

Environmental Protection Division



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Managed by Brookhaven Science Associates
for the U.S. Department of Energy

APR 21 2016

Ms. Maria Dikeakos
Director, Operations Management Division
U. S. Department of Energy
Brookhaven Site Office
Upton, NY 11973

Dear Ms. Dikeakos:

Subject: NEPA Environmental Evaluation Notification Form – sPHENIX Project

Please find attached the following document:

National Environmental Policy Act (NEPA) – Environmental Evaluation Notification Form for the sPHENIX Project.

This document is submitted to DOE–BHSO for review and NEPA determination as required by 10 CFR 1021, DOE’s Rules Implementing NEPA. If you need further assistance with this document or have any questions, please contact J. Higbie at extension 5919.

Sincerely,

A handwritten signature in black ink, appearing to read "J. Remien", written over a circular stamp or watermark.

Jason Remien
Manager
Environmental Protection Division

JR/jlh

Attachments

cc: w/o attachments: G. Mattson, T. Green, J. Remien and E. Lessard
w/attachments: J. Higbie, J. Mills and C. Polish

File: EC51ER.16

Brookhaven National Laboratory
National Environmental Policy Act (NEPA)
ENVIRONMENTAL EVALUATION NOTIFICATION FORM

Project/Activity Title: sPHENIX Project

BNL Project Tracking No.: _____ DOE NEPA No.: _____

BNL Project Manager: E. O'Brien Signature: 
Date: 4/18/16

BNL NEPA Reviewer: J. Higbie Signature: 
Date: 4/18/14

I. Description of Proposed Action:

The PHENIX experiment located in Building 1008 in the RHIC complex will be decommissioned at the end of the RHIC 2016 run in June 2016. The decommissioning activities will result in the removal of the PHENIX detector from the Interaction Region (IR), capping off of IR utilities and services, and conditioning of the area for the eventual installation of a new detector at RHIC. Equipment and materials from the PHENIX detector will, as appropriate, be collected and preserved for re-use in a future RHIC experiment, returned to the institutions owning the items, stored for reuse in other projects, or properly disposed of. Decommissioning of particular equipment and materials will also take place in the PHENIX Assembly Hall, Power Supply Building, Pump House, Gas Mixing Hut and Gas Pad. No decommissioning activities are anticipated for the 1008 Counting House, or Control Room where the equipment will be preserved for re-use in a future RHIC detector to be installed in 1008.

All disposition of equipment for PHENIX decommissioning will be coordinated through the BNL Department of Procurement and Property Management in consultation with The Brookhaven Site Office (BSHO) and the Department of Energy Office of Nuclear Physics (DOE-ONP). At all times, the RHIC Accelerator Safety Envelope and C-AD Safety Assessment Document shall apply to the former PHENIX experiment facilities and any associated roads on which the equipment in the PHENIX experimental facilities may travel within the BNL site boundary, and include any PHENIX or RHIC accelerator facilities to be stored on-site that have used the accelerated particle beams and include any radioactive material created by those beams. The term facilities includes PHENIX detectors, experimental halls, non-contiguous support and analysis facilities, experimental enclosures and experimental apparatus utilizing the

accelerator-collider beams, regardless of where that apparatus may have been designed, fabricated, or constructed, including all systems, components and activities that are addressed in the C-AD Safety Assessment Document. All decommissioning activities will be planned using the C-AD work planning system that follows the BNL Standards-Based Management System (SBMS) for Work-Planning and Control. All materials that are declared as waste by C-AD shall be properly disposed of as per BNL requirements. All waste items to be removed from the IR will be handled in accordance with DOE rules and BNL Subject Areas applicable to waste and to accelerators. A preliminary assessment has been made of the amount and type of potentially activated waste materials and is factored into the cost estimates. Material screening will verify the preliminary assessment.

At the end of the PHENIX Decommissioning, the 1008 Interaction Region, Assembly Hall, Power Supply Building, Pump House, and sections of the Gas Mixing Hut and Gas Pad will be clear of all PHENIX equipment and materials that are unneeded for a future experiment. The 1008 complex will be ready to begin the preparation for and installation of a new experiment.

sPHENIX is a proposal for a new experiment at RHIC capable of measuring jets, jet correlations and upsilons to determine the temperature dependence of transport coefficients of the quark-gluon plasma. The detector will have electromagnetic and hadronic calorimetry for measurements of jets built around a superconducting solenoid magnet, a high resolution and low mass tracking system for reconstruction of the Upsilon states, and a high speed data acquisition system. Construction shall consist of fabrication and installation of new experimental equipment and electronics. The experimental equipment will be composed of steel, aluminum, a variety of plastics, carbon and fiber glass-based composites and tungsten-epoxy composite blocks.

II. Description of Affected Environment:

The proposed action will place the existing facility, Building 1008 and adjacent support areas into a safe configuration in preparation for the construction of the new sPHENIX experiment. At all times, including the PHENIX decommissioning period, post decommissioning period and the sPHENIX construction period, IR8, Building 1008 and adjacent support areas shall remain part of C-AD accelerator facilities and subject to DOE Order 420.2C, Safety of Accelerator Facilities, or its successor document. The proposed construction of the sPHENIX experiment will take place within the footprint of the Building 1008 complex.

III. Potential Environmental Effects: (In Section IV, document an explanation for each "yes" and "no" response if additional information is available and could be significant in the decision-making process.)

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

- | | Yes/No |
|---|-------------------|
| 1. Threatened/Endangered Species and/or Critical Habitats | Yes <u> </u> |
| 2. Other Protected Species (e.g., Burros, Migratory Birds) | No <u> </u> |
| 3. Wetlands | Yes <u> </u> |
| 4. Archaeological/Historic Resources | Yes <u> </u> |
| 5. Prime, Unique, or Important Farmland | No <u> </u> |
| 6. Non-Attainment Areas | Yes <u> </u> |
| 7. Class I Air Quality Control Region | Yes <u> </u> |
| 8. Climate Change (e.g., greenhouse gases) | Yes <u> </u> |
| 9. Special Sources of Groundwater (e.g., Sole Source Aquifer) | Yes <u> </u> |
| 10. Navigable Air Space | No <u> </u> |
| 11. Coastal Zones | No <u> </u> |
| 12. Areas with Special National Designation (e.g., National Forests, Parks, Trails) | No <u> </u> |
| 13. Floodplain | No <u> </u> |

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

- | | Yes/No |
|---|-------------------|
| 14. Clearing or Excavation | No <u> </u> |
| 15. Dredge or Fill (under Clean Water Act section 404; indicate if greater than 10 acres) | No <u> </u> |
| 16. Noise (in excess of regulations) | No <u> </u> |
| 17. Asbestos Removal | No <u> </u> |
| 18. PCBs | No <u> </u> |
| 19. Import, Manufacture, or Processing of Toxic Substances | No <u> </u> |
| 20. Chemical Storage/Use | No <u> </u> |
| 21. Pesticide Use | No <u> </u> |
| 22. Hazardous, Toxic, or Criteria Pollutant Air Emissions | No <u> </u> |
| 23. Liquid Effluent | No <u> </u> |
| 24. Underground Injection | No <u> </u> |
| 25. Hazardous Waste | Yes <u> </u> |
| 26. Underground Storage Tanks | No <u> </u> |
| 27. Radioactive (AEA) Mixed Waste | Yes <u> </u> |
| 28. Radioactive Waste | Yes <u> </u> |
| 29. Radiation Exposures | Yes <u> </u> |
| 30. Surface Water Protection | No <u> </u> |
| 31. Ozone Depleting Substances | Yes <u> </u> |

C. Other Relevant Disclosures. Will the proposed action involve the following?

- | | Yes/No |
|--|-----------------------|
| 32. A threatened violation of ES&H regulations/permit requirements | No <u> </u> |
| 33. Siting/Construction/Major Modification of Waste Recovery, or TSD Facilities | No <u> </u> |
| 34. Disturbance of Pre-existing Contamination | No <u> </u> |
| 35. New or Modified Federal/State Permits | No <u> </u> |
| 36. Public controversy (e.g., Environmental Justice Executive Order 12898 consideration and other related public issues) | No <u> </u> |
| 37. Action/involvement of Another Federal Agency (e.g., license, funding, approval) | No <u> </u> |
| 38. Action of a State Agency in a State with NEPA-type law. (Does the State Environmental Quality Review Act Apply?) | No <u> </u> |
| 39. Public Utilities/Services | Yes <u> </u> |
| 40. Depletion of a Non-Renewable Resource | No <u> </u> |
| 41. Adverse visual impacts | No <u> </u> |
| 42. Targets for Intentional Destructive Acts | No <u> </u> |
| 43. Opportunity for environmental sustainability (energy usage, green buildings, native vegetation, etc.) | Yes <u> </u> |
| 44. Connected Action (To other actions with significant effects) | No <u> </u> |
| 45. Extraordinary Circumstances (affecting significance of environmental effects) | No <u> </u> |

IV. Additional Information:

A1. The northern long-eared bat has recently been listed as a federally threatened species. This species has been known in the past to inhabit and utilize habitat found on BNL property included wooded areas and structures. Any demolition of structure will have to have a survey performed prior to demolition to ensure these bats are not utilizing potential habitat within the structures. The Eastern Tiger Salamander, a New York State endangered species, is known to be found in the habitat around RHIC. Work activities are controlled through the use of the BNL Digging/Trenching Permit system to ensure that the habitats would not be disturbed. If activities are identified that would affect the tiger salamander, an agreement for mitigating actions would be worked through with New York State.

A3. A Freshwater Wetlands Permit issued by the NY State Department of Environmental Conservation (NYSDEC) will need to be obtained for any work conducted within 100 feet of a State designated wetland per 6NYCRR Parts 663, Part 664, and Part 665. The entire RHIC area falls within the Peconic River Corridor which has been designated as 'Scenic' under the New York Wild, Recreational, and Scenic Rivers Act. Should exterior modifications, additions become necessary, a permit may be required.

A4. BNL has developed a Cultural Resource Management Plan (CRMP). Cultural resources include scientific discoveries and equipment used in the experiments. Equipment should be evaluated for significance and merit of preservation prior to disposal. All published papers are archived through the Research Library.

A6,7,8. Long Island has been designated a non-attainment area by the EPA. Greenhouse gases are used as part of the sPHENIX project; however, sPHENIX

will have fewer greenhouse gas emissions in comparison to the existing experiment.

A9. Although BNL is situated above a Sole Source Aquifer, operation of this accelerator facility should not affect groundwater quality. The BNL Standards Based Management System Subject Areas "Liquid Effluents" and "Accelerator Safety" provide rules related to discharges and protection of groundwater. C-AD follows these rules to ensure effluents do not contaminate groundwater.

B25. Hazardous waste may be routinely generated in small quantities during the course of some experiments. These small quantities of hazardous waste are characterized and disposed of according to BNL's waste management requirements. Waste minimization and disposal protocols adhere to all applicable regulations and procedures. Lead and activated steel will be reused whenever possible.

B27. C-AD has annually and safely disposed of approximately 100 m³ of low-level radioactive waste, 1 m³ of mixed waste, 5 m³ of activated water, and 500 m³ of solid hazardous- and industrial-waste. Based on the advice and assistance of experts in BNL's Environment, Safety and Health Directorate, the C-AD has gained a thorough understanding of the treatment requirements of all waste streams, the off-site disposal sites' acceptance criteria, and the shipping- and packaging-criteria. Although the PHENIX deactivation activities will involve smaller volumes of wastes, it will consist of all the same types of wastes that C-AD routinely handles.

B28,29. All radioactive waste generated will be managed in accordance with all Federal, State and BNL requirements for radioactive waste management. Disposal of radioactive waste will follow established protocols and adhere to all applicable regulations and procedures. Worker exposure to radioactive waste hazards are planned and controlled in accordance to Collider-Accelerator procedures. Engineering and administrative protocols are in place to minimize radiation exposures. Radiation exposures will be as low as reasonable achievable (ALARA) to workers and much less than DOE limits.

B31. Ozone depleting substances may be used in experiments. The use of these gases will be less in comparison to experiments in recent year in RHIC, leading to an overall reduction in ozone depleting substances. Alternatives are used whenever possible. If an alternative is not possible, exclusion for purchasing must be received from the Environmental Protection Agency (EPA).

C39. Public utilities will be used as a part of the experiment. Overall, a reduction in energy use is expected during sPHENIX.

C43. Lead and steel will be taken from the existing experiment and reused during sPHENIX. The BaBar solenoid, a 20 ton magnet device previously used at SLAC, will be reused as part of sPHENIX. A decrease in overall electrical power consumption is expected along with decreased greenhouse gas emissions.

NOTE: DOE BHSO will utilize the information provided in this EENF to make a NEPA determination. The separate determination document, provided by DOE, is to be appended to this NEPA review.