

MAR 14 2014

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

Dear Ms. White:

SUBJECT: NATIONAL ENVIRONMENTAL POLICY ACT DETERMINATION AT FERMI
NATIONAL ACCELERATOR LABORATORY – SUPERCONDUCTING RADIO
FREQUENCY CAVITY PROCESSING

Reference: Letter, from V. White to M. Weis, dated March 5, 2014, Subject: National
Environmental Policy Act Environmental Evaluation Notification Form for
Superconducting Radio Frequency Cavity Processing

I have reviewed the National Environmental Policy Act (NEPA) Environmental Evaluation
Notification Form (EENF) for the Superconducting Radio Frequency Cavity Processing. 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>
Superconducting Radio Frequency Cavity Processing	3/11/2014	B3.6

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,



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.

**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**

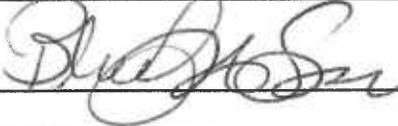
Project/Activity Title: Superconducting Radio Frequency Cavity Processing
ES&H Tracking Number: 01120

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: Allan Rowe (X4474)

Signature and Date  03-04-14

Fermilab ES&H Officer: Bridget Scerini (X3382)

Signature and Date  3/5/14

I. Description of the Proposed Action and Need

Purpose and Need:

The purpose of the Industrial Building (IB)4 and Meson Polarized (MP)9 facilities (MP9 is a 12,000-square-foot facility which consists of a Class10-100-1000 clean room for the cavity string assembly and cold mass assembly infrastructure outside of the clean room) is to provide superconducting Radio Frequency (RF) cavity surface preparation capability in order to satisfy the needs of the Technical Division (TD) Superconducting Radio Frequency (SRF) Department for ongoing SRF research and development (R&D) projects.

Proposed Action:

This activity consists of a set of modules that are used in the preparation stream for an SRF cavity; the modules are the following:

1. Cavity Preparation Lab (CPL), located at IB4 - This phase of cavity preparation may be centrifugal barrel polishing (CBP), a mechanical process, electro-polishing (EP)*, an electrochemical process, or a combination of the two processes.
2. Cleanroom, located at IB4 - This module would be used for ultrasonic cleaning, high pressure water rinsing, mechanical assembly and vacuum leak testing.
3. Vacuum Furnace, located at IB4 and MP9 - These modules would be used for hydrogen degassing of cavities as well as for experimental studies in interstitial doping of niobium surfaces.
4. Low Temperature Ovens, located in MP9 - These modules would be used to modify the surface resistance of niobium RF cavities.
5. RF measurement Lab, located in IB4 - This module would be used for mechanical adjustment of cavities as well as for making basic RF measurements on cavities and RF antennas used in cavity testing.

This activity is sized to treat up to 3 cavities per week.

*The electro-polishing activities received prior NEPA review and approval (Integrated Chemical Processing Apparatus for Single Cell Superconducting RF Cavities, approved on 7/14/08, CX B3.6). These activities will not be included here.

Alternatives Considered:

Alternative sites are used for larger scale and production based cavity preparation. The TD IB4 and MP9 sites would be used primarily for the following reasons:

1. To provide flexible and efficient service for rapidly evolving R&D requirements.
2. To develop and demonstrate closed loop process capability and competency for Fermilab TD SRF.
3. To maintain configuration and procedural control of extremely demanding and unique technical processes.
4. Because the high-temperature vacuum furnaces at IB4 and MP9 and the low temperature ovens at MP9 are not available in industry or at other FNAL partner laboratories within the United States.

Therefore, the only alternative is no action but if this activity were no longer available, then the number of SRF cavities that could be prepared and tested would fall to less than half the current rate, effectively stopping the FNAL SRF R&D program. Therefore 'no action' would not fulfill the stated purpose and need.

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

Liquinox (phosphate free soap solution) would be used in the cleanroom operations as well as the chemical barrel polishing operations. The maximum use would be approximately 1 gallon per day for each operation.

Small amounts of epoxies and alcohols are used for cleaning and gluing detector components. Lead shielding may be used on occasion.

Air Emissions

The IB4 and MP9 vacuum furnaces use cryopumps that require helium gas as a refrigerant. Since helium is an inert gas, there is no potential for environmental impact from this refrigerant.

The IB4 and MP9 vacuum furnaces use water chillers that contain the following amounts of refrigerant:

IB4: 74 pounds of R-22 (chlorodifluoromethane)

MP9: 47 pounds of R407C (Actrol = 23% Difluoromethane (HFC-32), 25% Pentafluoroethane (HFC-125), 52% 1,1,1,2-Tetrafluoroethane (HFC-134a))

The IB4 and MP9 vacuum furnaces are backed up by internal combustion engine powered emergency generators. They are 100 Kilowatt, natural gas powered units emitting very small, compared to diesel powered, amounts of Carbon Monoxide, Sulfur dioxide, Nitrogen oxide, and Particulates. Due to its size this engine is exempt from needing an air emissions permit in Illinois per 35 IAC 201.146 (i).

Liquid Effluents

For IB4/Cleanroom operation, water mixed with a small amount of phosphate free soap solution (Liquinox) would be discharged into the sanitary sewer. The water volume would be a maximum of 2000 gallons per day but typically 200 gallons per day; the soap solution would be a maximum of 1 gallon per day.

For IB4/CBP operation, water mixed with a small amount of phosphate free soap solution (Liquinox) is discharged into the sanitary sewer. The water volume would be a maximum of 200 gallons per day but typically 20 gallons per day; the soap solution would be a maximum of 1 gallon per day.

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 B3.6 which states:

B3.6 "Siting, construction, modification, operation and decommissioning of facilities for small-scale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment."

Fermilab NEPA Program Manager: Teri L. Dykhuis
Signature and Date

Teri L. Dykhuis 3/05/2014

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 3/14/2014

FSO NEPA Coordinator: Rick Hersemann
Signature and Date

Rick Hersemann 3/11/2014

VII. Attachment – Map indicating location of IB4 and MP9

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<http://fesspsdc.fnal.gov:8095/FessViewer/index.html>

2/26/2014