

NSTX Upgrade

Seismic Analysis

NSTXU-CALC-10-02-00

Rev 0

February 9 2011

Prepared By:

Peter Titus, Engineering Analysis Division

Reviewed By:

A handwritten signature in cursive script, appearing to read "Fred Dahlgren".

F. Dahlgren PPPL Mechanical Engineering (retired)

Approved By:

Phil Heitzenroeder, Head, Mechanical Engineering

PPPL Calculation Form

Calculation # **NSTXU-CALC-10-02-00** Revision # **00**
#, **1677**

WP

(ENG-032)

Purpose of Calculation: (Define why the calculation is being performed.)

Calculate the response of the NSTX upgrade to a seismic event and qualify the NSTX upgrade tokamak to the standards set for the project by the DOE. Stress levels will be reported for inclusion in other calculations addressing specific components. Where seismic stress levels are significant and where they are the primary loading of the component, for example, the lateral braces, their adequacy will be addressed in this calculation.

References (List any source of design information including computer program titles and revision levels.)

-See the reference list in the body of the calculation

Assumptions (Identify all assumptions made as part of this calculation.)

Only the tokamak and its major structural components is included in this calculation. Peripheral support systems, neutral beams, SF6 tanks are assumed qualified in the original seismic analyses of the initial installation of NSTX. 0% damping is assumed although the 5% damped response curve would be more consistent with the tokamak assembly with insulation, instrumentation and many bolted connections. Vertical excitation is not considered. The first vertical frequency of significance is at 26 hz (mode 8), away from the peak of the vertical building response.

Calculation (Calculation is either documented here or attached)

Attached in the body of the calculation

Conclusion (Specify whether or not the purpose of the calculation was accomplished.)

NSTX is structurally adequate to survive a prescribed seismic event, with minor modifications to improve the shear load capability of the angled braces concrete anchors

Cognizant Engineer's printed name, signature, and date

Peter Titus

I have reviewed this calculation and, to my professional satisfaction, it is properly performed and correct.

Checker's printed name, signature, and date

Fred Dahlgren



, 17 June 2011

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