

**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.

Originator: Gettelfinger WP/Project #: ~~1100~~ 1100

Project/Organization: NCSX Total Estimated Cost: \$100K

Title of Activity/Change: Coil Power Test Area

**Description of Activity:** [include physical description of activity, purpose, location, 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**

Build a 50 kilpampere, 77 degree Kelvin-capable test area in the TFTR Basement for power cycling NCSX field coils.

**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	<input type="checkbox"/>	<input checked="" type="checkbox"/>	13: Sewage System	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2: Liquid Effluent	<input type="checkbox"/>	<input checked="" type="checkbox"/>	14: Water Use	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3: Domestic Waste	<input type="checkbox"/>	<input checked="" type="checkbox"/>	15: Pesticide Use	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4: Radioactive Waste	<input type="checkbox"/>	<input checked="" type="checkbox"/>	16: Chemical Use/Storage	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5: Hazardous Waste <i>JH</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Urethane foam insulation (8 cu ft)	<input type="checkbox"/>	<input type="checkbox"/>
6: Mixed Waste	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17: Petroleum Use/Storage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7: Asbestos Waste	<input type="checkbox"/>	<input checked="" type="checkbox"/>	18: Radiation Exposure	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8: Wetlands	<input type="checkbox"/>	<input checked="" type="checkbox"/>	19: Impacts to Workers	see 16	<input type="checkbox"/>
9: Floodplains	<input type="checkbox"/>	<input checked="" type="checkbox"/>	20: Noise Levels	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10: Indoor/Outdoor Clearing or Excavation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	21: Pollution Prevention Applies	<input type="checkbox"/>	<input checked="" type="checkbox"/>
11: Soil Movement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	22: Stored Energy	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12: PPPL Water Systems	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Inductive storage (seconds-long)	<input type="checkbox"/>	<input type="checkbox"/>
			23: Fire Safety Issues	<input type="checkbox"/>	<input checked="" type="checkbox"/>
			24: Electrical/RF/Lasers	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

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.

COG PERSON/ATI: Gettelfinger *[Signature]* DATE: 10/24/03

DIV HEAD/RLM: Reiersen *[Signature]* DATE: 10/24/03

pg 2 of 2 NEPA PLANNING FORM # 1312

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

Covered by an existing DOE approved categorical exclusion? YES NO

YES  NO

If yes, specify \_\_\_\_\_

Approval for categorical exclusion required from DOE?  YES  NO

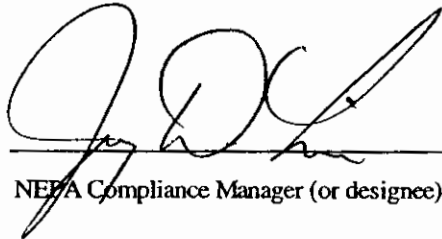
DOE approval: \_\_\_\_\_ Date: \_\_\_\_\_

Other NEPA documentation required?  YES  NO

If yes, specify Covered under approved DOE/OA-1437, FONSI issued 10/25/02

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NEPA Review for this Activity has been Completed :

  
\_\_\_\_\_  
NEPA Compliance Manager (or designee)

10/28/03  
Date:

- Review plans for foam insulation with waste Management Group & Industrial Hygiene. Precautions for MDI may be required.

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NEPA & SAFETY ANALYSIS REVIEW STATUS FORM

ACTIVITY: NCSX Coi Power Test Area

DATE RECEIVED & LOGGED IN: 10/24/03

READY FOR REVIEW:

NEPA PROCESS ON HOLD: \_\_\_\_\_

REASON

SAFETY ANALYSIS REVIEW

SAFETY ANALYSIS REVIEWER/DATE: Jy Kim 10/28/03

SAFETY REVIEW/DOCUMENT. REQTS JHA required. Ensure that oxygen-deficient atmosphere cannot develop. Use of urethane foam may require special precautions (e.g., MDI monitoring, PPE, enhanced ventilation due to MDI; consult product MSDS & JHA.

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 R. Borsovic
- ORIGINAL-NEPA FILES) \_\_\_\_\_

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ENVIRONMENTAL EVALUATION FOR PPPL CHANGE PROPOSAL

NCSX COIL POWER TEST AREA  
TITLE OF CHANGE OR PROJECT

G. GETTELFINGER  
COGNIZANT PERSON

1100  
PROJECT NUMBER

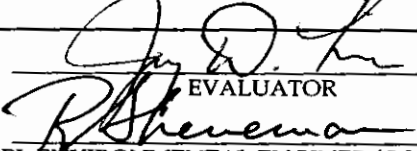
Evaluation

ISSUE	APPLICABILITY		POTENTIAL IMPACT			ISSUE	APPLICABILITY		POTENTIAL IMPACT		
	A	NA	N	NAI	AI		A	NA	N	NAI	AI
CONSTRUCTION ACTIVITY						LAND USE CONSIDERATION					
DUST	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	WETLANDS/ FLOODPLAINS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NOISE	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	CRITICAL HABITATS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ARCHAEOLOGICAL SITES	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EFFLUENTS AND CONTAMINANTS						FACILITY CONSIDERATIONS					
SOLIDS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AESTHETICS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LIQUIDS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PUBLIC RELATIONS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GASES	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	OTHER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ENERGY EMISSIONS						CATEGORICAL EXCLUSION		YES	<input type="checkbox"/>	NO	<input checked="" type="checkbox"/>
RADIATION	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Approved NCSX EA (DOE/EA-1437)					
OTHER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
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.

Very small amounts of urethane fumes may be emitted.

  
EVALUATOR  
PPPL ENVIRONMENTAL ENGINEER (OR DESIGNEE)

10/28/03  
EVALUATION DATE  
10/28/03  
APPROVAL DATE

Foam insulation should be evaluated by waste management group for potential as a hazardous waste (provide MSDS to waste management). Non-hazardous foam insulation should be used if practical.

1312

ENVIRONMENTAL EVALUATION NOTIFICATION FORM

Grantee/Contractor Laboratory: Princeton University/Princeton Plasma Physics Laboratory (PPPL)
Project/Activity Title: NCSX Coil Power Test Area
CH NEPA Tracking No.: Type of Funding
B&R Code: Total Estimated Cost: \$100K

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

Contractor Project Manager: Signature: Date:

Contractor NEPA Reviewer: Jerry D. Levine Signature: Date: 10/28/03

- I. Description of Proposed Action: A 50 kA, 77°K-capable test area will be built in the TFTR Test Cell Basement for power cycling testing of NCSX field coils.
II. Description of Affected Environment: Work will take place in the D-Site TFTR Test Cell Basement (see attached drawing and 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?

Table with 12 rows listing sensitive resources (e.g., Threatened/Endangered Species, Wetlands, Archaeological/Historic Resources) and corresponding Yes/No responses, all marked as '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)	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
<i>Urethane foam (8 cubic feet) will be used to insulate tested coils. This foam may contain MDI (see attached MSDS).</i>	
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. No
<i>Foam insulation should be evaluated by the Waste Management Group for potential as a hazardous waste. Non-hazardous foam insulation should be used if practical.</i>	
25. Underground Storage Tanks	25. No
26. Radioactive (AEA) Mixed Waste	26. No
27. Radioactive Waste	27. No
28. Radiation Exposures	28. No

**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	29. No
<i>This activity will comply with the applicable provisions of the ES&amp;H Manual. A Job Hazard Analysis (JHA) must be prepared and reviewed by all participants prior to starting this work. Need to ensure that oxygen deficient atmosphere and other hazards from use of LN2 cannot develop and/or harm workers. Use of urethane foam may require special precautions (e.g., MDI monitoring, PPE, enhanced ventilation, etc.) due to presence of MDI; consult the MSDS and Industrial Hygiene.</i>	
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:

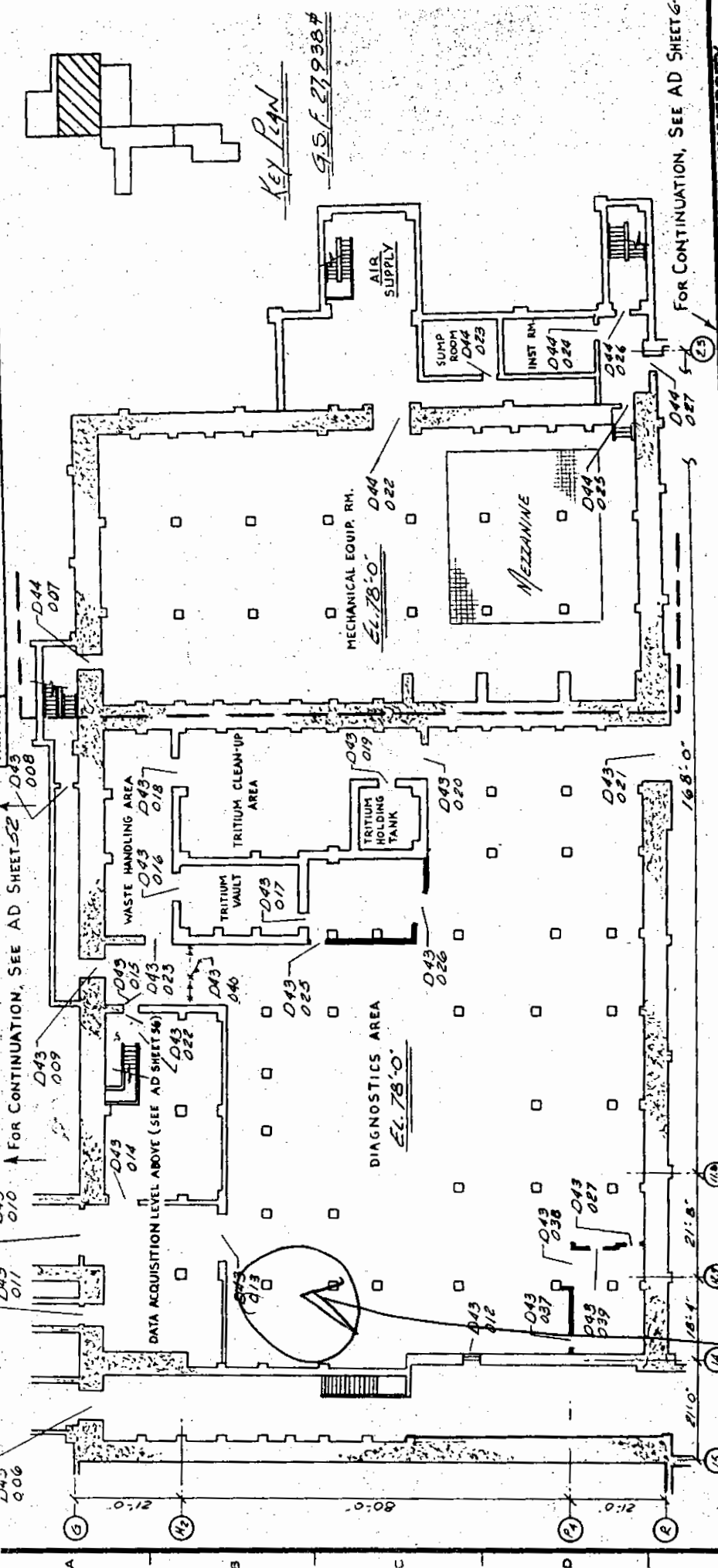
The preceding pages are a record of documentation required under DOE Final NEPA Regulation, 10 CFR Part 1021.410, and SEN-15-90 to establish that an action may be categorically excluded from further NEPA review. I have determined that the proposed action meets the requirements for the Categorical Exclusion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





PRINCETON UNIVERSITY  
 PLASMA PHYSICS LABORATORY  
 JAMES FORRESTAL RESEARCH CENTER  
 P.O. BOX 481 PRINCETON, N. J.

ENG. A. DeSantis  
 DRAWN: JLR 10.2.83  
 CHKD: R  
 APPD:   
 SCALE: 1" = 20'-0"  
 WORK ORDER NO.   
 FRACTIONS ± 00  
 DECIMALS ± 00  
 ANGULAR ± 00

TITLE: EXPERIMENTAL AREA  
 LOWER BASEMENT PLAN

ASSY:   
 MACH:   
 DWG. NO. AD-300

SHEET 55

NOTES:  
 1. REF. GIFFELS DWG. A-106

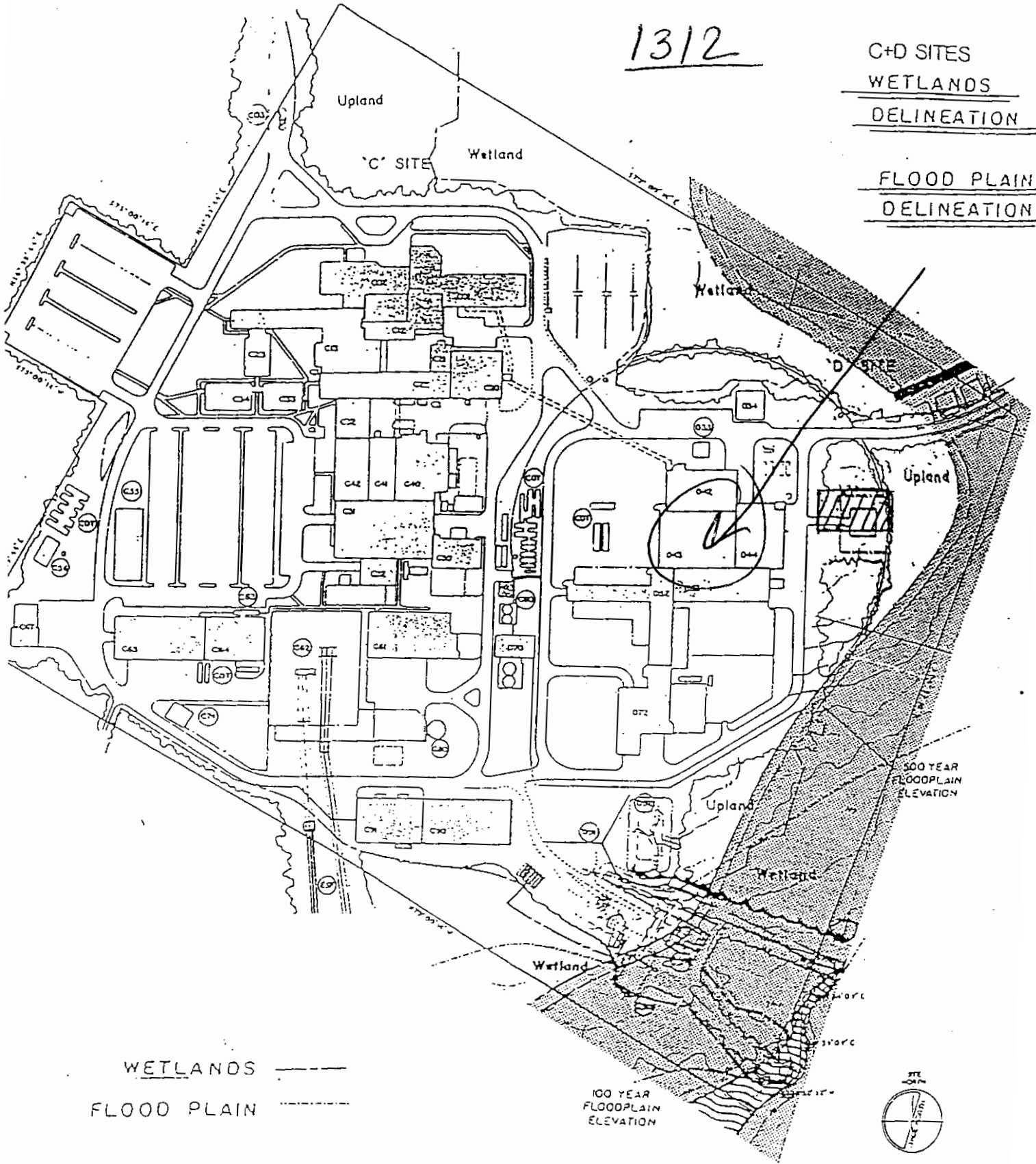
NO.	REVISION	DATE

1312

1312

C+D SITES  
WETLANDS  
DELINEATION

FLOOD PLAIN  
DELINEATION



WETLANDS - - - -  
FLOOD PLAIN . . . .

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

0 100 300 500 FT.

SITE PLAN  
PRINCETON UNIVERSITY  
PLASMA PHYSICS LABORATORY

# MATERIAL SAFETY DATA SHEET

62  
4630



IPI International, Inc.

P.O. Box 70  
505 Blue Ball Road  
Elkton, MD 21922-0070

Technical Information: 410-392-4800  
Emergency Information: 410-392-4800  
8:30 A.M. TO 5:00 P.M. E.S.T. M-F

Revision Date: 6/14/99  
MSDS Number: A  
Category Code: MPAS

In the event of a chemical emergency involving a spill, leak, fire, exposure, or accident call CHEMTREC, 800-424-9300. Read the MSDS, technical bulletin, label and the ISOFOAM Polyisocyanates Handling and Safety Information prior to use.

## Section I - Product Identification

Product Name: ISOFOAM® A (ISOFOAM is a registered trademark) R-1A13-A  
Description: Polyurethane isocyanate component.  
CAS Number: Mixture

## Section II - Hazardous Ingredients

	CAS #	Weight %	ACGIH/TLV		Exposure Limits	
			TWA	STEL	OSHA/PEL	
Polyurethane polyphenyl isocyanate containing	9016-87-9	100	NE	NE	NE	NE
4,4'-Diphenylmethane diisocyanate (MDI)	101-68-8	ca 50	0.005 ppm	NE	0.02 ppm (C)	

## Section III - Hazard Summary

Emergency Overview: Harmful if inhaled. Toxic fumes are released in fire situations. Dark brown viscous liquid. Pungent odor.

HMS RATINGS: Significant = 0      Health 3      Flammability 1      Reactivity 1  
Slight = 1      Moderate = 2      High = 3      Extreme = 4

NFPA RATINGS: Minimal = 0      Health 3      Flammability 1      Reactivity 1  
Slight = 1      Moderate = 2      Serious = 3      Severe = 4

### Potential Health Effects:

- Inhalation:** At room temperature, MDI vapors are minimal due to low vapor pressure. However, heating, spraying, foaming, or otherwise mechanically dispersing (drumming, venting or pumping) operations may generate vapor or aerosol concentrations sufficient to cause irritation or other adverse effects. Excessive exposure may cause irritation of the eyes, upper respiratory tract and lungs. Severe overexposure may lead to pulmonary edema. May cause respiratory sensitization with asthma-like symptoms in susceptible individuals. MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized. Symptoms may include coughing, dryness of throat, headache, nausea, difficult breathing and a feeling of tightness in the chest. Effects may be delayed. Impaired lung function (decreased ventilator capacity) has been associated with overexposure to isocyanates. *Persons with known respiratory or allergy problems must not be exposed to this product.*
- Skin Contact:** No irritation is likely to develop following short contact periods with skin. Prolonged or repeated exposure can cause skin irritation, reddening, dermatitis, and in some individuals, sensitization. Skin contact may result in allergic skin reactions or respiratory sensitization, but is not expected to result in absorption of amounts sufficient to cause other adverse effects. May stain skin.
- Eye Contact:** As a liquid or dust, may cause irritation, inflammation, and/or damage to sensitive eye tissue. Symptoms include watering or discomfort of the eyes. Corneal injury is unlikely.

NE=Not Established    NDA=No Data Available    ca=Approximately    <=Less than    C= Ceiling

Date: 6/14/99

MSDS Number: A

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### Section III - Hazard Summary - Cont'd

- **Ingestion:** Single dose oral toxicity is considered to be extremely low. Can result in irritation and corrosive action in the mouth, stomach tissue and digestive tract.
- **Chronic:** As a result of previous repeated overexposures or a single large dose, certain individuals develop isocyanate sensitization (chemical asthma) or tissue injury in the upper respiratory tract. Animal tests indicate skin contact alone may also lead to allergic respiratory reaction. These effects may be permanent. Any person developing asthmatic reaction or other sensitization should be removed from further exposure.
- **Carcinogenicity:** MDI and Polymeric MDI are not listed by the NTP, IARC or regulated by OSHA as carcinogens. Lung tumors have been observed in laboratory animals exposed to aerosol droplets of MDI/Polymeric MDI (6 mg/m<sup>3</sup>) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects.

### Section IV - First Aid Measures

- Eyes:** Flush eyes with plenty of water for at least 15 minutes. Materials containing MDI may react with the moisture of the eye forming a thick material which may be difficult to wash from the eyes. Seek medical attention.
- Skin:** Wash off in flowing warm water or shower with soap. Remove and wash contaminated clothing and discard contaminated shoes. If redness, itching or a burning sensation develops or persists after the area is washed, consult a physician.
- Ingestion:** If swallowed, drink 1 or 2 glasses of water or milk. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Seek medical attention.
- Inhalation:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility immediately.

#### NOTE TO

- PHYSICIAN:** **EYES:** Stain for evidence of corneal injury. If cornea is burned, instill antibiotic steroid preparation frequently. Workplace vapors have produced reversible corneal epithelial edema impairing vision.  
**SKIN:** This compound is a known skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burns. If burned, treat as a thermal burn.  
**INGESTION:** Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of this compound.  
**INHALATION:** Isocyanates are known pulmonary sensitizers. Treatment is essentially symptomatic. An individual having a skin or pulmonary sensitization reaction to this material should be removed from exposure to any isocyanate compound.

### Section V - Fire Fighting Measures

- Flash Point:** 425°F, 218°C (COC) NFPA Combustible Class III B
- Autoignition Temperature:** NDA
- Flammable Limits (STP):** NDA Toxic fumes are released in fire situations.
- Fire Degradation Products:** Isocyanate vapor and mist, carbon dioxide, carbon monoxide, nitrogen oxides and traces of hydrogen cyanide.
- Extinguishing Media:** Use dry chemical, foam, carbon dioxide, or halogenated agents. If water is used, use very large quantities. The reaction between water and hot isocyanate may be vigorous. If possible, contain fire run-off water.
- Protective Equipment:** Wear positive-pressure self-contained breathing apparatus with full face mask and full protective clothing.
- Unusual Hazards:** At temperatures greater than 400°F, polymeric MDI can polymerize and decompose which will cause pressure build-up in closed containers. Explosive rupture is possible. Water contamination will produce carbon dioxide. Do not reseal contaminated containers as pressure buildup may rupture the containers. Downwind personnel must be evacuated.

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Date: 6/14/99

MSDS Number: A

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## Section VI - Accidental Release Measures

**Spill:** Evacuate spill area. With adequate ventilation and appropriate personal protective equipment, cover the area with an inert absorbent material such as clay or vermiculite and transfer to metal waste containers. Saturate with water or decontamination solution below, but do not seal the container with the isocyanate mixture. Larger quantities of liquid may be transferred directly to drums for disposal. Decontaminate or discard all clean-up equipment.

**NOTE:** ISOCYANATES WILL REACT WITH WATER AND GENERATE CARBON DIOXIDE. THIS COULD RESULT IN THE RUPTURE OF ANY CLOSED CONTAINERS.

**Clean up:** The area should then be flushed with a decontamination solution. The decontamination solution is a 5-10% mixture of sodium carbonate and 0.5% liquid detergent in water solution or a 3-8% concentrated ammonium hydroxide and 0.5% liquid detergent in water. Use 10 parts decontamination solution to 1 part spilled material. If the ammonium hydroxide solution is used, ammonia will be evolved as a vapor. Use caution to avoid exposure to high concentrations of ammonia. Allow to stand for 48 hours letting evolved carbon dioxide to escape.

**Disposal:** Any disposal practice must be in compliance with all federal, state and local laws and regulations. Chemical additions, processing or otherwise altering the material may make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate. Waste characterization and disposal compliance are the responsibility solely of the party generating the waste or deciding to discard or dispose of the material. Product as sold is not a RCRA hazardous waste when disposed.

Do not allow material to enter sewers, a body of water, or contact the ground. Refer to RCRA 40 CFR 261, and/or any other appropriate federal, state or local requirements for proper classification information.

### Container

**Disposal:** Drums/containers must be thoroughly drained to process or storage vessels before removal to an appropriate area for subsequent decontamination. Drums/containers must be decontaminated in properly ventilated areas by personnel protected from the inhalation of isocyanate vapors. Spray or pour 1 to 5 gallons of decontaminating solution into the drum, making sure the walls are well rinsed. Let the drum/container soak/unsealed for 48 hours. Pour out the decontaminating solution and triple rinse the empty container. Puncture or otherwise destroy the rinsed container before disposal. Do not heat or cut empty containers with electric or gas torch.

Call CHEMTREC (800-424-9300) for chemical emergencies or spills during transportation

## Section VII - Storage and Handling

**Storage:** When stored between 15 and 30°C (60 and 85°F) in sealed containers, typical shelf life is 6 months or more from the date of manufacture. Consult technical data sheet for shelf life requirements affecting performance quality. Should freezing occur, the material must be thawed thoroughly and mixed until uniform. Opened containers must be handled properly to prevent moisture pickup.

**Handling:** Use personal protective equipment when transferring material to or from drums, totes or other containers. Safety glasses and gloves are the minimum protection. Additional precautions must be used when splash hazards are present. The reaction of polyols and isocyanates generates heat. Contact of the reacting materials with skin or eyes can cause severe burns and may be difficult to remove from the affected areas. Immediately wash affected areas with plenty of water and seek medical attention. In addition, such contact increases the risk of exposure to isocyanate vapors. Do not smoke or use naked lights, open flames, space heaters, or other ignition sources near pouring, frothing or spraying operations.

**Special Emphasis for Spray Applications:** Inspect the application area from the potential to expose other persons or for overspray to drift onto buildings, vehicles or other property. When spraying building exteriors, persons entering or exiting the building as well as those inside could be exposed to polyisocyanates due to wind conditions, open windows or air intakes. Do not begin application work until these potential problems have been corrected.

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Date: 6/14/99

MSDS Number: A

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## Section VIII - Exposure Control

**Exposure:** MDI contains reactive isocyanate groups. Use with adequate ventilation to keep airborne isocyanate level below TLV of 0.005 ppm TWA (ACGIH) and PEL 0.02 ppm ceiling (OSHA). These control limits do not apply to previously sensitized individuals or to individuals with existing respiratory disease, such as chronic bronchitis, emphysema or asthma. Respiratory protection may be needed where material is heated, sprayed or used in a confined space, or if TLV is exceeded. Never try to detect MDI vapor by odor.

*Persons with known respiratory or allergic problems must not be exposed to this product.*

**Ventilation:** MDI has a very low vapor pressure at room temperature. General/local ventilation typically control exposure levels very adequately. Uses requiring heating and/or spraying may require more aggressive engineering controls or personal protective equipment. Monitoring is required to determine engineering controls.

**Respiratory Protection:** A supplied air, full face mask, positive pressure or continuous flow respirator or a supplied air hood is required when airborne concentrations are unknown or exceed threshold values. A positive pressure self contained breathing apparatus can be used in emergencies or other unusual situations. All equipment must be NIOSH/MSHA approved and maintained. Air purifying (cartridge type) respirators are not approved for protection against isocyanates.

**Eye Protection:** Chemical splash goggles or safety glasses or full face mask must be used consistent with splash hazard present. If vapor exposure causes eye discomfort, use a full facepiece respirator or supplied air hood.

**Protective Clothing:** Wear clothing, boots and gloves impervious to MDI under conditions of use. Materials may include butyl rubber, nitrile rubber, neoprene and Saranex® coated Tyvek®.

### Other Protective

**Equipment:** An eyewash station and safety shower or other flushing facilities are recommended in the work area.

## Section IX - Typical Properties

Physical Form:	Dark brown viscous liquid
Odor:	Pungent
pH:	Reacts with water
Boiling Point:	406°F; 207°C (5 mmHg)
Vapor Pressure (mm at 20°C):	<0.00001
Solubility in water:	Not soluble, reacts
Specific Gravity at 25°C:	1.23
Viscosity at 25°C:	200 cps
% Volatile, by weight:	Negligible

## Section X - Stability and Reactivity

**Stability:** Polyisocyanates are highly reactive chemicals and should be handled and stored in a way to avoid exposure to many common substances, including water and moisture. Material is stable when stored in sealed containers under normal conditions. Avoid extended exposure over 110°F (45°C).

### Hazardous

**Polymerization:** May occur with incompatible reactants especially strong bases, water or temperatures over 320°F (160°C). Possible evolution of carbon dioxide gas from overheating or exposure to contaminants may rupture closed containers.

**Reactivity:** Reacts with water, acids, bases, alcohols, metal compounds. The reaction with water is very slow under 120°F (50°C), but is accelerated at higher temperatures and in the presence of alkalis, tertiary amines and metal compounds. Some reactions can be vigorous or even violent.

NE=Not Established NDA=No Data Available ca=Approximately <=Less than C= Ceiling

Date: 6/14/99

MSDS Number: A

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## Section XI - Shipping Information

DOT (Domestic Surface)  
Hazard Class or Division: Not regulated

IMO (Ocean)  
Hazard Class or Division: Not regulated

IATA/ICAO (Air)  
Hazard Class or Division: Not regulated

## Section XII - Federal Regulatory Information

OSHA Status: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA Status: On TSCA inventory.

CERCLA Reportable Quantity: 4,4'-Diphenylmethane diisocyanate = 5,000 lbs

SARA Title III:

Section 302 Extremely Hazardous Substances:  
None

Section 311/312 Hazard Categories:

Immediate Health Hazard, Delayed Health Hazard, Reactive Hazard

Section 313 Toxic Chemicals:

Poly(methylene polyphenyl isocyanate)

CAS Number: 9016-87-9 100%

Methylenebis(phenylisocyanate) (MDI)

CAS Number: 101-68-8 ca. 50%

RCRA Status: MDI is not listed as a hazardous waste. However, under RCRA, it is the responsibility of the user of products to determine, at any time of disposal, whether a product meets any of the criteria for hazardous waste.

## Section XIII - Other Regulatory Information

Individual State requirements:

California Proposition 65: This product does not contain any chemicals known to the State of California to cause cancer.

For further details on regulatory and shipping requirements, contact IPI or the appropriate agency.

## Section XIV - Comments

This MSDS complies with 29 CFR 1910.1200 (Hazard Communication Standard)

Issued by: IPI International, Inc. Elkton, Maryland

Prepared by Michael S. Buchanan.

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, expressed or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

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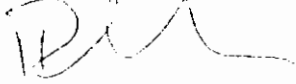
**PRINCETON UNIVERSITY: PLASMA PHYSICS LABORATORY**  
Electrical Design Branch

**TO: NCSX Project Team**

**DATE: February 23, 2005**

**FROM: R.E. Hatcher**

**SUBJECT: NCSX Coil Test Facility Fields**



**INTEROFFICE MEMORANDUM**

In April of 2004 I was asked to calculate the level of magnetic field produced in surrounding areas by a test coil located in the NCSX coil test facility. The results of this calculation would be used to determine what, if any, safety precautions (e.g., signage) would be appropriate for the facility.

The calculation is based on coil data taken from an Excel spread sheet entitled "PPPL racetrack coil points.xls" obtained from G. Gettelfinger (ATI of the NCSX coil test facility). Magnetic fields were calculated at three radii: 7.5, 15, and 140 feet from the coil center. Fields were calculated with a code that implements the Biot-Savart law for arbitrary geometries. The only simplifying assumption is that there is no significant ferro-magnetic material that needs to be considered (this is typical for these types of calculations).

The output of the code (available on request) is magnetic fields (in gauss) at the selected points. The results indicate that the peak field (assuming 24 kA current) is 24(3.4) gauss at a distance of 7.5(15) feet from the center of the coil.

If we interpret these findings (per ESHD-5008) we would conclude that the field levels are of no concern for non-pacemaker users and of some concern for pacemaker users. The peak field at 140 feet was  $\ll 1$  gauss which is the level where NSTX would be concerned (per M. Bell, private communication).

The results of this calculation could be scaled for some new configurations, but it is sufficiently simple that doing it afresh for each new configuration would be the prudent choice.