DOE/EA-0389

[6450-01]

U.S. Department of Energy

Finding of No Significant Impact

7-GeV Advanced Photon Source

Argonne National Laboratory

AGENCY: U.S. Department Of Energy

ACTION: Finding of No Significant Impact

SUMMARY: The U.S. Department of Energy (DOE) has prepared an Environmental Assessment (EA) for the construction and operation of the proposed 6- to 7-GeV synchrotron radiation source, also known as the 7-GeV Advanced Photon Source (APS), at Argonne National Laboratory, Argonne, Illinois. The main APS building would be ring-shaped with a circumference of about 4,083 feet. The complex also would include offices, general and special purposes laboratories, clean room laboratories, and service operation areas. The proposed APS would provide a national facility for advancing research in physics, chemistry, biology, and the materials and health sciences.

The EA examined and compared the environmental impacts of the proposed APS Project and reasonable alternatives. Based on the analysis in the EA, and the comments received on the EA and the proposed FONSI during the 30 day public comment period, DOE has

determined that the Environmental Assessment is adequate for the proposed APS Project and that the proposed action does not constitute a major federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969, 42 U.S.C. 4321 et seq. Therefore, an environmental impact statement is not required.

A proposed FONSI and the supporting EA were made available for public review for a period of 30 days, from March 1 through March 31, 1990. Following completion of the public review period, DOE analyzed the comments received on the proposed FONSI and the Environmental Assessment. Three comment letters were received. One comment was submitted from the Illinois State Historic Preservation Office stating that the EA adequately outlines the effect of the proposed project on cultural resources and the archaeological work conducted to mitigate this impact. The second comment letter was submitted by the Mayor of Woodridge, Illinois, who states that the Village of Woodridge, located approximately 5 miles from the site, fully supports the construction of the APS. The third comment letter was submitted by the U.S. Environmental Protection Agency (EPA), Region 5. EPA agrees that wetland losses would be mitigated by the "full wetland replacement" proposed by DOE in the EA. EPA Regional guidance recommends that for construction projects, consideration be given to additional mitigation for wetland losses at a ratio of at least 1.5:1. A summary of the comments

and the DOE response is presented as an attachment to this notice. No changes in the EA have been made.

PROPOSED ACTION: The proposed action is the construction and operation at Argonne National Laboratory (ANL) of the 7-GeV Advanced Photon Source and those associated facilities of the APS including the linear accelerator (linac), the synchrotron and the storage ring. The linac injects positrons into the synchrotron which accelerates them to 7-GeV before they are injected into the storage ring. The positrons circulate continuously in the storage ring with a current of approximately 100 milliampere. The storage ring is capable of accommodating 34 insertion devices specially designed to produce high brilliance x-ray beams for multi-discipline research. The experimental area, which houses the x-ray beam lines, would accommodate beam lines up to 80 meters long. The project would occupy 70 acres of fields and forest in the southwest portion of the 1275-acre ANL property.

A multi-story central laboratory/office building would provide a working environment for up to 300 permanent staff scientists and support personnel at the site. Laboratory modules would be located around the outer wall of the experiment hall/storage ring building. These modules would contain offices, laboratories, a conference area, and service support space. Other proposed construction activities include service and utility buildings, parking areas, and access roads.

ALTERNATIVES: Two alternatives to the proposed action were considered in the EA:

- no action (the 7-GeV Advanced Photon Source would not be built),
- construction at other sites within ANL.

Taking no action would mean not constructing a 7 GeV Advanced Photon Source and would result in no changes to the existing environment. However, synchrotron radiation has emerged as a powerful tool for probing the structure of matter and studying important physical and chemical processes. If the facility is not built a number of scientific advances such as the determination of bulk and surface structure, the determination of catalytic activity of materials, microprobe impurity detection, inelastic x-ray scattering, and observation of the motion of atoms in protein systems would not occur.

Within ANL, four locations were identified as potentially suitable to meet the space requirements of the APS. Site selection was influenced by the following factors: (1) suitability of the site to meet technical requirements of design configuration and functional relationships; (2) suitability of topography and subsurface conditions; (3) minimal environmental resource impacts; (4) avoidance of external and traffic-generated

sources of vibration; (5) provision of a buffer zone between APS and the ANL site boundary; (6) minimal interference of existing structures; (7) availability of existing utilities; and (8) flexibility of the site for future expansion. Consideration of these factors eliminated two areas on the basis of technical considerations and one area was eliminated because of wetland involvement and topography features. Construction of the APS facility in the so-called South 800 Area at ANL provides the best overall site based on these factors and is the preferred location for the facility.

FINDINGS: The EA includes an assessment of impacts of constructing and operating the APS on land use, employment levels, vegetation, threatened and endangered species, cultural and historic resources, parking and traffic, noise, worker and public health, air quality, and water and power consumption.

Construction Impacts

Initial activities at the proposed site include site grading, preparing and paving roadways and parking areas, and construction of various buildings and facilities. Erosion and sedimentation to surface waters would be controlled by limiting exposed areas, surface water diversion, water flow velocity control, slope stabilization, collection of runoff, water/solids separation, and post construction restoration. Because this property is

currently part of the ANL site and has been intended eventually to support energy research facilities, this land conversion is in accord with long-range ANL planning and would have no significant direct effect on land use. Development of the entire APS site would decrease the amount of undeveloped areas in the ANL property by approximately 15%. No groundwater impacts would result since excavations do not extend to bedrock and recharge follows an extensive pathway through clay-rich glacial till which absorbs cations. Dust and fugitive emissions from construction would be temporary and local in nature. Construction noise also is expected to be temporary and local. Thus, no unusual or significant air quality problems or noise impacts are expected. No significant impacts to threatened or endangered species nor critical habitat are expected, since no such species are present on the site.

APS construction would result in the filling of three small wetlands (1.8 acres total). These wetlands provide some wildlife habitat but are of relatively low hydrological importance. The U.S. Army Corps of Engineers (COE) has issued a permit for construction in wetlands in accordance with Section 404 of the Clean Water Act. As part of this permit, DOE is having consultations with the COE on the implementation of plans to mitigate wetland loss. A Floodplain and Wetland Involvement Notice was published in the FEDERAL REGISTER (54 FR 18326) on April 28, 1989. By terms of the permit, detailed engineering

specifications for the created wetlands must be provided to the COE before implementation. With mitigation in place, significant impacts to wetlands are not expected. Impacts to nearby streams and aquatic biota would be minimized by following good engineering practices. Stream turbidity from construction site runoff may temporarily increase but no long-term impacts to the aquatic biota would occur.

DOE has determined that the APS project potentially would affect sites eligible for the National Register of Historic places. Consequently, DOE, Advisory Council on Historic Preservation (ACHP), and the State Historic Preservation Office (SHPO) have negotiated a Programmatic Agreement which stipulates that the DOE will develop and implement a data recovery plan in compliance with federal regulation and laws subject to SHPO review and monitoring.

Operational Impacts

Water for drinking, cooling, and other uses at the APS would be obtained from the existing water supply system. The increased demand on the ANL sanitary sewer system from APS activity would be an increase of only 3% of the excess capacity. APS water consumption would have no significant effect on public communities surrounding ANL. The pumpage rates of these communities declined from 1980 to 1985 and are expected to

continue declining as they convert from well water to Lake Michigan water usage. The additional 30,000-gallons per day sanitary sewage discharge, which includes cooling water blowdown from APS activities, should have no significant effect on surface water quality. Sludge generated from the APS sanitary waste would be minimal since the increase in the demand of an additional 4 cubic yards per year is an increase of only 0.01% in the permitted limit of the ANL landfill.

The projected need for electric power represents a 19% decrease in excess power capacity available at ANL. Thus the APS power demand is not expected to affect significantly the availability of electricity in the area of Chicago and its suburbs. The operation of APS is not expected to generate significant amounts of gaseous or particulate emissions. The noise from site traffic, compressors, and cooling towers would be well within the Illinois State Noise Standard and DOE criteria for occupational safety and health. During normal operation, the dose to the nearest offsite resident (0.9 mile to the southwest of the APS) from penetrating radiation (gamma ray and neutron) is estimated to be 0.05 millirem per year which is well below the DOE standard of 100 millirem per year. The dose equivalent to workers, as the result of the maximum credible accident (probability of less than 10^{-4}), would be 1.17 rem (23% of the allowed exposure of workers). The dose equivalent at the site boundary would be less than 1 mrem. During normal operation, the dose due to airborne

emissions of activiated products is calculated to be 6.0×10^{-2} mrem per year at the fenceline which is well below the 10 mrem per year standard of 10 CFR 61 (National Emission Standards for Hazardous Air Pollutants).

Operation of the proposed APS would have little potential for impact on ecological resources beyond those occurring during the construction phase. Considering that a number of APS workers would transfer from existing ANL activities to APS, the actual number of staff added to the current ANL work force of 3760 persons by APS would be relatively small (8-16%). Since housing and services are not limited within the ANL community area, no significant socioeconomic impacts are expected from the additional work force to an area that has 3.5 million people within the 20-mile radius of ANL.

Determination

Based on the analysis in the EA and the comments received on the proposed FONSI during the 30 day public comment period, DOE has determined that the EA is adequate for the proposed APS project and that the proposed action does not constitute a major federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969, 42 U.S.C. 4321 et seq. Therefore, an environmental impact statement is not required.

Single copies of the EA (DOE/EA-0389) are available from:

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For further information regarding the NEPA process, contact:

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Signed in Washington, D.C., this 9th day of May, 1990

Raymond P. Berube

Raymond P. Berube
Acting Assistant Secretary
Environment, Safety and Health

Attachment

Summary of Comments Received on the Proposed FONSI

Comment: The Environmental Protection Agency states in their letter, "For unavoidable wetland impacts, appropriate compensation is required to replace lost wetland functions, which you have proposed to do in the EA by full wetland restoration. However, the goal of our Regional guidance is that mitigation, such as wetland restoration, should be on a basis of at least a 1.5:1 ratio of mitigated wetlands to those lost. Your mitigation plans should reflect this guidance, as well as identify all affected wetlands in detail (including total acreage, vegetation present, functions, and values), according to the Federal Manual of Wetland Identification. ..... As long as wetland mitigation is provided as outlined above we will have no objections to the construction of the Project."

Response: The U.S. Corps of Engineers (COE) has federal regulatory authority for compliance with Section 404 of the Clean Water Act. A wetland relocation permit for the APS Project, as outlined in the EA, has been granted to the U.S. Department of Energy by the U.S. COE (Nationwide Permit number 26) on February 2, 1989. The basis for this permit is the development of natural replacement wetlands, performing the same function as the

original wetlands, on a ratio of 1:1. The COE permit was reviewed by the Illinois EPA in November 1988 as part of their responsibilities under Section 401 of the Clean Water Act.

EPA states that the goal of their Regional guidance is mitigation and, as such, wetland restoration should be on a basis of at least 1.5:1 ratio of mitigated wetlands to those lost. EPA further states that this goal represents EPA regional policy and is not a regulatory requirement.

Both the EPA and the COE agree that the "functional replacement" of the wetlands is the primary objective of mitigation. The proposed mitigation will provide functional replacement of wetlands. DOE willprovide final detailed designs of the mitigation, as well as the 5-year monitoring and management plans to the COE for approval. The DOE believes that the mitigation described in the EA provides "full wetland restoration" which results in "functional replacement" of the wetlands. The net effect will be "no net loss" of wetlands from the construction and operation of the APS. Additional "functional" contributions will not be needed.

Comment: The letter from the Mayor of Woodridge states that the "APS also holds the prospect of being a catalyst for local employment growth and business attraction."

Response: Section 4.3 of the EA states that the total number of personnel connected with the APS is not expected to exceed 600 people at any time. While this will increase the size of the ANL work force, it is expected that they will have the same off-site residence pattern as the existing ANL staff. Most ANL staff live within a 20-mile radius of the site. Since housing and services are not limited within the ANL commuting area, no significant socioeconomic impacts are expected from the additional work force to an area that has 3.5 million people within a 20-mile radius.

Comment: The letter from the Deputy State Historic Preservation Officer stated that the environmental assessment adequately outlines the affect of the proposed project on cultural resources and the archaeological work conducted to mitigate this impact.

Response: None required.