PRINCETON PLASMA PHYSICS LABORATORY

ENG-033 - PDRS - PDR SUMMARY

NSTX-U TF Inner Bundle Twist Laser Measurement PDR Summary

NSTXU_1-7-3-4-5_PDRS_100

Work Planning #:
Effective Date: **01/21/2020**
Prepared By: **George D. Loesser**

Reviewed By	George D. Loesser, Design Review Chair	01/21/2020 11:19:19 AM
Approved By	Brentley C. Stratton, Responsible Engineer	01/21/2020 11:22:46 AM

DESIGN REVIEW DOCUMENTATION – RESULTS – No: #NSTXU_1.7.3.4.5

Title: NSTX-U TF INNER BUNDLE TWIST LASER MEASUREMENT PRELIMINARY DESIGN REVIEW

Type of Review: Peer CDR XXX PDR FDR CAT: A3

Cognizant Individual: Austin Cao _____Date of Review: _ 26 Nov 2019

D. Loesser	Design Review Chair and ME TA
P. Titus	TA, Analysis
M. Cropper	SME, Operations
P. Dugan	Systems Engineering
N. Gerrish	ES&H
A. Castaneda	QA Representative
B. Stratton	RE, Diagnostics
Y. Zhai	NSTX-U Project Engineer

Other Attendees

R. Bell	B. Leblanc
A. Cao	B. Gattoni
M. Cropper	T. Stevenson
J. Galayda	
S. Gerhardt	
R. Hawryluk	
B. Stratton	C. Freeman

Items Reviewed:	Sat.	Unsat.	Comments or n/a if not applicable
Appropriate requirements identified	☒		
Development plans and schedules	☒	☐	
Reg. compliance incl. USI/USID and NEPA	☒	☐	
Disposition of CHITS from previous reviews	☒	☐	
Cost objectives	☒	☐	
Other review objectives addressed	☒	☐	

SUMMARY OF RESULTS:

The TF inner bundle will twist under imposed EM load during operations. A combination of strain gauges and external measurements can be used the monitor the twist. For the external measurement, A proposal was shown to install a laser reflector system to assess the twist at the top of the bundle in both the laminated and delaminated coil states. Proposed to mount a laser, a reflector, and a detector in a configuration that provides suitable sensitivity for comparison to expected twist values.
A prototype test was conducted to determine the measurement sensitivity of the system proposed at the conceptual design review (CDR). A laser was pointed at a reflector and an image of the reflected spot was taken at the approximate distance proposed in the CDR. The measurement sensitivity of the prototype was determined by calculating the center of mass of the laser spot and by comparing a sampling of images taken by the camera.

The review was successful with no CHITS generated. It was noted that the COG would include an Operational Procedure & User Manual in the cost & schedule and include this in the FDR scope.

Dashboard:
https://sites.google.com/pppl.gov/20191126-instrumentation-tf-tw/home

Charge Letter:
https://drive.google.com/open?id=1JOp3QjCq6MtJxHIbt8ycbwt9Zmo1AIr_

Zoom Link:
https://zoom.us/j/6104504777

Disposition: [check one]
_X_____ 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.

Design Review Chair Person _____Date: _____

Cognizant Individual Acceptance_____Date: _____

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

Revised 8/10/18