

NCSX Critical Spares Plan

Nov. 19, 2004

Scope

Startup testing of NCSX is scheduled to begin in November, 2007 and to conclude with the achievement of First Plasma. The sequence of operations is:

1. Coil tests.
2. Electron-beam mapping
3. Final ISTP and First Plasma

The purpose of this plan is to ensure that adequate spare parts are available to support NCSX Startup.

Reference Documents

The NCSX Startup testing plan is documented in:

“NCSX Test and Evaluation Plan,” NCSX-PLAN-TEP-00, Draft E, Aug. 2004

Since actual execution of startup testing is still three years away, to date the Test and Evaluation (TEP) plan has been developed only to the level necessary to support development of the cost and schedule baseline and is currently maintained as a draft.

Assessment and Plan

Operation of NCSX will be supported by a well established technical infrastructure at PPPL. It will **employ** existing vacuum pumps and power supplies. The control and data acquisition system is an extension of that which already supports NSTX and will use the same types and models of equipment. Since NCSX is employing PPPL site credits in the form of the existing (mature) technical infrastructure, spare parts is not expected to be a major problem, although there will be some new construction.

As part of developing the TEP, an equipment failure modes and effects analysis (FMEA) will be incorporated to capture the response to equipment failures that may affect startup. A preliminary assessment highlights two areas where spare parts are especially critical:

Pumping System: Four turbomolecular pumps (TMP), formerly used on the PBX-M facility, have been identified for use on NCSX in its (final) full operational configuration. However, only two TMPs are required for startup, thus 2 TMPs are available for spares. In addition the PPPL vacuum shop maintains capability for the repair of TMP's.

Power Supplies: NCSX will use the C-site power systems in alignment with the PSE&G line. The C-Site power supplies are well characterized stable systems, as is the PSE&G line. The seven rectifiers exist and five are in recent or current service; the other two will be tested. Some new equipment, e.g., for coil protection, will be procured.

The current status of spares planning is summarized in the attachment.

Attachment: NCSX Critical Spares Assessment and Plan

WBS & Responsible Person	Assessment	Plan	Comments
85. Integrated System Testing, C. Gentile	Spares should not be a major problem overall, since NCSX startup operations rely on a mature infrastructure.	As part of developing the TEP, an equipment failure modes and effects analysis (FMEA) will be incorporated to capture the response to equipment failures that may affect startup.	
22. Torus Vacuum Pumping System, W. Blanchard	Have 4 TMPs; only 2 needed for startup. Equipment not needed for startup is an adequate source of spares.	No further action needed	
38. E-beam mapping diagnostics, D. Johnson	E-beam mapping equipment will be new construction.	Planned E-beam procurements will include spares of critical components.	
4. Power Systems, S. Ramakrishnan	Have all seven rectifiers; five are in active service.	Out-of-service rectifiers will be tested by Jan., 2006. Spares inventory and requirements will be assessed. Adequate spares inventory will be established prior to start-up.	
5. Central I&C, G. Oliaro	Design and equipment will be similar to NSTX and will use a common spares inventory.	No further action needed.	
62. Cryogenic systems, G. Gettelfinger	New construction planned.	Planned procurements will include spares of critical components.	