July 10, 2006

Mr. James H. Lash
Vice President
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
P. O. Box 4
Shippingport, PA 15077

SUBJECT: BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2 (BVPS-1 AND 2) - FINAL ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT RELATED TO PROPOSED EXTENDED POWER UPRATE (TAC NOS. MC4645 AND MC4646)

Dear Mr. Lash:

Enclosed is a copy of the Final Environmental Assessment and Finding of No Significant Impact related to your application dated October 4, 2004, as supplemented by letters dated February 23, May 26, June 14, July 8 and 28, August 26, September 6, October 7, 28, and 31, November 8, 18, and 21, December 2, 6, 9, 16, and 30, 2005, and January 25, February 14 and 22, and March 10 and 29, May 12, and July 6, 2006, for BVPS-1 and 2. The proposed amendment would authorize increasing the maximum steady-state reactor core power level from 2689 megawatts thermal (MWt) to 2900 MWt, which is an increase of approximately 8.0 percent. The proposed increase in power level is considered an extended power uprate.

The assessment is being forwarded to the Office of the Federal Register for publication.

Sincerely,

/RA/

Timothy G. Colburn, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-334 and 50-412

Enclosure:
Final Environmental Assessment

cc w/encl: See next page

July 10, 2006

Mr. James H. Lash
Vice President
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
P. O. Box 4
Shippingport, PA 15077

SUBJECT: BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2 (BVPS-1 AND 2) - FINAL ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT RELATED TO PROPOSED EXTENDED POWER UPRATE (TAC NOS. MC4645 AND MC4646)

Dear Mr. Lash:

Enclosed is a copy of the Final Environmental Assessment and Finding of No Significant Impact related to your application dated October 4, 2004, as supplemented by letters dated February 23, May 26, June 14, July 8 and 28, August 26, September 6, October 7, 28, and 31, November 8, 18, and 21, December 2, 6, 9, 16, and 30, 2005, and January 25, February 14 and 22, and March 10 and 29, May 12, and July 6, 2006, for BVPS-1 and 2. The proposed amendment would authorize increasing the maximum steady-state reactor core power level from 2689 megawatts thermal (MWt) to 2900 MWt, which is an increase of approximately 8.0 percent. The proposed increase in power level is considered an extended power uprate.

The assessment is being forwarded to the Office of the Federal Register for publication.

Sincerely,

/RA/

Timothy G. Colburn, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-334 and 50-412

Enclosure:
Final Environmental Assessment

cc w/encl: See next page

*Draft EA concurrence on 4/12/06. No comments received on or changes to draft EA.
Accession Number: ML061770605

OFFICE	LPLI-1\PM	LPLI-1\LA	REBB\BC	OGC	LPLI-1\BC
NAME	TColburn	SLittle	RFranovich*	SHamrick	RLaufer
DATE	7/10/06	7/10/06	04/12/06	07/07/06	7/10/06

Official Record Copy

DISTRIBUTION:

PUBLIC	
LPLI-1 Reading File	
C. Haney	RidsNrrDorl
C. Holden	RidsNrrDorl
R. Laufer	RidsNrrDorlLpIa-1
T. Colburn	RidsNrrPMTColburn
R. Franovich	RidsNrrDlrRebb
L. Fields	
B. McDermott, R-I	RidsRgn1MailCenter
T. Alexion	RidsNrrPMTAlexion
ACRS	RidsAcrsAcnwMailCenter
	RidsOgcRp

cc: Plant Mailing List

7590-01-P

UNITED STATES NUCLEAR REGULATORY COMMISSION

FIRSTENERGY NUCLEAR OPERATING COMPANY

FIRSTENERGY NUCLEAR GENERATION CORP.

OHIO EDISON COMPANY

THE TOLEDO EDISON COMPANY

DOCKET NOS. 50-334 AND 50-412

BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2

FINAL ENVIRONMENTAL ASSESSMENT AND

FINDING OF NO SIGNIFICANT IMPACT

RELATED TO THE PROPOSED LICENSE AMENDMENT

TO INCREASE THE MAXIMUM REACTOR POWER LEVEL

AGENCY: U.S. Nuclear Regulatory Commission (NRC)

SUMMARY: The NRC has prepared a Final Environmental Assessment as part of its evaluation of a request by FirstEnergy Nuclear Operating Company (FENOC), et. al., for a license amendment to increase the maximum rated thermal power at Beaver Valley Power Station, Unit Nos. 1 and 2 (BVPS-1 and 2) from 2689 megawatts-thermal (MWt) to 2900 MWt. This represents a power increase of approximately 8 percent for BVPS-1 and 2. As stated in the NRC staff's position paper dated February 8, 1996, on the Boiling-Water Reactor Extended Power Uprate (EPU) Program, the NRC staff will prepare an environmental impact statement if it believes a power uprate will have a significant impact on the human environment. The NRC staff did not identify any significant impact from the information provided in the licensee's EPU application for BVPS-1 and 2 or from the NRC staff's independent review; therefore, the NRC staff is documenting its environmental review in an environmental assessment (EA). Also, in

accordance with the position paper, this Final Environmental Assessment and Finding of No Significant Impact is being published in the *Federal Register*.

The NRC published a Draft Environmental Assessment and Finding of No Significant Impact on the proposed action for public comment in the *Federal Register* on May 9, 2006 (71 FR 26985). No comments were received.

ENVIRONMENTAL ASSESSMENT

Plant Site and Environs:

The EPU would apply to the facilities at the BVPS-1 and 2 site, located on the south bank of the Ohio River in Shippingport Borough, Beaver County, Pennsylvania. The station site consists of 449 acres and it lies approximately 25 miles northwest of Pittsburgh, Pennsylvania, one mile southeast of Midland, Pennsylvania, 5 miles east of Liverpool, Ohio, 8 miles east of Newell, West Virginia, and 6 miles southwest of Beaver, Pennsylvania.

BVPS-1 and 2 are located within the Pittsburgh Low Plateau Section of the Appalachian Plateau Physiographic Province, which is characterized by a smooth, upland surface cut by numerous narrow, relatively shallow river valleys. The site region encompasses portions of Pennsylvania, Ohio, and West Virginia, and the site elevation ranges from 660 to 1,700 feet above sea level.

The major river systems in the region consist of the Monongahela, Allegheny, and Ohio Rivers, and their tributaries. The Ohio River is formed by the juncture of the Monongahela and Allegheny Rivers at Pittsburgh, and extends 981 river miles to Cairo, Illinois, where it joins the Mississippi River. The Ohio River and lower portions of the Allegheny and Monongahela Rivers are maintained and controlled by a series of locks and dams operated by the U.S. Army Corps of Engineers.

BVPS-1 and 2 consist of two light-water cooled, pressurized-water reactors (PWRs) with

a current authorized maximum reactor core power level output of 2689 MWt for each unit. The two units employ a closed-loop cooling system that includes a natural draft cooling tower (CT) (one per unit) to dissipate waste heat to the atmosphere. The BVPS-1 and BVPS-2 circulating water systems (CWSs) are non-safety related and provide cooling water for the main condensers of the turbine-generator units. The closed-loop systems consist of CT pumps, pumphouses, CWS piping, main condenser vacuum priming systems, mechanical tube cleaning system (BVPS-2 only), natural draft, hyperbolic CTs for removal of waste heat from the main condensers, and associated hydraulic and electrical equipment.

Identification of the Proposed Action:

By letter dated October 4, 2004, FENOC proposed an amendment to the operating licenses for BVPS-1 and 2 to increase the maximum rated thermal power level by approximately 8 percent, from 2689 MWt to 2900 MWt. The change is considered an EPU because it would raise the reactor core power level more than 7 percent above the original licensed maximum power level. This proposed action would allow the heat output of the reactor to increase, which would increase the flow of steam to the turbine. This would allow the turbine-generator to increase the production of power and would increase the amount of waste heat delivered to the condenser, resulting in an increase in the circulating water condenser discharge temperature, evaporation flow rates, and blowdown concentrations. Moreover, the temperature of water discharged from the service water systems (SWSs) to the Ohio River would increase slightly due to the increased heat load, but flow rates would remain unchanged.

In April 2001, the NRC approved a FENOC request to increase the licensing basis core power level of BVPS-1 and 2 by 1.4 percent; no other power uprates have been requested or granted for this site.

The Need for the Proposed Action:

The purpose and need for the proposed action (EPU) is to increase the maximum

thermal power level of BVPS-1 and 2, thereby increasing the electric power generation. The increase in electric power generation would give FENOC the capability to provide lower cost power to its customers than can be obtained otherwise in the current and anticipated energy market.

Environmental Impacts of the Proposed Action:

At the time of issuance of the operating license for BVPS-1 and 2, the NRC staff noted that any activity authorized by the license would be encompassed by the overall action evaluated in the Final Environmental Statements (FESs) for the operation of BVPS-1 and 2, which were issued in July 1973 for BVPS-1 and September 1985 for BVPS-2. This EA summarizes the radiological and non-radiological impacts in the environment that may result from the proposed action.

NON-RADIOLOGICAL IMPACTS

Land Use Impacts:

The potential impacts associated with land use for the proposed action include impacts from construction and plant modifications. FENOC or its subsidiary companies own all land within the BVPS-1 and 2 exclusion area except the Ohio River proper; onsite property owned by Duquesne Light (i.e., the switchyard tract, which is jointly owned by Duquesne Light and FENOC); the eastern portion of Phillis Island, owned by the U.S. Government and administered by the U.S. Fish and Wildlife Service (FWS); and 7.4 acres of the Freeport Development Company (now Laurel Ventures) tract, located along the southern BVPS-1 and 2 site boundary. However, appropriate controls are in place to restrict use of these lands. In case of an emergency that threatens persons or the environment, FENOC has the authority to enter the switchyard (after notifying Duquesne Light) to take action to prevent damage, injury, or loss. Limited hunting is permitted on Phillis Island, but no public assembly is allowed there. Similarly, the Freeport Development Company property restricts use of this land by current and future

purchasers or leasers.

The Beaver County Planning Commission estimates that forest land accounts for 49.5 percent (140,840 acres) of all land in Beaver County, while agricultural lands account for 26.2 percent (73,892 acres). Forested lands are prevalent in western Beaver County. Residential lands account for 15.5 percent (44,050 acres), while industrial, commercial, and other non-residential urban land uses account for only 4.1 percent of the County's land area. Included in these industrial lands are brownfield sites of former steel manufacturing operations, including sites along the Ohio River.

Several public lands in the vicinity of the BVPS-1 and 2 site are dedicated to wildlife management and recreation. These public lands include a portion of the Ohio River Islands National Wildlife Refuge, Raccoon Creek State Park, Beaver Creek, State Forest, Brady Run County Park, and several areas of the Pennsylvania Game Lands. Shippingport Community Park, a 7.5-acre public recreation facility, is located along State Route 3016 in Shippingport. The Shippingport Boat Ramp is located approximately 800 feet upstream from the BVPS-1 and 2 site eastern boundary on the Ohio River.

Phillis Island and Georgetown Island are located in the BVPS-1 and 2 site vicinity and have been designated as part of a National Wildlife Refuge. Phillis Island (approximately 39 acres) is situated approximately 400 feet offshore of the downstream portion of the BVPS-1 and 2 site and lies partially within the BVPS-1 and 2 exclusion area. The 16.2-acre Georgetown Island is located approximately three river miles downstream from the BVPS-1 and 2 site.

The Municipality of Shippingport Borough has zoned the BVPS-1 and 2 site as industrial except for the tract on which the Training and Simulator Buildings are located, which is zoned business. Some land adjacent to the site, south of State Route 168, is zoned residential. However, this area is small, consists of steep, wooded slopes, and has limited potential for

growth. The U.S. Coast Guard has established a Restricted Use Zone encompassing all waters extending 200 feet from FENOC's BVPS-1 and 2 property line along the southeastern shoreline of the Ohio River. Entry of persons or vessels into this Restricted Use Zone is prohibited unless authorized by the Coast Guard Captain of the Port of Pittsburgh or his designated representative.

The proposed EPU would not require any land disturbance to the BVPS-1 and 2 site. The EPU would not significantly affect material storage, including chemicals and fuels stored on site. The most significant modifications that would take place to support the EPU include replacement of the high-pressure turbine rotor, changes to the transformer cooler, replacement of the BVPS-1 steam generators (SGs), and replacement of the CT fill. None of these modifications would result in changes in land use.

FENOC does not plan to conduct major refurbishment or significant land-disturbing activities to implement the EPU. FENOC has stated that there would be no refurbishment-related impacts on historic and archaeological resources associated with the EPU. The proposed EPU would not modify the current land use activities at the site beyond that described in the July 1973 or the September 1985 FESs related to the operation of BVPS-1 and 2. Therefore, the staff concludes that the land use impacts of the proposed EPU are bounded by the impacts previously evaluated in the FESs.

Cooling Tower Impacts:

The potential impacts associated with increased CT operation for the proposed action include aesthetic impacts due to the increased moisture content of the air. Other impacts include fogging, icing, thermal, suspended solids, and noise. BVPS-1 and 2 employ a closed-loop cooling system including a natural draft CT (one per unit) to dissipate waste heat to the

atmosphere. The two CTs are natural draft, hyperbolic, reinforced concrete shells, approximately 500 feet high.

There would be roughly a 10-percent increase in the evaporation rates from the CTs as a result of the EPU. The wide dispersion and elevated CT exhaust plumes of the natural draft CTs at BVPS-1 and 2 would continue to provide an advantage in mitigating any fogging and icing potentials. The fogging potential of the CT plumes would be slightly diminished compared to the existing plume trajectories. The EPU higher heat load would increase the CT exit velocity and temperature. The plumes would be more buoyant and have a slightly higher upward velocity. This reduces the potential for fogging. The icing potential of the plumes during the EPU operation may increase slightly, with a maximum of 8 percent more icing than indicated by the original plume studies in the Updated Final Safety Analysis Reports (UFSARs). This results in an additional thickness of 0.002 inches compared to the original estimates. However, the original icing estimates were based on very high drift rates and depositions that, according to FENOC, have not occurred in the past 28 years. Therefore, no significant fogging or icing would occur as a result of the EPU.

The increased plant load due to the EPU would increase the CT blowdown discharge temperature to the Ohio River by approximately 3 degrees Fahrenheit (EF). The CT evaporation rate would increase by up to an additional 10 percent, which would reduce CT blowdown flow. Concentrate solutions and suspensions in the discharged water are expected to increase, and yield up to 10 percent more solids deposition in the Cts. The National Pollutant Discharge Elimination System (NPDES) permit specifies that the discharge may not change the temperature of the receiving stream by more than 2 EF in any one hour. The data evaluated indicate that the post-EPU discharges would not challenge this NPDES permit parameter. Based on Environmental Protection Agency (EPA) standards, the water temperature at representative locations in the Ohio River shall not exceed the monthly maximum limits by more

than 3 EF. The month of January has the most limiting EPA maximum temperature of 50 EF. In addition, the data evaluated indicate that the evaporation related to operation at EPU conditions would not cause the mass or concentration parameters of the CT blowdown to exceed the BVPS-1 and 2 NPDES permit parameter limits. Furthermore, the additional 10-percent increase in suspended solids would not cause significant impacts to the Ohio River, and sedimentation from the CTs would be removed during refueling outages.

The aesthetic impacts associated with increased CT operation would not change significantly from the aesthetic impacts associated with the current CT operation. No significant increase in noise is anticipated for CT operation because there would be no change in flowrate and no new CT construction. The fogging potential of the CT plumes of the natural draft CTs at BVPS-1 and 2 is slightly diminished compared to the existing plume trajectories due to higher heat load, which would increase the CT exit velocity and temperature, making the elevation of the plumes even further from the ground. Therefore, the NRC staff concludes that there are no significant impacts associated with increased CT operation for the proposed action.

Transmission Facility Impacts:

The potential impacts associated with transmission facilities for the proposed action include changes in transmission line corridor right-of-way maintenance and electric shock hazards due to increased current. The proposed EPU would not require any physical modifications to the transmission lines. FENOC implements a specific program for ensuring continued safe and reliable operation of these transmission lines, continued compatibility of land uses on the transmission corridors, and environmentally sound maintenance of the corridors.

FENOC conducts transmission line corridor right-of-way maintenance through helicopter inspections of transmission lines to determine the physical condition of towers, conductors and other equipment; status of vegetation communities; land use changes; and any encroachments

on the line. On-foot inspections are conducted to manage vegetation growth, and crews are sent to problem areas to make onsite inspections and repairs, as needed. Routine vegetation maintenance of the rural transmission line corridors is managed to promote a diversity of shrubs, grasses, and other groundcover that provides wildlife food and cover. Maintenance efforts prescribed for transmission corridors include the removal, pruning, and chemical control of woody vegetation as necessary to ensure adequate clearance for safe and reliable operation of the line. Management of the corridor edge and beyond involves identification and removal of hazardous trees. These maintenance procedures are not expected to change as a result of the proposed action.

There would be an increase in current passing through the transmission lines associated with the increased power level of the proposed EPU. The increased electrical current passing through the transmission lines would cause an increase in electromagnetic field strength. The National Electric Safety Code (NESC) provides design criteria that limit hazards from steady-state currents induced by transmission line electromagnetic fields. The NESC limits the short-circuit current to ground to less than 5 miliamperes (mA). FENOC conducted an independent analysis of each of the transmission lines to determine conformance with the current NESC standard. As a result of the EPU, FENOC does not expect changes in operating voltage or other parameters for these lines that would affect conformance status with respect to the NESC 5-mA standard. Currently, all circuits at BVPS-1 and 2 meet NESC requirements for limiting induced shock.

The impacts associated with transmission facilities for the proposed action would not change significantly from the impacts associated with current plant operation. No new transmission lines are expected to be constructed as a result of the EPU. There would be no physical modifications to the transmission lines, transmission line rights-of-way maintenance practices would not change, there would be no changes to transmission line rights-of-way or

vertical clearances, and electric current passing through the transmission lines would increase only slightly. Therefore, the NRC staff concludes that there are no significant impacts associated with transmission facilities for the proposed action.

Water Use Impacts:

Water used for BVPS-1 and 2 site operations consists of raw water from the Ohio River and potable water from the Midland Borough Municipal Water Authority (MWA). Water withdrawn from the Ohio River is used primarily for cooling, initially as once-through non-contact cooling water for primary and secondary heat exchangers in BVPS-1 and 2. Most of this water is then used as makeup to the CWSs, which provide cooling for the main condensers, to replace water lost from evaporation and drift from the CTs, and to maintain dissolved solids at design equilibrium. A small fraction of water withdrawn from the river is used as feedwater for production of demineralized water (for use in nuclear steam supply system primary and secondary cooling loops) and other purposes. Cooling water not consumed by evaporation and drift losses and other treated wastewater streams is ultimately discharged back to the Ohio River in accordance with the NPDES permit for the BVPS-1 and 2 site issued by the Pennsylvania Department of Environmental Protection.

Municipal water from MWA supplies the station domestic water distribution system. Sanitary wastewater is treated in the BVPS-1 and 2 sewage treatment plants. Though the BVPS-1 and 2 site originally drew water from onsite wells and the Ohio River as supply sources for domestic water, no groundwater is currently used at BVPS-1 and 2, and no future use of groundwater is anticipated.

Potential water use impacts from the proposed action include hydrological alterations to the Ohio River and changes to plant water supply. Water from the BVPS-1 SWS is discharged to the BVPS-1 CWS, and water from the BVPS-2 SWS (excluding up to 8,400 gallons per minute (gpm) discharged to the emergency outfall structure) is discharged to the BVPS-2 CWS.

This makeup water replaces consumptive losses due to evaporation and drift from the CTs. The excess makeup overflows at the CT basin and is directed back to the river as CT blowdown. CT blowdown flow also keeps dissolved solids in the CWSs within design limits.

Makeup flows to the CWSs would be essentially unchanged from pre-EPU conditions. Since the consumptive loss would increase (due to increased evaporation), less water would overflow the basin as CT blowdown when operating at the EPU conditions, leading to an increase in the maximum dissolved solids concentration of the blowdown by approximately 7 percent, with an increase in blowdown temperature of less than 3 EF at design conditions noted above, and a decrease in blowdown flow amounts approximately equivalent to the increase in evaporation rates. With respect to these changes, FENOC determined that the combined maximum monthly average blowdown flows for the BVPS-1 and 2 units operating at the EPU maximum power levels of 2,900 MWt would be less than 42,500 gpm. BVPS-1 and 2 operational monitoring data indicate that this is likely a conservative upper-bound estimate; for a recent 2-year period prior to power uprate (2001-2002), actual maximum monthly average blowdown discharge flow from BVPS-1 and 2 was approximately 38,000 gpm.

Predicted monthly average temperature differences between the blowdown and the ambient river water at current authorized maximum power levels range from 2.4 EF in August to 28.6 EF in January. During June through August, when ambient river temperatures under this prediction are highest (75-80 EF), this temperature differential ranges as high as 7.2 EF. BVPS-1 and 2 operational monitoring indicates that this range is appropriate for periods of high ambient water temperature. For example, average temperature differential between BVPS-1 and 2 blowdown and the ambient river was approximately 5.5 EF for August 2002, a month in which both BVPS-1 and 2 units were operated at or near full power and ambient temperature of the Ohio River averaged 82 EF, at or near its highest of the year. Considering the expected maximum increase of less than 3 EF in blowdown temperature at design conditions noted

above, FENOC therefore expects that this monthly average temperature differential during summer months when ambient river temperatures are highest (between June-August) would range from approximately 5 EF to 10 EF when both units are operating at maximum power levels of 2,900 MWt. As noted above, temperature effects would not be expected to challenge NPDES permit parameters or EPA standards for the Ohio River.

The annual average flow of the Ohio River at the BVPS-1 and 2 site is 39,503 cubic feet per second (cfs; or 1.25 x 10^{12} cubic feet per year), which meets NRC's annual flow criterion for classification as a small river. The results of FENOC's analysis indicate that the lowest average flow in the Ohio River at the BVPS site is approximately 5,300 cfs, which occurs once in 10 years for 7-day duration. Based on estimates from the U.S. Army Corps of Engineers, the minimum expected flow under conditions corresponding to the lowest flow of record, which occurred in 1930, is approximately 4,000 cfs. Consumptive water losses resulting from BVPS-1 and 2 operation comprise a very small fraction of flow in the Ohio River, even under low flow conditions. FENOC estimates that the maximum consumptive loss that would occur if both BVPS-1 and 2 were operated at their maximum uprated power level (2,900 MWt per unit) would be approximately 59 cfs or 1.1 percent and 1.5 percent of the once-in-10-year low flow rate and the lowest flow of record of the Ohio River, respectively.

The EPU would not involve any configuration change to the intake structure. The pump capacity would not change; therefore, there would not be an increase in the rate of withdrawal of water from the Ohio River. There would be a slight increase in the amount of Ohio River water consumed as a result of the EPU under all cooling modes of operation due to increased evaporative losses. However the increased evaporative loss would be insignificant relative to the flow in the Ohio River, even under low flow conditions. Therefore, the NRC staff concludes that there would be no significant impact to the hydrological pattern of the Ohio River, and there would be no significant impact to plant water supply due to the proposed action.

Discharge Impacts:

Once cooling water from the BVPS-1 plant river and raw water system has served its plant components, it is discharged to the BVPS-1 CWS to make up operational water losses from that system. Similarly, once cooling water from the BVPS-2 SWS has served its plant components, most of it is discharged to the BVPS-2 CWS downstream from the main condenser to replace operational losses from that system. As much as 8,400 gpm (19 cfs) originating from the BVPS-2 primary (reactor plant) heat exchangers and components is discharged to the Ohio River via the emergency outfall structure to reduce silt accumulation in that system. Under normal plant operations, the temperature of this discharge to the emergency outfall structure is approximately 12 EF above ambient river temperature. FENOC calculations indicate that operation at the EPU power level of 2,900 MWt would increase this temperature by less than 1 EF.

Makeup water is supplied to the BVPS-1 closed-loop CWS by discharging the plant river and raw water (service water for BVPS-2) into the circulating water condenser discharge lines. In these systems, water heated by passage through the main condensers is circulated through the CTs, where waste heat is removed primarily by evaporation. The cooled water, which accumulates in a basin beneath each CT, is recirculated back through the main condensers. CWS system flow would remain essentially unchanged following the EPU. The increased levels of rejected heat resulting from an increase in turbine exhaust flow would increase the CWS condenser outlet temperature by less than 3 EF at bounding design condition.

No additional chemical usage is planned as a result of operation at EPU conditions. No additional pumps to increase water usage would be added. Therefore, total chemical mass and concentration in the service and river water systems would not be changed, and the chemical mass in the CWSs would not be changed. BVPS-1 and 2 site operations have had no known

impact on public health from thermophilic microbial pathogens. Risk to human health is low due to poor conditions for supporting populations of such organisms in the Ohio River, including areas affected by the thermal discharge, and low potential for exposure of the public in the thermally affected zone.

The impacts of continued dredging generally were determined to be minor for other resources, including aquatic macroinvertebrates, fish, aquatic vegetation, wetlands, and terrestrial biota (e.g., riparian zone communities). In the Commonwealth of Pennsylvania, these dredging activities require dredging permits issued by the U.S. Army Corps of Engineers and Water Obstruction and Encroachment Permits and Sand and Gravel License Agreements issued by the Pennsylvania Department of Environmental Protection, which act to control these activities to ensure that adverse environmental impacts are minimized. At BVPS-1 and 2, most of the cooling water is recirculated and kept at a relatively high temperature. The once-through cooling water discharged at the emergency outfall structure and the CT blowdown are routinely treated with biocides, including calcium hypochlorite. Some residual chlorine, within limits prescribed in the NPDES permit, may be discharged. These biocide applications significantly reduce the likelihood that microbial pathogens would be discharged into the area of concern or pose occupational health risks. Limited access by members of the public to waters and sediment in the immediate cooling water discharge areas further lowers health risks. Access to the BVPS-1 and 2 site by members of the public is subject to control, and shore-based recreation (e.g., fishing) on the property by the public is not permitted. In addition, the U.S. Coast Guard has established a Restricted Use Zone encompassing all waters extending 200 feet from FENOC's BVPS property line along the southeastern shoreline of the Ohio River. Entry of persons or vessels into this Restricted Use Zone is prohibited unless authorized by the Coast Guard Captain of the Port of Pittsburgh or his designated representative.

FENOC is not aware of any public health concerns or incidents related to the BVPS-1

and 2 site cooling water discharge. In response to FENOC's general request to agencies for information as part of its new and significant information review for the EPU, the Pennsylvania Department of Health indicated that it was not aware of any significant health issues that might result from the EPU. Therefore, the NRC staff concludes that the environmental impacts of the proposed action associated with BVPS-1 and 2 discharge would not be significant.

Impacts on Aquatic Biota:

The potential impacts to aquatic biota from the proposed action include impingement, entrainment, thermal discharge effects, and impacts due to transmission line right-of-way maintenance. BVPS-1 and 2 has intake and discharge structures on the Ohio River. The aquatic species evaluated in this EA are those which occur in the vicinity of the intake and discharge structures.

Closed-cycle cooling reduces potential impacts from impingement, entrainment, and thermal discharge. Under normal operating conditions, both BVPS-1 and 2 units are not shut down simultaneously, reducing potential impacts from cold shock. Considered together with the small quantity of river water the BVPS-1 and 2 closed-loop cooling system requires, the potential for fish entrainment and impingement is greatly reduced by the design and operation of the intake structure.

Population increases of some fish species have apparently occurred since BVPS-1 and 2 initiated operation. Annual monitoring of the fish community at BVPS-1 and 2 indicates the presence of special-status fish species at both control and non-control stations. Monitoring conducted at BVPS-1 and 2 from 1976 through 1995 indicated that impacts from entrainment of fish eggs and larvae were not significant, and that impingement losses were small and had little impact on fish populations. Review of BVPS-1 and 2 annual monitoring reports and the BVPS-2 Operating License Stage Environmental Review (ER) indicates that none of these special status species were specifically identified in egg and larvae samples collected during

entrainment monitoring. The impacts of impingement of fish and shellfish are negligible, and would not be expected to increase as a result of the proposed action. The BVPS-1 and 2 NPDES permit specifies that the discharge may not change the temperature of the receiving stream by more than 2 EF in any one hour. The data evaluated indicate that the post-EPU discharges would not challenge this NPDES permit parameter.

The EPU would not increase the amount of water withdrawn from the river, and the increased discharge temperature would not compromise the NPDES permit parameters, and therefore, would not result in significant environmental impacts. As discussed in the transmission facility impacts section of this EA, there are no changes in the transmission line right-of-way maintenance practices associated with the proposed action. Therefore, the NRC staff concludes that there are no significant adverse impacts to aquatic biota for the proposed action.

Impacts on Terrestrial Biota:

The potential impacts to terrestrial biota from the proposed action include impacts due to transmission line right-of-way maintenance. As discussed in the transmission facility impacts section of this EA, transmission line right-of-way maintenance practices would not change for the proposed action. FENOC does not plan to conduct major refurbishment or significant land-disturbing activities to implement the EPU. Therefore, the NRC staff concludes that there are no significant impacts to terrestrial biota associated with transmission line right-of-way maintenance for the proposed action.

Impacts on Threatened and Endangered Species:

Potential impacts to threatened and endangered species from the proposed action include the impacts assessed in the aquatic and terrestrial biota sections of this EA. These impacts include impingement, entrainment, thermal discharge effects, and impacts due to transmission line right-of-way maintenance for aquatic species, and impacts due to

transmission line right-of-way maintenance or construction refurbishment activities for terrestrial species.

There are eleven species listed as threatened or endangered under the Federal Endangered Species Act within Beaver County, Pennsylvania. These include the following:

Table 1: Threatened and Endangered Species for Beaver County, PA

Mussels	Northern riffleshell (*Epioblasma torulosa rangiana*), Clubshell (*Pleurobema clava*), Dwarf wedgemussel (*Alasmidonta heterodon*)
Fish	Shortnose sturgeon (*Acipenser brevirostrum*)
Plants	Small-whorted pogonia (*Isotria medeoloides*), Northeastern bulrush (*Scirpus ancistrochaetus*)
Reptiles	Bog turtle (*Clemmys mublenbergii*), Eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*)
Birds	Bald eagle (*Haliaeetus leucocephalus*), Piping plover (*Charadrius melodus*)
Mammals	Indiana bat (*Myotis sodalis*)

Consultations with the FWS have been conducted to verify that this list of threatened or endangered species of potential concern to the BVPS-1 and 2 EPU is accurate. In a letter dated October 2, 2003, the Pennsylvania FWS stated that there are no federally listed or proposed threatened or endangered species under its jurisdiction in the vicinity of BVPS-1 and 2. FWS indicates that no federally listed or proposed threatened and endangered species are

known to occur within the project impact area. The NRC staff's review and conclusions for each species is presented in the following paragraphs.

The species of concern consist of three mussels, two plants, two reptiles, two birds, one fish, and one mammal. The three federally listed mussel species were last documented as occurring in the upper Ohio River or lower Allegheny River in early 1900s. The Clubshell mussel (*Pleurobema clava*) and Northern riffleshell mussel (*Epioblasma torulosa rangiana*) have been collected in the French Creek and Allegheny River watersheds in Clarion, Crawford, Erie, Forest, Mercer, Venango, and Warren Counties; no adverse impacts to these mussels are known to occur from the proposed actions.

The two mussel species known to occur in the area are typically found in areas with substrates composed of clean gravel or a mix of sand and gravel, and which have moderate water current. However, the Northern riffleshell mussel has also been collected in quieter waters, such as in the Great Lakes at a depth of greater than 35 feet on suitable substrate. The Northern riffleshell mussel prefers firmly packed gravel or sand. Potential habitats might include islands, nearshore areas, and the head ends of pools. The FWS has not designated critical habitat for this species. Since there has not been extensive dive sampling throughout the study area, it is not known with certainty whether this species occurs in other pools of the Allegheny and Ohio Rivers.

The two federally listed plant species of concern, Small-whorted pogonia *(Isotria medeoloides*) and Northeastern bulrush (*Scirpus ancistrochaetus*), are endangered nationwide and extremely rare. No occurrence records were identified for these species in areas of significance to the BVPS-1 and 2 EPU. Only three populations of Small-whorted pogonia are known to exist in the Commonwealth, none in southwestern Pennsylvania. Information from the Pennsylvania Department of Conservation and Natural Resources indicates that there are no recent historical records of these species in Beaver and Allegheny Counties. Some areas in or

near the transmission line corridor may be consistent with the habitat affinities.

The two federally listed reptile species of concern, the Bog turtle *(Clemmys mublenbergii*) and Eastern massasauga rattlesnake, have not been sighted in Beaver or Allegheny Counties. There is little or no suitable wetland habitat on or near the BVPS-1 and 2 site or Beaver Valley-Crescent Line 318 transmission corridor for these species.

The two federally listed bird species, the Bald eagle *(Haliaeetus leucocephalus*) and the Piping plover (*Charadrius melodus*), are endangered, and there are no records of these species on the BVPS-1 and 2 site. According to the FWS, the Bald eagle, a federally listed threatened species, may possibly be found state-wide in Pennsylvania. It is primarily found in riparian areas and is associated with coasts, rivers, and lakes. The Bald eagle usually nests near bodies of water where it feeds. Bald eagles feed primarily on fish, although they may also take a variety of birds, mammals, and turtles when fish are not readily available. Nesting has been known to occur in Butler County, and it is possible that any resident or transient individuals of this species may feed along the Allegheny or Ohio River corridors within the study area.

The Bald eagle species has been observed along the Ohio River portion at the BVPS-1 and 2 site. To date, no known nesting sites of Bald eagles are noted immediately adjacent to areas that may be dredged. In addition, critical habitat has not been identified for the protection of these species within the Ohio River at or near the BVPS-1 and 2 site.

The federally listed fish species, Shortnose sturgeon *(Acipenser brevirostrum*), is an endangered fish species and has never been known to occur in western Pennsylvania; therefore, it is not expected to occur in the impact area.

The federally listed mammal species, the Indiana bat (*Myotis sodalis*), may be found state-wide in suitable habitat in Pennsylvania as part of its summer range. Preferred winter hibernation sites include limestone caves; abandoned coal, limestone, and iron mines; and abandoned tunnels (one colony is currently using an abandoned railroad tunnel). As many as

four winter hibernation sites have been identified in the state to date, including sites in Armstrong County, Blair County, and Somerset County. According to the 1983 USFWS recovery plan for the Indiana bat, there is no critical habitat for the species in Pennsylvania.

Impacts to the eleven threatened and endangered species described above are expected to be small due to one or more of the following: (a) low potential for occurrence in areas affected by plant and transmission line operation and associated maintenance; (b) protective operation and maintenance practices; and c) lack of observed impacts as documented by operational monitoring. The FWS has listed several species with ranges that include Pennsylvania as threatened or endangered at the Federal level, but has not designated any areas in the Commonwealth as critical habitat for listed species (50 CFR 17.95, 50 CFR 17.96). There is no federally listed threatened and endangered species critical habitat which has been identified on or near the BVPS-1 and 2 site. Therefore, the species described above would not be significantly affected as a result of the EPU. The NRC staff therefore concludes that there is no effect on threatened and endangered species for the proposed action.

Social and Economic Impacts:

Potential social and economic impacts due to the proposed action include changes in tax revenue for Beaver County and changes in the size of the workforce at BVPS-1 and 2.

FENOC is now being assessed annual property taxes by Beaver County, Shippingport Borough, and the South Side Area School District. Revenues received by Beaver County support such programs as engineering, recreation, public safety, public works, and emergency services. Revenues received by the Shippingport Borough support such programs as waste management, public works, and public safety.

FENOC employs a permanent workforce of approximately 1,000 employees and approximately 500 contractors at the BVPS-1 and 2 site. No additional permanent employees would be expected as a result of the EPU. Approximately 55 percent of the permanent

workforce live in Beaver County and 27 percent live in Allegheny County. The remaining employees live in various other locations. FENOC refuels BVPS-1 and 2 at intervals of approximately 18 months. During refueling outages, site employment increases by as many as 800 workers for temporary (30 to 40 days) duty, and FENOC expects that similar increases would occur for refueling outages as a result of the EPU. The proposed EPU would not

significantly impact the size of the BVPS-1 and 2 labor force and would not have a material effect upon the labor force required for future outages.

FENOC's annual property tax payments for BVPS-1 and 2 averaged less than 1 percent of Beaver County's operating budgets for 2000 to 2002. Given the area's declining populations and sluggish growth pattern, EPU tax-driven land-use changes would generate very little new development and minimal changes in the area's land-use patterns. No tax-driven land-use impacts are anticipated because no additional full-time employees would be expected as a result of the EPU. The amount of future property tax payments for BVPS-1 and 2 post-EPU and the proportion of those payments to the operating budgets of Beaver County, South Side Area School District, and Shippingport Borough are dependent on future market value of the units, future valuations of other properties in these jurisdictions, and other factors.

The NRC staff has reviewed the information provided by the licensee regarding socioeconomic impacts. No significant socioeconomic impacts are anticipated because no permanent additional employees are expected as a result of the EPU.

Summary:

The proposed EPU would not result in a significant change in non-radiological impacts in the areas of land use, water use, waste discharges, CT operation, terrestrial and aquatic biota, transmission facility operation, or social and economic factors. No other non-radiological impacts were identified or would be expected. Table 2 summarizes the non-radiological

environmental impacts of the proposed EPU at BVPS-1 and 2.

Table 2: Summary of Non-Radiological Environmental Impacts

Land Use	No significant land use modifications; no refurbishment activities with land impacts on historic and archaeological resources.
Cooling Tower	No significant aesthetic impact, slightly larger plume size; no significant increase in noise; no significant fogging or icing.
Transmission Facilities	No physical modifications to transmission lines; lines meet shock safety requirements; no changes to right-of-ways; small increase in electrical current would cause small increase in electromagnetic field around transmission lines.
Water Use	No configuration change to intake structure; no increased rate of withdrawal; slight increase in water consumption due to increased evaporation; no water-use conflicts. No change in ground water use.
Discharge	Increase in water temperature discharged to Ohio River; will meet thermal discharge limits in current NPDES permit at EPU conditions; no additional chemical usage is planned as a result of operation at EPU conditions. EPU will not change conclusions made in the FES.
Aquatic Biota	No additional impact expected on aquatic biota.
Terrestrial Biota	Pennsylvania FWS found no adverse impact from EPU; no additional impact on terrestrial plant or animal species.
Threatened and Endangered Species	There are eleven federally listed species in Beaver County; EPU will have no effect on these species.
Social and Economic	No significant change in size of BVPS-1 and 2 labor force required for plant operation or future refueling outages.

RADIOLOGICAL IMPACTS

Radioactive Waste Stream Impacts:

BVPS-1 and 2 uses waste treatment systems designed to collect, process, and dispose

of gaseous, liquid, and solid wastes that might contain radioactive material in a safe and controlled manner such that discharges are in accordance with the requirements of Title 10 of the *Code of Federal Regulations*, Part 20 (10 CFR Part 20), "STANDARDS FOR PROTECTION AGAINST RADIATION," and 10 CFR Part 50, "DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES," Appendix I. These radioactive waste streams are discussed in the FESs for BVPS-1 and 2.

The proposed EPU would not result in changes in the operation or design of equipment for the gaseous, liquid, or solid waste systems.

Gaseous Radioactive Waste and Offsite Doses:

During normal operation, the gaseous effluent treatment systems process and control the release to the environment of gaseous radioactive effluents, including small quantities of noble gases, halogens, tritium, and particulate material. Gaseous radioactive wastes include airborne particulates and gases vented from process equipment and the building ventilation exhaust air. The major sources of gaseous radioactive waste are filtered using charcoal adsorbers, held up for decay using separate pressurized decay tanks, and monitored prior to release to ensure that the dose guidelines of 10 CFR Part 50, Appendix I and the limits of 10 CFR Part 20 are not exceeded.

Gaseous releases of Kr-85 would increase by approximately the percentage of power increase. Isotopes with shorter half-lives would have varying EPU increase percentages up to a maximum of 18 percent. The impact of the EPU on iodine releases would be slightly greater than the percentage increase in power level. The other components of the gaseous release (i.e., particulates via the building ventilation systems and water activation gases) would not be impacted by the EPU, according to analysis using the methodology outlined in NUREG-0017, "Calculation of Release of Radioactive Materials in Liquid and Gaseous Effluents from

Pressurized Water Reactors." Tritium releases in the gaseous effluents increase in proportion to their increased production, which is directly related to core power. The impact of the increased activity in the radwaste systems is primarily in the activity shipped offsite as solid waste. Gaseous releases to the environment would not increase beyond the limits of 10 CFR Part 20 and the guidelines of 10 CFR Part 50, Appendix I. Therefore, the increase in

offsite dose due to gaseous effluent release following implementation of the EPU would not be significant.

Liquid Radioactive Waste and Offsite Doses:

During normal operation, the liquid effluent treatment systems process and control the release of liquid radioactive effluents to the environment, such that the doses to individuals offsite are maintained within the limits of 10 CFR Part 20 and the guidelines of 10 CFR Part 50, Appendix I. The liquid radioactive waste systems are designed to process the waste and then recycle it within the plant as condensate, reprocess it through the radioactive waste system for further purification, or discharge it to the environment as liquid radioactive waste effluent in accordance with State and Federal regulations.

To bound the estimated impact of EPU on the annual offsite releases, the licensee used the highest percentage change in activity levels of isotopes in each chemical grouping found in the primary reactor coolant and secondary fluids that characterize each unit. The licensee then applied the values to the applicable gaseous and liquid effluent pathways. The percentage change was applied to the doses reported in the licensee's radioactive effluent reports for 1997 through 2001 (adjusted to reflect a 100-percent capacity factor) to calculate the offsite doses following the EPU. The licensee concluded that although the doses increased, they remained below the regulatory requirements of 10 CFR Part 20 and the guidelines of Appendix I to 10 CFR Part 50.

The EPU would increase the liquid effluent release concentrations by approximately 14 percent, as this activity is based on the long-term reactor coolant system (RCS) and secondary side activity and on waste volumes. Tritium releases in liquid effluents would increase in proportion to their increased production, which is directly related to core power and is allocated between the gaseous and liquid releases in this analysis in the same proportion as pre-EPU releases. However, doses from liquid releases to the environment would not increase beyond the limits of 10 CFR Part 20 and the guidelines of 10 CFR Part 50, Appendix I. Therefore, there would not be a significant environmental impact from the additional amount of radioactive material generated following implementation of the EPU.

Solid Radioactive Wastes:

The solid radioactive waste system collects, processes, packages, and temporarily stores radioactive dry and wet solid wastes prior to shipment offsite and permanent disposal. The volume of solid waste is not expected to increase proportionally with the EPU increment, since the EPU neither would appreciably impact installed equipment performance, nor would it require drastic changes in system operation or maintenance. Only minor, if any, changes in waste generation volume are expected. This would include the small increase in volume of condensate polishing resins in BVPS-2. However, it is expected that the activity inventories for most of the solid waste would increase proportionately to the increase in long half-life coolant activity. While the total long-lived activity contained in the waste is expected to be bounded by the percentage of the EPU, the increase in the overall volume of waste generation resulting from the EPU is expected to be minor. Therefore, no significant additional waste would be generated due to operation at EPU conditions. Since operation at EPU conditions would not increase the SG blowdown, no significant additional solid waste resin would be generated.

Spent fuel from BVPS-1 and 2 is transferred from the reactors and stored in the respective spent fuel storage pools. There is sufficient capacity in the BVPS-1 fuel storage pool

to accommodate that unit, including full core discharge, through the end of its current license term. FENOC anticipates that the capacity of the BVPS-2 spent fuel pool would be exhausted by approximately year 2007, although requests for approval of increased capacity may be undertaken. The increased power level of the EPU would require additional energy for each cycle. To accommodate this extra energy, it is expected that additional fresh feed fuel assemblies would be needed in the core designs. The specific number of feed fuel assemblies (or discharge assemblies) for each cycle will be determined during the core design process, and will take into account expected energy carryover from the previous cycle. FENOC has determined that four additional fresh fuel assemblies would be needed for each refueling under EPU conditions to meet the higher energy needs.

Additional storage capacity would be required beyond the current license terms if spent fuel stored in the pools cannot be transferred to a permanent repository. Installation of additional onsite spent fuel storage capacity, if elected, is an action licensed by the NRC separately from EPU. Current ongoing criticality analysis conducted by the licensee may free up presently unavailable storage in the upcoming months. FENOC plans to request an amendment to increase spent fuel pool storage capacity and to seek approval for dry cask storage at BVPS-1 and 2 by 2014. At this time, the NRC staff concludes that there would be no significant environmental impacts resulting from storage of the additional fuel assemblies.

Direct Radiation Doses Offsite:

The licensee evaluated the direct radiation dose to the unrestricted area and concluded that it is not a significant exposure pathway. Since the EPU would only slightly increase the core inventory of radionuclides and the amount of radioactive wastes, the NRC staff concludes that direct radiation dose would not be significantly affected by the EPU and would continue to meet the limits in 10 CFR Part 20.

In addition to the dose impact to radioactive gaseous and liquid effluents, the licensee

evaluated the dose impact of the EPU on the direct radiation from plant systems and components containing radioactive material to members of the public, as required by 40 CFR Part 190.

The licensee's evaluation concluded that the direct radiation doses are not expected to increase significantly over current levels and are expected to remain within the limit of 25 mrem (0.25 mSv) annual whole-body dose equivalent as specified in 40 CFR Part 190.

Occupational Dose:

Occupational exposures from in-plant radiation primarily occur during routine maintenance, special maintenance, and refueling operations. An increase in power at BVPS-1 and 2 could increase the radiation levels in the RCS. However, plant programs and administrative controls such as shielding, plant chemistry, and the radiation protection program would help compensate for these potential increases.

The licensee's assessment takes into consideration that following EPU, the operation and layout/arrangement of plant radioactive systems would remain consistent with the original design. The EPU assessment takes into account that normal operational dose rates and dose to members of the public and to plant workers must continue to meet the requirements of 10 CFR Part 20 and radioactive effluent release license conditions.

The NRC staff has evaluated the licensee's plan regarding occupational exposure related to the EPU. The licensee has evaluated the impact of the EPU on the radiation source terms in the reactor core, irradiated fuels/objects, RCS and downstream radioactive systems. These source terms are expected to increase by approximately 7.9 percent after a core power uprate from 2689 MWt to 2900 MWt. The radiation exposure received by plant personnel would be expected to increase by approximately the same percentage. The above increase in radiation levels would not affect the radiation zoning or shielding requirements in the various areas of the plant because the increase due to EPU would be offset by the conservatism in the

pre-EPU "design- basis" source terms used to establish the radiation zones by BVPS-1 and 2 Technical Specifications (TSs) that limit the RCS concentrations to levels well below the design-basis source terms, and by conservative analytical techniques used to establish shielding requirements. Regardless, individual worker exposures would be maintained within acceptable limits by the site Radiation Protection Program, which controls access to radiation areas. In addition, procedural controls and As Low as Reasonably Achievable (ALARA) techniques are used to limit doses in areas having increased radiation levels. Therefore, the annual average collective occupational dose after the EPU is implemented would still be well below the value expected when the FESs were published.

Summary of Dose Impacts:

On the basis of the NRC staff's review of the BVPS-1 and 2 license amendment request, the staff concludes that the proposed 8-percent power uprate would not have a significant effect on occupational dose or members of the public from radioactive gaseous and liquid effluent releases. The licensee has programs and procedures in place to ensure that radiation doses are maintained ALARA in accordance with the requirements of 10 CFR 20.1101, Appendix I to 10 CFR Part 50, and 40 CFR Part 190. Therefore, the staff finds the dose impacts from the proposed EPU at the BVPS-1 and 2 to be acceptable from a normal operations perspective.

Postulated Accident Doses:

As a result of implementation of the proposed EPU, there would be an increase in the source term used in the evaluation of some of the postulated accidents in the FESs. The inventory of radionuclides in the reactor core is dependent upon power level; therefore, the core inventory of radionuclides could increase by as much as 8 percent. The concentration of radionuclides in the reactor coolant may also increase by as much as 8 percent; however, this concentration is limited by the BVPS-1 and 2 TSs. Therefore, the reactor coolant concentration

of radionuclides would not be expected to increase significantly. This coolant concentration is part of the source term considered in some of the postulated accident analyses. Some of the radioactive waste streams and storage systems evaluated for postulated accidents may contain slightly higher quantities of radionuclides. For those postulated accidents where the source term has increased, the calculated potential radiation dose to individuals at the site boundary (the exclusion area) and in the low population zone would be increased over values presented in the FESs. As a result of the proposed EPU, plant radioactive source terms would be anticipated to increase proportionally to the actual power level increase.

The NRC staff has reviewed the licensee's analyses and performed confirmatory calculations to verify the acceptability of the licensee's calculated doses under accident conditions. The NRC staff's independent review of dose calculations under postulated accident conditions determined that dose would be within regulatory limits. Therefore, the NRC staff concludes that the EPU would not significantly increase the consequences of accidents and would not result in a significant increase in the radiological environmental impact of BVPS-1 and 2 from postulated accidents.

Fuel Cycle and Transportation Impacts:

The environmental impacts of the fuel cycle and transportation of fuels and wastes are described in Tables S-3 and S-4 of 10 CFR 51.51 and 10 CFR 51.52, respectively. An additional NRC generic EA (53 FR 30355, dated August 11, 1988, as corrected by 53 FR 32322, dated August 24, 1988) evaluated the applicability of Tables S-3 and S-4 to higher burnup cycles and concluded that there is no significant change in environmental impact from the parameters evaluated in Tables S-3 and S-4 for fuel cycles with uranium enrichments up to 5 weight percent Uranium-235 and burnups less than 60,000 megawatt (thermal) days per metric ton (MWd/MTU). Both BVPS-1 and 2 would maintain their nominal 18-month refueling

cycles with the EPU. Therefore, the environmental impacts of the EPU would remain bounded by the impacts in Tables S-3 and S-4 and would not be significant.

Summary:

The proposed EPU would not significantly increase the potential radiological consequences of design-basis accidents, would not result in a significant increase in occupational or public radiation exposure, and would not result in significant additional fuel cycle environmental impacts. Accordingly, the Commission concludes that there are no significant radiological environmental impacts associated with the proposed action. Table 3 summarizes the radiological environmental impacts of the proposed EPU at BVPS-1 and 2.

Alternatives to Proposed Action:

As an alternative to the proposed action, the NRC staff considered denial of the proposed EPU (i.e., the "no-action" alternative). Denial of the application would result in no change in the current environmental impacts. However, if the EPU were not approved, other agencies and electric power organizations may be required to pursue other means of providing electric generation capacity to offset future demand such as fossil fuel power generation. Construction and operation of a fossil-fueled plant would create impacts in air quality, land use, and waste management significantly greater than those identified for the EPU at BVPS-1 and 2.

Implementation of the proposed EPU would have less impact on the environment than the construction and operation of a new fossil-fueled generating facility or the operation of fossil-fueled facilities outside the service area.

Alternative Use of Resources:

This action does not involve the use of any resources not previously considered in the FESs.

Table 3: Summary of Radiological Environmental Impacts

Gaseous Effluents and Doses	Slight increase in dose due to gaseous effluents; doses to individuals offsite will remain within NRC limits.
Liquid Effluents and Doses	14-percent increase in liquid effluent release concentrations; 14-percent increase for doses due to liquid effluent pathway are still well within the 10 CFR Part 50, Appendix I guidelines, so no significant increase in dose to public is expected.
Solid Radioactive Waste	Volume of solid waste is not expected to increase; within FES estimate; increase in amount of spent fuel assemblies; future application for dry cask storage.
In-plant Dose	Occupational dose could increase by 7.9 percent; will remain within FES estimate.
Direct Radiation Dose	Dose expected to increase the same percentage as the EPU for dose rates offsite; expected annual dose continues to meet NRC/EPA limits.
Postulated Accidents	Licensee concluded doses are within NRC limits.
Fuel Cycle and Transportation	Impacts in Tables S-3 and S-4 in 10 CFR Part 51, "ENVIRONMENTAL PROTECTION REGULATIONS FOR DOMESTIC LICENSING AND RELATED REGULATORY FUNCTIONS," are bounding.

Agencies and Persons Consulted:

In accordance with its stated policy, on July 6, 2006, the NRC staff consulted with the Pennsylvania State official, Lawrence Ryan, of the Pennsylvania Department of Environmental Protection, regarding the environmental impact of the proposed action. The State official had no comments.

FINDING OF NO SIGNIFICANT IMPACT

On the basis of the environmental assessment, the Commission concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the Commission has determined not to prepare an environmental impact statement for the proposed action.

For further details with respect to the proposed action, see the licensee's application dated October 4, 2004, as supplemented by letters dated February 23, May 26, June 14, July 8 and 28, August 26, September 6, October 7, 28, and 31, November 8, 18, and 21, December 2, 6, 9, 16, and 30, 2005, and January 25, February 14 and 22, March 10 and 29, May 12, and July 6, 2006. Documents may be examined, and/or copied for a fee, at the NRC's Public Document Room (PDR), located at One White Flint North, Public File Area O1F21, 11555 Rockville Pike (first floor), Rockville, Maryland. Publicly available records will be accessible electronically from the Agencywide Documents Access and Management System (ADAMS) Public Electronic Reading Room on the NRC Web site, http://www.nrc.gov/reading-rm/adams.html. Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS should contact the NRC PDR Reference staff at 1-800-397-4209, or 301-415-4737, or send an e-mail to pdr@nrc.gov.

Dated at Rockville, Maryland, this 10th day of July, 2006.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Timothy G. Colburn, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Beaver Valley Power Station, Unit Nos. 1 and 2

cc:

Gary R. Leidich
President and Chief Nuclear Officer
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-19
76 South Main Street
Akron, OH 44308

Joseph J. Hagan
Senior Vice President of Operations
and Chief Operating Officer
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-14
76 South Main Street
Akron, OH 44308

Danny L. Pace
Senior Vice President, Fleet Engineering
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-14
76 South Main Street
Akron, OH 44308

Jeannie M. Rinckel
Vice President, Fleet Oversight
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-14
76 South Main Street
Akron, OH 44308

David W. Jenkins, Attorney
FirstEnergy Corporation
Mail Stop A-GO-18
76 South Main Street
Akron, OH 44308

Manager, Fleet Licensing
FirstEnergy Nuclear Operating Company
Mail Stop A-GHE-107
395 Ghent Road
Akron, OH 44333

James H. Lash
Vice President
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Mail Stop A-BV-SEB1
P.O. Box 4, Route 168
Shippingport, PA 15077

Lew W. Myers
Executive Vice President, Special Projects
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Mail Stop A-BV-SGRP
P.O. Box 4, Route 168
Shippingport, PA 15077

Manager, Site Regulatory Compliance
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Mail Stop A-BV-A
P.O. Box 4, Route 168
Shippingport, PA 15077

Commissioner James R. Lewis
West Virginia Division of Labor
749-B, Building No. 6
Capitol Complex
Charleston, WV 25305

Director, Utilities Department
Public Utilities Commission
180 East Broad Street
Columbus, OH 43266-0573

Director, Pennsylvania Emergency
Management Agency
2605 Interstate Dr.
Harrisburg, PA 17110-9364

Ohio EPA-DERR
ATTN: Zack A. Clayton
P.O. Box 1049
Columbus, OH 43266-0149

cc:

Dr. Judith Johnsrud
Environmental Coalition on Nuclear Power
Sierra Club
433 Orlando Avenue
State College, PA 16803

Director
Bureau of Radiation Protection
Pennsylvania Department of
Environmental Protection
Rachel Carson State Office Building
P.O. Box 8469
Harrisburg, PA 17105-8469

Mayor of the Borough of Shippingport
P.O. Box 3
Shippingport, PA 15077

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 298
Shippingport, PA 15077