



## Department of Energy

Fermi Site Office  
Post Office Box 2000  
Batavia, Illinois 60510

JUN 02 2016

Ms. Martha E. Michels  
Chief Safety Officer  
Fermilab  
P.O. Box 500  
Batavia, IL 60510

Dear Ms. Michels:

**SUBJECT: NATIONAL ENVIRONMENTAL POLICY ACT DETERMINATION AT FERMI  
NATIONAL ACCELERATOR LABORATORY – HOLOMETER  
RECONFIGURATION**

**Reference:** Letter, from M. Michels to R. Hersemann, dated May 17, 2016, Subject: National Environmental Policy Act Environmental Evaluation Notification Form for the Holometer Reconfiguration

The Fermi Site Office (FSO) has reviewed the National Environmental Policy Act (NEPA) Environmental Evaluation Notification Form (EENF) for the Holometer Reconfiguration. Based on the information provided in the EENF, the following categorical exclusion (CX) is approved:

<u>Project Name</u>	<u>Approved</u>	<u>CX</u>
Holometer Reconfiguration	5/31/2016	B1.15

Enclosed is 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.  
J. Lykken, w/o encl.  
T. Meyer, w/o encl.  
B. Iverson, w/o encl.  
T. Dykhuis, 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:** Holometer Reconfiguration  
**ES&H Tracking Number:** 01139

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:** Chris Stoughton (X2440)

**Signature and Date**

 5/20/16

## **I. Description of the Proposed Action and Need**

### **Purpose and Need:**

The purpose of the proposed action/project is to reconfigure the Holometer interferometers so that they would be sensitive to exotic quantum rotation. It is needed because it would be an important measurement of this phenomenon and no other scientific instrument is able to make this measurement. By bending the east arms of the existing interferometers at 90 degrees, they become sensitive to errors in the measurement of rotation angles.

### **Proposed Action:**

This proposed action would be contained inside the current Meson campus footprint. In the area indicated on the drawing (see Appendix I), the top layer of loam would be scraped off and fifteen - four foot deep pylons would be installed and then covered with four inches of crushed gravel. The total project area would be 1197 square feet. In addition a three foot cube, with a slanted roof, structure would be constructed.

These structures would support the vacuum tubes and fittings that are installed in the current implementation of the Holometer. Fermilab would reconfigure the arms that currently run east-west to have a 90-degree bend. This bend is located near the mid-point of the east-west arm. At that point, the tubes turn to the north and are supported by the new 4 feet deep concrete pylons to be installed. The existing mirrors in the east hut end stations would be relocated to the new piers.

The one new optical component needed is the mirrors that bend the light at the bend station. Fermilab would use existing glass blanks purchased for the original Holometer experiment, and have them coated to be highly reflected for the 90-degree bend reflections.

A small number of vacuum fittings to house the bend mirrors would also be purchased.

### **Alternatives Considered:**

No other technologies are sensitive to exotic quantum rotation. It would be possible to build this experiment at a variety of locations but the cost and time delay to relocate the infrastructure of this experiment would be prohibitive.

This scenario was selected because: 1) all equipment (laser tables, central beam splitters, north end stations, electronics and computers) installed in the MP8 tunnel would remain intact; 2) no excavation of

the MP8 tunnel is necessary; 3) driveways and parking lots would not need to be traversed; and 4) parts from the existing interferometers can be used, thereby, avoiding purchase of large vacuum tubes.

The 'no action' alternative would not meet the purpose and need.

## II. Description of the Affected Environment

This proposed action would involve excavation of approximately 1197 square feet of material and the construction of a small support structure. These environmental effects are included in Section III.

## 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.

### Clearing and Excavation

The proposed gravel pad would result in 22 yards of excavated loam and the pylons would result in 2 yards of excavated loam for a total of 24 yards of material. Roads and Grounds would use this material to backfill low areas on site.

Soil erosion control measures would be utilized as necessary.

## V. NEPA Recommendation

Fermilab staff has evaluated the 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 as follows.

### B1.15 Support Buildings

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.

Fermilab NEPA Program Manager: Teri L. Dykhuis

Signature and Date

Teri L. Dykhuis 5/17/2016

## VI. DOE/Fermi Site Office (FSO) NEPA Review

Based upon my review of information conveyed to me and in my possession concerning the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1A), I have determined that the proposed action fits within the specified class of actions, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

FSO NEPA Compliance Officer: Rick Hersemann

Signature and Date

Rick Hersemann 5/31/2016

## I. Appendix – Diagrams

Location of Holometer Reconfiguration (see next page)

