



Department of Energy

Fermi Site Office
Post Office Box 2000
Batavia, Illinois 60510

MAR 27 2009

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

Dear Dr. Chrisman:

SUBJECT: NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DETERMINATION AT FERMILAB NATIONAL ACCELERATOR LABORATORY (FERMILAB) FOR THE FEYNMAN COMPUTING CENTER (FCC) COOLING UPGRADES PROJECT

Reference: Letter, B. Chrisman to J. Livengood, dated March 18, 2009, Subject: Same As Above

I have reviewed the Fermilab Environmental Evaluation Notification Form (EENF) for the subject proposed project transmitted by your referenced letter. Based on the information provided in the EENF, I have approved the following project as a categorical exclusion (CX):

<u>Project Name</u>	<u>Approved</u>	<u>CX(s)</u>
FCC Cooling Upgrades Project	3/25/2009	B1.15

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(s) provided in 10 CFR 1021, as amended in November 1997.

If you have any questions, please contact Sally Arnold on x2239.

Sincerely,

Dr. Joanna M. Livengood
Site Manager

cc: P. Oddone
Y.-K. Kim
V. White
N. Grossman

FERMILAB ENVIRONMENTAL EVALUATION NOTIFICATION FORM

Project/Activity Title: Feynman Computing Center (FCC) Cooling Upgrades
ES&H Tracking Number: 01075 **Funding Source:** American Reinvestment and Recovery Act
Fermilab Project Director: Gerald Bellendir (X3930)

I hereby certify via my signature that every effort would be made throughout this project to pursue 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/minimize future DOE legacy wastes.

Signature Gerald G. Bellendir

Date 3/17/09

Fermilab NEPA Reviewer: Teri L. Dykhuis

Signature Teri L. Dykhuis

Date 3/17/09

i. Description of the Proposed Action and Need

Need

The Computing Division provides administrative, technical and physical support of central computing, storage and networking equipment critical to the success of the lab's scientific mission. This equipment resides in a number of locations including the Feynman Computing Center (FCC) which was constructed in the late-1980's and is located along Road D northeast of Wilson Hall on the Fermilab site. The building consists of a three story, semicircular building containing computing rooms, offices, tech areas and required support spaces.

The original design of the building included a combination of water source and chilled water computer room air conditioning (CRAC) units in the computer rooms on the first and second floor. The water source units utilize industrial cooling water as a heat transfer medium while the chilled water units use a closed loop chilled water system. These units have been operated continually since their initial installation in order to provide conditioned air to the computer rooms. The maintenance and operational improvements to these units in recent years has allowed the majority of these units to function adequately for almost 25 years. As these units approach the end of useful life, alternate methods of providing the

conditioned environment were investigated. With the advent of newer technologies and commodity computers at lower cost, the physical infrastructure requirements in terms of floor space, power and cooling has changed dramatically since FCC was constructed. Modern computers provide far more computer cycles per dollar and per footprint. However, the newer, denser electronics with redundant components have resulted in significant increases in power and cooling densities. This increased density requires new cooling strategies in order to effectively remove the heat generated by the computers.

In order to provide reliable effective cooling for the mission driven computing operations within FCC, modern cooling strategies, equipment and controls are needed. The proposed computer room air conditioning (CRAC) units would utilize a refrigerant based cooling strategy in order to eliminate the current water source units and potential detrimental impact of water in the computer rooms. In addition, this approach would allow a phased replacement of the CRAC units as funding and cooling requirements allow. In order to accomplish the project objective, three (3) construction packages are anticipated. A description of each construction package is listed below.

Description of Proposed Action

The proposed cooling equipment for this project is refrigerant based. Each piece of cooling equipment would include two (2) sections. The first section would be located within the computer room and would contain the fans, compressors and pumps to condition the air. The second section, the condenser, would be located outside and serve as the heat rejection component. In order to provide an unobtrusive location for the condensers, a steel framed platform would be installed on the roof of FCC to accommodate the condensers; these roof modifications would be the first construction package. The platform would be raised approximately 24 inches off the surface of the roof and would have a steel grating walking surface. The platform would be supported by extending existing building columns. Access to the platform would be provided by extending the existing south exit stair to the roof level. To minimize the visual impact of the stair extension, a low profile walk out hatch would be installed. The location of the condenser platform was selected to minimize the appearance of the platform from the adjacent areas.

The second construction package for this project would include cooling upgrades for the second floor FCC computer rooms and would be accomplished through a modular system of individual units each discharging into a common below-floor plenum. The design assumes that the new CRAC units would be eight (8) 30 ton capacity, air-cooled, downflow, compressorized systems units which would replace ten (10) smaller capacity existing units. The new CRAC units would be installed in the existing computer rooms and discharge the cooled air beneath the raised access floor for distribution throughout the room and return heated air would be taken from the ceiling plenum.

The third construction package for this project would include cooling upgrades to the third floor FCC computer rooms; these upgrades are dictated by the architectural constraints of the existing space (the third floor lacks a raised access floor). The cooling strategy for the computer room center would utilize overhead cooling modules to create a "cold aisle" on one side of the computer racks. A corresponding "hot aisle" on the opposite side of the computer racks would collect the hot air and route it to the ceiling for return to the cooling modules. This arrangement would allow for reconfiguration of the computers and provide for a redundant system for cooling. The overhead cooling units are coolant based and served by a chiller unit located in the data center. The chillers would utilize air-cooled condensers for heat rejection. The matching condensers for the new CRAC units would be located on the roof platform described in the sections above. The refrigerant lines would be routed in existing spaces to the rooftop.

Potential Alternatives

The only feasible alternative to the project is no action. Taking no action would not provide reliable or adequate cooling capacity that is necessary for future mission critical FCC operations.

II. Description of the Affected Environment

The project involves replacement and upgrading of existing cooling equipment so impacts are limited to the disposal of any construction debris and potential accidental refrigerant releases. See comments in Section VI pertaining to each item checked in Section III.

In accordance with Section 0110-12 "Energy Conservation" of DOE Order 6430.1A - General Design Requirements, all elements of this project would be reviewed for energy conservation features that can be effectively incorporated into the overall building design. Energy conservation techniques and high efficiency equipment would be utilized wherever appropriate to minimize the total energy consumption.

In accordance with FESS/Engineering Policy 4, Sustainability, the High Availability Computing Center project was reviewed for applicability to the requirements contained in DOE Order 430.2B, Departmental Energy, Renewable Energy and Transportation Management. The project team determination is that this project is not eligible for Leadership in Energy and Environmental Design (LEED) certification by the U.S. Green Building Council (USGBC) since construction or major renovation of a building is not part of the project scope. While this project is not intended to become LEED certified, the project processes and each project element would be evaluated during the final design phase to reduce their impact on natural resources without sacrificing program objectives. The project design would incorporate maintainability, aesthetics,

environmental justice and program requirements to deliver a well-balanced project; further information can be found in Appendix B of the project conceptual design report, 10-5-66.

III. Potential Environmental Effects (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

- 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

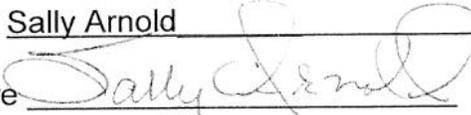
IV. NEPA Recommendation

Fermilab has reviewed this proposed action and conclude 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 B1.15.

v. DOE/CH-FAO NEPA Coordinator Review

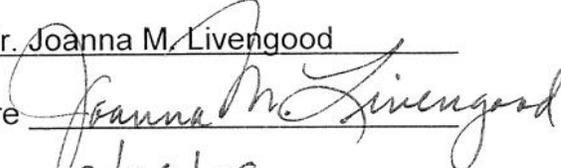
Concurrence with the recommendation for determination:

NEPA Coordinator Reviewer Sally Arnold

Signature 

Date 3/23/2009

Fermi Site Office Manager Dr. Joanna M. Livengood

Signature 

Date 3/26/09

vi. Comments on checked items in section III.

Demolition or Decommissioning

Construction debris would be recycled to the extent practicable. A report describing the amount of waste and recycled material would be provided.

Decontamination and decommissioning procedures are an important part of Fermilab environment, safety and health policies. These policies are described in Chapter 8070 of the Fermilab Environment, Safety and Health Manual (FESHM). Appropriate decontamination and decommissioning procedures would be instituted for this project and any future decommissioning involving the FCC.

Air emissions

Release of refrigerants would be minimized by utilizing certified technicians and following the policy and procedures described in FESHM 8081.