JUN 27 2011

Dr. Bruce L. Chrisman
Chief Operating Officer
Fermilab
P.O. Box 500
Batavia, IL 60510

Dear Dr. Chrisman:

SUBJECT: NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DETERMINATION AT FERMI NATIONAL ACCELERATOR LABORATORY (FERMILAB) – PHASE AND FREQUENCY LOCKED MAGNETRONS FOR SRF SOURCES, PHASE II ACTIVITIES

Reference: Letter, B. Chrisman to M. Weis, dated June 21, 2011, Subject: National Environmental Policy Act (NEPA) Environmental Evaluation Notification Form (EENF) for the Phase and Frequency Locked Magnetrons for SRF Sources, Phase II Activities

I have reviewed the Fermilab EENF for the Phase and Frequency Locked Magnetrons for SRF Sources, Phase II Activities. Based on the information provided in the EENF, I have approved the following categorical exclusion (CX):

Project Name	Approved	CX
Phase and Frequency Locked Magnetrons for SRF Sources, Phase II Activities	6/24/2011	B3.6

I am returning a signed copy of the EENF for your records. No further NEPA review is required. This project falls under a categorical exclusion provided in 10 *CFR* 1021, as amended in November 1997.

Sincerely,

Original Signed by
Mark E. Bollinger
Deputy Manager

Michael J. Weis
Site Manager

Enclosure:
As Stated

cc: P. Oddone, w/o encl.
Y.-K. Kim, w/o encl.
N. Grossman, w/encl.
T. Dykhuis, w/encl.

bc: P. Siebach, CH-STS, w/encl.
M. McKown, CH-OCC, w/o encl.
J. Scott, w/o encl.
R. Hersemann, w/encl.

FERMILAB ENVIRONMENTAL EVALUATION NOTIFICATION FORM

Project/Activity Title: Phase and Frequency Locked Magnetrons for Superconducting Radio Frequency (SRF) Sources, Phase II
ES&H Tracking Number: 01091
Funding Source: SBIR Grant
Fermilab Project Manager: Milorad Popovic (X4478)

I hereby certify via my signature that every effort would be made throughout this project 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 the Lab to accomplish its mission, achieve environmental compliance, reduce risks to health and the environment, and prevent or minimize future DOE legacy wastes.

Fermilab Project Manager: Milorad Popovic

Signature _____

Date June 20th, 2011

Fermilab NEPA Reviewer: Teri L. Dykhuis

Signature _____

Date 6/20/2011

I. Description of the Proposed Action and Need

Purpose and Need:
The purpose of the project is to develop highly efficient and inexpensive magnetrons to provide the lowest-cost microwave sources for a number of diverse applications, including particle accelerators, phased-array radars, and sputtering systems. The goal would be to develop novel variable frequency cavity techniques that would be utilized to phase and frequency lock magnetrons, allowing their use for either individual cavities or cavity strings. Such techniques may be needed at Fermilab in a future construction project such as a Muon Collider, Neutrino Factory, or intensity frontier beam facility.

Proposed Action:
Phase II of this project would begin with further magnetic field testing of garnet and ferrite materials using the cold-test fixture that was built for Phase I, with the goal being to determine the best material from which to make the phase-control rods for the magnetron's anode structure. After final material selection, an order would be placed with a major magnetron manufacturer to custom-build an L-band magnetron (≥100 kW peak output power) for testing with a complete radiofrequency (RF) system. The remaining material tests and low-power testing of the magnetron would take place at Fermilab in the LINAC "south mezzanine," room LIG-108, using a spectrum analyzer and network analyzer. High-power testing would most likely be done off site at a facility in Yorkville, IL (Device Technologies).

Alternatives
There are no other technically feasible alternatives to the proposed action and the 'no action' alternative would not fulfill the purpose and need. The activity would pose some common, well-understood occupational safety issues, but no real environmental impacts. These would not be dependent on location.

II. Description of the Affected Environment

This activity would not involve any civil construction, only fabrication and testing of a small experimental apparatus. These tests would not use hazardous materials of any kind. There are no identified environmental impacts. High-power testing would require a 100-kW RF power load, a 10-kV power supply, and cooling water. This would involve some safety hazards that are commonly dealt with both at Fermilab and in industry (hot, pressurized water, electrical, magnetic and RF hazards, and x-rays). All applicable safety regulations would be followed.

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.

Radiation exposures or radioactive air emissions: High-power testing could produce some x-rays, which would be a potential source of occupational exposure. Exposures would be kept to acceptable levels through some combination of access controls and shielding. Fermilab Radiological Control Manual

limits would apply if this were done on site; state limits (Title 32, Illinois Administrative Code) would apply at an off-site facility. The project would not create radioactive air emissions.

V. NEPA Recommendation

Fermilab staff have reviewed this proposed action and concluded that the appropriate level of NEPA determination is a Categorical Exclusion. The conclusion is based on the proposed action meeting the applicable requirements in DOE's NEPA Implementation Procedures, 10 CFR 1021, Subpart D, Appendix B3.6 which states: "Siting, construction, (or modification), operation and decommissioning of facilities for indoor bench-scale research projects and conventional laboratory operations (for example, preparation of chemical standards and sample analysis); small-scale research and development projects; and small-scale pilot projects (generally less than two years) conducted to verify a concept before demonstration actions. Construction (or modification) will be within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible). See also C12."

VI. DOE/CH-FAO NEPA Coordinator Review

Concurrence with the recommendation for determination:

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

Signature _____

Date 6/27/2011

FSO NEPA Coordinator Reviewer: Rick Hersemann

Signature _____

Date 6/24/11