NCSX Conceptual Design Cost Estimate Summary Form
(Attachment 1a)

SUMMARY DESCRIPTION

WBS Number: 4	**Title: Power Systems**
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Description

NCSX operations are divided into six phases:

1. Initial Operation
2. Field Line Mapping
3. Initial Ohmic
4. Initial Auxiliary Heating
5. Confinement and Beta Push
6. Long Pulse

The NCSX MIE (Major Item of Equipment) Project includes all Electrical Power System capabilities required for initial operation as defined in the GRD. All equipment in the MIE Project will be installed prior to first plasma. All upgrades will be implemented after the first plasma.

Included in the MIE Project are all the engineering and physics design efforts starting with the preliminary design phase (Title I) and ending with completion of the MIE Project, all the necessary Research and Development (R&D) to support the design effort, all component fabrication, assembly, and installation activities, and all system level commissioning and testing. Integrated systems testing of the entire NCSX device is covered in Pre-Operational and Integrated Systems Testing (WBS 92). Suitable provisions will be made for transition to the upgrades defined in the GRD.

This summary-level WBS element consists of the electrical power systems needed by the NCSX device and facility. Electrical Power Systems (WBS 4) includes the following elements:

- AC Power Systems (WBS 41);
- AC/DC Convertors (WBS 42);
- DC Systems (WBS 43);
- Control and Protection Systems (WBS 44);
- Power System Design and Integration (WBS 45); and
- FCPC Building Modifications (WBS 46)

Electrical Power Systems (WBS 4) includes bus up to the interface with the subsystems, typically at the stellarator core outside the cryostat boundary. Power supplies for plasma heating systems are not included in Electrical Power Systems (WBS 4), but rather in Auxiliary Systems (WBS 2)..

Description of Existing Equipment/Facilities to be Reused: **Components and infrastructure from the existing C-site AC power and D-site experimental systems AC power will be reused to the maximum extent practical. For the D-site experimental power systems, a sharing arrangement with NSTX will be established.**

Description of Major Modifications Required to Existing Equipment/Facilities: **No major modifications are needed other than routine maintenance and reactivation.**

Date: 9/15/03