(REVISED 3/3/04 & 4/28/05)

pg 1 of 2

# NEPA PLANNING FORM# 1283 (by ES&H)

**Applicability**: this form shall be prepared as early as possible for each new or continuing activity at PPPL. **Physical implementation of PPPL activities shall not proceed prior to NEPA certification of this form.**

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**Originator:** Jim Chrzanowski **WP/Project #:** 1016, 1018, 1019, 1138

**Project/Organization:** NCSX **Total Estimated Cost:** ~~$3.7~~ $12.8 million & TF 4/28/05 & fabrication 4/ 3/3/04, 4/28/05

**Title of Activity/Change:** *Modular Coil Winding Development Activities* 4/ 3/3/04

**Description of Activity:** [include physical description of activity, purpose, location, and changes to any operating Parameters or approved environmentally related limits, potential or actual ES&H impacts, as applicable. [Attach additional sheets if needed] Circle one of these choices: GENERIC ***UNIQUE*** 4/4/28/05

The activities described in this document are associated with the development of a plan for fabricating the NCSX Modular Coils. The majority of development activities will be performed in the TFTR basement at D-site. Some of the preparation work will be performed in the RESA building with all the final activities (prototype coil fabrication and winding) being done in the abandoned TFTR Test Cell at D-site. These activities will require the use of epoxies, solvents such as Inhibisol/acetone), ethanol alcohol; and Fiberglass tapes. Machining, welding, vacuum systems, electrical systems are all a component of these activities. The specific activities include: TF 4/ 3/3/04

- The development and demonstration of the equipment and tooling required for winding and vacuum impregnating the modular coils.
- The selection of an epoxy resin system through testing, for vacuum impregnating the modular coils
- The development and demonstration of a vacuum-pressure-impregnation (VPI) plan for the modular coils. Includes fabrication of molds; use of chopped fiberglass/resin applicator, and numerous VPI trials.
- Study of tolerance control during winding, involves hand winding insulated copper conductor onto a mandrel to determine tolerance requirements.
- A full-scale demonstration of winding and VPI of a modular coil. Winding and VPI stations will be set up in the TFTR Test Cell. A full-scale prototype modular coil will be fabricated to verify the new tooling, equipment and procedures. Note: The TFTR Test Cell will ultimately be used for modular coil fabrication. & TF Coil 4/ 4/28/05

**ES&H Considerations:** Will the change/activity, either individually or cumulatively with other known activities, result in changes and/or disturbances to the following entities (see Attachment 2 for directions on answering)*

| | YES | NO | | YES | NO |
|---|---|---|---|---|---|
| 1: Air Emissions | X | | 13: Sewage System | | X |
| 2: Liquid Effluent | | X | 14: Water Use | | X |
| 3: Domestic Waste * | X | | 15: Pesticide Use | | X |
| 4: Radioactive Waste | | X | 16: Chemical Use/Storage | X | |
| 5: Hazardous Waste ** | X | | 17: Petroleum Use/Storage | X | |
| 6: Mixed Waste | | X | 18: Radiation Exposure | | X |
| 7: Asbestos Waste | | X | 19: Impacts to Workers | X | |
| 8: Wetlands | | X | 20: Noise Levels | | X |
| 9: Floodplains | | X | 21: Pollution Prevention Applies | | X |
| 10: Indoor/Outdoor Clearing or Excavation | | X | 22: Stored Energy | | X |
| 11: Soil Movement | | X | 23: Fire Safety Issues | X | |
| 12: PPPL Water Systems | | X | 24: Electrical/RF/Lasers | X | |

* Provide any necessary explanations on a separate sheet attached to this form

# NEPA PLANNING FORM#_____ (by ES&H)

The undersigned have reviewed the description and assessment of ES&H considerations and state that they are accurate and complete.

**Work will not proceed until NEPA certified form (page 2) is received by cognizant person.**

**COGNIZANT PERSON:** James D. Chrzanowski **DATE:** 10/29/02

**DIVISION HEAD:** Wayne F. Reiersen **DATE:** 10/31/02

G.H. Neilson 11/1/02

**Description of ES&H Considerations**

1) Air Emissions:
Includes release of Nitrogen gas used during VPI along with epoxy resin fumes, plus minimal air emission would be generated during the operation of vacuum pumps

3) Domestic waste:
Domestic waste will be generated during the ~~dismantling of the PDX device, existing control room and computer room.~~ R&D activities and The manufacturing of The Tooling JWC 11/1/02

5) Hazardous waste:
Hazardous waste generated by this project will be given to Haz Mat Group for proper disposal according to PPPL/DOE regulations.
Machinist coolant
Used vacuum pump oil
Epoxy/ cements
Waste solvents
Solvent soaked rags

16) Chemical Use & Storage
The following chemicals would be used and stored according to PPPL/DOE regulated guidelines.
Ethanol
Acetone
Epoxy
RTV Sealant
Insulating compounds
(MSDS sheets would be provided to the IH Group for the various materials to be used)

The following gases will be used during some of the R&D trials.
Nitrogen

17) Petroleum use & Storage
Petroleum oil will be used in the vacuum pumps.

18) Impacts to Workers
Construction activities present personnel safety and Industrial Hygiene issues will have to be addressed throughout the project.

22) Stored Energy
Nitrogen gas will be used to partially pressurize epoxy fill tank during VPI (25 psi max.)

23) Fire Safety Issues
An oven system will be used to cure epoxy samples. Smoke and sprinkler heads may have to be shutdown during these operations. Fire watch would then be required.

24) Electrical/RF/Lasers
The NCSX coils will operate via DC electrical power generated from FCPC at D-site. Energized circuits are required for machine operation. As a future upgrade, 6 MW of RF power will be added.

pg 2 of 2 **NEPA PLANNING FORM # 1283**

**NEPA Evaluation: (attach "Environmental Evaluation for PPPL Change Proposal" and "Environmental Evaluation Notification Form")**

TO BE COMPLETED BY ES&H

| | YES | NO |
|---|---|---|
| Covered by an existing DOE approved categorical exclusion? | ___ | ✓ |
| If yes, specify ___ | | |
| Approval for categorical exclusion required from DOE ? | ___ | ✓ |
| DOE approval: ___ Date: ___ | | |
| Other NEPA documentation required ? | ✓ | ___ |

If yes, specify Covered under NCSX EA, DOE/EA-1437; FONSI issued 10/25/02

**NEPA Review for this Activity has been Completed :**

NEPA Compliance Manager (or designee) — Date: 11/8/02

- Revised 4/26/05 to include manufacturing of the TF Coils in the former TFTR Test Cell, See attached email from J. Chrzanowski. 4/26/05

- Certain activities in the Test Cell Basement involving contaminated components (e.g., moving elephant trunks or dehumidifier) may require HP involvement.



- Work in TFTR Test Cell requires RWP.

**Subject: Modification to NEPA 1283**
**Date:** Thursday, April 28, 2005 1:12 PM
**From:** James H. Chrzanowski <jchrzanowski@pppl.gov>
**To:** "Jerry D. Levine" <jlevine@pppl.gov>
**Cc:** "Wayne T. Reiersen" <reiersen@pppl.gov>, Hutch Neilson <hneilson@pppl.gov>, "Michael R. Kalish" <mkalish@pppl.gov>

Jerry

Per our conversation, I would like to modify the existing NEPA form #1283 "Modular Coil Fabrication" to include the manufacturing of the TF coils. Overall there isn't much difference between modular and toroidal field coils with the ES&H considerations, materials or processes used to manufacture. Below is a general description of the new work scope. Let me know what additional information you may need. Thanks

Jim

Changes:
Title:
Include reference to the manufacturing of the TF coils

TF Costs:
$1.8 million additional costs for TF coils

General Work Scope Description:
The TF coils will be manufactured in the same facility (D-site TFTR Test Cell) as are the modular coils. Processes are similar to the modular coils. They include winding the insulated copper conductor onto a mandrel. The coils will then be ground wrapped with fiberglass insulation and epoxy impregnated in the autoclave. The finished coils will also be electrically tested. The basic materials are the same for both the modular and TF coils. The TF are using extruded copper conductor, while Modular coils are using copper rope. The types of insulation and epoxy are the same as being used on the modular coils.

ES&H Considerations:
There shouldn't be any changes in this area

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ATT. #1
REVISED 4/27/99

# NEPA & SAFETY ANALYSIS REVIEW STATUS FORM

**ACTIVITY:** NCSX Modular Coil Winding Activities

**DATE RECEIVED & LOGGED IN:** 11/1/02

**READY FOR REVIEW:** ☑

**NEPA PROCESS ON HOLD:** _____

_____
REASON

**SAFETY ANALYSIS REVIEW**

SAFETY ANALYSIS REVIEWER/DATE: 11/7/02

SAFETY REVIEW/DOCUMENT. REQTS JHA(s) are required + consultation with IH & Industrial Safety. Work in TFTR Test Cell will require HP involvement (at least RWP) because the area is an RCA. If contaminated components (e.g. electrical trunks) are used in the Test Cell Basement, HP involvement is required.

**REVIEW COMPLETE** ☑
ENV EVALUATIONS COMPLETED AND SIGNED BY
ENVIRONMENTAL ENGINEER OR ALTERNATE)

**NEPA FORMS READY TO BE SENT OUT** ☑
(NEPA PLANNING FORM CERTIFIED BY
NEPA COMPLIANCE MANAGER)

**NEPA FORMS SENT OUT** ☑

- ONE COPY-ORIGINATOR
- ONE COPY-COGNIZANT PERSON
- ONE COPY-DIVISION HEAD
- ONE COPY-FACILITY MANAGER(S) FOR THE AREA(S) AFFECTED (Von Halle)
- ONE COPY-INDUSTRIAL HYGIENIST
- ONE COPY-ER/WM DIVISION HEAD [IF HAZARDOUS OR RADIOACTIVE WASTES ARE INVOLVED]
- ONE COPY-ENVIRONMENTAL ENGINEER [IF AIR EMISSIONS ARE INVOLVED]
- ONE COPY-SITE PROTECTION DIVISION HEAD [IF HAZARDOUS MATERIALS ARE INVOLVED]
- ONE COPY-OPERATIONS CENTER [IF A D-SITE CHANGE IS INVOLVED]
- ONE COPY-SAFETY ANALYSIS REVIEWER (IF APPLICABLE)
- ONE COPY-OTHERS (G. Ascione)
- ORIGINAL-NEPA FILES)

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# ENVIRONMENTAL EVALUATION FOR PPPL CHANGE PROPOSAL

NCSX MODULAR COIL WINDING ACTIVITIES
TITLE OF CHANGE OR PROJECT

J. CHRZANOWSKI
COGNIZANT PERSON

WP #1016, 1018, 1019
PROJECT NUMBER

## Evaluation

| ISSUE | APPLICABILITY A | APPLICABILITY NA | POTENTIAL IMPACT N | POTENTIAL IMPACT NAI | POTENTIAL IMPACT AI |
|---|---|---|---|---|---|
| **CONSTRUCTION ACTIVITY** | | | | | |
| DUST | ☐ | ☑ | ☐ | ☐ | ☐ |
| NOISE | ☐ | ☑ | ☐ | ☐ | ☐ |
| OTHER | ☐ | ☑ | ☐ | ☐ | ☐ |
| **EFFLUENTS AND CONTAMINANTS** | | | | | |
| SOLIDS | ☑ | ☐ | ☐ | ☑ | ☐ |
| LIQUIDS | ☑ | ☑ | ☐ | ☑ | ☐ |
| GASES | ☑ | ☐ | ☐ | ☑ | ☐ |
| **ENERGY EMISSIONS** | | | | | |
| RADIATION | ☑ | ☐ | ☐ | ☑ | ☐ |
| OTHER | ☐ | ☑ | ☐ | ☐ | ☐ |

| ISSUE | APPLICABILITY A | APPLICABILITY NA | POTENTIAL IMPACT N | POTENTIAL IMPACT NAI | POTENTIAL IMPACT AI |
|---|---|---|---|---|---|
| **LAND USE CONSIDERATION** | | | | | |
| WETLANDS/ FLOODPLAINS | ☐ | ☑ | ☐ | ☐ | ☐ |
| CRITICAL HABITATS | ☐ | ☑ | ☐ | ☐ | ☐ |
| ARCHAEOLOGICAL SITES | ☐ | ☑ | ☐ | ☐ | ☐ |
| **FACILITY CONSIDERATIONS** | | | | | |
| AESTHETICS | ☐ | ☑ | ☐ | ☐ | ☐ |
| PUBLIC RELATIONS | ☐ | ☑ | ☐ | ☐ | ☐ |
| OTHER | ☐ | ☑ | ☐ | ☐ | ☐ |

CATEGORICAL EXCLUSION: YES ☐ NO ☑

Covered under the NCSX EA (DOE/EA-1437); FONSI issued 10/25/02.

APPLICABILITY: A- APPLICABLE, NA - NOT APPLICABLE
POTENTIAL IMPACT: N - NONE, NAI - NO ADVERSE IMPACT (POSSIBLE IMPACT BUT NOT EXPECTED TO BE HARMFUL), AI - ADVERSE IMPACT

## COMMENTS & CONCLUSIONS

ANY APPLICABLE ISSUE REQUIRES COMMENT STATEMENT - USE ADDITIONAL PAGES IF NECESSARY.

Some air emissions of nitrogen gas during vacuum pressure impregnation (VPI) operations, along with epoxy resin fumes may occur. Some domestic wastes may be generated, along with hazardous wastes (i.e., machinist coolant, used vacuum pump oil, epoxy/cements, waste solvents, and solvent soaked rags). Work in the TFTR Test Cell would comply with PPPL requirements for work in an radiologically controlled area (RCA) (e.g., RWP, etc.).

EVALUATOR — EVALUATION DATE: 11/7/02

PPPL ENVIRONMENTAL ENGINEER (OR DESIGNEE) — APPROVAL DATE: 11/6/02

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# ENVIRONMENTAL EVALUATION NOTIFICATION FORM

Grantee/Contractor Laboratory: Princeton University/Princeton Plasma Physics Laboratory (PPPL)
Project/Activity Title: NCSX Modular Coil Winding Development Activities
CH NEPA Tracking No.: _____ Type of Funding SC
B&R Code: AT5015020 Total Estimated Cost: $3.7M

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

Contractor Project Manager: --------- Signature: --------
Date: _____

Contractor NEPA Reviewer: Jerry D. Levine Signature: _____
Date: 11/7/02

TF & GF 4/8/05

I. **Description of Proposed Action:** Activities will be performed to develop a plan for fabricating the NCSX Modular Coils; the majority of this work will be done in the former TFTR Test Cell Basement at D-Site. These activities will require the use of epoxies; solvents such as inhibisol/acetone and ethanol alcohol; and fiberglass tapes. Machining, welding, use of vacuum systems, and use of electrical systems will be part of these activities, which will include (see attached Statement of Work NCSX-SOW-142-00):

1. Development & demonstration of the equipment & tooling required for winding and vacuum impregnating the modular coils;
2. Selection of an epoxy resin system, through testing, for vacuum impregnating the modular coils;
3. Development & demonstration of a vacuum pressure impregnation (VPI) plan for the modular coils, which includes mold fabrication, use of chopped fiberglass/resin applicator, and numerous VPI trials;
4. Study of tolerance control during winding, which involves hand winding insulated copper conductor onto a mandrel to determine tolerance requirements;
5. A full-scale demonstration of winding and VPI of a modular coil, which will include setting up winding and VPI stations in the TFTR Test Cell and fabrication of a full-scale prototype modular coil to verify new tooling, equipment and procedures (the TFTR Test Cell will ultimately be used for modular coil fabrication).

TF 11/28/05

II. **Description of Affected Environment:** Most of this work will take place in the former TFTR Test Cell Basement at D-Site, with some preparation work occurring in the RESA Building at C-Site, and final activities being done in the former TFTR Test Cell. See attached map.

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?**

| | | Yes/No |
|---|---|---|
| 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?**

| | | Yes/No |
|---|---|---|
| 13. | Clearing or Excavation (indicate if greater than 5 acres) | 13. No |
| 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 | 16. No |
| 17. | PCBs | 17. No |
| 18. | Import, Manufacture or Processing of Toxic Substances | 18. No |
| 19. | Chemical Storage/Use | 19. Yes |

*Examples of chemicals that will be used during this work would include ethanol, acetone, epoxy, RTV sealant and insulating compounds. All chemicals will have accompanying material safety data sheets (MSDSs) reviewed with Industrial Hygiene, and would be used and stored per PPPL policies and procedures. Nitrogen gas would be used during some of the R&D trials to partially pressurize the epoxy filled tank (25 psi max) during VPI.*

| | | |
|---|---|---|
| 20. | Pesticide Use | 20. No |
| 21. | Hazardous, Toxic, or Criteria Pollutant Air Emissions | 21. No |
| 22. | Liquid Effluent | 22. No |
| 23. | Underground Injection | 23. No |
| 24. | Hazardous Waste | 24. Yes |

*Wastes may include 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.*

| | | |
|---|---|---|
| 25. | Underground Storage Tanks | 25. No |
| 26. | Radioactive (AEA) Mixed Waste | 26. No |
| 27. | Radioactive Waste | 27. No |
| 28. | Radiation Exposures | 28. Yes |

*Work performed in the former TFTR Test Cell will follow PPPL requirements for work in a radiological controlled area (RCA).*

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

| | | Yes/No |
|---|---|---|
| 29. | A threatened violation of ES&H regulations/permit requirements | 29. No |

*Work will involve safety hazards from use of chemicals, emissions of gases and fumes, use of a hot oven to cure epoxy samples, use of tools, use of pressurized gases and tanks, application of high voltages to coils, etc. Work preplanning (e.g., job hazard analyses, consultation with Industrial Hygiene & Industrial Safety, etc.) to mitigate hazards will be conducted. All activities will apply safety requirements of the PPPL ES&H Manual and PPPL policies and procedures). Appropriate personal protective equipment (e.g. hard hats, safety shoes, gloves, etc.) will be used. Use of the oven may require shutdown of smoke detector, requiring use of a fire watch.*

| | | |
|---|---|---|
| 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 | 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 |

IV. **Section D Determination:** Is the project/activity appropriate for a determination by the OM under Subpart D of the DOE NEPA Regulations for compliance with NEPA?

N/A

A. **DOE-CH NEPA Coordinator Review: N/A**

DOE-CH NEPA Coordinator Reviewer: Allen Wrigley

Signature: N/A Date:

B. **DOE CH NCO NEPA Review: N/A**

NCO Concurrence with Proposed Class of Action Recommended

CX EA EIS

Category

DOE CH NCO Reviewer: Peter R. Siebach

Signature: N/A Date:

**DOE Recommendation Approvals:**

CH PG: Jerry W. Faul Signature: N/A

Date:

CH NCO: Peter R. Siebach Signature: N/A

Date:

CH GLD: Irene P. Atney Signature: N/A

Date:

CH ESHD: Justin T. Zamirowski Signature: N/A

Date:

CH AMST: John P. Kennedy Signature: N/A

Date:

Office Manager Subpart D CX Determination and Approval:

**The preceding pages are a record of documentation required under DOE Final NEPA Regulation, 10 CFR Part 1021.410, and SEN-15-90 to establish that an action may be categorically excluded from further NEPA review. I have determined that the proposed action meets the requirements for the Categorical Exclusion referenced above. Therefore, by my signature below, I have determined that the proposed action may be categorically excluded from further NEPA review and documentation.**

CH Office Mgr: Marvin E. Gunn Signature: N/A

Date:

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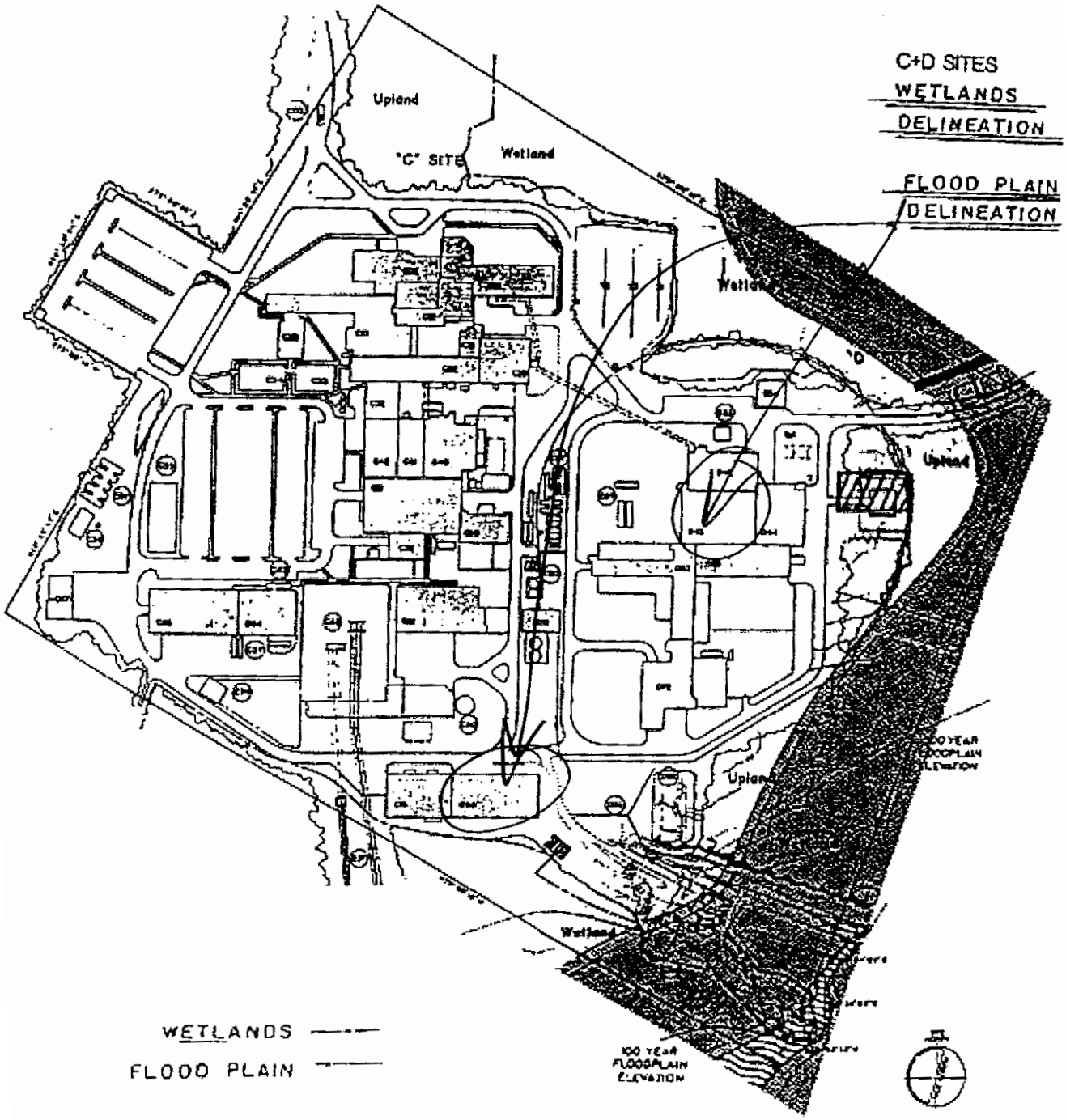
| PPPL | PRINCETON PLASMA PHYSICS LABORATORY | PROCEDURE | No. ESH-014 Rev 4 Attachment 4 |
|---|---|---|---|
| Map (Floodplains and Wetlands) | | | page 1 of 1 |




SHADE INDICATES STREAM PROTECTION CORRIDOR PER PRINCETON FORRESTAL CENTER STORMWATER MANAGEMENT PLAN, 1980

SITE PLAN
PRINCETON UNIVERSITY
PLASMA PHYSICS LABORATORY