

FEB - 4 2014

Ms. Victoria A. White  
Chief Operating Officer  
Fermilab  
P.O. Box 500  
Batavia, IL 60510

FSO Hersemann/jp <i>RH</i> 2/4/14
FSO Scott <i>JS</i> 2/4/14
FSO Bollinger <i>AB</i> 2/4/14
FSO Weis <i>MW</i> 2/4/14

Dear Ms. White:

SUBJECT: NATIONAL ENVIRONMENTAL POLICY ACT DETERMINATION AT FERMI  
NATIONAL ACCELERATOR LABORATORY – NIOBIUM TIN  
SUPERCONDUCTING COIL DEVELOPMENT FOR FUTURE MAGNETS

Reference: Letter, from V. White to M. Weis, dated January 30, 2014, Subject: National  
Environmental Policy Act Environmental Evaluation Notification Form for Niobium  
Tin Superconducting Coil Development for Future Magnets

I have reviewed the National Environmental Policy Act (NEPA) Environmental Evaluation  
Notification Form (EENF) for Niobium Tin Superconducting Coil Development for Future  
Magnets. Based on the information provided in the EENF, I have approved the following  
categorical exclusion (CX):

<u>Project Name</u>	<u>Approved</u>	<u>CX</u>
Niobium Tin Superconducting Coil Development for Future Magnets	2/4/2014	B1.15, B1.31

I am returning a signed copy of the EENF for your records. No further NEPA review is required.  
This project falls under categorical exclusions provided in 10 *CFR* 1021, as amended in  
November 2011.

Sincerely,  
*MJW*  
Michael J. Weis  
Site Manager

Enclosure:  
As Stated

cc: N. Lockyer, w/o encl. M. Michels, w/encl. A. Kenney, w/o encl. T. Dykhuis, w/encl.	bc: J. Scott, w/o encl. R. Hersemann, w/encl.
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**FERMILAB ENVIRONMENTAL EVALUATION NOTIFICATION FORM  
(EENF) for documenting compliance with the National Environmental Policy  
Act (NEPA), DOE NEPA Implementing Regulations, and the DOE NEPA  
Compliance Program of DOE Order 451.1B**

**Project/Activity Title:** Niobium Tin ( $Nb_3Sn$ ) Superconducting Coil Development for  
Future Magnets

**ES&H Tracking Number:** 01118

I hereby verify, via my signature, the accuracy of information in the area of my contribution for this document and that every effort would be made throughout this action to comply with the commitments made in this document and to pursue cost-effective pollution prevention opportunities. Pollution prevention (source reduction and other practices that eliminate or reduce the creation of pollutants) is recognized as a good business practice which would enhance site operations thereby enabling Fermilab to accomplish its mission, achieve environmental compliance, reduce risks to health and the environment, and prevent or minimize future Department of Energy (DOE) legacy wastes.

**Fermilab Action Owner:** Alexander Zlobin (X8192)

**Signature and Date** \_\_\_\_\_

*Alexander Zlobin* / *01/24/2014*

**Fermilab ES&H Officer:** Bridget Scerini (X3382)

**Signature and Date** \_\_\_\_\_

*Bridget Scerini* / *1/29/14*

## I. Description of the Proposed Action and Need

### Purpose and Need:

The purpose of this activity is to produce from 2 to 6 coils per year. It is needed to further develop superconducting  $Nb_3Sn$  coil technology for future accelerator magnets specifically Fermilab's High Field Magnet (HFM) program and LARP (Large Hadron Collider Accelerator R&D Program).

### Proposed Action:

Dipole and quadrupole coil fabrication have four major steps prior to being built into completed magnets, which are the following:

- 1) Inner coil and outer coil winding and curing – consisting of  $Nb_3Sn$  unreacted (non-superconducting) cable insulated with fiberglass which would be wound into coils and cured into shape with a hydraulic press.
- 2) Coil assembly reaction – is a heat treatment process which would cause a phase transformation within the strands of the cable that become  $Nb_3Sn$ , a superconductor. The coil is extremely fragile after the heat treatment process and would need to be potted with an epoxy type material.
- 3) Coil impregnation – vacuum impregnation, with an epoxy type material, would be used to strengthen and protect the coil for inspection, handling, measurement, and assembly.
- 4) Coil instrumentation – includes voltage taps, strain gauges, and spot and quench heaters, all would be used to monitor and test the coil performance during testing as a magnet.

All of these activities, except for step 3), coil impregnation, would be performed in Industrial Building #3 (IB3). Coil impregnation with epoxy would be performed in IB2.

### Alternatives Considered:

Coil fabrication technology for accelerator magnets using  $Nb_3Sn$  cable has been in development at FNAL for over 10 years in both the HFM program and LARP. As R&D efforts, these activities are not well suited for private industry. Great improvements in the technology have been made however, and over the next few years the possibility exists to have industry make production  $Nb_3Sn$  coils for a future accelerator.

## II. Description of the Affected Environment

See Section IV for details.

## III. Potential Environmental Effects (If the answer to the questions below is "yes", provide comments for each checked item and where clarification is necessary.)

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

- Threatened or endangered species
- Other protected species
- Wetland/Floodplains
- Archaeological or historical resources
- Non-attainment areas

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

- Clearing or Excavation
- Demolition or decommissioning
- Asbestos removal
- PCBs
- Chemical use or storage
- Pesticides
- Air emissions
- Liquid effluents
- Underground storage tanks
- Hazardous or other regulated waste (including radioactive or mixed)
- Radioactive exposures or radioactive emissions
- Radioactivation of soil or groundwater

C. Other Relevant Disclosures: Would the proposed action involve any of the following actions/disclosures?

- Threatened violation of ES&H permit requirements
- Siting/construction/major modification of waste recovery or TSD facilities
- Disturbance of pre-existing contamination
- New or modified permits
- Public controversy
- Action/involvement of another federal agency
- Public utilities/services
- Depletion of a non-renewable resource

## IV. Comments on checked items in section III.

### Chemical Use or Storage

Isopropyl alcohol – for cleaning tooling and work surfaces  
CTD 1202 – proprietary ceramic binder used to hold coil together after curing  
CTD 101K – proprietary epoxy used for potting coils  
Epoxy putty – adhesive putty used as an assembly aide  
Cyanoacrylate Adhesive – superglue used as an assembly aide  
RTV – material used for sealing tooling assemblies

All work would be performed in IB2 and IB3, industrial work areas.  
All materials would be FNAL stock room items except for CTD 1202 and 101K.

**Hazardous or Other Regulated Waste**

A small amount of alcohol rags, about 5-10 gallons/month, would be generated and handled as hazardous waste.

**V. NEPA Recommendation**

Fermilab staff has reviewed this proposed action and believe a Categorical Exclusion is appropriate. It is believed that the proposed action meets the description found in DOE's NEPA Implementation Procedures, 10 CFR 1021, Subpart D, Appendix B1.15 and B1.31 which states:

B1.15 "Siting, construction or modification, and operation of support buildings and support structures (including, but not limited to, trailers and prefabricated and modular buildings) within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible). Covered support buildings and structures include, but are not limited to, those for office purposes; parking; cafeteria services; education and training; visitor reception; computer and data processing services; health services or recreation activities; routine maintenance activities; storage of supplies and equipment for administrative services and routine maintenance activities; security (such as security posts); fire protection; small-scale fabrication (such as machine shop activities), assembly, and testing of non-nuclear equipment or components; and similar support purposes, but exclude facilities for nuclear weapons activities and waste storage activities, such as activities covered in B1.10, B1.29, B1.35, B2.6, B6.2, B6.4, B6.5, B6.6, and B6.10 of this appendix."

B1.31 "Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or related items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modification would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts."

Fermilab NEPA Program Manager: Teri L. Dykhuis

Signature and Date Teri L. Dykhuis 1/29/2014

**VI. DOE/FSO NEPA Coordinator Review**

Concurrence with the recommendation for determination:

Fermi Site Office (FSO) Manager: Michael J. Weis

Signature and Date Michael J. Weis 2/4/2014

FSO NEPA Coordinator: Rick Hersemann

Signature and Date Rick Hersemann 2/4/2014