**: review title as found in the Primavera plan, without leading 'LEVEL5.ACCSYS.' text

	Date	Status	Work Package	Type	Review Title	Location	Chair
1	2014-11-18	Held	03	CDR	WP03.RFQ Review CDR1		
2	2015-02-10	Held	03	CDR	WP03.CDR ISrc+LEBT	INFN - LNS, Catania, Italy	R. Ferdin
3	2015-02-25	Held	07	CDR	WP07.CDR EMU LEBT		
4	2015-05-20	Held	11	PDR	WP11.Cryogenic Distribution for Elliptical Linac - PDR	Lund	John Weiser
5	2015-06-01	Held	07	PDR	WP07.PDR for LEBT NPM		
6	2015-06-22	Held	03	CDR	WP03.DTL ESS CDR Approval	INFN - Legnaro	John Weiser

## Purpose with Work Orders : Operational control of work at site



### **Registering the work**

*Installation Coordinator + Others*



### **Starting the work**

*Installation Coordinator after coordinating with Area coordinator  
Based on coordination*



### **Approving the work**

*Installation Coordinator (ONLY)  
Based on coordination & maturity  
(documentation status, availability  
of material etc)*

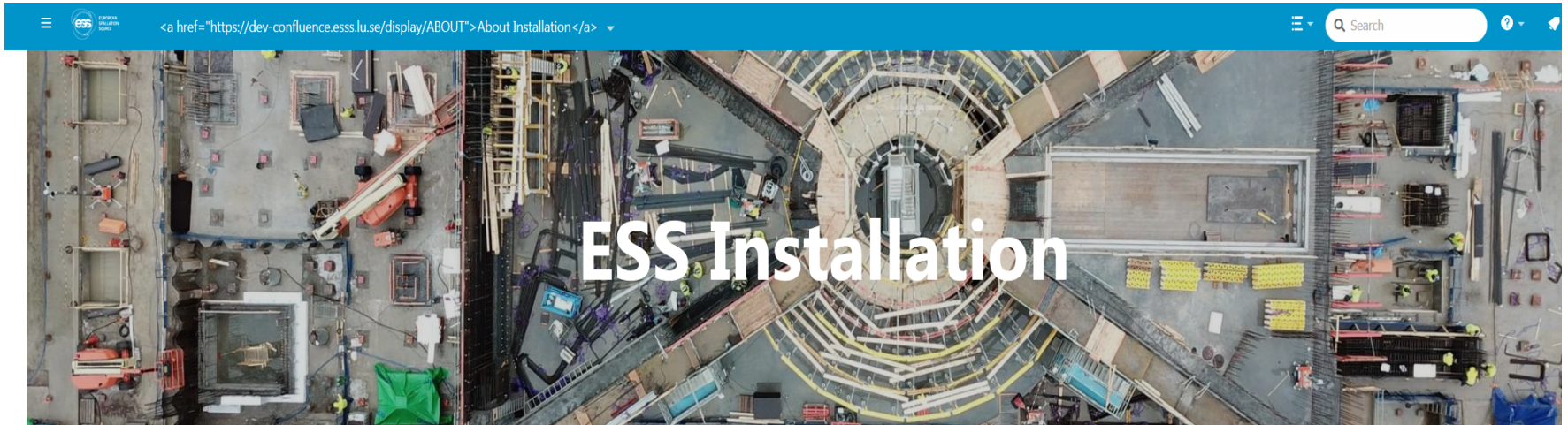


### **Closing the work**

*Installation Coordinator after  
coordinating with NSS Division*



# The Installation Guide



## About Installation

What we talk about when we talk about ESS Installation. And why it matters.

[Read more](#)



## How we work

For each step of the Installation workflow, we tell you everything you need to know and do to help us facilitate your work, in a safe and sustainable way.

[Find out more](#)



## ESS Services

Browse the portfolio to request engineering, logistics or other services that we have place to support your work.

[Browse](#)