Action Items for Engineering

#4   Estimate ripple effects on magnetic diagnostics and equilibrium field perturbations.

#6   First plasma metrics have been removed from the GRD. They should be picked up in the ISTP.

#10   Follow up with appropriate PPPL Departments to secure agreements on external interfaces and associated responsibilities.

#18   Assess power supply implications of loop voltage requirements (3V, upgradeable to 5V).

#26   What analyses are needed to implement new seismic requirements?

#29   Same as #18.

#30, 31 Metrology requirement needs implementation plan.

#32   Assess implications of new requirement on lifetime number of bakeout cycles.

#44   Review proposed disposition.

#45   Assess implications of requirement for 1000V bias on first wall sections.

#48   Assess implications of new requirement to position the machine high enough that eddy currents in the ground plane are not a problem.

#50   Assess implications of new requirement on vacuum vessel weight-carrying capacity.

Action Items for Physics

#16   Determine the rise time for beta in the 1.2 T scenario.

#47, 51 Assess implications of changes in the reference scenarios.

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___1____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW 04-03-03	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION
Page 9, Requirements Para c) "Longest lived eddy current in conducting structures shall be <20ms". Does this mean <u>all</u> structures in the Test Cell? How far out? Electrical breaks?

ORIGINATOR L. Dudek_____

NAME/ORGANIZATION ____F.O.M._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Clarified. The 20 ms requirements applies to everything outside the vacuum vessel and inside the cryostat. The electrical breaks requirement applies to everything inside the cryostat except the vacuum vessel and coils. The cryostat boundary is chosen for simplicity. **Affects 3.2.1.5.2**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. Schmidt_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0 APPROVE COG DISPOSITION
0 DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___2____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION
Page 20 para 3.3.1.1 Magnetic Permeability $\mu<1.02$ to how far out from machine?

ORIGINATOR ___L.Dudek_____

NAME/ORGANIZATION __F.O.M._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Everything inside the cryostat. **Affects 3.3.1.1.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON _J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___3____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS	☐ HARDWARE	☐ SAFETY
☐ ANALYSIS	☐ CONFIGURATION	☐ COST/SCHEDULE
☐ PERFORMANCE	☐ RELIABILITY/MAINTAINABILITY	☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Clarify that radial position reqt does not imply a reqt for PRC to handle 16 cm ……?…..

ORIGINATOR R. Hawryluk_____

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. Added clarification. **Affects 3.2.1.5.3.4.5.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION | SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___4____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____	☐ PDR ☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Define power supply coil current ripple.

ORIGINATOR   **R. Hawryluk**

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur that there needs to be a limit, to keep ripple from interfering with equilibrum measurements or control. **Affects 3.2.1.5.3.7.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___5___

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____ DATE OF REVIEW 04-03-03	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Global leak rate of 1×10^{-5} tl/sec is hard to meet and an   increase by a factor of l 3

ORIGINATOR ___R. Hawryluk_____

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. Increase leak rate to 2×10^5 torr-l/s. With our 2,600 l/s of pumping, that leak rate is still compatible with the base pressure requirement of 1×10^8 torr and some margin.
Affects 3.2.1.2.2.1.

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___6___

COMPONENT/SUBSYSTEM/SYSTEM __NCSX GRD REVIEW__

COGNIZANT DESIGN ENGINEER _H. Neilson_____ DATE OF REVIEW _04-03-03_____

- ☒ PEER
- ☐ CDR
- ☐ PDR
- ☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

- ☐ REQUIREMENTS
- ☐ ANALYSIS
- ☐ PERFORMANCE
- ☐ HARDWARE
- ☐ CONFIGURATION
- ☐ RELIABILITY/MAINTAINABILITY
- ☐ SAFETY
- ☐ COST/SCHEDULE
- ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

The GRD should focus on project requirements and not on first plasma requirements, which should be documented at a higher level elsewhere. The level of detail in the PEP is applicable for the high level milestone.

ORIGINATOR R. Hawryluk _____

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. Remove them from the GRD, and capture them in the Integrated Systems Test Plan. **Affects 3.1.2, 3.2.1.1, 3.2.1.2.2.1, 3.2.1.5.3.3.2, 3.2.1.5.6.1.1, 3.2.1.5.9.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON _J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____ DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____ DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____ DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___7___

COMPONENT/SUBSYSTEM/SYSTEM NCSX GRD REVIEW	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW 04-03-03_____	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Remove "Voltage isolation…" sentence under electrical grounding. Should RF shielding also be addressed in the Grounding Spec?

ORIGINATOR W. Reiersen_____

NAME/ORGANIZATION ___M.E.D._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur (H. Neilson and S. Ramakrishnan). **Affects 3.3.2.1 and Deletes 3.3.2.2.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW
0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___8____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW 04-03-03_____	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Add "unless otherwise authorized" qualification for lithium compatibility.

ORIGINATOR _____W.Reiersen_____
NAME/ORGANIZATION _____M.E.D._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.3.1.3.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___9____

COMPONENT/SUBSYSTEM/SYSTEM NCSX GRD REVIEW	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____ DATE OF REVIEW 04-03-03_____	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Limitations on μ_v <1.02 needs to be specified – not everywhere in the facility.

ORIGINATOR ___W. Reiersen_____

NAME/ORGANIZATION ____M.E.D._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Everything inside the cryostat. **Affects 3.3.1.1.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___10____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW 04-03-03	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Review external interfaces.

ORIGINATOR ___W. Reiersen_____

NAME/ORGANIZATION ____M.E.D._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Applies to 3.2.2, but does dot require a change.** That section documents the assumptions NCSX is making concerning its interfaces with the PPPL facility. The project will follow up with the relevant PPPL Departments to secure agreements on these interfaces and associated responsibilities.

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___11_____

COMPONENT/SUBSYSTEM/SYSTEM __NCSX GRD REVIEW_____

COGNIZANT DESIGN ENGINEER _H. Neilson_____ DATE OF REVIEW _04-03-03_____

☒ PEER
☐ CDR
☐ PDR
☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Review upgrades for inboard fueling, especially i.e. things w/vv interfaces.

ORIGINATOR _____W. Reiersen_____

NAME/ORGANIZATION ___M.E.D._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. Requirements were reviewed by H. Kugel. **Affects 3.2.1.5.7.2 b).**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON _J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___12____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03____	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS ☐ HARDWARE ☐ SAFETY
☐ ANALYSIS ☐ CONFIGURATION ☐ COST/SCHEDULE
☐ PERFORMANCE ☐ RELIABILITY/MAINTAINABILITY ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

IC: 6MW Add TBR. Compatibility w/new VV geometry needs to be determined.

ORIGINATOR ___W.Reiersen_____

NAME/ORGANIZATION __M.E.D._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.2.1.5.6.2.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___13____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson DATE OF REVIEW 04-03-03	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Requirement for electrical breaks should apply to things outside the VV and in-vessel components. Time constants should not be applied outside stellarator coil.

ORIGINATOR ___W. Reiersen_____

NAME/ORGANIZATION _M.E.D._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Clarified. The 20 ms requirements applies to everything outside the vacuum vessel and inside the cryostat. The electrical breaks requirement applies to everything inside the cryostat except the vacuum vessel and coils. The cryostat boundary is chosen for simplicity. **Affects 3.2.1.5.2**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___14____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**_____	☒ PEER ☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW 04-03-03_____	☐ PDR ☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Should "or" be in the field error requirement?

ORIGINATOR ___W. Reiersen_____

NAME/ORGANIZATION __M.E.D._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

It should be "and". The implementation is to make each of the contributions individually small compared to 10% and not try to come up with a way to sum them. **Affects 3.2.1.5.1.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___15____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS	☐ HARDWARE	☐ SAFETY
☐ ANALYSIS	☐ CONFIGURATION	☐ COST/SCHEDULE
☐ PERFORMANCE	☐ RELIABILITY/MAINTAINABILITY	☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Use PIES to confirm the VMEC plasma configurations over flexibility space.

ORIGINATOR ___W.Reiersen_____

NAME/ORGANIZATION _M.E.D._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur, but this is a management issue, does not impact the GRD.

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___16____

COMPONENT/SUBSYSTEM/SYSTEM   **NCSX GRD REVIEW**_____

COGNIZANT DESIGN ENGINEER H. Neilson_____ DATE OF REVIEW _04-03-03_____

☒ PEER
☐ CDR
☐ PDR
☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Are the timescales for heating to fuel beta (100ms) acceptable?

ORIGINATOR ___W. Reiersen_____

NAME/ORGANIZATION __M.E.D._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

It may be an issue at 1.2 T, where beta could rise more quickly. Add "TBR" to the rise time. **Affects 3.2.1.5.3.3.1.5.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___17____

COMPONENT/SUBSYSTEM/SYSTEM   **NCSX GRD REVIEW**_____

COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____

☒ PEER
☐ CDR
☐ PDR
☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Add GDC to "15 min. intervals when constrained by coil or PFC cooldown."

ORIGINATOR ___W.Reiersen_____

NAME/ORGANIZATION __M.E.D._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.2.1.5.10.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___18____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS	☐ HARDWARE	☐ SAFETY
☐ ANALYSIS	☐ CONFIGURATION	☐ COST/SCHEDULE
☐ PERFORMANCE	☐ RELIABILITY/MAINTAINABILITY	☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Is the loop voltage implied by the ref. Scenarios adequate to assure inductive breakdown?

ORIGINATOR ___W.Reiersen_____

NAME/ORGANIZATION _M.E.D._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

No, there needs to be an explicit requirement for 3V, upgradeable to 5V, to cope with dirty plasma conditions. **New Requirement 3.2.1.5.3.6.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___19____

COMPONENT/SUBSYSTEM/SYSTEM   **NCSX GRD REVIEW**_____

COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____

☒ PEER
☐ CDR
☐ PDR
☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Need to define scope (negotiate scope) with DOE – PDR will only cover VV and Modular Coils. (Hawryluk cognizant)

ORIGINATOR ___W.Reiersen for RH_____
NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. This is a management issue, does not impact the GRD.

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___20____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**_____	☒ PEER
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____	☐ CDR ☐ PDR ☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS ☐ HARDWARE ☐ SAFETY
☐ ANALYSIS ☐ CONFIGURATION ☐ COST/SCHEDULE
☐ PERFORMANCE ☐ RELIABILITY/MAINTAINABILITY ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Blow away requirement areas that do not add value (at back end of spec).

ORIGINATOR ___W.Reiersen____

NAME/ORGANIZATION __M.E.D._____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.3.7, Human Engineering.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0 APPROVE COG DISPOSITION
0 DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___21____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW 04-03-03	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS	☐ HARDWARE	☐ SAFETY
☐ ANALYSIS	☐ CONFIGURATION	☐ COST/SCHEDULE
☐ PERFORMANCE	☐ RELIABILITY/MAINTAINABILITY	☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

(5) kV isolation between V.V. and systems attached to it other grounds (diagnostics,…).

ORIGINATOR ___E. Fredrickson_____

NAME/ORGANIZATION _PPPL_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Retained a general requirements for voltage isolation between the vacuum vessel and attachments, but refer to the NCSX Grounding Spec for all details, including the isolation voltage. **Affects 3.3.2.1.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

	WP # _____ (ENG-032)
PPPL DESIGN REVIEW CHIT	CHIT # ___22.1____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**_____	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

1. Words should be added on maximum neutron generation, i.e., per shot, per second, per year, and/or lifetime.

ORIGINATOR ___J.Levine_____

NAME/ORGANIZATION __ES&H_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. Added clarification that an annual DD neutron yield of 4.6×10^{16} per year corresponds to 1 rem per year dose-equivalent in the control room. **Affects 3.3.6.8.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW
0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.
SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___22.2____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER ☐ CDR ☐ PDR ☐ FDR
COGNIZANT DESIGN ENGINEER H. Neilson_____ DATE OF REVIEW _04-03-03_____	

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

   2. The following sentence should be added to Section 3.3.6.7: "Designs shall
       comply with the requirements of ES&HD 5008, Section 2."

ORIGINATOR ___J.Levine_____

NAME/ORGANIZATION __ES&H_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.3.6.7.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW
0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___23____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**_____	☒ PEER
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW 04-03-03_____	☐ CDR ☐ PDR ☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Would like to reiterate that Section 4 of the GRD should be renamed from "Quality Assurance Provisions" to Verification and Validation." QA Provisions include much more than is discussed here, or should be discussed here, including design verification, management and independent assessments, calibration. The given title is a misnomer.

ORIGINATOR _____Judy Malsbury_____

NAME/ORGANIZATION ____QA_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

The text explains that this section deals with verification of requirements, so the title is changed to "Verification of Requirements." **Affects Section 4. title.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___24____

COMPONENT/SUBSYSTEM/SYSTEM __NCSX GRD REVIEW_____

COGNIZANT DESIGN ENGINEER _H. Neilson_____ DATE OF REVIEW _04-03-03_____

- ☒ PEER
- ☐ CDR
- ☐ PDR
- ☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

- ☐ REQUIREMENTS
- ☐ ANALYSIS
- ☐ PERFORMANCE
- ☐ HARDWARE
- ☐ CONFIGURATION
- ☐ RELIABILITY/MAINTAINABILITY
- ☐ SAFETY
- ☐ COST/SCHEDULE
- ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Figure 3-1 is difficult to read so can't determine if it is accurate. What does the "OR" in the circles mean?

ORIGINATOR ___Judy Malsbury_____

NAME/ORGANIZATION ___QA_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Improved readability by enlarging the words and expanding the figure to fill the page.
"OR" designates a branch node. **Affects Figure 3-1.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___25____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____ DATE OF REVIEW _04-03-03_____	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS	☐ HARDWARE	☐ SAFETY
☐ ANALYSIS	☐ CONFIGURATION	☐ COST/SCHEDULE
☐ PERFORMANCE	☐ RELIABILITY/MAINTAINABILITY	☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

For both NSTX and TFTR, we maintain(ed) availability statistics via manual entries made into a database by the COE (or designee). Should be consider defining requirements for determining system availability and try to automate much of this now? It would primarily impact instrumentation and control.

ORIGINATOR ___Judy Malsbury_____

NAME/ORGANIZATION ____QA_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

This is a task for the operating phase. Does not impact GRD.

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___26____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER _H. Neilson_____ DATE OF REVIEW _04-03-03____	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS	☐ HARDWARE	☐ SAFETY
☐ ANALYSIS	☐ CONFIGURATION	☐ COST/SCHEDULE
☐ PERFORMANCE	☐ RELIABILITY/MAINTAINABILITY	☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

In Section 3.3.1.6 on Seismic Criteria, add the following at the end of the Section: "for PC1 facilities." PC1 (Performance Category 1) facilities are low hazard facilities, and is the same classification as NSTX.

ORIGINATOR ___Jerry Levine_____

NAME/ORGANIZATION __ES&H_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.3.1.6.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___27____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW 04-03-03	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS ☐ HARDWARE ☐ SAFETY
☐ ANALYSIS ☐ CONFIGURATION ☐ COST/SCHEDULE
☐ PERFORMANCE ☐ RELIABILITY/MAINTAINABILITY ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Coupled power for ICRF system is dependent on size (plasma-facing area) of cavities incorporated into the vacuum vessel for the antennas. Cavity size (plasma facing area) is not yet finalized. ICRF power $\sim$ 5MW/m^2 x total area in m^2.

ORIGINATOR ___Richard Majeski____

NAME/ORGANIZATION __PPPL_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

OK. Change the requirement to 6 MW (TBR). **Affects 3.2.1.5.6.2.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW
0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

COMPONENT/SUBSYSTEM/SYSTEM NCSX GRD REVIEW	☒ PEER ☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____	☐ PDR ☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Vessel cooling should be sufficient to allow for a 250 C° liner (upgrade reg. For lithium liner).

ORIGINATOR ___Richard Majeski_____

NAME/ORGANIZATION ___PPPL_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.2.1.4.2.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW
0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT	WP # _____ (ENG-032)
	CHIT # ___29____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS	☐ HARDWARE	☐ SAFETY
☐ ANALYSIS	☐ CONFIGURATION	☐ COST/SCHEDULE
☐ PERFORMANCE	☐ RELIABILITY/MAINTAINABILITY	☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Need specification of maximum V_{loop} to ensure breakdown and plasma formation.

ORIGINATOR ___M. Zarnstorff_____

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Added an explicit requirement for 3V, upgradeable to 5V, to cope with dirty plasma conditions. **New Requirement 3.2.1.5.3.6.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW** _____	☒ PEER ☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson _____ DATE OF REVIEW _04-03-03_____	☐ PDR ☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Need requirement on location of vessel relative to the coils/field.

ORIGINATOR ___M. Zarnstorff_____

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

The "location of the vessel" is not well defined because it is a large structure with tolerances as large as 3/8-inch. However, fiducial markers on the vessel and coils are needed in order to be able to locate attachments with high accuracy. This is captured in a new requirement for metrology. **Affects 3.3.1.7.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___31____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER ☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____	☐ PDR ☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION
Need requirement for Fiducial Markers on the vessel and coils for use during
installation and locating of in-vessel components.

ORIGINATOR ___M. Zarnstorff_____
NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical
reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. This is captured in a new requirement for metrology. **Affects 3.3.1.7.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW
0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___32____

COMPONENT/SUBSYSTEM/SYSTEM   NCSX GRD REVIEW

COGNIZANT DESIGN ENGINEER H. Neilson_____ DATE OF REVIEW _04-03-03_____

- ☒ PEER
- ☐ CDR
- ☐ PDR
- ☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

- ☐ REQUIREMENTS
- ☐ ANALYSIS
- ☐ PERFORMANCE
- ☐ HARDWARE
- ☐ CONFIGURATION
- ☐ RELIABILITY/MAINTAINABILITY
- ☐ SAFETY
- ☐ COST/SCHEDULE
- ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Is there a limit on the number of bakeout cycles? Should there be a requirement on minimum number?

ORIGINATOR ___M. Zarnstorff_____

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. Add new requirement for 100 bakeout cycles over the life of the machine. Based on 1 bakeout at the beginning of a run and up to 3 bakeouts during a run. Two runs per year for 10 years. 25% contingency. (1+3)x2x10x1.25 = 100. Per Hutch Neilson and Henry Kugel. **New Section 3.2.1.2.3.6.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___33____

COMPONENT/SUBSYSTEM/SYSTEM   NCSX GRD REVIEW_____

COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____

☒ PEER
☐ CDR
☐ PDR
☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION
Section 3.2.1.5.1 should read: "The toroidal flux…due to fabrication errors, magnetic materials, <u>and</u> eddy currents shall not exceed 10% of the toroidal flux > the plasma (<u>includir</u> <u>compensations</u>).

ORIGINATOR ___M. Zarnstorff_____

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.2.1.5.1.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW
0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___34____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**_____

COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____

⊠ PEER
☐ CDR
☐ PDR
☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Section 3.2.1.5.2 (b) should also except the vessel (in addition to the coils).

ORIGINATOR ___M. Zarnstorff_____

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.2.1.5.2 b).**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___35____

COMPONENT/SUBSYSTEM/SYSTEM   NCSX GRD REVIEW_____

COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____

☒ PEER
☐ CDR
☐ PDR
☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Section 3.3.1.2 (a) and (b) should be modified as indicated.
3.3.1.2 (a) The Vacuum Vessel interior and all in-vessel metallic components shall be electro-polished prior to installation, except when explicitly authorized by the project. (b) The Vacuum Vessel and all in-vessel components shall be degreased and cleaned prior to installation. They will be vacuum baked, except as authorized by the project.

ORIGINATOR M. Zarnstorff___
NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.3.1.2.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___36____

COMPONENT/SUBSYSTEM/SYSTEM   NCSX GRD REVIEW_____

☒ PEER
☐ CDR
☐ PDR
☐ FDR

COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION
3.3.1.3, second paragraph: Materials used inside the vessel shall be compatible with lithium, except as authorized by the project.

ORIGINATOR ___M. Zarnstorff_____

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.3.1.3.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___37___

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW 04-03-03	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Section 3.1.1.5.3.3.1.5: first sentence should read "the 1.2T long pulse high beta scenario…" the 100 ms time of rise of β should be TBD. The final bullet: "at least 1.1 sec.

ORIGINATOR ___M. Zarnstorff_____

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.2.1.5.3.3.1.5 in the current draft.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___38____

COMPONENT/SUBSYSTEM/SYSTEM __NCSX GRD REVIEW__

- ☒ PEER
- ☐ CDR
- ☐ PDR
- ☐ FDR

COGNIZANT DESIGN ENGINEER H. Neilson_____ DATE OF REVIEW _04-03-03_____

SUBJECT: (CHECK AS APPLICABLE)

- ☐ REQUIREMENTS
- ☐ ANALYSIS
- ☐ PERFORMANCE
- ☐ HARDWARE
- ☐ CONFIGURATION
- ☐ RELIABILITY/MAINTAINABILITY
- ☐ SAFETY
- ☐ COST/SCHEDULE
- ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

3.2.1.5.6.2: "6 MW (TBR) of ICH…"
3.2.1.5.6.3: "…3 MW (TBR) of ECH…"

ORIGINATOR ___M. Zarnstorff_____

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION

(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.2.1.5.6.2 and 3.2.1.5.6.3.**

0 CONCUR
0 DISAGREE
0 OTHER

CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION

SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT

Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___39____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____ DATE OF REVIEW 04-03-03_____	☐ PDR ☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS	☐ HARDWARE	☐ SAFETY
☐ ANALYSIS	☐ CONFIGURATION	☐ COST/SCHEDULE
☐ PERFORMANCE	☐ RELIABILITY/MAINTAINABILITY	☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

3.2.1.5.7.1: "… or other non-corrosive gasses."

ORIGINATOR M. Zarnstorff____

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.2.1.5.7.1.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___40____

COMPONENT/SUBSYSTEM/SYSTEM   **NCSX GRD REVIEW**

COGNIZANT DESIGN ENGINEER H. Neilson_____ DATE OF REVIEW 04-03-03_____

☒ PEER
☐ CDR
☐ PDR
☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

3.2.1.5.7.2 – In general, the physics requirements still need to be developed. In particular, as an upgrade capability, we will need to accommodate at least ~ 4 gas injectors per period. (Inside & outside, top & bottom divertors.) Also, the supersonic injectors may need to *use* inboard.

ORIGINATOR ___M. Zarnstorff_____

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.2.1.5.7.2 a) and b).**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

$

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___41____

COMPONENT/SUBSYSTEM/SYSTEM NCSX GRD REVIEW	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson____DATE OF REVIEW 04-03-03	☐ PDR ☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS ☐ HARDWARE ☐ SAFETY
☐ ANALYSIS ☐ CONFIGURATION ☐ COST/SCHEDULE
☐ PERFORMANCE ☐ RELIABILITY/MAINTAINABILITY ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Recommend minor changes to "Base Pressure" and "Pumping Speed" sections (see attached).

ORIGINATOR __W. Blanchard_____

NAME/ORGANIZATION _____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur, with the proviso that base pressure and leak rate must be specified. **Affects 3.2.1.2.2.1 and 3.2.1.2.3.1**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW
0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

Eventually the device shall produce a base pressure in the low 10^{-8} torr range. This is predicated on a well baked and conditioned vacuum vessel and appendages and a total global leak in the low 10^{-5} torr·liter/sec or less at 293°K

3.2.1.2.2 Vacuum Requirements

3.2.1.2.2.1 Base Pressure

The device and facility shall produce high vacuum conditions with a base pressure of less than or equal to 2×10^{-8} torr and a global leak rate of less than or equal to 1×10^{-5} torr·l/s at 293K.

At First Plasma, with limited vacuum conditioning time, the device and facility shall produce vacuum conditions with a base pressure of less than or equal to 2×10^{-7} torr and a global leak rate of less than or equal to 1×10^{-4} torr·l/s at 293K. *low 10^{-7} or better*

at first plasma The base pressure shall be measured with standard, magnetically shielded, nude ion gauges *and at least one fast neutral pressure gauge.*

The partial pressure components of the base pressure shall be measured with a Residual Gas Analyzer (RGA) mounted at a location on one of the pump ducts near the Turbomolecular pumps.

The system shall be designed for High Vacuum compatibility. All appendages, ports and diagnostics that are not to be left open permanently to the vacuum vessel shall have their own pumping system and conditioning capabilities to maintain required conditions when opened to the vacuum vessel. All systems and components either in vacuum or with a vacuum interface should be designed to preclude trapped volumes and virtual leaks. The system shall be designed to allow for leak checking and repair of leaks on the vacuum vessel. *Paul Goranson + Mike Cole need to agree with this*

3.2.1.2.2.2 Pumping Speed

The device and facility shall be equipped with the four PBX-M 1500 l/s turbo-molecular pumps (or equivalent), configured to provide a total net pumping speed at the torus of at least 2600 l/s.

3.2.1.2.3 Bakeout

Background

The temperature of the vacuum vessel shell will be elevated to a nominal bakeout temperature of 150°C by circulating high temperature gas in tubes attached to the vacuum vessel shell and ports. Initially, there will be only a few, discrete limiters installed in the vacuum vessel for ohmic operation. However, later in the program, a carbon-based liner will be installed inside the vacuum vessel with a surface area that is a substantial part of the vacuum vessel surface area to absorb the high heat loads and to protect the vacuum vessel and internal components. The temperature of the carbon-based liner will be elevated to a nominal bakeout temperature of 350°C by circulating high temperature gas in tubes attached to the liner assembly. Components that will become hot during bakeout operations must be compatible with their elevated temperatures in terms of strength, compliance for expansion, and vacuum integrity.

3.2.1.2.3.1 Vacuum Vessel Bakeout Temperatures

150°C $^{+5}_{-25}$

During bakeout, the temperature of the vacuum vessel shell and ports shall be maintained at ~~150°C±25°C.~~

3.2.1.2.3.2 Carbon-based Plasma Facing Components (PFCs) Bakeout Temperatures

During bakeout, the temperature of the carbon-based PFCs (to be installed as a future upgrade) shall be maintained at 350°C±25°C. (The 350°C bakeout capability is an upgrade.)

3.2.1.2.3.3 Coil Temperatures During Bakeout

During bakeout, the temperature of the cryo-resistive coils shall be capable of being kept below 90 K. (TBR)

3.2.1.2.3.4 Bakeout Timelines

a) The vacuum vessel and all components internal to the vacuum vessel shall be capable of being raised to their bakeout temperatures within 36 hours (TBR) and maintained at that temperature indefinitely.

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___42____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03____	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY

☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE

☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

- Under "During Bakeout"
- Under "Capable of GDC"
- Change "-any of: hydrogen, deuterium, helium, methane"
  To read "-any of hydrogen, deuterium, helium, and other noncorrosive gases.

ORIGINATOR ___H.W. Kugel_____

NAME/ORGANIZATION __NCSX/PHYSICS_____

REVIEW BOARD COMMENT/RECOMMENDATION

(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. Incorporated by modifying 3.2.1.4.1 (GDC Between Pulses), which the GDC During Bakeout Section (3.2.1.2.3.5) cross-references.

0 CONCUR

0 DISAGREE

0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION

0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT

Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___43____

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW 04-03-03	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS ☐ HARDWARE ☐ SAFETY
☐ ANALYSIS ☐ CONFIGURATION ☐ COST/SCHEDULE
☐ PERFORMANCE ☐ RELIABILITY/MAINTAINABILITY ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

- Under GDC between discharges
- Change "-Any of: hydrogen, deuterium, helium & methane"
  To "-any or: hydrogen, deuterium and other non-corrosive gases

ORIGINATOR ___H.W. Kugel_____

NAME/ORGANIZATION __NSTX PHYSICS_____

REVIEW BOARD COMMENT/RECOMMENDATION

(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.2.1.4.1 b).**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT

Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___44____

COMPONENT/SUBSYSTEM/SYSTEM	NCSX GRD REVIEW	☒ PEER

COGNIZANT DESIGN ENGINEER H. Neilson_____ DATE OF REVIEW 04-03-03_____

☐ CDR
☐ PDR
☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS ☐ HARDWARE ☐ SAFETY
☐ ANALYSIS ☐ CONFIGURATION ☐ COST/SCHEDULE
☐ PERFORMANCE ☐ RELIABILITY/MAINTAINABILITY ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

It would be helpful to have a matrix of temperature ranges for the various components, such as that which is attached (next page), possibly including the maximum time allotted to transition from one condition to another. (Note: the table has not been updated from the CDR for the new requirements.)

ORIGINATOR ___B. Nelson_____

NAME/ORGANIZATION ___ORNL_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

This table should be updated to the current requirements and used by Engineering if is found convenient to do so. It may be overly prescriptive for the GRD, since some of the entries are requirements while others are free parameters. It does identify the need to set requirements on Pre-Run (standby) temperature. **Affects 3.2.1.213.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

The temperatures of components will fall between the limits stated in the table below

Operating state:	PFCs - surface min (C)	PFCs - surface max (C)	PFC - ribs min (C)	PFC - ribs max (C)	Vessel min (C)	Vessel max (C)	VV extensions min (C)	VV extensions max (C)	Mod Coils/shell min (K)	Mod Coils/shell max (K)
Standby	20	100	20	100	20	100	20	100	77	85
Pre-operating	20	100	20	100	20	100	20	100	77	85
Equilibrated operation		< 1200	20	100	20	100	20	100	77	85
Bakeout	150	350	150	350	150	150	150	150	77	100

Typical operating modes for analysis:

		PFCs - surface min (C)	PFCs - surface max (C)	PFC - ribs min (C)	PFC - ribs max (C)	Vessel min (C)	Vessel max (C)	VV extensions min (C)	VV extensions max (C)	Mod Coils/shell min (K)	Mod Coils/shell max (K)
Typical standby:	case 1		100		100		20		20		77
Pre-op / conditioning:	case 2		100		100		100		100		77
Operation:											
- no PFCs, 3 MW, .3 s	case 3a		n/a		n/a		20		20		77
- no PFCs, 6 MW, .3 s	case 3b		n/a		n/a		100		100		77
- 12 MW, 1.2s, partial PFCs	case 3c	n/a +	< 1200	n/a +	< 350		TBD		TBD		77
- 12 MW, 1.2s with PFCs	case 3d		< 1200		< 350		100		100		77
Bakeout:	case 4		350		350		150		150		100

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___45____

COMPONENT/SUBSYSTEM/SYSTEM   NCSX GRD REVIEW_____

COGNIZANT DESIGN ENGINEER H. Neilson_____ DATE OF REVIEW 04-03-03_____

☒ PEER
☐ CDR
☐ PDR
☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS ☐ HARDWARE ☐ SAFETY
☐ ANALYSIS ☐ CONFIGURATION ☐ COST/SCHEDULE
☐ PERFORMANCE ☐ RELIABILITY/MAINTAINABILITY ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

The electrical bias for the first wall does not give a voltage range. Suggest adding a voltage limit such as "up to 1000 V".

ORIGINATOR ___B. Nelson_____

NAME/ORGANIZATION _____ORNL_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.2.1.5.4.1. c).**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW
0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT	WP # _____ (ENG-032)
	CHIT # ___46____

COMPONENT/SUBSYSTEM/SYSTEM   **NCSX GRD REVIEW** _____

☒ PEER
☐ CDR

COGNIZANT DESIGN ENGINEER H. Neilson _____ DATE OF REVIEW 04-03-03 _____

☐ PDR
☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

The 30 micro-inch finish required for in-vacuum surfaces seems very restrictive considering things like all the port extension assembly welds that must be polished in place. Can the 30 micro-inch surface finish be modified to include a caveat that the requirement can be relaxed with project permission?

ORIGINATOR B. Nelson _____

NAME/ORGANIZATION ___ORNL_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. Requirement is to electropolish except as authorized by the project. **Affects 3.3.1.2**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___47____

COMPONENT/SUBSYSTEM/SYSTEM   **NCSX GRD REVIEW**_____

COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW 04-03-03_____

☒ PEER
☐ CDR
☐ PDR
☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

The 350-kA (1.8 T) Ohmic Scenario should be changed to 320 kA (1.7 T) to be consistent with providing a factor 2 range of internal iota flexibility at the nominal field of 1.7 T.

ORIGINATOR N. Pomphrey_____

NAME/ORGANIZATION ___PPPL_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. Also applies to the maximum current for disruptions. **Affects 3.2.1.5.3.3.1.7 and 3.2.1.5.5**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___48____

COMPONENT/SUBSYSTEM/SYSTEM   NCSX GRD REVIEW_____

COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____

☒ PEER
☐ CDR
☐ PDR
☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

The machine should be positioned high enough above the existing copper gound plane in the test cell such that eddy currents in the ground plane do not become a problem.

ORIGINATOR S. Ramakrishnan

NAME/ORGANIZATION ___PPPL_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Added Requirement 3.2.1.5.2 f).**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW
0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___49___

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**_____	☒ PEER
	☐ CDR
COGNIZANT DESIGN ENGINEER H. Neilson_____DATE OF REVIEW _04-03-03_____	☐ PDR
	☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS	☐ HARDWARE	☐ SAFETY
☐ ANALYSIS	☐ CONFIGURATION	☐ COST/SCHEDULE
☐ PERFORMANCE	☐ RELIABILITY/MAINTAINABILITY	☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

Update the requirements allocation matrix and Requirements Verification Matrix.

ORIGINATOR H. Neilson_____

NAME/ORGANIZATION ___PPPL_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.7, 4.3, Appendix B, Appendix C.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___50___

COMPONENT/SUBSYSTEM/SYSTEM **NCSX GRD REVIEW**

☒ PEER
☐ CDR
☐ PDR
☐ FDR

COGNIZANT DESIGN ENGINEER H. Neilson_____ DATE OF REVIEW 04-03-03_____

SUBJECT: (CHECK AS APPLICABLE)

☐ REQUIREMENTS   ☐ HARDWARE   ☐ SAFETY
☐ ANALYSIS   ☐ CONFIGURATION   ☐ COST/SCHEDULE
☐ PERFORMANCE   ☐ RELIABILITY/MAINTAINABILITY   ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

The GRD should contain a requirement that either specifies or ensures adequate weight-carrying capacity in the vacuum vessel and the vessel support structure. We should have a entry in the GRD specifying that the vessel and support system must mechanically support anticipated loads (as above) including upgrades and maintain their allignment.

ORIGINATOR M. Zarnstorff___

NAME/ORGANIZATION ___PPPL_____

REVIEW BOARD COMMENT/RECOMMENDATION
(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. Added requirement for Vacuum Vessel weight-carrying capacity. **Affects 3.3.1.8.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT
Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____

PPPL DESIGN REVIEW CHIT

WP # _____ (ENG-032)

CHIT # ___51____

COMPONENT/SUBSYSTEM/SYSTEM __NCSX GRD REVIEW__

COGNIZANT DESIGN ENGINEER _H. Neilson_____ DATE OF REVIEW _04-03-03_____

- ☒ PEER
- ☐ CDR
- ☐ PDR
- ☐ FDR

SUBJECT: (CHECK AS APPLICABLE)

- ☐ REQUIREMENTS
- ☐ ANALYSIS
- ☐ PERFORMANCE
- ☐ HARDWARE
- ☐ CONFIGURATION
- ☐ RELIABILITY/MAINTAINABILITY
- ☐ SAFETY
- ☐ COST/SCHEDULE
- ☐ QUALITY

COMMENT/CONCERN/RECOMMENDATION

The full-current, zero-beta S2 equilibrium condition leads to pathological PF coil currents in the lastest design, translating to excessive coil current swings (including polarity changes) in going from S1 to S2 to S3. A redefined S2 with 70% current, zero beta has more reasonable currents. Modify the reference scenarios accordingly.

ORIGINATOR H. Neilson_____

NAME/ORGANIZATION ___PPPL_____

REVIEW BOARD COMMENT/RECOMMENDATION

(Address technical, cost, and schedule impacts as appropriate. If CHIT is not adopted, provide technical reason - do not simply state "out-of-scope or N/A" without explaining.)

Concur. **Affects 3.2.1.5.3.3.1.3, 3.2.1.5.3.3.1.4, and 3.2.1.5.3.3.1.6.**

0 CONCUR
0 DISAGREE
0 OTHER   CHAIRPERSON J. SCHMIDT_____ DATE:_____

COGNIZANT DESIGN ENGINEER'S RESPONSE/DISPOSITION:

SIGNATURE _____DATE:_____

RESPONSIBLE RLM REVIEW

0   APPROVE COG DISPOSITION
0   DISAPPROVE COG DISPOSITION   SIGNATURE _____DATE:_____

COGNIZANT DESIGN ENGINEER CLOSE-OUT

Sign when action required by disposition is complete.

SIGNATURE _____DATE: _____