

Introduction to the Tollgate 4 and installation organization

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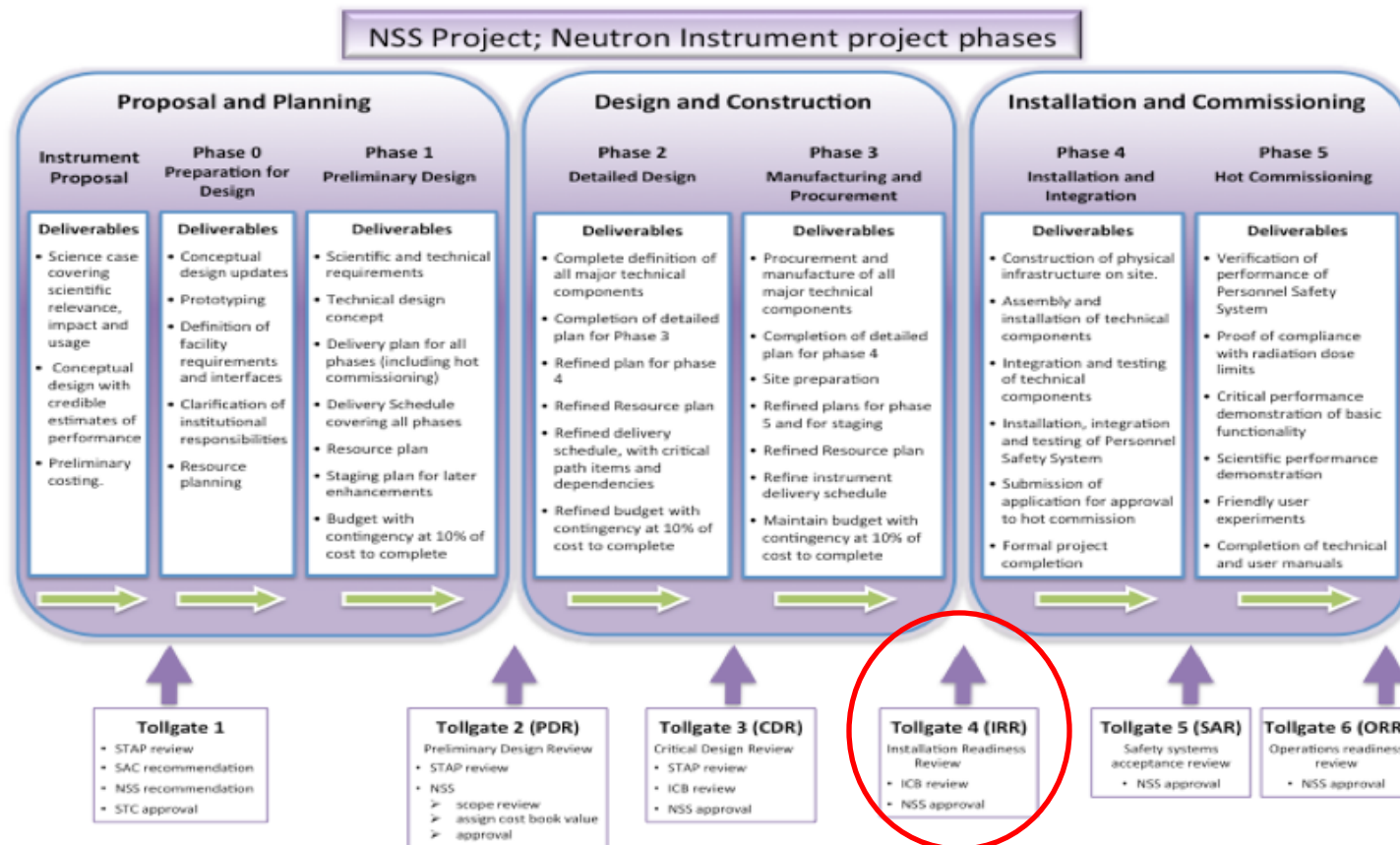
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Introduction

According to the *Process for Neutron Instrument Design and Construction (ESS-0051706)*, a review will be conducted by the NSS Project Management Team prior the commencement of instrument installation (**PHASE 4**).



Description of the Phase 4

The **Phase 4** refers mainly to the following activities:

- **On site construction**
- Here the individual components are installed and secured. Installation of the technical components into the physical infrastructure will be performed by the appropriate Partners, vendors, and technical groups associated with the Neutron Instrument.
- **System Integration**
- Connection and integration of the individual instrument components into a working system.
- Integration includes mechanical, electrical, vacuum and communications systems. Also the Instrument's Personnel Safety Systems (PSS) are Installed and integrated with the instrument and with the ESS central Instrument Control System (ICS).
- **Cold commissioning**
- Cold commissioning will test and validate Neutron Instrument components and systems without spallation neutrons.
- The focus is on ensuring that all components and systems work, fixing bugs, and prepare for "hot" commissioning. By the end of this phase, the Neutron Instrument should be able to run as if doing an experiment and all systems engineering verification and testing possible without neutrons should be complete.
- Results of cold commissioning tests are to be recorded and all systems documented in preparation for Tollgate 5 (the safety systems readiness review)

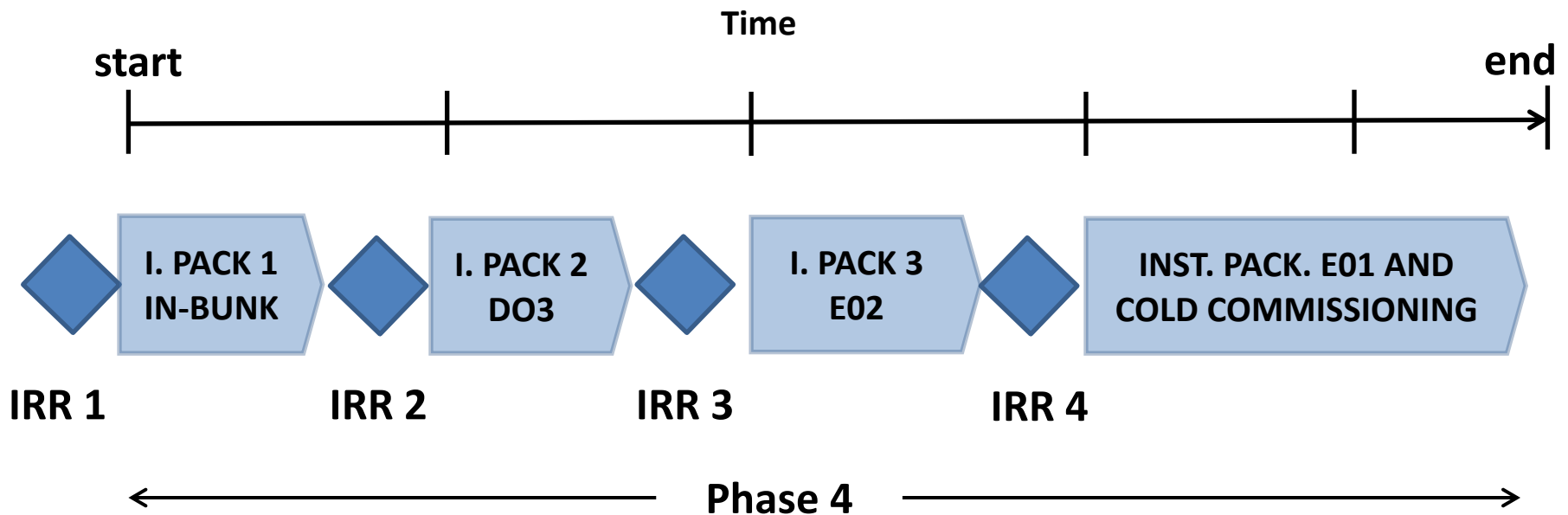
What above mentioned is described in the **"SYSTEM INTEGRATION AND VERIFICATION PLAN"** (already defined in the TG 3 – ESS 099059)

IRR Key tasks

- The instrument installation (**phase 4**) shall begin later on verification of a defined organization, with specific reference to :
- A well specified on **site delivery plan of material**;
- Site organization (**logistic plan**), able to guarantee a successful installation completion in term of time, quality;
- A detailed **installation plan**, able to identify the installation process and intermediate milestones to achieve, possible deviation from the final milestone in order to the implementation of corrective measure if necessary;
- All the available **resources** for any specific task, in terms of equipment and manpower;
- A definition of all the **exclusions** from the instrument scope of work (total or partial);
- The definition of the **predicted needs** in term of required support from ESS (labour/equipment), from the beginning of the installation up to the cold commissioning;
- A detailed installation **hazard analysis**, trough the identification of all the predicable risks and preventive and protective measures to avoid any injury in the installation.

TG 4 Reviews

Depending on the **Phase 4** duration, might be not easy to identify a clear view trough the whole installation. A solution, adopting the same principle of TG3, may consists defining more than one review, according to specific Installation Packages to install.



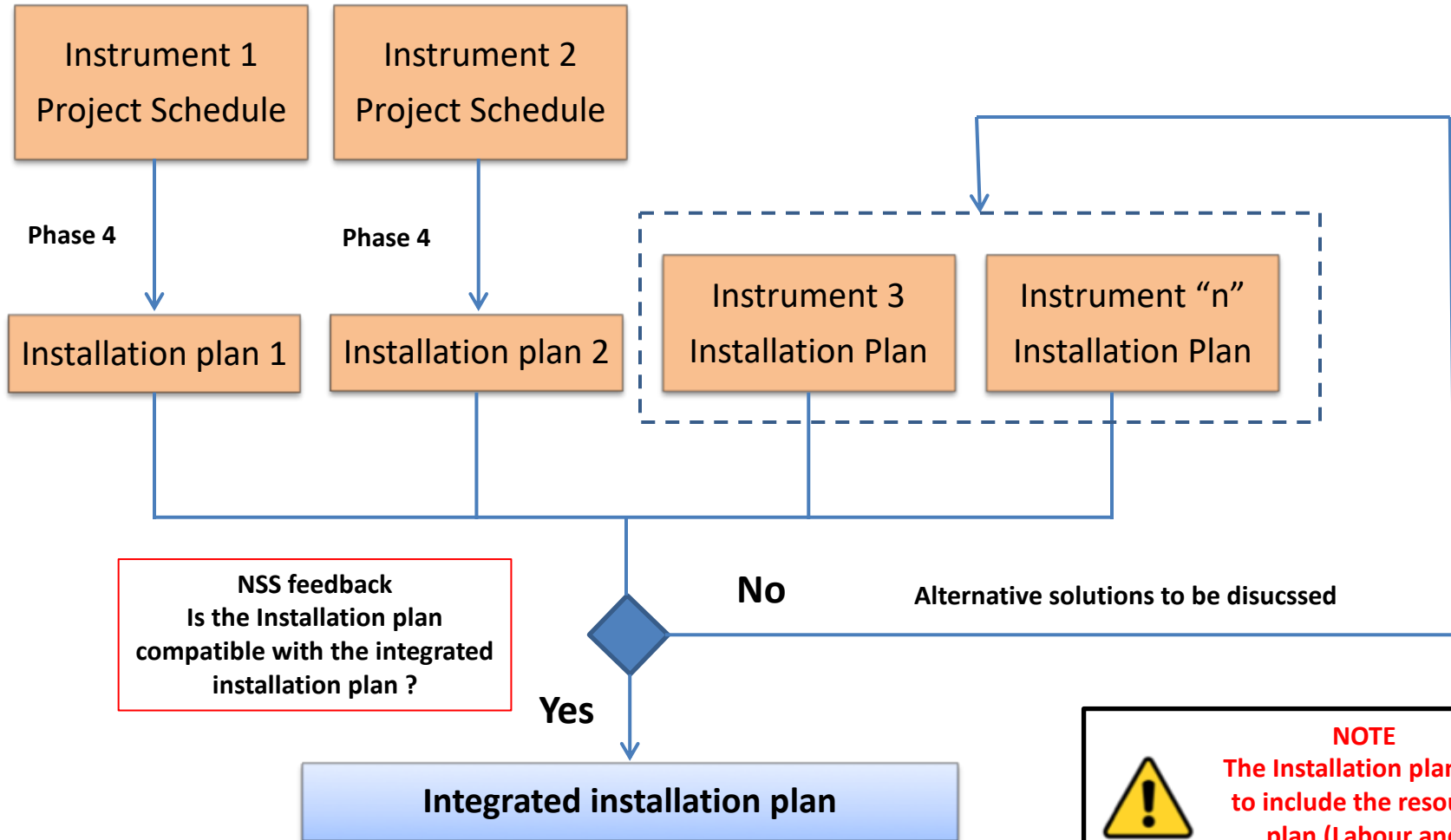
Generic west sector instrument

Detailed instrument installation plan

The instrument installation plan shall identify in detail the time schedule of any Installation Package. The installation plan will identify in detail all the installation packages and components to be installed. Tasks will provide information about:

- On-site storage area of material;
- Off-site storage area of material (others ESS structure “external” to the construction site);
- Pre-assembly on site working areas (where components are assembled outside their final destination, whenever necessary);
- Installation tasks for all the components, including their reference area;
- Resources (labor and equipment) for each installation task considered;

Integrated installation plan



NSS feedback
Is the Installation plan
compatible with the integrated
installation plan ?

No

Alternative solutions to be discussed

Yes

Integrated installation plan



NOTE
The Installation plan has
to include the resource
plan (Labour and
Equipment) for each task

Laydown and storage areas

In the TG 4 the instrument team shall provide information in term of temporary areas they need to carry out the installation phase. Each laydown/storage of material on site (both for storage purpose or for integration works) will be identified into the **installation plan** and trough specific **site layouts** as well.

Information shall point out with particular reference to:

- The required support for unloading/transport services (in terms of personnel and/or equipment)
- Rental of equipment forklifts, mobile cranes, etc. etc....;
- Labor support in terms of handling operators, cranes operators, riggers, others.....

Installation packages

In the **IRR** the instruments teams shall be required to provide a list of all the components that have to be delivered on site, according to their instruments work packages:

In Bunker components (Installation Package 1)

COMPONENT/SYSTEMS DESCRIPTION/	PBS/I.D.	DELIVERY DATE	DELIVERY LOCATION	REFERENCE DRAWING FOR INSTALLATION/OTHER RELEVANT DOCUMENTS	F.A.T./C.E.	NOTES
			RATS	XXXXXXXX		
			UTGARD	XXXXXXXX		
			SITE	XXXXXXXX		

Instrument constructability

The instrument team shall provide **practical information** about how they intend to carry out the installation:

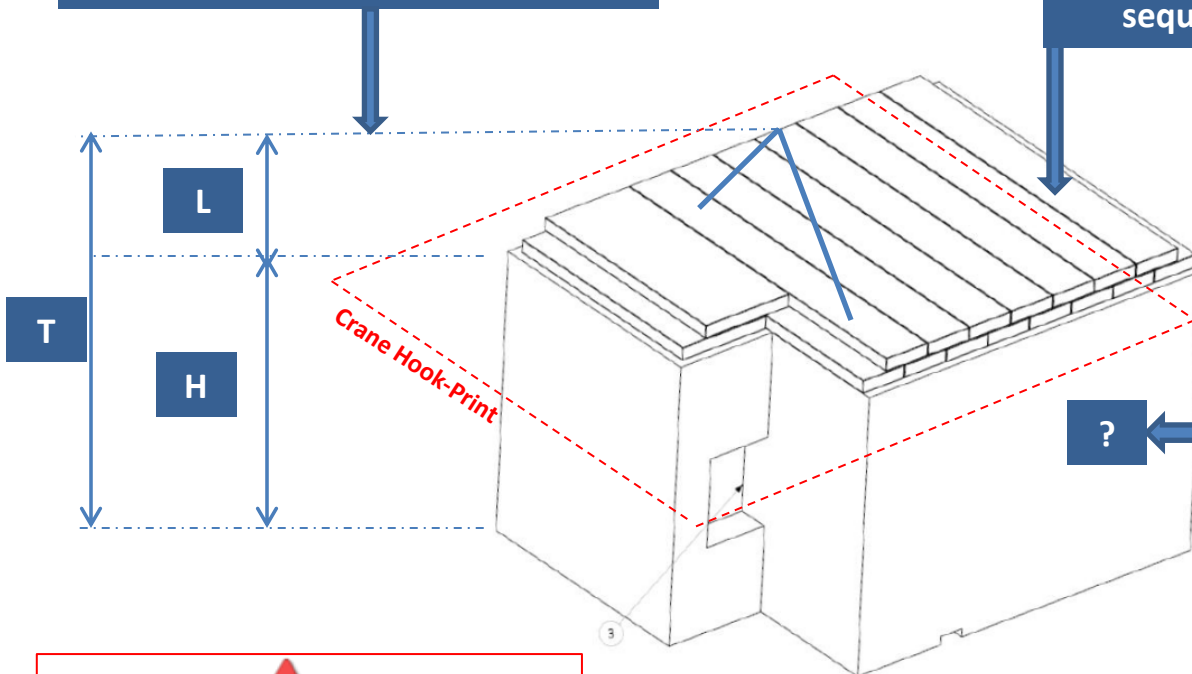
A successful key of this task shall include:

- The definition of a logic sequence of the installation works, able to minimize any chance to damage components, to guarantee the final defined instrument performance without loss of time;
- The knowledge of the existing constraints (building slab load capacities compared to the weight of the components, how they will be lifted, ease of transport, space available, compatibility between the building cranes hook height, interferences with cable-trays, other physical obstacles...). Even if some construction works will be delegated to ESS and/or other Contractors/Vendors, it has to be highlighted how the instruments can be installed.
- A realist estimation of the installation progress compared to the planned resources;
- The definition of the activities to be performed from ESS and a description of the required support.

Exp. Cave constructability (example)

Is the total high "T" (cave + lifting tools) compatible with the crane hook-high?

• Is the structure completely included in the crane hook-print? If no, how to progress? In which installation sequence?



- Pre-cast blocks? In alternative, will they be cast in place?
- Are the blocks weights compatible with the crane capacity?
- Is the stability of structure guaranteed in any phase of the construction, before to be completed ?
- Temporary supports have to be installed ?
- If yes, are they an obstacle to the logistic?

• Do the structure fulfil the slab capacity limits (ton/m²)?



The detailed design has to take into account the construction phase. The IRR will clarify definitely the whole construction sequences

Instrument-needs to be provided from NSS/ESS (1/2)



- **The Resources Plan** will identify in detail for each I.P. all the resources that will be involved during the installation, in term of labour and equipment. It is crucial in order to start the installation a proper definition of the support required from ESS. Below are represented the main subjects, to be integrated from the in Kind Partner

IN-BUNKER Installation Package			
Resources	Amount	Tasks	Comment
Technicians (mechanical)			Provide detailed information about ESS/NSS required support
Technicians (electrical)			Provide detailed information about ESS/NSS required support
Technicians (cooling)			Provide detailed information about ESS/NSS required support
Technicians (piping)			Provide detailed information about ESS/NSS required support
Workshop(s)			Provide detailed information about ESS/NSS required support
Materials shop(s)			Provide detailed information about ESS/NSS required support
Equipment shop(s)			Provide detailed information about ESS/NSS required support
Lifting machinery			Provide detailed information about ESS/NSS required support
Survey & alignment support			Provide detailed information about ESS/NSS required support

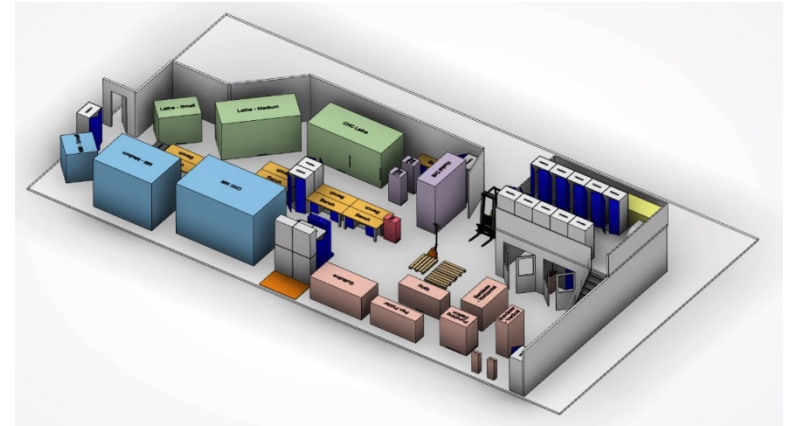
Instrument-needs to be provide from NSS/ESS (2/2)



Installation Package			
Resources	Amount	Time Frame	Description
Office space			Provide detailed information about instrument team organization and ESS/NSS required support
Changing rooms			Provide detailed information about instrument team organization and ESS/NSS required support
Sanitary			Provide detailed information about instrument team organization and ESS/NSS required support
Canteen			Provide detailed information about instrument team organization and ESS/NSS required support
Transport & handling			Provide detailed information about instrument team organization and ESS/NSS required support
Laydown areas			Provide detailed information about instrument team organization and ESS/NSS required support
Accommodation			Provide detailed information about instrument team organization and ESS/NSS required support
Cars			Provide detailed information about instrument team organization and ESS/NSS required support
Others			Provide detailed information about instrument team organization and ESS/NSS required support

Workshop services

The TG4 documentation will include the final needs in terms of workshop support. This information are provided in order coordinate the In Kind needs with those of the others Stakeholders (Accelerator, Target Division...), since an ESS Central Workshop will be implemented on site.



Machines	Description of anticipated operations, i.e. what is being manufactured/modified	Materials	Frequency, e.g. 1d/month	Portability required Y/N
Cutting				
Sheet Metal				
Welding				
Machining				
Other, please describe				

Roles and responsibilities

This section includes specification about the staff involved in the installation, in order to clearly identify roles and responsibilities of each one. A site chart organization shall be included to clarify the instrument personnel organization.

The installation personnel shall be trained according to the Swedish/EU law and regulation, with particular reference to these specific subjects:

- Forklifts/lifting equipment operators;
- Heavy lifting;
- Installation of scaffoldings;
- Work at height position;
- Electrical works;
- Hot works:

A proper numbers of workers will possess appropriate training in order to guarantee:

- Emergency management;
- Fire fighting;
- First aid;

In Kind installation personnel

All the personnel involved in the installation will be summarised as below indicated. Information refers to the Employer name, a description of responsibility from installation and safety point of view, the safety certificates. In case of sub contractors the same information has to be provided.

Name	Employer	Role name	Description of Role/Responsibility	Description of Role/Responsibility Safety	Safety Training/Certificates
	Institute name	Mechanical Technician			
	Institute name	Electrical Technician			
	Institute name	Piping technician			
	Institute name	Surveyor			

Contractors/Vendors installation works

The Instrument team shall specify all the installation/site works they intend subcontract. A detailed description has to be provided to a proper understanding of the on-site activity.

Contractor name	Installation works description	Installation drawings reference	Notes
Vendor A	Installation of Chopper system		
Vendor B	Installation of neutron guides		

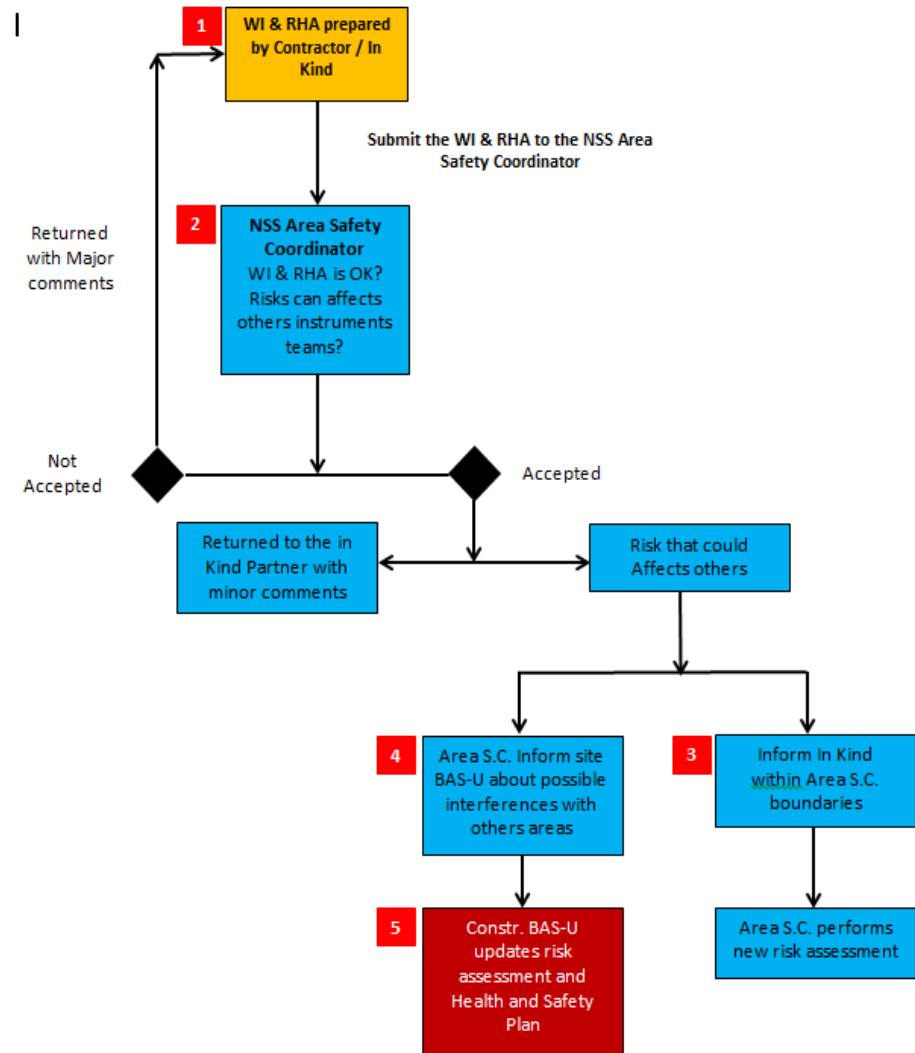
Hazard Risk Assessment

In the **IRR** the Instrument team will provide from the In Kind Partners and Contractors involved, the draft document called “**WI and RHA**” - Work Instruction and Hazard Risk Assessment- from each Instrument team.

The documents shall be approved from the “**NSS Area Safety Coordinator**” and finally delivered to the site BAS-U (Safety Responsible from legal point of view for the whole construction site).

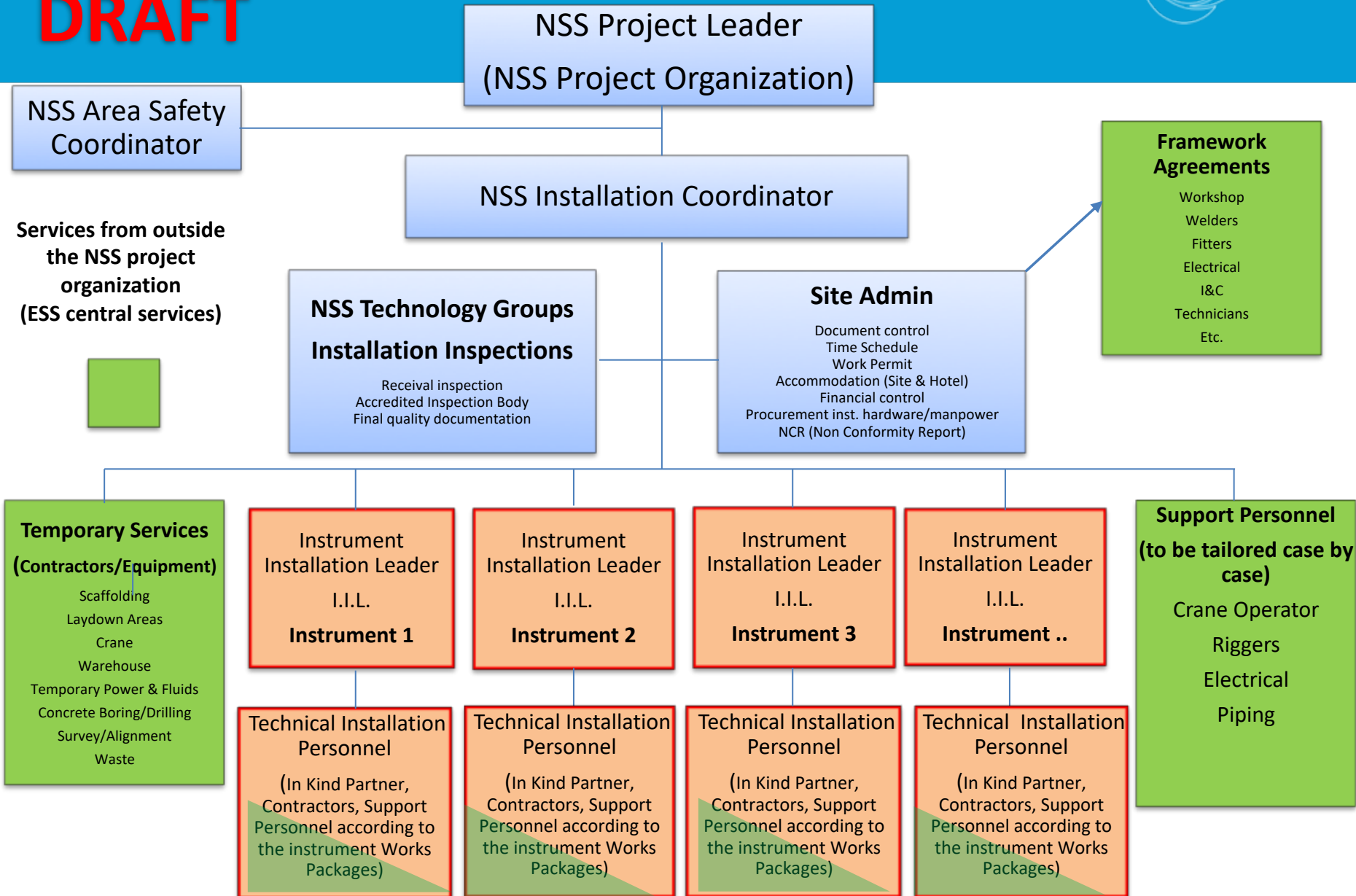
Any instrument team will appoint a **Safety Manager** at site (e.g. the Installation Leader) to prevent hazards, interface with NSS safety coordinator, take actions and solve any identified issues.

Template to be provided from NSS

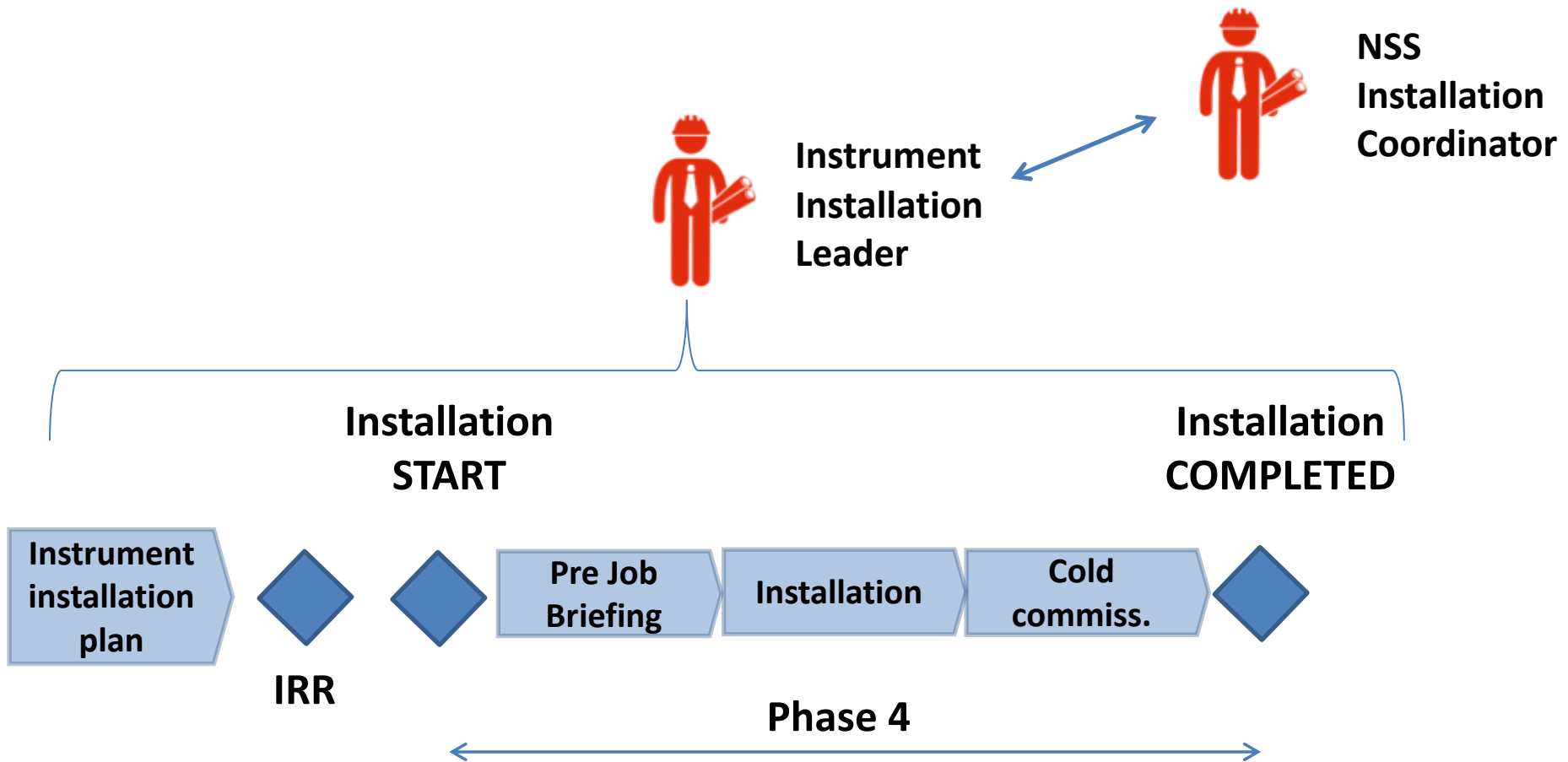


NSS Installation Organization

DRAFT



Instrument Installation Leader



Installation organization: Site coordination meeting contents

Periodical coordination meeting with the Installation Instrument Leader will be focused to all the installation activities, like for example the following items:

1. Installation kick off
2. Site documentation status
3. Personell/Contractor involved (new personel to be authorized)
4. Lifting works;
5. Scaffolding/temporary structures required
6. Logistic area (lockers rooms, bathrooms, material storage, parkings, etc etc.)
7. Installation works planned;
8. Work progress compare to the installation plan/ corrective measures in case od deviation from the approved installation plan/schedule
9. Waste management status
10. All the safety issues, according to the «NSS Safety Area Coordination» prescriptions/indications
11. Others

Any of the items above mentioned will be defiened from the a general matrix as the one below represented:

ITEM	DESCRIPTION	ACTION	RESPONSIBLE	NO LATER THAN

Installation site coordination meetings



The Technical Annex already specifies the In Kind Partners have to attend a monthly meeting. More specifically in the installation phase, each instrument team will attend these other meetings:

Weekly Meetings (indicative)

Participants:

NSS Installation Coordinator
Instrument Installation Leader – Instrument 1
Instrument Installation Leader – Instrument 2
Instrument Installation Leader – Instrument 3

Monthly Meetings (indicative)

Participants:

ESS Installation Manager
NSS Division Project Manager
NSS Technology Groups Responsible
NSS Planners
Instrument Lead Scientist
Instrument Lead Engineer
Instrument W.P. leader

Conclusion

- What previous described represents a first introduction to the IRR and the NSS construction organization;
- Further NSS internal discussion is still necessary to improve the contents and meet the requirements from each group, system engineering etc. etc..;
- Further details will be provided in order to ensure a process fully coherent with the TG3 and TG5;
- TG4 milestones dates to be defined yet;
- Indicative suitable time for IRR, 3 months before the installation start;

