

## DESIGN REVIEW DOCUMENTATION – RESULTS

**Title:** NSTX-U CS Alignment and Interfaces (I&II) \_\_\_\_\_

**WP#:** 2293 \_\_ (ENG-032)

**CAT:** \*A1 ☐ A2 ☐ A3

**Type of Review:**    ☒ Peer    ☐ CDR    ☐ PDR    ☐ FDR

**Cognizant Individual:** D. Loesser \_\_\_\_\_ **Date of Review:** 2/1/18 \_\_\_\_\_

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**Review Board Members:**

Chair: T. N. Stevenson  
RE: M. Smith  
RE: M. Jaworski  
RE: S. Raftopoulos  
S. Gerhardt  
D. Loesser  
A. Brooks  
M. Bell, external reviewer  
M. Mardenfeld  
L. Dudek  
J. Menard

**Attendees:**

PE: C. Neumeyer  
P. Titus  
J. Petrella  
M. Cropper  
A. Jariwala  
N. Ferraro  
M. Reinke  
M. Kalish

**Attendees:**

J. King, DOE-FES \_\_\_\_\_  
CE: V. Riccardo  
D. Cai (remote)  
W. Wang (remote)  
S. Weidner \_\_\_\_\_  
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**Items Reviewed:**

	<b>Sat.</b>	<b>Unsat.</b>	<b>Comments or n/a if not applicable</b>
Appropriate requirements identified	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
Development plans and schedules	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
Reg. compliance incl. USI/USID and NEPA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	NSTX-U Recovery _____
Disposition of CHITS from previous reviews	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
Cost objectives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
Other review objectives addressed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Metrology _____

**SUMMARY OF RESULTS:**

This review was held in two parts. The first review (1/18/18) was held to address alignment issues as they pertain to the CS, PF1A coil, polar region design, error fields, and heat loads to PFCs. A previous peer review increased the internal diameter of the PF1A coil design by 4 mm to gain sufficient clearance and adjustment. The first alignment meeting extended the discussion of assembly and alignment against as built dimensions. This first meeting reached a point where it was determined that the work was incomplete and that a second meeting would be held. The second meeting (2/1/18) resolved the open questions from the first meeting while also addressing additional considerations. The peer review addressed physics basis and requirements, metrology results so far and available clearances, achievable alignment with existing CS case, pros and cons of using the existing case versus replacing some or all of the CS case, dimensions and control, interfaces and analysis for PF coils and PFCs, and assembly. Metrology confirmed that assembly clearances were not an issue. The as built CS case provides an

opportunity where two directions of the case offer clearance for Rogowski coils and wires. Assembly has been performed in the past and is well understood. With proper metrological care of the alignments of prerequisite structures, the CS assembly can be installed, measured, aligned, and adjusted to meet requirements. With the knowledge obtained thus far, the review recommended a trial fit up of the TF/OH and CS case; given success, the review also concluded with the recommendation to use the CS case as is, align TF/OH to mitigate error fields, and align the PF coils perpendicular to the CS to mitigate PFC thermal issues. The polar region design will accommodate the adjustment issues. Options for fixing the CS case bore, replacing the CS center section, or replacing the CS case entirely were discussed. A total of 14 chits were generated (8&6) some of which drove and were addressed by the second stage of the review. Agenda, presentations, and the chit log can be accessed at the link below:

<https://sites.google.com/pppl.gov/nstx-u-alignment-peer-review/chit-responses>

**Disposition:** [check one]

☐ **Acceptable**

☒ **Acceptable pending resolution of concerns-** CHITS identified above must be resolved prior to installation.

☐ **Incomplete** - Additional design work is required prior to another design review.

☐ **Unsuccessful** – Corrective actions must be taken and another review process must be initiated.

**Responsible Engineer** \_\_\_\_\_ **Date:** \_\_\_\_\_

**DRC Concurrence** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Distribution:** Review Board Members, Operations Center, Responsible Engineer, Cognizant Individuals, Project Manager, Project Director, relevant Technical Authorities, Chief Engineer, Fire Protection Engineer, Attendees, QA, ES&H, Security, Requesting & Performing Dept. Head