

ENVIRONMENTAL EVALUATION NOTIFICATION FORM

Grantee/Contractor Laboratory: Princeton University/Princeton Plasma Physics Laboratory (PPPL)  
Project/Activity Title: Construction and Operation of the National Compact Stellarator Experiment (NCSX)

CH NEPA Tracking No.: \_\_\_\_\_ Type of Funding SC  
B&R Code: AT5015020 Total Estimated Cost: \$72M

DOE Cognizant Secretarial Officer (CSO): Raymond L. Orbach

Contractor Project Manager: \_\_\_\_\_ Signature: \_\_\_\_\_  
Date: \_\_\_\_\_

Contractor NEPA Reviewer: Jerry D. Levine Signature: \_\_\_\_\_  
Date: \_\_\_\_\_

I. **Description of Proposed Action:** The National Compact Stellarator Experiment (NCSX) would be an experimental research facility whose purpose would be to develop the physics of compact stellarators, an innovative fusion confinement concept. NCSX would consist of a plasma confinement device made up of an assembly of several magnet systems and structures that surround a highly shaped plasma (see attached figure). Coils would be provided to produce a magnetic field for plasma shape control, inductive current drive, and field error correction. A vacuum vessel and plasma facing components would produce a high vacuum plasma environment with access for heating, pumping, diagnostics, and maintenance. The device would be enclosed in a cryostat to permit cooling of the magnets at cryogenic temperature using liquid nitrogen.

The NCSX device would be installed in the C-site test cell (formerly occupied by the Princeton Large Torus [PLT] and Princeton Beta Experiment [PBX] facilities) at the Princeton Plasma Physics Laboratory. This test cell would be refurbished and would have been previously cleared of equipment that would not be reused. The former PBX/PLT computer and control rooms, which are contiguous to the test cell, would be refurbished and utilized. Power supplies currently located at D-site would be used by running approximately 500 ft of copper transmission lines from equipment in the D-Site Field Coil Power Conversion (FCPC Building) to the C-Site EF/OH Building, and then to NCSX. Additional existing equipment such as neutral beams, power supplies, and vacuum pumping and gas injection systems would also be used. After completion of assembly and installation, an integrated testing program would be carried out and a plasma ("first plasma") would be produced in the device to make it ready for experimental operations.

Experiments would be carried out using hydrogen, helium and deuterium; no tritium fuel would be used. Radioactivity produced during these experiments (gamma rays, neutrons and tritium) would be very small, comparable to existing experimental fusion devices at PPPL. Construction and fabrication activities would take place mainly in 2004-2006, with operations commencing in 2007.

II. **Description of Affected Environment:** Work would take place in the former PBX-M and PLT test cells and PBX-M/PLT control room at C-Site, the OH/EF Building at C-Site, the TFTR Test Cell at D-Site, and the FCPC Building at D-Site. Also, the power cable run from D-Site to C-Site will pass over some outdoor areas and require digging. See attached map and figures.

III. **Potential Environmental Effects:** (Attach explanation for each "yes" response, and "no" responses if additional information is available and could be significant in the decision making process.)

**A. Sensitive Resources: Will the proposed action result in changes and/or disturbances to any of the following resources?**

	<u>Yes/No</u>
1. Threatened/Endangered Species and/or Critical Habitats	1. No
2. Other Protected Species (e.g. Burros, Migratory Birds)	2. No
3. Wetlands	3. No
4. Archaeological/Historic Resources	4. No
5. Prime, Unique or Important Farmland	5. No
6. Non-Attainment Areas	6. No
7. Class I Air Quality Control Region	7. No
8. Special Sources of Groundwater (e.g. Sole Source Aquifer)	8. No
9. Navigable Air Space	9. No
10. Coastal Zones	10. No
11. Areas w/Special National Designation (e.g. National Forests, Parks, Trails)	11. No
12. Floodplain	12. No

**B. Regulated Substances/Activities: Will the proposed action involve any of the following regulated substances or activities?**

	<u>Yes/No</u>
13. Clearing or Excavation (indicate if greater than 5 acres) <i>Some digging for footings would be required for the power cable runs between D-Site and C-Site; disturbed area would be about 0.2 acres.</i>	13. Yes
14. Dredge or Fill (under Clean Water Act section 404; indicate if greater than 10 acres)	14. No
15. Noise (in excess of regulations)	15. No
16. Asbestos Removal <i>The C-Site Test Cell walls are made of asbestos panels. Any wall modifications (e.g., penetrations) could result in asbestos waste, which would be handled using existing PPPL procedures.</i>	16. Yes
17. PCBs	17. No
18. Import, Manufacture or Processing of Toxic Substances	18. No
19. Chemical Storage/Use <i>Examples of chemicals that would be used during this work would include ethanol, acetone, epoxy, RTV sealant and insulating compounds. All chemicals would have accompanying material safety data sheets (MSDSs) reviewed with Industrial Hygiene, and would be used and stored per PPPL policies and procedures. Gases such as hydrogen, deuterium, helium, argon &amp; nitrogen would be used for experiments.</i>	19. Yes
20. Pesticide Use	20. No
21. Hazardous, Toxic, or Criteria Pollutant Air Emissions <i>About 1 Ci/yr maximum of tritium produced during operations would be vented to the atmosphere, well within the site limit of 500 Ci/yr.</i>	21. No
22. Liquid Effluent	22. No
23. Underground Injection	23. No
24. Hazardous Waste <i>Wastes may include small amounts of hazardous wastes (i.e., machinist coolant, used vacuum pump oil, epoxy/cements, waste solvents, and solvent soaked rags). These would be disposed of in accordance with approved PPPL procedures.</i>	24. Yes
25. Underground Storage Tanks	25. No
26. Radioactive (AEA) Mixed Waste	26. No

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| 27. | Radioactive Waste<br><i>Very small amounts (&lt; 0.001 Ci per year) of tritium contaminated vacuum pump oil may be produced during D-D operations. These would be disposed of in accordance with approved PPPL procedures.</i>   | 27. Yes |
| 28. | Radiation Exposures<br><i>Radiation shielding and administrative controls would limit worker exposures in accordance with PPPL requirements (e.g., ≤ 1,000 mrem/yr, ≤ 600 mrem/qtr). Doses to the public from direct/scattered radiation from the plasma and from air emissions would be &lt; 2 mrem/yr.</i> | 28. Yes |

**C. Other Relevant Disclosures. Will the proposed action involve the following?**

- |     |   | <u>Yes/No</u> |
|-----|---|---------------|
| 29. | A threatened violation of ES&H regulations/permit requirements<br><i>Equipment would require application of proper electrical and/or mechanical safing procedures, including lockout/tagout. All activities would apply safety requirements of the PPPL ES&amp;H Manual and PPPL policies and procedures (e.g., hoisting and rigging). Appropriate personal protective equipment (e.g., fall protection, hard hats, safety shoes, gloves, etc.) would be used. Work preplanning (e.g., job hazard analyses) to mitigate hazards would be conducted, and the area would be posted to limit unauthorized access. Appropriate measures would be taken to protect workers from adverse effects of atmospheric emissions of up to 30,000 gallons/wk of vaporized LN<sub>2</sub>.</i> | 29. No        |
| 30. | Siting/Construction/Major Modification of Waste Recovery, or TSD Facilities   | 30. No        |
| 31. | Disturbance of Pre-existing Contamination   | 31. No        |
| 32. | New or Modified Federal/State Permits   | 32. No        |
| 33. | Public controversy<br><i>Trucking in of liquid nitrogen (estimated to require up to 3 trucks per day during operating periods) would not add significantly to current offsite traffic patterns in the vicinity of PPPL, or to onsite traffic.</i>   | 33. No        |
| 34. | Action/involvement of Another Federal Agency (e.g. license, funding, approval)  | 34. No        |
| 35. | Action of a State Agency in a State with NEPA-type law. (Does the State Environmental Quality Review Act Apply?)  | 35. No        |
| 36. | Public Utilities/Services   | 36. No        |
| 37. | Depletion of a Non-Renewable Resource   | 37. No        |



Office Manager Subpart D Determination

**I HAVE DETERMINED THAT AN EA SHOULD BE PREPARED FOR THE PROPOSED ACTION DESCRIBED IN THE EENF AND BY MY SIGNATURE BELOW, YOU ARE AUTHORIZED TO PROCEED WITH THE PREPARATION OF AN EA. No further action should be taken on the project until the EA is completed, except in accordance with 40 CFR 1506.1(a). I also request that you prepare and submit a schedule to the CH NCO for the activities associated with the completion of the EA.**

CH Office Mgr: Marvin E. Gunn      Signature: \_\_\_\_\_

Date: \_\_\_\_\_