INTEGRATION DESIGN OF NB CELL & HV LINES

SUM UP OF THE NB CELL INTEGRATION & HV LINES DESIGN CONTRACT

SUMMARY

1. GOAL OF THE DOCUMENT

This document is a summary of the document "NB cell and HV lines design contract". The goal of it is to provide some short explanation of the different tasks to do in order to design several tools concerning the integration of the NB cell and L3 components.

The NB cell is a 6000m^3 space in the ITER tokamak building where the three High Voltage Neutral Beam Injectors (HNB) and one Diagnostic Neutral Beam Injector (DNB) are located. The room where the HV lines will be integrated is above the NB cell (call later in the document L3 level).

The HNBs are part of the plasma heating system. This is a heating system by high energy particles injection. The energy to deliver for each HNB is 1MV. The DNB is based on the same system principle but using for diagnostic with lower energy.

The High Voltage lines (HV lines) are the components which allow providing energy for the HNBs/DNB.

The present status of the design of the NB cell and HV lines is not sufficiently detailed to place construction/manufacturing orders.

2. DESCRIPTION OF THE TASKS TO REALISE

2.1. GENERAL DESCRIPTION

The job describes below should include mechanical design, mechanical analysis and documentation.

The design to provide concerns the assembly/maintenance of the components located in the NB cell.

As described above there are three HNB and one DNB. At the beginning of the ITER operation only two HNBs and the DNB will be installed. The third HNB will be installed ten years later.

Each injector is made up by a Neutral Beam (NB) magnetic field reduction system, NB injector vessels, NB vacuum pumping components, and several internal components, NB calorimeter, NB Residual Ion Dump (R.I.D), NB Neutralizer and one Ion Source.

Each HV line is made up by internal busbar, a pipe and a Passive Magnetic Shield all around. There is one line by injector.

The part of each is described in the document given in reference in the complete version of the design contract.

2.2. DESIGN TASKS PRINCIPLES

The design to be provided should cover the installation of each component from outside the building to their final location. That is why there are different types of systems or tools to consider: transport tools, lifting tools, adjustment tools, supporting system and man access.

All of these must respect the nuclear rules define by ITER International Organization (IO), allow safe and easy human operation.

The number of tools must be minimized and compatible for each injector and the maintenance operations during ITER life must be taken into account.

The design of the tools and systems must be realized with the maximum of simplicity in order to make the assembly and the maintenance easier and increase the reliability.

The main requirements are described in detail in the complete version of the design contract.

3. SUPPLY LIMIT AND TIME OF DELIVERY

In the frame of the design contract the supplier must provide a full design of the different components including CAD models, a set of "build to print" drawings, mechanical analyses, reports and documentation for each system or tools.

The design must be concluded within one year. The supplier is responsible fro the reconciliation in the ITER database, Enovia. Before reconciliation ITER require to approve each design.

The delivery of the design is foreseen with several milestones. These milestones are described in the complete version of the design contract.

The company will provide the necessary CAD station, analysis software and hardware and other necessary utilities to do the design.