NUCLEAR REGULATORY COMMISSION

[Docket No. 50–354]

PSEG Nuclear, LLC; Hope Creek Generating Station Draft 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 draft Environmental Assessment (EA) as its evaluation of a request by the PSEG Nuclear, LLC (PSEG) for license amendments to increase the maximum thermal power at Hope Creek Generating Station (HCGS) from 3,339 megawatts-thermal (MWt) to 3,840 MWt. The EA assesses environmental impacts up to a maximum thermal power level of 3,952 MWt, as the applicant's environmental report was based on that power level. As stated in the NRC staff's position paper dated February 8, 1996, on the Boiling-Water Reactor (BWR) Extended Power Uprate (EPU) Program, the NRC staff would prepare an environmental impact statement if it believes a power uprate would 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 HCGS or from the NRC staff's independent review; therefore, the NRC staff is documenting its environmental review in an EA. The draft EA and Finding of No Significant Impact are being published in the **Federal Register** with a 30-day public comment period.

Environmental Assessment

Plant Site and Environs

HCGS is located on the southern part of Artificial Island, on the east bank of the Delaware River, in Lower Alloways Creek Township, Salem County, New Jersey. While called Artificial Island, the site is actually connected to the mainland of New Jersey by a strip of tideland, formed by hydraulic fill from dredging operations on the Delaware River by the U.S. Army Corps of Engineers. The site is 15 miles south of the Delaware Memorial Bridge, 18 miles south of Wilmington, Delaware, 30 miles southwest of Philadelphia, Pennsylvania, and 7.5 miles southwest of Salem, New Jersey. The station is located on a 300-acre site.

The site is located in the southern region of the Delaware River Valley, which is defined as the area immediately adjacent to the Delaware River and extending from Trenton to Cape May Point, New Jersey, on the eastern side, and from Morrisville, Pennsylvania, to Lewes, Delaware, on the western side. This region is characterized by extensive tidal marshlands and low-lying meadowlands. Most land in this area is undeveloped. A great deal of land adjacent to the Delaware River, near the site, is public land, owned by the Federal and State governments. The main access to the plant is from a road constructed by PSEG. This road connects with Alloways Creek Neck Road, about 2.5 miles, east of the site. Access to the plant site and all activities thereon are under the control of PSEG.

Identification of the Proposed Action

HCGS is a single unit plant that employs a General Electric BWR that was designed to operate at a rated core thermal power of 3,339 MWt, at 100-percent steam flow, with a turbine-generated rating of approximately 1,139 megawatts-electric (MWe).

In 1984, NRC issued operating license NPF–57 to HCGS, authorizing operation up to a maximum power level of 3,293 MWt. In 2001, NRC authorized a license amendment for a 1.4 percent power uprate from 3,293 MWt to 3,339 MWt and issued an Environmental Assessment and Finding of No Significant Impact for Increase in Allowable Thermal Power Level (NRC 2001).

By letter dated September 18, 2006, PSEG proposed an amendment to the operating license for HCGS, to increase the maximum thermal power level by approximately 15 percent, from 3,339 MWt to 3,840 MWt. The change is considered an EPU because it would raise the reactor core power levels more than 7 percent above the originally licensed maximum power level. According to the licensee, the proposed action would involve installation of a higher efficiency turbine and an increase in the heat output of the reactor. This would increase turbine inlet flow requirements and increase the heat dissipated by the condenser to support increased turbine exhaust steam flow requirements. In the turbine portion of the heat cycle, increases in the turbine throttle pressure and steam flow would result in a small increase in the heat rejected to the cooling tower and the temperature of the water being discharged into the Delaware River. In addition, there would be an increase in the particulate air emission and an increase in the contaminants that are in the blowdown water discharge.

The Need for the Proposed Action

PSEG (2005) evaluated the need for additional electrical generation capacity in its service area for the planning period of 2002–2011. Information provided by the North American Electric Reliability Council showed that, in order to meet projected demands, generating capacity must be increased by at least 2 percent per year for the Mid-Atlantic Area Council and the PJM Interconnection, LLC (PSEG 2005). Such demand increase would exceed PSEG's capacity to generate electricity for its customers.

PSEG determined that a combination of increased power generation and purchase of power from the electrical grid would be needed to meet the projected demands. Increasing the generating capacity at HCGS was estimated to provide lower-cost power than can be purchased on the current and projected energy market. In addition, increasing nuclear generating capacity would lessen the need to depend on fossil fuel alternatives that are subject to unpredictable cost fluctuations and increasing environmental costs.

Environmental Impacts of the Proposed Action

At the time of issuance of the operating license for HCGS, the NRC staff noted that any activity authorized by the license would be encompassed by the overall action evaluated in the Final Environmental Statement (FES) for the operation of HCGS that was issued by the NRC in December 1984 (NRC 1984). This EA summarizes the non-radiological and radiological impacts that may result from the proposed action.

Non-Radiological Impacts

Land Use Impacts

The potential impacts associated with land use (including aesthetics and historic and archaeological resources) include impacts from construction and plant modifications at HCGS. While some plant components would be modified, most plant changes related to the proposed EPU would occur within existing structures, buildings, and fenced equipment yards housing major components within the developed part of the site. No new construction would occur, and no expansion of buildings, roads, parking lots, equipment storage areas, or transmission facilities would be required to support the proposed EPU (PSEG 2005).

Existing parking lots, road access, offices, workshops, warehouses, and restrooms would be used during construction and plant modifications. Therefore, land use would not change at HCGS. In addition, there would be no land use changes along transmission lines (no new lines would be required for the proposed EPU), transmission corridors, switchyards, or substations. Because land use conditions would not change at HCGS and because any disturbance would occur within previously disturbed areas, there would be no impact to aesthetic resources and historic and archeological resources in the vicinity of HCGS (PSEG 2005).

The Coastal Zone Management Act (CZMA) was promulgated to encourage and assist States and territories in developing management programs that preserve, protect, develop, and, where possible, restore the resources of the coastal zone. A ''coastal zone'' is generally described as the coastal waters and the adjacent shore lands strongly influenced by each other. This includes islands, transitional and intertidal areas, salt marshes, wetlands, beaches, and Great Lakes waters. Activities of Federal agencies that are reasonably likely to affect coastal zones shall be consistent with the approved coastal management program (CMP) of the State or territory to the maximum extent practical. The CZMA provisions apply to all actions requiring Federal approval (new plant licenses, license renewals, materials licenses, and major amendments to existing licenses) that affect the coastal zone in a State or territory with a Federally approved CMP. On April 23, 2007, PSEG submitted an application requesting the State of New Jersey to perform the Federal consistency determination in accordance with CZMA. On July 3, 2007, the New Jersey Department of Environmental Protection (NJDEP) Land Use Regulation Program, acting under Section 307 of the Federal Coastal Management Act, agreed with the certification that the EPU is consistent with the approved New Jersey Coastal Management Program.

The impacts of continued operation of HCGS under EPU conditions are bounded by the evaluation in the FES for operation (NRC 1984). Therefore, the potential impacts to land use, aesthetics, and historic and archaeological resources from the proposed EPU would not be significant.

Cooling Tower Impacts

HCGS has one natural draft cooling tower that is currently used to reduce the heat output to the environment. The potential impacts associated with cooling tower operation under the proposed EPU could affect aesthetics, salt drift deposition, noise, fogging or icing, wildlife, and particulate emissions.

The proposed EPU would not result in significant changes to aesthetics such as cooling tower plume dimension at HCGS. Atmospheric emissions from the natural draft cooling tower consist primarily of waste heat and water vapor resulting in persistent cloudlike plumes. The size of the cooling tower plume depends on the meteorological conditions such as temperature, dew point, and relative humidity. For the proposed EPU, NRC does not anticipate any change in the dimension of the plume under equivalent meteorological conditions as evaluated in the FES. Therefore, the NRC staff concludes that there would be no significant aesthetic impacts associated with HCGS cooling tower operation for the proposed action.

Native, exotic, and agricultural plant productivity may be adversely affected by the increased salt concentration in the drift deposited directly on soils or directly on foliage. FES has indicated that the salt drift deposition must be above 90 lbs/acre/year before agriculture plant productivity would be reduced. PSEG has estimated that the proposed EPU would not significantly increase the rate of salt drift deposition from the increase in cooling tower operation. PSEG has estimated that the increase in salt drift deposition rate would be 9 percent to a maximum of 0.109 lbs/acre/year. Therefore, the NRC staff concludes that there would be no significant salt drift deposition impacts associated with HCGS cooling tower operation for the proposed action.

Because the HCGS cooling tower is natural draft, no increase in noise is expected. Therefore, the NRC staff concludes that there would be no significant noise impacts associated with HCGS cooling tower operation for the proposed action.

PSEG has indicated that there would be no significant increase in fogging or icing expected for the proposed EPU. Increased ground-level fogging and icing resulting from water droplets in the cooling tower drift may interfere with highway traffic. The 1984 FES evaluated the impacts of fogging and icing associated with the operation of the natural draft cooling tower at HCGS and found these impacts to be insignificant and inconsequential. The fact that the nearest agricultural or residential land is located several miles from the site further minimizes the potential for impact. Therefore, the NRC staff concludes that there would be no significant fogging or icing impacts associated with HCGS cooling tower operation for the proposed action.

The 1984 FES has stated that although some birds may collide with cooling tower, unpublished surveys at existing cooling towers indicated that the number would be relatively small. The proposed EPU would not increase the risk of wildlife colliding with cooling tower. Therefore, the NRC staff concludes that there would be no significant wildlife impacts associated with HCGS cooling tower operation for the proposed action.

The proposed EPU would increase the particulates emission rate from the HCGS cooling tower, from the current rate of 29.4 pounds per hour (lbs/hr) to an average rate of 35.6 lbs/hr (maximum 42.0 lbs/hr). Particulates (primarily salts) from the cooling tower have an aerodynamic particle size of less than 10 microns in diameter (PM10). The NJDEP has imposed a maximum hourly emission rate for particulates at 30 lbs/hr. Therefore, the projected particulate emission rate from the HCGS cooling tower, due to the proposed EPU, would exceed the NJDEP emission regulatory limit. On March 30, 2007, NJDEP issued a Public Notice and Draft Title V Air Operating Permit for the HCGS cooling tower, proposing to authorize a variance to the HCGS air operating permit with an hourly emission rate of 42 lbs/hr (NJDEP 2007a). On June 13, 2007, NJDEP issued the final Title V Air Operating Permit for HCGS allowing a 42 lbs/hr particulate emission rate for the proposed EPU.

Since particulates from HCGS cooling tower consist primarily of salts with particle size of less than 10 microns, the FES evaluated the environmental impacts on air quality and found the impacts to be minor. Furthermore, a prevention of significant deterioration (PSD) non-applicability analysis was submitted to the U.S. Environmental Protection Agency (EPA)

Region 2, by PSEG on March 4, 2004. Based on the information provided by PSEG, EPA concluded that the EPU project would not result in a significant increase in emissions and would not be subject to PSD review (NJDEP 2007a). In addition, NJDEP has stated that the Bureau of Technical Services reviewed the Air Quality Modeling for the proposed Hope Creek uprate project and determined that the project would meet the National Ambient Air Quality Standards and the New Jersey Ambient Air Quality Standards. Therefore, the NRC staff concludes that there would be no significant particulate emission impacts associated with HCGS cooling tower operation for the proposed action.

Transmission Facility Impacts

The potential impacts associated with transmission facilities include changes in transmission line right-of-way (ROW) maintenance and electric shock hazards due to increased current. The proposed EPU would not require any physical modifications to the transmission lines.

PSEG's transmission line ROW maintenance practices, including the management of vegetation growth, would not change. PSEG did not provide an estimate of the increase in the operating voltage due to the EPU. Based on experience from EPUs at other plants, the NRC staff concludes that the increase in the operating voltage would be negligible. Because the voltage would not change significantly, there would be no significant change in the potential for electric shock. Modifications to onsite transmission equipment are necessary to support the EPU; such changes include replacement of the high- and low-pressure turbines, and the replacement of the main transformer (PSEG 2005). No long-term environmental impacts from these replacements are anticipated.

The proposed EPU would increase the current, which would affect the electromagnetic field. The National Electric Safety Code (NESC) provides design criteria that limit hazards from steady-state currents. The NESC limits the short-circuit current to the ground to less than 5 milliamperes. 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. However, since the increase in power level is approximately 15 percent, the impact of exposure to electromagnetic fields from the offsite transmission lines would not be expected to increase significantly over the current impact. The transmission lines meet the applicable shock prevention provision of the NESC. Therefore, even with the slight increase in current attributable to the EPU, adequate protection is provided against hazards from electrical shock.

The 1984 FES evaluated bird mortality resulting from collision with towers and conductors. The FES has estimated that only 0.07 percent of the mortality of waterfowls from causes other than hunting resulted from collision with towers and conductors at HCGS. Because the proposed EPU does not require physical modifications to the transmission line system, the additional impacts of bird mortality would be minimal.

The impacts associated with transmission facilities for the proposed action would not change significantly relative to the impacts from current plant operation. There would be no physical modifications to the transmission lines, transmission line ROW maintenance practices would not change, there would be no changes to transmission line ROW or vertical ground clearances, and electric current passing through the transmission lines would increase only slightly. Therefore, the NRC staff concludes there would be no significant impacts associated with transmission facilities for the proposed action.

Water Use Impacts

Potential water use impacts from the proposed EPU include localized effects on the Delaware Estuary and changes to plant water supply. HCGS is located on the eastern shore of the Delaware Estuary. The estuary is approximately 2.5 miles wide, and the tidal flow past HCGS is approximately 259,000 million gallons per day (MGD) (NRC 2001). The Delaware Estuary is the source of cooling water for the HCGS circulating water system, a closed-cycle system that utilizes a natural draft cooling tower. During normal plant operations, water usage at HCGS accounts for less than 0.03 percent of the average tidal flow of the Delaware Estuary (PSEG 2005).

HCGS's service water system withdraws approximately 67 MGD from the Delaware Estuary for cooling and makeup water. When estuary water temperature is less than 70 degrees Fahrenheit (°F), two pumps operate to supply an average service water flow rate of approximately 37,000 gallon per minute (gpm). When estuary water temperature is greater than 70 °F, three pumps operate to supply an average service water flow rate of approximately 52,000 gpm (Najarian Associates 2004). Estuary water is delivered to the cooling tower basin and acts primarily as makeup water to the circulating water system—replacing 47 MGD that are returned to the estuary as cooling tower blowdown, and depending upon meteorological conditions and the circulating water flow rate, replacing approximately 10–13 MGD of cooling water that are lost through evaporation from the cooling tower. Approximately 7 MGD of the 67 MGD are used for intake screen wash water and strainer backwash. The circulating water system has an operating capacity of 11 million gallons; however, approximately 9 million gallons of water actually reside in the circulating water system at any given time. Water is re-circulated through the condensers at a rate of approximately 550,000 gpm (PSEG 2005). No changes to the HCGS circulating water or service water systems are expected due to the proposed EPU; therefore, the proposed EPU would not increase the amount of water withdrawn from or discharged to the Delaware Estuary.

Consumptive use of surface water by HCGS is not expected to change substantively as a result of the proposed EPU and is regulated by the Delaware River Basin Commission (DRBC) through a water use contract. The proposed EPU would likely result in a small increase in cooling tower blowdown temperature. To mitigate this temperature increase, PSEG has modified its cooling tower to improve its thermal performance, and as discussed in the following section, thermal discharge to the Delaware Estuary would remain within the regulatory limits set by the New Jersey Pollutant Discharge Elimination System (NJPDES) permit granted to HCGS by NJDEP (PSEG 2005; NJDEP 2002).

Two groundwater wells access the Raritan aquifer to provide domestic and process water to HCGS. The wells are permitted by NJDEP and are also regulated by DRBC. The proposed EPU would not increase the use of groundwater by HCGS or change the limits of groundwater use currently set by DRBC (PSEG 2005). As such, the conclusions in the 1984 FES regarding groundwater use at HCGS would remain valid for the proposed EPU.

The proposed EPU would not increase the amount of surface water withdrawn from the Delaware Estuary and groundwater use at HCGS would not increase. Therefore, the NRC staff concludes the proposed EPU would have negligible water use impacts on the estuary.

Discharge Impacts

Potential impacts to a water body from power plant discharge include increased turbidity, scouring, erosion, sedimentation, contamination, and water temperature. Because the proposed EPU would not increase the amount of cooling tower blowdown discharged to the Delaware Estuary, turbidity, scouring, erosion, and sedimentation would not be expected to significantly impact the estuary. Additionally, the proposed EPU would not introduce any new contaminants to the Delaware Estuary and would not significantly increase any potential contaminants that are presently regulated by the station's NJPDES permit. The concentration of total dissolved solids (TDS) in the cooling tower blowdown would increase due to the increased rate of evaporation; however, the amount of blowdown discharged to the estuary would decrease, and the concentration of TDS would remain within the station's NJPDES permit limits.

Although the amount of water withdrawn from the Delaware Estuary would remain unchanged, the proposed EPU would result in a slight increase in the temperature of the cooling tower blowdown discharged to the estuary. The station's NJPDES permit imposes limits on the temperature of the blowdown and the amount of heat rejected to the estuary by the HCGS circulating water system. The NJDES permit specifies that the 24-hour average maximum blowdown temperature is limited to 97.1 °F, and heat rejection is limited to 662 million British thermal units per hour (MBTU/hr) from September 1 through May 31 and 534 MBTU/hr from June 1 through August 31. DRBC also imposes thermal regulations on HCGS through the NJPDES permit, specifying that the net temperature increase of the Delaware Estuary may not exceed 4 °F from September through May, and 1.5 °F from June through August or estuary water temperature may not exceed a maximum of 86 °F, whichever is less. These limitations apply to waters outside of the heat dissipation area, which extends 2,500 feet upstream and downstream of the discharge point and 1,500 feet offshore from the discharge point. The NJPDES permit provides an exception for occasional excess blowdown temperatures during extreme meteorological conditions (a coincident occurrence of a wet-bulb temperature above 76 °F and relative humidity below 60 percent); however, the net temperature limitations may never be exceeded (Najarian Associates 2004).

The 1984 FES concluded that the station's shoreline discharge would not adversely affect the estuary because of its large tidal influence, which would dilute, mix, and rapidly dissipate the heated effluent (PSEG 2005). Hydrothermal modeling conducted for the proposed EPU determined that, even during extreme meteorological conditions, the post-EPU increase in cooling tower blowdown temperature would not exceed 91.7 °F, and the station would continue to comply with all applicable Delaware Estuary water quality standards set by the station's NJPDES permit and DRBC (Najarian Associates 2004).

In addition to setting thermal discharge limits, the NJPDES permit also regulates all surface and wastewater discharges from the station. The NJPDES permit, effective March 1, 2003, regulates discharge from six outfalls at HCGS, including the cooling tower blowdown, low volume oily wastewater, stormwater, and sewage treatment; these discharges ultimately flow to the Delaware Estuary. As required by the NJPDES permit, in addition to temperature, cooling tower blowdown is monitored for flow, pH, chlorine produced oxidants (CPOs), total suspended solids, TDS, and total organic carbon. HCGS operates a dechlorination system that utilizes ammonium bisulfate to reduce CPOs in the blowdown. Furthermore, acute and chronic biological toxicity tests were routinely performed on cooling tower blowdown from 1998 through 2001 to comply with NJDEP non-toxicity regulations (PSEG 2005).

The NJPDES permit sets monitoring, sampling, and reporting requirements for all HCGS discharges. A search of the NJDEP *Open Public Records Act Datamine* online database revealed no water quality violations for HCGS (NJDEP 2007).

With the exception of increased blowdown temperature and TDS concentration, as discussed above, the proposed EPU would not be expected to alter the composition or volume of any other effluents, including stormwater drainage, oily water, and sewage treatment (PSEG 2005). Blowdown temperature and composition, and Delaware Estuary water temperatures would remain in compliance with the station's NJPDES permit, and the proposed EPU would not result in changes in any other effluents to the estuary. Therefore, the NRC staff concludes that the proposed EPU would result in negligible impacts on the Delaware Estuary from HCGS discharge.

Impacts on Aquatic Biota

The potential impacts to aquatic biota from the proposed action are primarily due to operation of the cooling water system and to maintenance of transmission line ROWs. Cooling water withdrawal affects aquatic populations through impingement of larger individuals (e.g., fish, some crustaceans, turtles) on the intake trash bars and debris screens and entrainment of smaller organisms that pass through the screens into the cooling water system. The proposed action would not change the volume or rate of cooling water withdrawn. Most of the additional heat generated under the proposed EPU would be dissipated by the cooling tower, and PSEG proposes no changes to the cooling water system.

Discharge of heated effluent alters natural thermal and current regimes and can induce thermal shock in aquatic organisms. The HCGS effluent would change under the proposed EPU. Because the volume of makeup water withdrawn from the estuary would remain unchanged and the volume of evaporative loss from the cooling tower would increase, the volume of the blowdown released as effluent, which is the difference between the water withdrawn and the water lost to evaporation, would decrease. The increased evaporation would leave behind more solids in the blowdown, so the concentration of TDS in the effluent would be an average of about 9 percent higher than under current operations (Najarian Associates 2004). The effluent would also be somewhat warmer, but modeling predicts that all present NJPDES permit conditions for the effluent would still be met (Najarian Associates 2004).

PSEG proposes no new transmission line ROWs and no change in current maintenance procedures for transmission line ROWs under the proposed EPU, so this potential source of impact will not be considered further for aquatic resources.

The potential receptors of the environmental stressors of impingement, entrainment, and heat shock are the aquatic communities in the Delaware Estuary near HCGS. Ecologists typically divide such communities into the following categories for convenience when considering ecological impacts of power plants: Microbes, phytoplankton, submerged aquatic vegetation, invertebrate zooplankton, benthic invertebrates, fish, and sometimes birds, reptiles (e.g., sea turtles), and marine mammals. Of these, effects of power plant operation have been consistently demonstrated only for fish.

Unless otherwise noted, the following information on Delaware Estuary fish and blue crab (*Callinectes sapidus*) is from information summarized in the 2006 Salem NJPDES Permit Application (NJDEP 2006). Salem is an adjacent nuclear power plant that has conducted several large studies in support of permitting of its once-through cooling water system. About 200 species of fish have been reported from the Delaware Estuary. Some are resident, some are seasonal migrants, and some are occasional strays. In its NJPDES Permit Application, PSEG selected 11 species, one invertebrate and ten fish, as species representative of the aquatic community (Table 1).

TABLE 1.—SPECIES REPRESENTATIVE OF THE DELAWARE ESTUARY AQUATIC COMMUNITY NEAR ARTIFICIAL ISLAND

Common name	Scientific name	Comment
Blue Crab	*Callinectes sapidus*	Swimming crab, abundant in the estuary. Recreational and commercial species.
Alewife	*Alosa pseudoharengus*	Anadromous herring; abundant in the estuary.
American Shad	*Alosa sapidissima*	Anadromous herring; abundant in the estuary. Recreational and commercial species.
Atlantic Croaker	*Micropogonias undulatus*	Drum family. Delaware Estuary stock may be single population. Recreational and commercial species.
Atlantic Menhaden	*Brevoortia tyrannus*	Herring. Larvae and juveniles use the estuary as a nursery. Commercial species.
Atlantic Silverside	*Menidia menidia*	Resident in intertidal marsh creeks and shore zones.
Bay Anchovy	*Anchoa mitchelli*	Common in the bay and tidal river zones.
Blueback Herring	*Alosa aestivalis*	Anadromous herring; abundant in the estuary.
Spot	*Leiostomus xanthurus*	Drum family. Juveniles use the estuary as a nursery. Recreational and commercial species.
Striped Bass	*Morone saxatilis*	Anadromous temperate bass. Recreational and commercial species.
Weakfish	*Cynoscion regalis*	Drum family. Larvae and juveniles use the estuary as nursery. Recreational and commercial species.
White Perch	*Morone americana*	Temperate bass. Year-round residents anadromous within estuary. Recreational species.

Source: NJDEP 2006.

HCGS is located in the Delaware Estuary between the Delaware River upstream and the wide Delaware Bay downstream. Estuaries are drowned river valleys where fresh water from rivers mixes with the higher salinity water of the ocean and bays. In estuaries, salinity and water temperature may change with season, tides, and meteorological conditions. Typically, few species are resident in an estuary all of their lives, perhaps because surviving the wide variations in salinity and temperature poses physiological challenges to fish and invertebrates. The predominant resident fish species in the Delaware Estuary are hogchoker (*Trinectes maculatus*), white perch (*Morone americana*), bay anchovy (*Anchoa mitchelli*), Atlantic and tidewater silversides (*Menidia menidia* and *M. peninsulae,* respectively), naked goby (*Gobiosoma bosc*), and mummichog (*Fundulus heteroclitus*).

Resident fish species are represented by Atlantic silversides, bay anchovy, and white perch (Table 1). Atlantic silversides are relatively small common fish that inhabit intertidal creeks and shore zones. They mature in less than a year and seldom live beyond 2 years. Although there may be no discernable long-term trend in abundance in the Delaware Estuary, the short-term trend appears to be decreasing abundance. Bay anchovy may be the most abundant species in the estuary. This small fish overwinters in deep areas of the lower estuary and near-shore coastal zone. Though bay anchovies tend to stay in the lower part of the estuary, they stray as far north as Trenton. They tend to mature in the summer following their birth. Typically two spawning peaks occur, one in late May and one in mid-July, although some spawning occurs all summer. Most spawning occurs where salinity exceeds 20 parts per thousand (ppt), but some spawning may occur throughout the estuary. Although no long-term trend in abundance is evident, abundance since the mid-1990s appears to be declining. White perch are found throughout the brackish portions of the estuary. They are anadromous within the estuary (''semi-anadromous''), meaning that they undergo a seasonal migration from the deeper, more saline areas where they overwinter in fresh, shallow waters in the spring to spawn and then return to more brackish waters. They typically mature in 2 to 3 years. The abundance of white perch in the Delaware Estuary appears to be stable or increasing, possibly in response to long-term improvements in water quality.

Adult blue crabs are resident macro-invertebrates in the Delaware Estuary, although their larvae are not. After mating in shallow brackish areas of the upper estuary in spring, adult females migrate to the mouth of the bay. The eggs, which are extruded and carried on the undersides of females, hatch typically in the warm (77–86 °F), high salinity (18–26 ppt) waters of the lower bay in summer. After hatching, the larvae pass through seven planktonic stages, called zoeae, and move offshore with near-shore surface currents. The first post-larval stage, called a megalops, uses wind-driven currents and tides to move inshore. They then metamorphose to the first crab stage and move up the estuary. Adult male crabs do not migrate from the upper estuary. Crabs typically mature when 1 or 2 years old. Between 1980 and 2004, blue crab abundance in the Delaware Estuary appears to have increased.

Anadromous species live their adult lives at sea and migrate into fresh water to spawn. The most common anadromous fish species in the Delaware Estuary are alewife (*Alosa pseudoharengus*), American shad (*A. sapidissima*), blueback herring (*A. aestivalis*), and striped bass (*Morone saxatilis*), of which the first three are members of the herring family. The endangered shortnose sturgeon (*Acipenser brevirostrum*) is also anadromous. The ecology of the three herrings is similar, as is their appearance. All use the estuary as spawning and nursery habitat. All migrate to fresh water in the spring and are believed to return to their natal streams to spawn. The newly hatched larvae are planktonic and move downstream with the current. Juveniles remain in freshwater nursery areas throughout the summer and migrate to sea in the fall. They then remain at sea until maturity and migrate along the coast. Alewife have become more abundant since 1980, although the trend since 1990 is unclear. Abundance of American shad in the Delaware Estuary drastically declined in the early 1900s due to poor water quality, dam construction, over-fishing, and habitat destruction. American shad began to recover in the 1960s and 1980s and appears to be recovering still. No trends are evident in blueback herring abundance.

Striped bass is a fairly large member of the temperate bass family, which also includes white perch. Adult striped bass, which may reach weights of over 100 pounds, migrate up the estuary to fresh and brackish waters in the spring to spawn and are believed to return to their natal rivers and streams for spawning. The newly hatched larvae are planktonic and move downstream with the current. Small juveniles use fresh and brackish areas as nurseries, and larger juveniles use the higher salinity waters of the lower estuary as feeding grounds. Adult striped bass live at sea and the lower estuary and migrate along the coast. Like American shad, the striped bass population in the Delaware Estuary declined prior to the 1980s but is now recovering.

The most common marine species that use the estuary include weakfish (*Cynoscion regalis*), spot (*Leiostomus xanthurus*), Atlantic croaker (*Micropogonias undulatus*), bluefish (*Pomatomus saltatrix*), summer flounder (*Paralichthys dentatas*), and Atlantic menhaden (*Brevoortia tyrannus*). Four of these, weakfish, spot, Atlantic croaker, and Atlantic menhaden, are shown as representative in Table 1. Atlantic croaker, spot, and weakfish are members of the drum family. Adult Atlantic croaker inhabit the deep, open areas of the lower bay from late spring through mid-fall. They spawn from July through April along the continental shelf. Larval Atlantic croaker first move with the currents and later move to the shallow areas of the bay. Juveniles use the shallow areas and tidal creeks in fresh and brackish water as nurseries, but move into deeper water during colder periods. They mature at about 2 to 4 years of age. Abundance of Atlantic croaker in the Delaware Estuary has been increasing since the early 1990s. Spot spawn over the continental shelf from late September through April. Larvae live in the ocean then move to the Bay. The young juveniles move upstream into tidal creeks and tributaries with low salinity. Like Atlantic croaker, spot move into deeper water during colder periods. Spot mature at 1 to 3 years old. Abundance of spot appears to be negatively related to the abundance of Atlantic croaker and has been decreasing. Weakfish spawn in the mouth of Delaware Bay in mid-May through mid-September, and after hatching, the larvae move up into the estuary to nursery areas of lower salinity (3 to 15 ppt). In mid-to-late summer they move south to mesohaline nursery grounds, and as temperatures decline in fall, the juveniles move south from the nursery areas to the continental shelf and south. They mature at an age of 1 or 2 years. Abundance of weakfish in the Delaware Estuary appear to have increased from the 1970s to 1990s and then declined.

Atlantic menhaden is a pelagic species that overwinters on the shelf, and large numbers overwinter off Cape Hatteras, North Carolina. The population moves north along the coast in the spring and south in the fall. The populations spawn all year, and peak spawning occurs off the Delaware Bay in spring and fall. The larvae move by wind-driven currents into estuarine nursery grounds, where they transform to juveniles and move upstream to oligohaline waters and then move out the estuary with falling temperatures. In the fall, they congregate into dense schools and move out of the estuary and south along the coast. Atlantic menhaden mature at about age two. No trend in abundance in the Delaware Estuary is apparent.

While the identity of species potentially affected by entrainment, impingement, and heat shock may be inferred from ecological information about the Delaware Estuary, the species affected cannot be verified, and the numbers cannot be quantified because no environmental monitoring programs are conducted at the HCGS. Impinged organisms are most likely to die, and the fish-return system does not function continuously to minimize mortality. All organisms entrained at HCGS, which operates a cooling tower, are probably killed from exposure to heat, mechanical, pressure-related stresses, and possibly biocidal chemicals before being discharged to the estuary.

The NRC staff found few data with which to assess impacts to aquatic organisms due to operation of HCGS. Under the proposed EPU, water withdrawal rates would not change from present conditions. Entrainment and impingement impacts may change over time due to changes in the aquatic populations even though HCGS's water withdrawal rate would not change from present conditions. Impacts due to impingement and entrainment losses are minimized because the closed-cycle cooling system at the plant minimizes the amount of cooling water withdrawn from and heated effluent returned to the estuary. The water quality of the effluent (e.g., temperature, toxicity, TDS concentrations) would continue to meet present NJPDES permit conditions for protection of aquatic life. The staff concludes that the proposed EPU would have no significant impact to aquatic biota.

Essential Fish Habitat Consultation

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) identifies the importance of habitat protection to healthy fisheries. Essential Fish Habitat (EFH) is defined as those waters and substrata necessary for spawning, breeding, feeding, or growth to maturity (Magnuson-Stevens Act, 16 U.S.C. 1801, *et seq.*). Designating EFH is an essential component in the development of Fishery Management Plans to minimize habitat loss or degradation of fishery stocks and to take actions to mitigate such damage. The consultation requirements of Section 305(b) of the MSA provide that Federal agencies consult with the Secretary of Commerce on all actions or proposed actions authorized, funded, or undertaken by the agency that may adversely affect EFH. An EFH assessment for the proposed EPU was sent to the National Marine Fisheries Service (NMFS) under separate cover to initiate an EFH consultation.

Impacts on Terrestrial Biota

The potential impacts to terrestrial biota from the proposed action would be those from transmission line ROW maintenance. Under EPU conditions, PSEG does not plan to change transmission line maintenance or add new transmission lines. In addition, PSEG does not plan to conduct major refurbishment of significant land-disturbing activities in order to implement the proposed EPU. Because no changes are planned that have the potential to impact terrestrial biota, the NRC staff concludes that the proposed EPU would have no impacts to terrestrial biota associated with transmission line ROW maintenance.

Threatened and Endangered Species and Critical Habitat

In a letter dated December 8, 2006, pursuant to Section 7 of the Endangered Species Act of 1969, as amended, the NRC requested from the NMFS a list of species and information on protected, proposed, and candidate species and critical habitat that are under their jurisdiction and may be in the vicinity of HCGS and its associated transmission lines. In response, NMFS issued a letter dated January 26, 2007, that provided information on the endangered shortnose sturgeon; Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), a candidate species for listing; and five species of endangered or threatened sea turtles: Loggerhead (*Caretta caretta*), Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*), green (*Chelonia mydas*), and hawksbill (*Eretmochelys imbricata*) turtles. The NRC staff investigated the effects of HCGS operation on these species and found that the primary concern for these endangered and threatened species is the risk of impingement or entrainment due to cooling water intake by the plant. The proposed EPU would not change the intake flow, and, therefore, would not increase in the risk of impingement and entrainment. To dissipate the additional heat created by the EPU, the temperature of the plant's cooling water discharge would be slightly elevated, but still within the NJPDES 24-hour average temperature limit of 97.1 °F. In addition, HCGS has had no takes of any of the endangered or threatened species listed above. Therefore, the NRC staff anticipates no effects related to the intake or discharge on threatened or endangered species under NMFS's jurisdiction, and on May 3, 2007, sent a letter to NMFS concluding the informal Section 7 consultation.

Although an informal consultation with the U.S. Fish and Wildlife Service regarding bald eagles was initiated for the HCGS, the U.S. Fish and Wildlife Service delisted bald eagles pursuant to the Endangered Species Act on July 9, 2007, and concluded the informal consultation.

Socioeconomic Impacts

The potential socioeconomic impacts due to the proposed EPU include changes in the payments in lieu of taxes for Lower Alloways Creek Township and Salem County and changes in the size of the workforce at HCGS. Nearly 70 percent of HCGS employees currently resides in Salem, Cumberland, and Gloucester Counties in New Jersey.

The proposed EPU would not increase the size of the HCGS workforce, since proposed plant modifications and other planned activities would be handled by the current workforce or would be phased in during planned outages. Also, the proposed EPU would not increase the size of the HCGS workforce during future refueling outages. Therefore, the proposed EPU would not have any measurable effect on annual earnings and income in Salem, Cumberland, and Gloucester Counties nor would there be any increased demand for community services.

According to the 2000 Census, Salem, Cumberland, and Gloucester County populations were about 20.4, 41.6, and 14.3 percent minority, respectively (USCB 2000). The percentages of minority populations residing in Salem and Gloucester Counties were well below the State minority population of 34.0 percent. In addition, the poverty rates for individuals living in Salem and Cumberland Counties were 9.5 and 15.0 percent, respectively, which were higher than the State's average of 8.5 percent (the Gloucester County poverty rate was 6.2 percent)(USCB 2000a). Even though these percentages are relatively high, the proposed EPU would not have any disproportionately high and adverse impacts to minority and low-income populations, because no significant environmental impacts were identified during the analysis.

The proposed EPU could affect the value of HCGS and the amount of monies paid to local jurisdictions, in-lieu-of-property tax payments, because the total amount of tax money to be distributed would increase as power generation increases and because the proposed EPU would increase HCGS's value, thus resulting in potentially larger payments to Lower Alloways Creek Township and Salem County. Also, because the proposed EPU would increase the economic viability of HCGS, the probability of early plant retirement would be reduced. Early plant retirement would have a negative impact on the local economy by reducing or eliminating payments to Lower Alloways Creek Township and Salem County and limiting employment opportunities in the region.

Since the proposed EPU would not affect annual earnings and income in Salem County, nor demand for community services and due to the lack of significant environmental impacts on minority or low-income populations, there would be no significant socioeconomic or environmental justice impacts associated with the proposed EPU. Conversely, the proposed EPU could have a positive effect on the regional economy because of the potential increase in the payments in-lieu-of-taxes received by the Lower Alloways Creek Township and Salem County, due to the potential increase in the book value of HCGS and long-term viability of HCGS.

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, cooling tower operation, terrestrial and aquatic biota, transmission facility operation, or socioeconomic 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 HCGS.

TABLE 2.—SUMMARY OF NON-RADIOLOGICAL ENVIRONMENTAL IMPACTS

Land Use	No significant land use modifications; installed temporary office space to support EPU.
Cooling Tower	No significant aesthetic impact; no significant fogging or icing.
Transmission Facilities	No physical modifications to transmission lines or ROWs; lines meet shock safety requirements; small increase in electrical current would cause small increase in electromagnetic field around transmission lines.
Water Use	No configuration change to intake structure; no increase rate of withdrawal; slight increase in water consumption due to increased evaporation; no water use conflicts.
Discharge	Increase in water temperature and containment concentration discharged to Delaware River; would meet discharge limits in current NJPDES permit following EPU implementation.
Aquatic Biota	Entrainment and impingement losses may change over time due to changes in the aquatic population but are minimized because of the closed-cycle cooling system utilized at the plant. The water quality of the effluent would continue to meet NJPDES permit conditions for protection of aquatic life. EFH consultation ongoing.
Terrestrial Biota	No land disturbance or changes to transmission line ROW maintenance are expected; therefore, there would be no significant effects on terrestrial species or their habitat.
Threatened and Endangered Species.	No significant impacts are expected on threatened or endangered species or their habitat. Informal consultation with U.S. Fish and Wildlife Service ongoing.
Socioeconomic	No change in the size of HCGS labor force required for plant operation and planned outages; proposed EPU could increase payments in-lieu-of-taxes to Lower Alloways Creek Township and Salem County as well as the book value of HCGS; there would be no disproportionately high and adverse impact on minority and low-income populations.

Radiological Impacts

The NRC staff evaluated radiological environmental impacts on waste streams, dose, accident analysis, and fuel cycle and transportation factors. Following is a general discussion of these issues and an evaluation of their environmental impacts.

Radioactive Waste Stream Impacts

HCGS 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 the discharges are in accordance with the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20, and Appendix I to 10 CFR part 50.

The licensee has indicated that operation at EPU conditions would not result in any changes in the operation or design of equipment in the radioactive waste solid waste, liquid waste, or gaseous waste management systems (GWMS). The safety and reliability of these systems would be unaffected by the power uprate. Neither the environmental monitoring of any of these waste streams nor the radiological monitoring requirements of the HCGS Technical Specifications and/or Offsite Dose Calculation Manual (ODCM) would be affected by the EPU. Furthermore, the EPU would not introduce any new or different radiological release pathways, nor would it increase the probability of either an operator error or an equipment malfunction, that would result in an uncontrolled radioactive release (PSEG 2005). The EPU would produce a larger amount of fission and activation products; however, the waste treatment systems are designed to handle the additional source term. The specific effects on each of the radioactive waste management systems are evaluated below.

Gaseous Radioactive Waste and Offsite Doses

During normal operation, HCGS's GWMS processes and controls the release of gaseous radioactive effluents to the environment. The GWMS includes the off-gas system and various building ventilation systems. The radioactive release rate of the gaseous effluent is well monitored and administratively controlled by the HCGS ODCM (PSEG 2005). The single year highest annual releases of gaseous radioactive material, for the time period 2000–2004, were 6.30 Curies (Ci) for noble gases in 2003, 0.0060 Ci for particulates in 2000, and 0.014 Ci for iodines in 2004 (PSEG 2005).

The licensee has estimated that the amount of radioactive material released in gaseous effluents would increase in proportion to the increase in power level (15 percent) (PSEG 2005). Based on experience from EPUs at other plants, the NRC staff concludes that this is an acceptable estimate. The dose to a member of the public, including the additional gaseous radioactive material that would be released from the proposed EPU, is calculated to still be well within the radiation standards of 10 CFR Part 20 and the dose design objectives of Appendix I to 10 CFR part 50. Therefore, the NRC staff concludes that the impact from the EPU would not be significant.

Liquid Radioactive Waste and Offsite Doses

During normal operation, HCGS's Liquid Waste Management System (LWMS) processes and controls 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 design objectives of Appendix I to 10 CFR part 50. The LWMS is designed to process the waste and then recycles it within the plant as condensate, reprocesses it through the radioactive waste system for further purification, or discharges it to the environment as liquid radioactive waste effluent in accordance with facility procedures which comply with New Jersey and Federal regulations. The radioactive release rate of the liquid effluent is well monitored and administratively controlled by the HCGS ODCM (PSEG 2005). The single year highest annual releases of liquid radioactive material, for the time period 2000–2004, were 54,742,400 gallons (2.072E+8 liters) and 0.068 Ci of fission and activating products in 2003 (PSEG 2005).

Even though the EPU would produce a larger amount of radioactive fission and activation products and a larger volume of liquid to be processed, the licensee expects the LWMS to remove all but a small amount of the increased radioactive material. The licensee has estimated that the volume of radioactive liquid effluents released to the environment and the amount of radioactive material in the liquid effluents would increase by 2.2 percent, due to the EPU. Based on experience from EPUs at other plants, the NRC staff concludes that this is an acceptable estimate. The dose to a member of the public, including the additional liquid radioactive material that would be released from the proposed EPU, is calculated to still be well within the radiation standards of 10 CFR part 20 and the dose design objectives of Appendix I to 10 CFR part 50. Therefore, the NRC staff concludes that the impact from the EPU would not be significant.

Solid Radioactive Waste and Offsite Doses

During normal operation, HCGS's Solid Waste Management System (SWMS) collects, processes, packages, and temporarily stores radioactive dry and wet solid wastes prior to shipment offsite and permanent disposal. The SWMS is designed to package the wet and dry types of radioactive solid waste for offsite shipment and burial, in accordance with the requirements of applicable NRC and Department of Transportation regulations, including 10 CFR part 61, 10 CFR part 71, and 49 CFR parts 170 through 178. This results in radiation exposures to a member of the public to be well within the limits of 10 CFR part 20 and the design objectives of Appendix I to 10 CFR part 50. The volume of solid radioactive waste generated varied from about 11.7 to almost 90.4 cubic meters per year for the time period 2000–2004; the largest volume generated was 90.4 cubic meters in 2002. The amount of solid radioactive material in the waste generated varied from 1 to almost 600 Ci per year during that same period. The largest amount of radioactive material generated in the solid waste was 591 Ci in 2001 (PSEG 2005).

The EPU would produce a larger amount of radioactive fission and activation products, and treatment of this increase would require more frequent replacement or regeneration of SWMS filters and demineralizer resins. The licensee has estimated that the volume and radioactivity of solid radioactive waste would increase by approximately 14.7 percent from the average of the time period 2000–2004, due to the EPU (PSEG 2005). Based on experience from EPUs at other plants, the NRC staff concludes that this is an acceptable estimate. Therefore, the staff concludes that the impact from the increased volume of solid radwaste generated due to the EPU would not be significant.

The licensee estimates that the EPU would require replacement of 10 percent more fuel assemblies at each refueling. This increase in the amount of spent fuel being generated would require an increase in the number of dry fuel storage casks used to store spent fuel. However, the current dry fuel storage facility at HCGS can accommodate the increase.

Occupational Radiation Doses

The proposed EPU would result in the production of more radioactive material and higher radiation dose rates in some areas at HCGS. PSEG's radiation protection staff will monitor these increased dose rates and make adjustments in shielding, access requirements, decontamination methods, and procedures as necessary to minimize the dose to workers. In addition, occupational dose to individual workers must be maintained within the limits of 10 CFR part 20 and as low as reasonably achievable.

The licensee has estimated that after the implementation of EPU, the estimated annual average collective occupational dose would be in the range of 146 person-rem, representing a 16-percent increase of in-plant occupation exposure (PSEG 2005). According to the 2004 report on ''Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities,'' the highest HCGS occupational exposure is 240 person-rem in 2004, for the time period 2002–2004 (NUREG 2004). The dose to a member of HCGS personnel from the radiation exposures described above, increased by 20 percent, would still be well within the radiation standards of 10 CFR part 20. Based on experience from EPUs at other plants, the NRC staff concludes that these estimates are acceptable. Based on these estimates, the NRC staff concludes that the increase in occupational exposure would not be significant.

Offsite Radiation Doses

Offsite radiation dose consists of three components: Gaseous, liquid, and direct gamma radiation. As previously discussed under the Gaseous Radiological Wastes and Liquid Radiological Wastes sections, the estimated doses to a member of the public from gaseous and liquid effluents after the EPU is implemented would be within the dose design objectives of Appendix I to 10 CFR part 50.

The final component of offsite dose is from direct gamma radiation dose from radioactive waste stored temporarily onsite, including spent fuel in dry cask storage, and radionuclides (mainly nitrogen-16) in the steam from the reactor passing through the turbine system. The high energy radiation from nitrogen-16 is scattered or reflected by the air above the site and represents an additional public radiation dose pathway known as ''skyshine.'' The licensee estimated that the offsite radiation dose from skyshine would increase linearly with the increase in power level from the EPU (15 percent); more nitrogen-16 is produced at the higher EPU power and less of the nitrogen-16 decays before it reaches the turbine system because of the higher rate of steam flow due to the EPU. The licensee's radiological environmental monitoring program measures radiation dose at the site boundary and in the area around the plant with an array of thermoluminescent dosimeters. The licensee estimated that the offsite radiation dose would increase to approximately 9.3 millirem (mrem), in proportion to the EPU power increase (15 percent) (PSEG 2005). Based on experience from EPUs at other plants, the NRC staff concludes that this is an acceptable estimate. EPA regulation 40 CFR part 190, and NRC regulation 10 CFR Part 20, limit the dose to any member of the public to 25 mrem per year to the whole body from the entire nuclear fuel cycle. The offsite dose from all sources, including radioactive gaseous and liquid effluents and direct radiation, would still be well within this limit after the EPU is implemented. Therefore, the NRC staff concludes that the increase in offsite radiation dose would not be significant.

Postulated Accident Doses

As a result of implementation of the proposed EPU, there would be an increase in the inventory of radionuclides in the reactor core; the core inventory of radionuclides would increase as power level increases. The concentration of radionuclides in the reactor coolant may also increase; however, this concentration is limited by the HCGS technical specifications. Therefore, the reactor coolant concentration of radionuclides would not be expected to increase significantly. Some of the radioactive waste streams and storage systems may also contain slightly higher quantities of radioactive material. The calculated doses from design basis postulated accidents for HCGS are currently well below the criteria of 10 CFR 50.67. The licensee has estimated that the radiological consequences of postulated accidents would increase approximately in proportion to the increase in power level from the EPU (15 percent). Based on experience from EPUs at other plants, the NRC staff concludes that this is an acceptable estimate. The calculated doses from design basis postulated accidents would still be well within the criteria of 10 CFR 50.67 after the increase due to the implementation of the EPU. These calculated doses are based on conservative assumptions for the purposes of safety analyses. Estimates of the radiological consequences of postulated accidents for the purposes of estimating environmental impact are made by the NRC using best estimate assumptions, which result in substantially lower dose estimates. Therefore, the NRC staff concludes that the increase in radiological consequences for postulated accidents due to the EPU would not be significant.

Fuel Cycle and Transportation Impacts

The environmental impacts of the fuel cycle and transportation of fuel and waste 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 a higher burn-up fuel cycle and concluded that there would be 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 burn-ups less than 60,000 MW days per metric ton of uranium-235 (MWd/MTU).

The proposed EPU would increase the power level to 3,840 MWt, which is approximately 1 percent above the reference power level of 3,800 MWt for Table S–4. The increased power level of 3,840 MWt corresponds to approximately 1,265 MWe, which is 26.5 percent above the reference power level of 1,000 MWe for Table S–3. Part of the increase is due to a more efficient turbine design; this increase in efficiency does not affect the impacts of the fuel cycle and transportation of waste. More fuel will be used in the reactor (more fuel assemblies will be replaced at each refueling outage), and that will potentially affect the impacts of the fuel cycle and transportation of waste. However, the fuel enrichment and burn-up rate criteria will still be met because fuel enrichment will be maintained no greater than 5 weight percent uranium-235, and the fuel burn-up rate will be maintained within 60 MWd/MTU. The NRC staff concludes that after adjusting for the effects of the more efficient turbine, the potential increases in the impact due to the uranium fuel cycle and the transportation of fuel and waste from the increased amount of fuel used would not be significant.

Summary

Based on the NRC staff review of licensee submission and the FES for operation, it is concluded that the proposed EPU would not significantly increase the consequences of 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 would be no significant radiological environmental impacts associated with the proposed action. Table 3 summarizes the radiological environmental impacts of the proposed EPU at HCGS.

TABLE 3.—SUMMARY OF RADIOLOGICAL ENVIRONMENTAL IMPACTS

Gaseous Radiological Effluents.	Increased gaseous effluents (20 percent) would remain within NRC limits and dose design objectives.
Liquid Radiological Effluents	Increased liquid effluents (2.2 percent) would remain within NRC limits and dose design objectives.
Solid Radioactive Waste	Increased amount of solid radioactive waste generated (14.7 percent by volume & 20 percent by radioactivity) would remain bounded by evaluation in the FES.
Occupational Radiation Doses.	Occupational dose would increase by roughly 16 percent. Doses would be maintained within NRC limits and as low as is reasonably achievable.
Offsite Radiation Doses	Radiation doses to members of the public would increase to approximately 9.3 mrem and continue to be well within NRC and EPA regulations.
Postulated Accident Doses ..	Calculated doses for postulated design-basis accidents would remain within NRC limits.
Fuel Cycle and Transportation Impacts.	Fuel enrichment and burnup rate criteria would be met. Potential increases in the impact due to uranium fuel cycle and the transportation of fuel and waste would not be significant.

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 proposed EPU were not approved, other agencies and electric power organizations may be required to pursue alternative means of providing electric generation capacity to offset the increased power demand forecasted for the PJM regional transmission territory.

A reasonable alternative to the proposed EPU would be to purchase power from other generators in the PJM network. In 2003, generating capacity in PJM consisted primarily of fossil fuel-fired generators: Coal generated 36.2 percent of PJM capacity, oil 14.3 percent, and natural gas 6.8 percent. This indicates that purchased power in the PJM territory would likely be generated by a fossil-fuel-fired facility. Construction (if new generation is needed) and operation of a fossil fuel plant would create impacts in air quality, land use, and waste management significantly greater than those identified for the proposed EPU at HCGS. HCGS does not emit sulfur dioxide, nitrogen oxides, carbon dioxide, or other atmospheric pollutants that are commonly associated with fossil fuel plants. Conservation programs such as demand-side management could feasibly replace the proposed EPU's additional power output. However, forecasted future energy demand in the PJM territory may exceed conservation savings and still require additional generating capacity. Furthermore, the proposed EPU does not involve environmental impacts that are significantly different from those originally identified in the 1984 HCGS FES for operation.

Alternative Use of Resources

This action does not involve the use of any resources not previously considered in the original FES for construction (AEC 1974).

Agencies and Persons Consulted

In accordance with its stated policy, on July 24, 2007, the NRC staff consulted with the New Jersey State official, Mr. Jerry Humphreys, of the New Jersey Department of Environmental Protection, regarding the environmental impact of the proposed action. The state official stated that any comments would be provided during the 30-day public comment period.

Finding of No Significant Impact

On the basis of the EA, the NRC concludes that the proposed action would not have a significant effect on the quality of the human environment. Accordingly, the NRC 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 September 18, 2006, as supplemented on October 10, and October 20, 2006; February 14, February 16, February 28, March 13 (2 letters), March 22, March 30 (2 letters), April 13, April 18, April 30, May 10, May 18 (3 letters), May 24, June 22, and August 3, 2007. Documents may be examined, and/or copied for a fee, at the NRC's Public Document Room (PDR), located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland 20852. 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.*

DATES: The comment period expires November 21, 2007. Comments received after this date will be considered if it is practical to do so, but the Commission is only able to assure consideration of comments received on or before November 21, 2007.

ADDRESSES: Submit written comments to Chief, Rules and Directives Branch, Office of Administration, U.S. Nuclear Regulatory Commission, Mail Stop T–6D59, Washington, DC 20555–0001. Written comments may also be delivered to 11545 Rockville Pike, Room T–6D59, Rockville, Maryland 20852 from 7:30 a.m. to 4:15 p.m. on Federal workdays. Copies of written comments received will be electronically available at the NRC's Public Electronic Reading Room link, *http://www.nrc.gov/reading-rm/adams.html*, on the NRC Web site or at the NRC's PDR located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland 20852. 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 by e-mail to *pdr@nrc.gov*.

SUPPLEMENTARY INFORMATION: The NRC is considering issuance of an amendment to Facility Operating License No. NPF–057 issued to PSEG Nuclear, LLC for the operation of Hope Creek Generating Station, Unit 1, located in Salem County, New Jersey.

FOR FURTHER INFORMATION CONTACT: John G. Lamb, Office of Nuclear Reactor Regulation, Mail Stop O–8B1A, U.S. Nuclear Regulatory Commission, Washington, DC 20555–0001, by telephone at (301) 415–3100, or by e-mail at *JGL1@nrc.gov*.

Dated at Rockville, Maryland, this 12th day of October 2007.

For the Nuclear Regulatory Commission.

Harold K. Chernoff,

Chief, Plant Licensing Branch I–2, Division of Operating Reactor Licensing, Office of Nuclear Reactor Regulation.

[FR Doc. E7–20761 Filed 10–19–07; 8:45 am]

BILLING CODE 7590–01–P