

ES&H Aspects of NCSX

Question #4 in DOE Charge Letter: Are ES&H aspects being properly addressed given the project's current stage of development?

Since December 2001, discussions have been held with the DOE Princeton Area Office (PAO), Office of Science (SC), and Office of Environment, Safety & Health (EH) on the level of NEPA review required for NCSX. Based on these discussions, and in accordance with 10CFR1021 and DOE order 451.1B, it is planned to prepare a brief Environmental Assessment (EA) for NCSX (a similar EA was prepared for the comparable NSTX experiment in 1995). Following DOE procedures, an Environmental Evaluation Notification Form (EENF) was prepared by PPPL and submitted to DOE-PAO to support DOE's determination for an EA as the appropriate NEPA documentation. EA preparation is commencing, with the goal of having the Finding of No Significant Impact (FONSI) issued prior to the scheduled completion of Critical Decision 2 (CD-2).

Although the project is at an early stage of development, the kinds of hazards that will be present have been (and are being) identified. NCSX experiments will be carried out using hydrogen, helium and deuterium; no tritium fuel will be used. Emissions to the environment will include tritium produced by D-D fusion (estimated to be < 1 Ci/yr, well within the site limit of 500 Ci/yr), and 10,000-30,000 gallons per week of vaporized liquid nitrogen boiloff from the cryostat (for which there are no regulatory limits). Maximum offsite radiation doses (due to tritium and radiation produced by the plasmas) will be very small, < 2 mrem/yr and worker exposures will comply with PPPL standards (e.g., ≤ 1,000 mrem/yr). NCSX construction activities will involve the removal of approximately 160 tons of stainless steel, 80 tons of copper and 5 tons of aluminum that will be recycled to the maximum extent possible and several tons of non-metals (plastics, wood and fiberglass) that will be disposed of as domestic waste. Wastes may include small amounts of hazardous wastes (i.e., machinist coolant, used vacuum pump oil, epoxy/cements, waste solvents, and solvent soaked rags), and very small amounts (< 0.001 Ci per year) of tritium contaminated vacuum pump oil. Modifications (e.g., penetrations) in existing walls and floors of the NCSX Test Cell could result in asbestos waste, which would be handled using existing PPPL procedures and a certified asbestos subcontractor. Chemicals used will have accompanying material safety data sheets (MSDSs) reviewed with Industrial Hygiene, and will be used and stored per existing PPPL policies and procedures. The potential hazards to workers from an accidental release of liquid nitrogen from the cryostat to the NCSX Test Cell are recognized, and will be addressed as the design progresses

All NCSX activities will be conducted using the well-established principles and core function of integrated safety management (ISM), including applying the safety requirements of the PPPL ES&H Manual and PPPL policies and procedures. Appropriate personal protective equipment (e.g., fall protection, hard hats, safety shoes, gloves, etc.) will be used. Work preplanning (e.g., job hazard analyses) to mitigate hazards will be conducted, and work areas will be posted to limit unauthorized access. Prior to first plasma, a Safety Assessment Document (SAD) will be prepared, reviewed and approved for NCSX. The SAD will include:

ES&H Aspects of NCSX

1. An overview of NCSX, including mission, goals, and objectives;
2. Descriptions of NCSX structures, systems and components, with emphasis on environment, safety and health (ES&H) features;
3. Identification of NCSX hazards and methods employed for their mitigation; and
4. A description of how operations will be conducted, with emphasis on ES&H features.

Consistent with past and present experiences with comparable experiments (e.g., NSTX), it is anticipated that an independent committee consisting of members from PPPL and PAO will be formed to conduct ES&H reviews of planned NCSX operations. This committee will make recommendations to PPPL management on whether to approve the startup of NCSX, as well as future NCSX modifications that may significantly affect ES&H.