NSTX

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Environment, Safety & Health (ES&H)

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NSTX Upgrade Project
Office of Science Review
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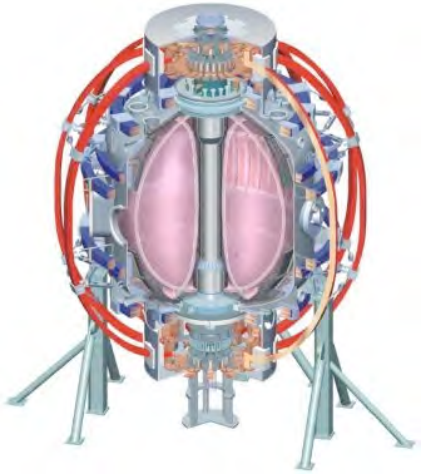

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- **Are Environment, Safety and Health (ES&H) aspects being properly addressed given the project's current stage of development?**

NEPA

- Upgrades to the NSTX experiment had been addressed in the NSTX Environmental Assessment (DOE/EA-1108; FONSI issued 12/8/95), including plasma currents up to 2 MA and pulse lengths up to 60 sec.
- Formal request to DOE-PSO for Categorical Exclusion (CX) determination under 10CFR1021 (Appendix B, B3.13).
- CX determination for NSTX Upgrade Project granted by PSO NEPA Compliance Officer on 3/31/09.
- No further NEPA actions required.

NUCLEAR FACILITY HAZARD CLASSIFICATION

- Evaluation performed of projected NSTX nuclear facility hazard classification with upgrades in place.
- Evaluation indicates that NSTX with upgrades will remain Below Hazard Category 3 Facility; 10CFR830 Subpart B safety analysis requirements are not applicable.
- Assumes maximum of 4E18 DD neutrons/yr generated.
- NSTX Safety Certificate (operations authorization) for upgrades will address neutron generation limit.

NSTX-U ES&H Considerations

- Preliminary Hazards Analysis (PHA) prepared based on current plans using hazard analysis summary in current NSTX Safety Assessment Document (SAD).

- Expected environmental emissions:
  - 0.19 Ci/yr tritium from D-D fusion (site limit: 500 Ci/yr).
  - No 40CFR61 Subpart H (NESHAPS) issues.
    - 0.0005 mrem/yr at nearest business
    - Subpart H limit is 10 mrem/yr
    - EPA approval to construct required at 0.1 mrem/yr

NSTX-U ES&H Considerations

- Radiation exposure to public: 0.006 mrem/yr from tritium & direct radiation (site limit: 10 mrem/yr).
- Radiation exposure to workers: <1000 mrem/yr, <600 mrem/qtr (PPPL Policy); collective dose controlled ALARA.
- Compliance with occupational radiation exposure regulation (10CFR835) and DOE-approved PPPL Radiation Protection Program will be assured with PPPL Health Physics Division support.
- Radiological conditions post upgrade will be enhanced compared with current operations but well within previous PPPL experience (e.g., TFTR DD & DT, TFTR D&D).

NSTX-U ES&H Considerations

- Nonradiological hazards (e.g., electrical, fire, magnetic fields, RF, lithium, etc.) are expected to be comparable to present NSTX operations.

Integrated Safety Management (ISM)

- NSTX-U activities will be conducted using PPPL's well-established policies and procedures that apply the principles and core functions of ISM.

- Project will follow the DOE approved ISM System Description (ISMS), which is incorporated into the DOE approved Worker Safety & Health Plan (WSHP) per 10CFR851

Examples of PPPL ISM Elements to be Applied by NSTX-U

- Hazard Controls

  - Installation, test & operating procedures

  - Design reviews

  - Job hazard analyses (JHAs)

  - Worker training

  - Line managers & workers involvement & responsibility
    - Safety Training Observation Program (STOP™)

  - Oversight by ES&H professionals

Examples of PPPL ISM Elements to be Applied by NSTX-U

- Assessment & Feedback

  - Line manager & facility manager walkthroughs & STOP™ audits

  - Laboratory Management Safety Walkthroughs

  - Internal audits

  - PSO surveillances

  - Plan-of-the-day meetings

  - Project team meetings

NSTX Safety Assessment Document (SAD)

- Existing NSTX Safety Assessment Document (SAD) will be revised prior to operating with upgrades

  - Descriptions of NSTX structures, systems and components (including upgrades), with emphasis on environment, safety and health (ES&H) features;

  - Identification of NSTX hazards and methods employed for their mitigation; and

  - A description of how operations will be conducted, with emphasis on ES&H features.

NSTX Activity Certification Committee (ACC)

- The existing independent joint PPPL/PSO "Activity Certification Committee", ACC will:

  - Conduct ES&H reviews of planned NSTX operations with the upgrades.

  - Make recommendations to PPPL management on whether to approve the start of NSTX operations with the upgrades.

  - Make recommendations to PPPL management on any restrictions or limitations associated with Upgrade operations (e.g., neutron generation limit).

- ACC is composed of senior engineers, physicist and ES&H professionals

Summary

The NSTX Upgrades Project is incorporating ES&H into its plans and activities, and will draw on the well-established ISM culture and infrastructure at PPPL.