

TO: Phil Heitzenroeder
FROM: Mike Cole

SUBJECT: Field Period Assembly Specifications and Drawings, Job 1806

Date: September 30, 2008

Scope:

This WBS element includes preparation of the specifications and assembly drawings in support of the assembly of the Stellarator core field periods in the TFTR Test Cell and NCSX Test Cell.

Status

Station 1 Specification and Drawings are complete. Copies of these documents can be found using the links below:

Specification

NCSX-CSPEC-185-01-03

Drawings:

SE120-002 Vacuum Vessel Sub Assembly (VVSA)
SE121-004 VVSA Phase I Assembly
SE121-008 VVSA Phase 2 Assembly
SE123-049 VVSA Phase 3 Station 1 Assembly
SE310-030 Magnetic Loop Arrangement Drawing

Station 2 Specification and Drawings are complete. Copies of these documents can be found using the links below:

Specification

NCSX-CSPEC-185-02-00

Drawings:

SE 140-003 1/2 FIELD PERIOD ASSY
SE 140-101 MCWF TYPE A
SE 140-102 MCWF TYPE A
SE 140-103 MCWF TYPE A
SE 140-046 MOD COIL SHIM AND SHEAR PLATE LAYOUT
SE 140-190 MCWF FLANGE STUD KITS

Station 3 Specification and Drawings are complete. Copies of these documents can be found using the links below:

Specification

NCSX-CSPEC-185-03-00

Drawings:

SE100-003 FIELD PERIOD ASSEMBLY STATION 3
SE121-009 VACUUM VESSEL ASSY STATION 1 PHASE 3
SE124-051 VERTICAL UPPER SUPPORT ASSEMBLY

SE124-054 VERTICAL LOWER SUPPORT ASSEMBLY
SE140-003 MODULAR COIL ASSEMBLY ½ FIELD PERIOD
SE140-045 A-A MOD COIL SHIM AND SHEAR PLATE KIT
SE140-190 MCWF FLANGE STUD KITS

Specification

NCSX-CSPEC-185-03-00

Specifications:

http://ncsx.pppl.gov/SystemsEngineering/Requirements/Specs/WBS1/WBS18/index_Specs_WBS18.htm

Drawings:

<http://cadd-web.pppl.gov/NCSX/100/List18.htm>

Station 5 - this activity included the assembly of the vacuum vessel, modular coils, Toroidal field coils and trim coils into three identical modules known as field periods. Each field period would contain one vacuum vessel sub-assembly (120-degree shell sector, Toroidal spacer, and ports), six modular coils (two each of the three types), six Toroidal field coils; sixteen trim coils, and associated coil support structures.

The specification for this activity had not been started.

The assembly drawings are approximately 90% complete. The next step was to obtain comments and final check.

Specification

The specification had not been started

Drawing(s):

SE100-002 FIELD PERIOD ASSEMBLY STATION 5

Station 6 - covers the top level machine assembly: Some work had been started in this area with the assembly model, SE100-001. An initial drawing, se100-001.drw had been started and was approximately 50% complete.

Specification

The specification had not been started

Drawing(s):

SE100-001 NCSX STELERATOR CORE ASSEMBLY

Interfaces

Modular coil interfaces remain as defined in ICD 14-ALL-0001-00-dA and ICD-14-3-0001-03-dA. No changes have been made. These documents are located on the web at:

http://ncsx.pppl.gov/SystemsEngineering/Interface_Cntl/WBS14_StatusIndex.htm

Specifications

See specifications in the Status Section above.

Schematics and PIDs

No schematics or PIDs were required for Job 1806.

Models

The model number and title are the same as the drawing list in the status section above.

Drawings

See drawing list in the Status Section above.

Analyses

None Required

Testing

None Required

Costs

Cost for Job 1806 were last updated at the April 2008 Lehman Review.

Remaining Work

Station 1, 2, & 3 are complete.

Station 5

Models

At the time of the closeout the assembly models contained all the current components. If the project is restarted at a future time these models would need to be updated and checked for completeness. Interference studies should be conducted to verify that sufficient clearance is maintained at all levels of assembly.

Drawings

The drawings would require additional details added with notes/procedures written describing the details of the assembly process. Additional checking and comments from manufacturing would need to be obtained and the drawings modified to reflect comments.

Specification

The requirements for the assembly of the Field Period are well understood. These requirements need to be defined in the specification to reflect the current assembly methods that have been developed. A preassembly of the components should be conducted to verify the requirements can be met.

Station 6

Similar comments made for Station 5 would also apply for Station 6.

To reduce the risk at the time of Stellarator Core Assembly those areas of most concern i.e. the positioning of the three field periods and assembly of the cryostat should be reviewed using cad models, mockups and stereo lithography models constructed to simulate the assembly procedure. In areas of high level of concern full scale mockups should be constructed to verify assembly techniques. This process would help show that the information contained in the documentation adequately defines what is required to

complete the construction of the Stellarator Core Assembly. Using this approach would find problems early and hopefully keep the cost and schedule problems to a minimum.

Lessons Learned: None

Conclusion: None