



13-970204-CLN-01

TO: DISTRIBUTION
FROM: C NEUMEYER
SUBJECT: PRELIMINARY FMEA OF CENTER STACK

Reference: Action Item # 17

This memo presents the results of a preliminary Failure Modes and Effects Analysis (FMEA) which considers failures within the center stack as well as failures in other elements of NSTX which would effect the center stack.

The purpose is to identify all plausible failure mechanisms related to the center stack, to ensure that features have been incorporated into the center stack to mitigate the effects of such failures, and to identify features which must be incorporated into the other elements of NSTX to protect the center stack.

The center stack is defined herein to consist of the TF coils, the OH coil, the PF1a coil, the PF1b coil, and the Center Stack Casing.

A FMEA matrix is presented on the attached spreadsheet entitled "CS FMEA". The following is a definition of the columns thereon.

Effected Element: This is the center stack element (TF, OH, PF1a, PF1b, or CS Casing) which is effected by the failure.

Failure Element: This is the element which fails. Abbreviations used for elements outside the center stack are....

CWS	-	Cooling Water System
PSS	-	Power Supply System
OP Error	-	Operator Error
BOH	-	Bakeout Heating System

Failure Description: This is a description of the failure.

Mitigation Features: These are features which have been incorporated into the center stack design, shall be incorporated into the design of the related systems, or shall be incorporated into operating/maintenance procedures, in order to reduce the probability of the failure as well as the consequences.

Failure Detection: Means for detecting the failure.

Response After Detection: Desired response of the control and interlocking system in response to the detected failure. A description of some of the responses is as follows....

Suppress, bypass power supplies - this results in zero voltage and a short circuit across the coils in the effected element, in the case of coil elements.

Terminate pulse - this results in the shutdown of all magnet power supplies and auxiliary heating input power

Inhibit next pulse - this prevents the execution of the next pulse sequence unless the failure condition is cleared and/or the failure detection is reset.

Effect: This is the predicted effect on the element, assuming that the failure detection and response is successful.

cc:

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NSTX File