2.0 Description of Nuclear Power Plant and Site and Plant Interaction with the Environment

The Exelon Generation Company's (Exelon's) Peach Bottom Atomic Power Station is located on the bank of the Susquehanna River in York County, Pennsylvania. The plant consists of three units. Units 2 and 3 are operating nuclear reactors and the subject of this action. Unit 1 is a permanently shut down and defueled plant maintained in an operating SAFSTOR decommissioning condition (i.e., safe storage; continued surveillance, security, and maintenance) and is not subject to this action. Additional information regarding SAFSTOR and additional decommissioning methods are described in Section 7.2.2 of NUREG-1437 (NRC 1996). Units 2 and 3 are boiling water reactors (BWRs) which produce steam that turns turbines to generate electricity. In addition to the nuclear units, the site features intake and discharge canals, auxiliary buildings, switchyards, an independent spent fuel storage installation (ISFSI), a training center, and a public boat ramp and picnic area. The plant and its environment are described in Section 2.1, and the plant's interaction with the environment is presented in Section 2.2.

2.1 Plant and Site Description and Proposed Plant Operation During the Renewal Term

Peach Bottom Units 2 and 3 are located on approximately 248 ha (620 ac) of Exelon-owned land in York County, Pennsylvania (Exelon 2001a). The plant is located approximately 61 km (38 mi) north of Baltimore, Maryland. Figures 2-1 and 2-2 show the site location and features within 80 km (50 mi) and 10 km (6 mi), respectively. The area immediately behind the site is a rock cliff that rises to an elevation of about 90 m (300 ft). The site has an exclusion area boundary extending approximately 0.82 km (0.51 mi) around the plant (Exelon 2001a, NRC 1996).

The region surrounding the Peach Bottom site was identified in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2 (NRC 1996; 1999)[a] as having a low population density. Peach Bottom Units 2 and 3 employ a work force of about 725 permanent employees and about 275 contractor employees. Each unit is refueled on a 24-month cycle, which means one refueling at the site every year. During refueling outages, site employment increases by as many as 800 workers for temporary duty (typically, 30 to 40 days). The nearest city limits are Lancaster, Pennsylvania, approximately 31 km (19 mi) to the north, and York, Pennsylvania, approximately 48 km (30 mi) to the northwest of the site.

(a) The GEIS was originally issued in 1996. Addendum 1 to the GEIS was issued in 1999. Hereafter, all references to the "GEIS" include the GEIS and its Addendum 1.

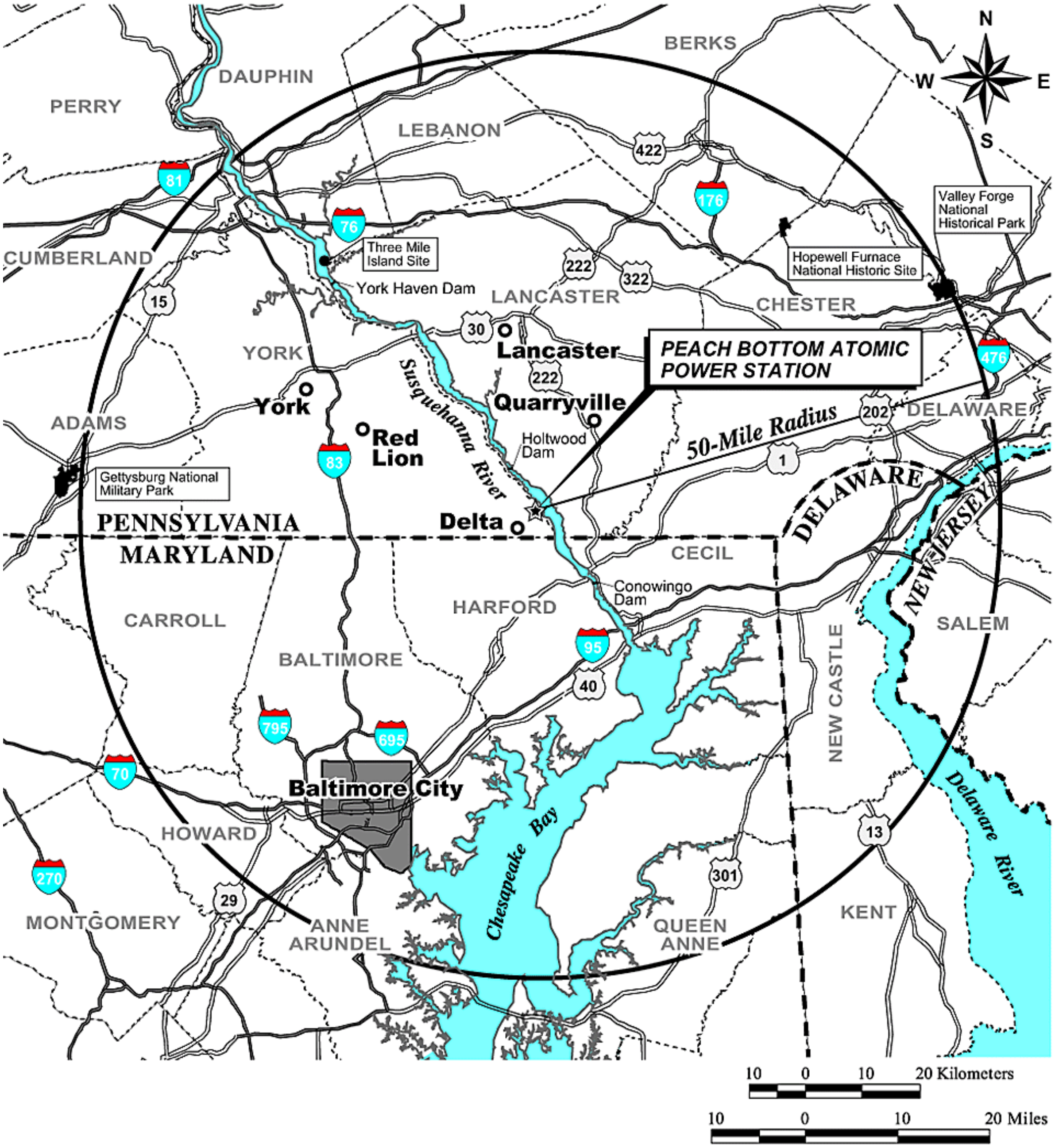

Figure 2-1. Location of Peach Bottom site, 80-km (50-mi) Region

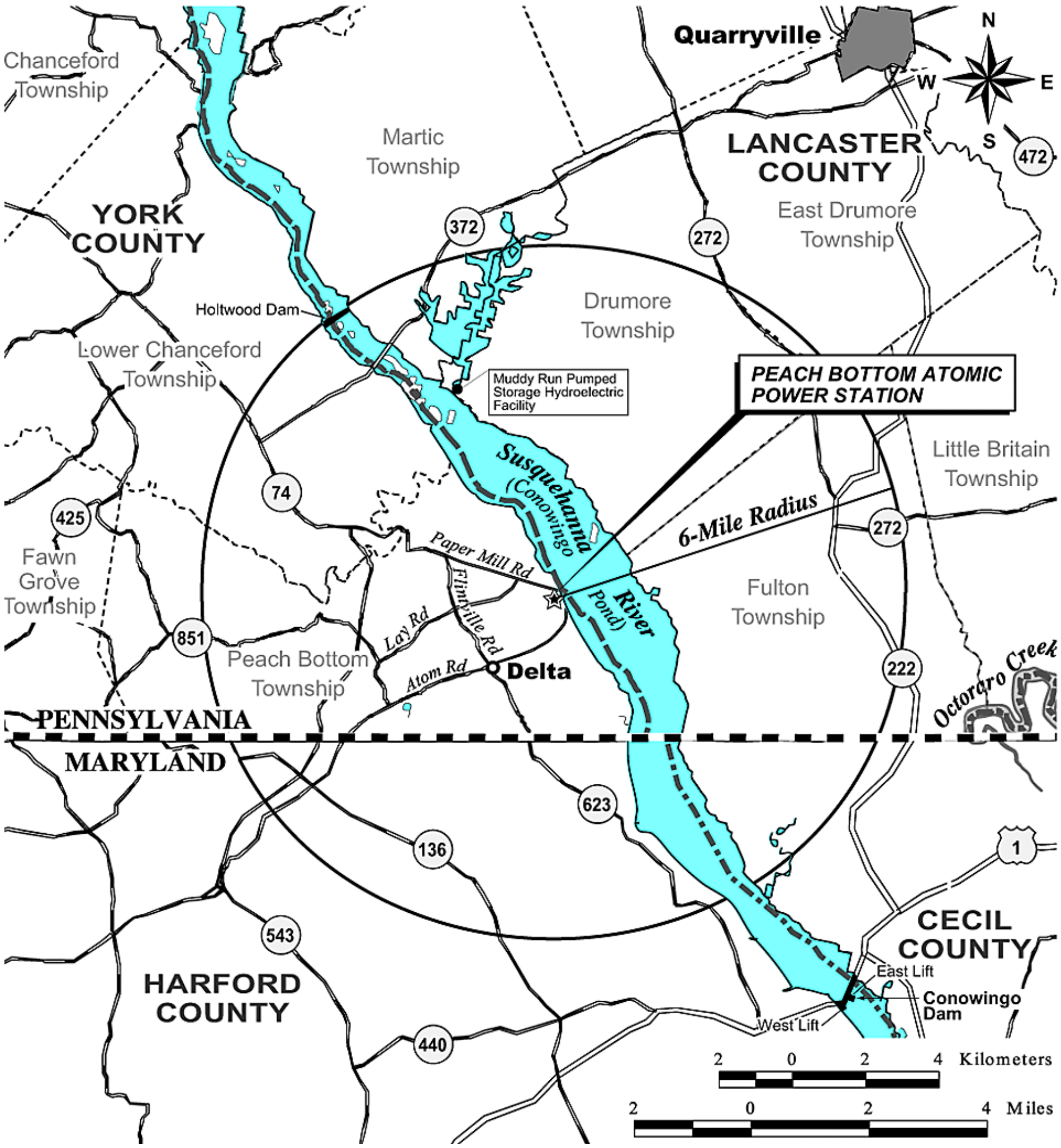

Figure 2-2. Location of Peach Bottom site, 10-km (6-mi) Region

The Peach Bottom site is located on the west side of Conowingo Pond, which was formed when Conowingo Dam was constructed across the Susquehanna River in 1928 (Figure 2-2). The Peach Bottom site is approximately 29 km (18 mi) upstream from the point where the river enters the Chesapeake Bay (Figure 2-1) and 13 km (8 mi) upstream from Conowingo Dam.

In addition to the two operating nuclear reactors and their turbine buildings, intake and discharge canals, and auxiliary buildings, the site includes switchyards, an ISFSI, a training center, the retired Peach Bottom Unit 1 (a prototype high-temperature, gas-cooled reactor now in SAFSTOR decommissioning), and a public boat ramp and picnic area (Exelon 2001a).

2.1.1 External Appearance and Setting

The terrain on either side of Conowingo Pond is steeply hilly. Immediately behind the Peach Bottom site is a rock cliff that was created when part of a hill was cut away for site construction. It rises to an elevation of about 90 m (300 ft) above the river. With the exception of the stack, the plant is not visible from the farming communities located near the site. The plant is visible only from the river and residences on the shores of Conowingo Pond.

The geological location of the site is in the Piedmont Upland Province. It is bounded on the southeast by the Coastal Plain, from which it is separated by the Fall Line, and on the northwest by the Triassic Lowland Section of the Piedmont Province. The Piedmont Upland is a dissected plateau surface with a gently rolling topography. It is underlain by the rocks of the Glenarm series, which are believed to be of late Precambrian or early Paleozoic age. The site itself is underlain by the Peters Creek Schist, probably a member of the widespread Wissahickon Schist. Just to the south is the long, narrow Peach Bottom syncline in which are exposed the somewhat younger Cardiff conglomerate and the Peach Bottom Slate. This small syncline is one of the few structures in the area that can be identified although one or more faults are believed to trend northeast-southwest parallel to the regional structure. The fault nearest to the site is 1.6 km (1 mi) to the southeast. However, these faults, as well as more recent but still ancient faults to the northwest in the Triassic Lowland section, have been inactive for at least 140 million years and are not probable sources for an earthquake (AEC 1973).

The Peters Creek Schist is weathered to a depth of 4.6 to 18 m (15 to 60 ft). This weathered material has been removed for the foundations of the heavier structures. The underlying fresh rock is firm and strong and provides a good foundation for the plant (AEC 1973).

2.1.2 Reactor Systems

Peach Bottom has two active nuclear reactor units (Units 2 and 3) as shown in Figure 2-3. Each unit includes a boiling light-water reactor and a steam-driven turbine generator manufactured by General Electric Company. The architectural engineer and constructor was Bechtel Corporation. Each unit was licensed for an output of 3293 megawatts-thermal (MW(t)), with a design net electric rating of 1,065 megawatts-electric (MW(e)). Units 2 and 3 achieved commercial operation in July 1974 and December 1974, respectively. The facility's net

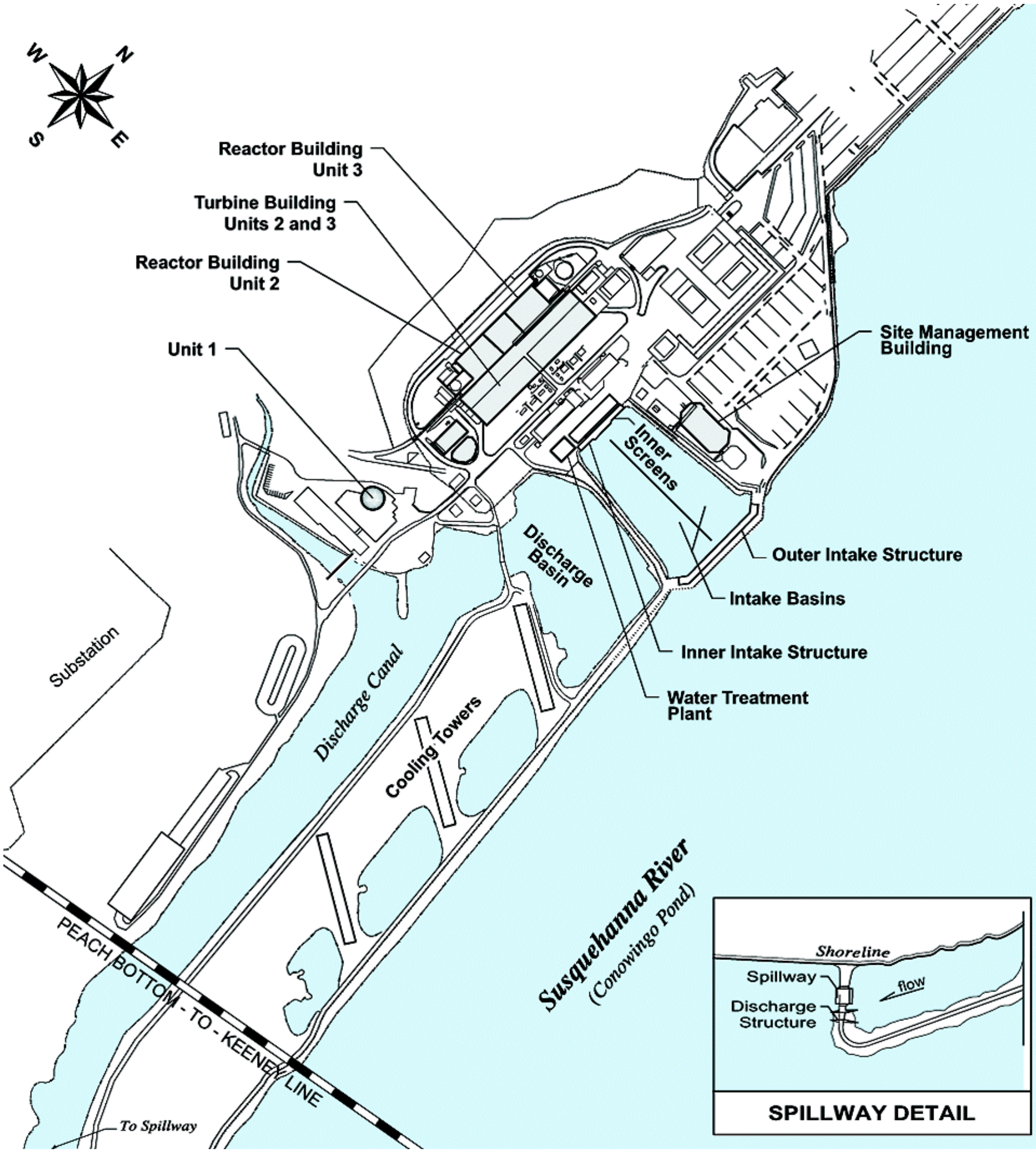

Figure 2-3. Peach Bottom Station Layout

generating capacity was subsequently increased by 60 MW(e). An NRC-prepared environmental assessment and finding of no significant impact concluded that there were no measurable environmental impacts associated with the power uprate. Both units have been uprated to a core power output of 3458 MW(t). Exelon (at that time known as Philadelphia Electric Company, or PECO) received its uprate amendment for Unit 2 in 1994 and for Unit 3 in 1995. Each unit's gross output is 1160 MW(e). The net capacity of each unit is 1093 MW(e) (Exelon 2001a).

Each reactor's primary containment is a pressure-suppression system consisting of a dry well, pressure-suppression chamber, vent system, isolation valves, containment cooling system, and other service equipment. Each containment system is designed to withstand an internal pressure of 62 pounds per square inch above atmospheric pressure (psig). Together with its engineered safety features, each containment system is designed to provide adequate radiation protection for both normal operation and postulated design-basis accidents, such as earthquakes or loss of coolant. Peach Bottom Units 2 and 3 fuel is low enriched uranium dioxide with enrichments below 5 percent by weight uranium-235 and fuel burn-up levels less than 60,000 megawatt-days per metric ton uranium (Exelon 2001a).

Peach Bottom Unit 1 is located adjacent to Units 2 and 3. It was a prototype, high-temperature, gas-cooled reactor that had a net electrical output of 40 MW(e) (115 MW(t)) and operated from 1966 to 1974. Since then it has been maintained in SAFSTOR. Unit 1 will be decommissioned in the future and is not part of this license renewal application.

2.1.3 Cooling and Auxiliary Water Systems

Peach Bottom Units 2 and 3 use a once-through heat dissipation system that withdraws water from and discharges to Conowingo Pond, a 3600 ha (9000 acre) reservoir on the lower Susquehanna River (Figure 2-3). Water withdrawn from Conowingo Pond passes through a series of intake structures before it is circulated through two main condensers (one for each unit). From the condensers, the water passes through a series of discharge structures and the Conowingo Pond where the heat is dissipated to the environment. The temperature of the cooling water can increase as much as 11.5 °C (20.8 °F) as it passes through the condensers. Exelon also maintains three mechanical-draft "helper" cooling towers with the capacity to divert approximately 60 percent the circulating water flow through the cooling towers. During normal operations, circulating water moves through the plant from the intake structure to the discharge structure in approximately 88 minutes; when three cooling towers are in operation, the transit time is approximately 109 minutes.

The Peach Bottom site is not connected to a municipal water system and acquires all makeup water for the once-through heat dissipation system and potable water from the Susquehanna River. When both units are operating, six circulating water pumps (each rated at 950 m^3/min [250,000 gpm]) draw water from Conowingo Pond at a total rate of 5700 m^3/min (1.5 million gpm). A small fraction of the water is treated at a package plant onsite for use as potable water. Sanitary waste water is treated onsite and discharged to the discharge canal.

The principal components of the circulating water system are the outer intake structure, two intake basins, inner circulating water pump intake structures, condensers, cooling towers, discharge canal, and discharge structure as shown in Figure 2-3.

Water from Conowingo Pond flows into the outer intake structure. The outer intake (or "screenwell") structure is 148 m (487 ft) long along the west bank of Conowingo Pond, parallel to the long axis of the reservoir. Trash racks protect 32 outer intake openings and prevent large floating debris and ice floes from reaching 24 traveling screens. The traveling screens are designed to prevent fish and small debris from entering the system. The screens are made of 1-cm (3/8-in) square mesh and are placed approximately 12 m (40 ft) behind the outer trash racks in the outer intake structure. The rotating screens are washed every 24 hours or when there is a pressure differential between the sides of the screen; the trash and debris are removed to a trash collection area and eventually disposed of at an offsite landfill.

From the outer intake structure, water enters two intake basins. Cooling water for the condensers is withdrawn from the two intake basins. Each basin is 210 m (700 ft) long and 60 m (200 ft) wide. Sediment deposited in these basins is dredged and deposited to one of three onsite landfills. This dredging operation is infrequent (about once in 20 years of operation) but may occur during the license renewal period.

At the end of the two intake basins opposite the outer intake structure is the inner circulating water pump intake structure with six circulating water pump intakes, three in the south basin for Unit 2 and three in the north basin for Unit 3. The inner pump intakes are also protected by traveling screens made of 1-cm (3/8-in) mesh. As with the other screens, the traveling screens for the inner pump intakes are washed every 24 hours or when there is a pressure differential between the sides of the screen; the wash water is returned to the intake basin and the screenings are disposed of at an offsite landfill.

The two condensers are equipped with a system that circulates polyethylene tube cleaners (flexible, cylindrical plugs) through the condenser tubes to prevent the accumulation of deposits and biofouling organisms. The system is also intended to reduce the station's use of oxidizing biocides, such as sodium hypochlorite. The polyethylene tube cleaners are periodically circulated into the circulating water pump discharge line, passed through the condenser and retrieved at the discharge canal for reuse. If the tube cleaner system is out of service for an extended period, sodium hypochlorite may be injected into the system, normally one section of a condenser at a time to minimize the amount of chlorine discharged.

From the condensers, cooling water discharges into a discharge basin approximately 210 m (700 ft) long and 120 m (400 ft) wide. From the discharge basin, the heated cooling water normally flows directly into a 1430 m (4700 ft) long discharge canal. As necessary, 60 percent of the circulating water can also be diverted to the three mechanical-draft helper cooling towers for additional cooling before discharge to the canal. At the end of the discharge canal is the discharge structure, which contains one permanent opening (spillway) and three adjustable gates that control the flow to Conowingo Pond. The three adjustable gates maintain the velocity of the discharge to between 1.5 and 2.4 m/s (5 and 8 ft/s). A recent study (Normandeau 2000) indicates that water temperatures at the point of discharge were mostly about 11 °C (20 °F) above the intake temperature.

2.1.4 Radioactive Waste Management Systems and Effluent Control Systems

Peach Bottom Units 2 and 3 use liquid, gaseous, and solid radioactive waste management systems to collect and process the liquid, gaseous, and solid wastes that are the by-products of the reactor unit operation. These systems reduce radioactive liquid, gaseous, and solid effluents before they are released to the environment. The waste disposal system meets the design objectives of 10 CFR Part 50, Appendix I (Numerical Guide for Design Objectives and Limiting Conditions for Operation to meet the criterion “As Low As is Reasonably Achievable” for Radiological Material in Light-Water-Cooled Nuclear Power Reactor Effluents), and controls the processing, disposal, and release of radioactive liquid, gaseous, and solid wastes (PECO 2001b).

The liquid and solid wastes from both Units 2 and 3 are routed to a common radioactive waste (radwaste) building for collection, treatment, sampling, and disposal. Packaged solid wastes and reusable radioactive material may be temporarily stored in the radwaste on-site storage facility, or in approved outside storage locations. Gaseous wastes are processed and routed to a common high stack for release to the atmosphere. The liquid and gaseous radwaste systems are designed to reduce the activity in the liquid and gaseous wastes such that the concentrations in routine discharges are less than the applicable regulatory limits. The liquid and gaseous effluents are continuously monitored and the discharge is stopped if the effluent concentrations exceed predetermined limits.

Radioactive fission products build up within the fuel as a consequence of the fission process. These fission products are contained in the sealed fuel rods, but small quantities escape from the fuel rods and contaminate the reactor coolant. Neutron activation of the primary coolant system is also responsible for coolant contamination. Non-fuel solid wastes result from treating and separating radionuclides from gases and liquids and from removing contaminated material from various reactor areas. Solid wastes also consist of reactor components, equipment, and tools removed from service, as well as contaminated protective clothing, paper, rags, and other trash generated from plant operations and design modifications and routine maintenance activities. Solid wastes may be shipped to a waste processor for volume reduction before disposal or they may be sent directly to the licensed burial site. Spent resins and filters are stored or packaged for shipment to an offsite processing or disposal facility.

Fuel rods that have exhausted a certain percentage of their fuel and are removed from the reactor core for disposal are called spent fuel. Peach Bottom Units 2 and 3 currently operate on a 24-month refueling cycle per unit, with one refueling at the site every year. Spent fuel is stored onsite in the spent fuel pool or at the ISFSI.

The *Offsite Dose Calculation Manual* (ODCM) for Peach Bottom Units 2 and 3 describes the methods used for calculating radioactivity concentrations in the environment and the estimated potential offsite doses associated with liquid and gaseous effluents from Peach Bottom (PECO 2001a). The ODCM also specifies controls for release of liquid and gaseous effluents to ensure compliance with the following:

- The concentration of radioactive liquid effluents released from the site to areas at or beyond the site boundary will not exceed 10 times the concentration specified in 10 CFR Part 20, Appendix B, Table 2, Column 2, for radionuclides other than noble gases. For dissolved or entrained noble gases, the concentration shall not exceed 7.4 Bq/mL (2×10^{-4} μCi/mL).

- The dose or dose commitment to a member of the public from any radioactive materials in liquid effluents released from the two reactors at the site to the areas at or beyond the site boundary shall be limited to: (1) less than or equal to 30 μSv (3 mrem) to the total body and less than or equal to 100 μSv (10 mrem) to any organ during any calendar quarter; and (2) less than or equal to 60 μSv (6 mrem) to the total body and less than or equal to 200 μSv (20 mrem) to any organ during any calendar year.

- Under the provisions of 10 CFR Part 20, the dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to (1) less than or equal to 5 mSv/yr (500 mrem/yr) to the total body and less than or equal to 30 mSv (3000 mrem/yr) to the skin due to noble gases, and (2) less than or equal to 15 mSv/yr (1500 mrem/yr) to any organ due to iodine-131, iodine-133, tritium, and for all radioactive materials in particulate form with half-lives greater than 8 days. Additionally, with respect to radioiodines and particulates, consistent with Appendix I to 10 CFR Part 50, these doses are limited to less than or equal to 0.15 mSv (15 mrem) during any calendar quarter and less than or equal to 0.30 mSv (30 mrem) during any calendar year.

- The air dose at and beyond the site boundary due to noble gases in gaseous effluents released from the two reactors at the site shall be limited to: (1) less than or equal to 100 μGy (10 mrad) for gamma radiation and less than or equal to 200 μGy (20 mrad) for beta radiation during any calendar quarter; and (2) less than or equal to 200 μGy (20 mrad) for gamma radiation and less than or equal to 400 μGy (40 mrad) for beta radiation during any calendar year.

- The dose to any individual member of the public from all uranium fuel cycle sources will not exceed the maximum limits of 40 CFR Part 190 (<0.25 mSv [25 mrem]) and 10 CFR Part 20 (5 mSv [500 mrem] in a year and 20 μSv [2 mrem] in any hour).

2.1.4.1 Liquid Waste Processing Systems and Effluent Controls

Potentially radioactive liquid wastes are generated from equipment drains, floor drains, containment sumps, the chemistry laboratory, the laundry drain, and miscellaneous sources. The liquid radwaste system collects, processes, stores, monitors, and disposes of all normal and potentially radioactive aqueous liquid wastes from both Units 2 and 3. Wastes are collected in sumps and drain tanks, and then transferred to the tanks in the Radwaste Building for treatment, storage, monitoring, and disposal. The liquid radwaste system is designed to collect various types of liquid wastes separately so that each type of waste can be processed by those methods most appropriate to that type. Liquid wastes are processed on a batch basis, and each batch is sampled to determine that all discharge requirements are met prior to release from the waste system (PECO 2001b). Tanks, equipment, and piping that contain liquid radioactive wastes are enclosed within radwaste areas in buildings or tunnels and are shielded where required to permit operation, inspection and maintenance with acceptable personnel exposures. These areas are drained to sumps that return the liquid to the radwaste system. Liquid requiring cleanup before being discharged to the environment is filtered, demineralized, and sampled. Other drains, sumps, etc., in the plant that do not handle potentially radioactive liquid are not part of this system. This other equipment is used in the collection and disposal of non-radioactive wastes from equipment or areas that are not radioactive or subject to radiological control.

Processed aqueous liquid wastes may be returned to the Condensate System for plant re-use or discharged to the environment after analysis and dilution with condenser circulating water. Liquid wastes may also be packaged for off-site disposal.

Liquid effluents with moderate to high conductivity and generally low radioactive concentrations (low purity water) are pumped to a floor drain collector tank on a batch basis. These effluents are processed through a pressure-precoat type filter and/or mixed bed demineralizer and pumped to the floor drain sample tank. After sampling and analysis, they can be discharged to the environment through the circulating water discharge canal at a controlled rate or pumped to the condensate storage tank if the water quality meets the condensate storage tank water standards. Liquid effluents having conductivity higher than suitable for plant re-use and with radioactivity concentration higher than can be safely released to the environment are processed for proper disposal.

Liquid effluents with chemical wastes such as laboratory drains and chemical decontamination solutions are processed through the chemical waste tank in the Radwaste Building to the radwaste floor drain sump or batch processed to the floor drain collector tank for filtration and dilution along with floor drain waste.

Liquid waste containing detergents or similar cleaning agents or chemicals from the laundry drains, cask wash down, and personnel decontamination station drains is collected and processing may be through the laundry drain filter or through temporary processing equipment specifically configured for treatment of the liquid waste stream, the Chemical/Oily Waste Cleanup Subsystem.

Wastewater containing oils, cleaning agents or chemicals may also be collected in designated drums located in areas around the plant where such wastes are generated. These drums of liquid are transported to the Radwaste Building for processing as required. Processed liquids or wastewater which are acceptable for release without processing are transferred to one of the two laundry drain tanks and isolated. Each isolated batch for discharge is sampled during recirculation. If acceptable for release, it is then discharged to the environment through the laundry drain filter.

Four tanks, which contain potentially radioactive water, are located outside the plant building structures. They are the refueling water storage tank, two condensate storage tanks, and the Torus dewatering tank. These tanks are enclosed within watertight dike structures with adequate capacity to contain the contents of the largest single tank. In the event of leaks, spills, or overflows from these tanks, control of the liquid radioactive waste is ensured. Sumps collect liquid from each of the watertight dike structures. From the sumps, the water is either drained by gravity to the liquid radwaste system for processing or is released to the storm sewer (if rain water, etc.). Prior to any release to the storm sewer, any liquid in these sumps is sampled and analyzed for radioactivity to ensure no significant radioactivity is released to the environment from this source.

All systems are protected against overflow and similar undesirable conditions by appropriate alarms and shutdown devices. The ODCM prescribes the alarm/trip set points for the liquid effluent radiation monitors, which are derived from 10 times the effluent concentration limits provided in 10 CFR Part 20, Appendix B, Table 2, Column 2. The alarm/trip set point for each liquid effluent monitor is based on the measurements of radioactivity in a batch of liquid to be released or in the continuous liquid discharge (PECO 2001a).

During 2000, the total volume of liquid effluents from Peach Bottom Units 2 and 3 was 3630 m^3 (958,000 gal), including 69 batch releases. The actual liquid waste generated is reported in the *Peach Bottom Atomic Power Station, Unit Numbers 2 and 3, Radioactive Effluent Release*

Report, No. 43 (Exelon 2001e). These are typical quantities released to the environment, and Exelon does not anticipate any increase in liquid released during the renewal period. See Section 2.2.7 for a discussion of the theoretical doses to the maximally exposed individual as a result of these releases.

2.1.4.2 Gaseous Waste Processing Systems and Effluent Controls

Radioactive gaseous effluents include low concentrations of fission-product noble gases (such as krypton and xenon), halogens (mostly iodines), tritium contained in water vapor, and particulate material including both fission products and activated corrosion products. Each reactor unit is provided with a gaseous radwaste/off-gas system, which includes condenser air removal subsystems, and gland seal steam exhauster subsystems that discharge to a common main stack. The condenser air removal subsystem is utilized to establish a vacuum in the three main condenser sections and to maintain this vacuum during normal plant operation by removing non-condensable gases. The subsystem removes the condenser gases, which include radiolytic oxygen and hydrogen, air in-leakage, and radioactive fission and activation gases (PECO 2001b).

Subsystem exhaust is cooled in the recombiner condenser where essentially all water vapor (from process steam and recombination) is condensed and drained to the main condenser via the condensate drain tank. The remaining non-condensables pass through charcoal adsorber beds and high efficiency particulate air (HEPA) filters before atmospheric release through a common main stack, which stands approximately 200 m (650 ft) above the plant grade.

Continuous main stack radiation monitoring at sample points in the stack base provides an indication of radioactive releases from the off-gas system. The off-gas effluent radiation monitor and control system is used to monitor the condition of reactor fuel and alert operators if off-gas activity levels are increasing.

The ODCM prescribes alarm/trip set points for the monitor and control instrumentation to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20 for gaseous effluents (PECO 2001a). The actual gaseous effluents for year 2000 are reported in the *Peach Bottom Atomic Power Station, Unit Numbers 2 and 3, Radioactive Effluent Release Report, No. 43* (Exelon 2001e). These are typical quantities released to the environment, and Exelon does not anticipate any increase in gaseous releases during the renewal period. See Section 2.2.7 for a discussion of the theoretical doses to the maximally exposed individual as a result of these releases.

2.1.4.3 Solid Waste Processing

Solid wastes from Peach Bottom Units 2 and 3 consist of spent (dewatered) resin, solidified resin, filters, sludge, evaporator bottoms, dry compressible waste, irradiated components (control rods, etc.), and other non-compressible waste. The solid radwaste system consists of those systems and components that are used to condition and package wet and dry solid wastes so that the waste is suitable for transport and disposal. The system is not used for spent fuel storage and shipment. Temporary storage capacity for packaged solid wastes is provided by the onsite storage facility or in approved outside storage locations. Different methods are used for processing and packaging solid radioactive wastes, depending primarily upon the waste characteristics. The solid radwaste system includes the phase separators, which serve as an interface with the liquid radwaste processing system and the dewatering system. The dewatering system is the system used to dewater filter and demineralizer material to meet burial site and 10 CFR 61.56 requirements. High integrity containers (HICs) are the disposal package used when the waste classification requires that the waste meet stability requirements. Only HICs certified acceptable for use at the disposal facility to which the waste is destined are used (PECO 2001b).

Dry active wastes (DAWs), generated as a result of operation and maintenance activities, are collected throughout the radiological controlled areas of the facility. Typical wastes of this type are air filters, cleaning rags, protective tape, paper and plastic coverings, discarded contaminated clothing, tools, equipment parts, and solid laboratory wastes. Most DAWs have relatively low radioactive content and may be handled manually. DAWs are collected from throughout the plant in packages, and most are loaded into containers for shipment to an offsite processor for decontamination or further volume reduction prior to disposal. DAWs that do not meet the criteria for processing by the offsite processor may be packaged for direct shipment to a disposal facility. Selected items may be decontaminated onsite as practical for reuse or release as clean. DAWs are monitored as packaged to ensure applicable controls are maintained. Most DAW packages are loaded into containers until a sufficient volume has been collected to fill the container for transport. Packaged dry wastes may also be stored in the onsite storage facility or in approved outside storage locations.

Wet solid radwastes result from the processing of spent demineralizer resins (both bead and powdered) and spent filter material from the equipment drain and floor drain subsystems, and from the three (reactor, condensate, and fuel pool) water cleanup systems. The wastes are spent demineralizer resins and filter material water slurries, which are collected in the four backwash receiving tanks or in the waste sludge tank. The slurries collected in the Condensate and Reactor Water Cleanup backwash receiving tanks are pumped on a batch basis to one of the corresponding phase separators for collection and decay. The slurry is stagnant in the phase separator, allowing solids to settle so that clarified liquid may be decanted off the top. The process continues until a sufficient quantity of solids is collected for processing.

The radwaste filter demineralizers, radwaste deep bed demineralizers, and fuel pool filter demineralizers are backwashed to the Waste Sludge Tank. When a sufficient volume has been collected in the tank, its contents are pumped to a condensate phase separator for further processing. When sufficient volume has been collected in a phase separator, that phase separator is isolated and its contents mixed to obtain a homogeneous slurry in the required solids concentration range. The slurry is then pumped to the dewatering system.

Filled HICs may be stored inside shielded cells located within the onsite storage facility. This facility is designed to allow for remote handling. Cell covers are installed subsequent to a storage or retrieval operation when shielding is required. Floor drains from each cell are routed to a collection tank for sampling and analysis prior to transfer to the non-radioactive sump for discharge, or if radioactive, for processing via a portable demineralizer or transfer to a mobile processing system. Normal discharge is made from the non-radioactive sump to the storm drain system after sample analysis and sump contents monitoring show acceptably clean water. The discharge valve is interlocked to a radiation monitor to prevent inadvertent discharge of contaminated liquids.

Disposal and transportation of solid radioactive wastes are performed in accordance with the applicable requirements of 10 CFR Part 61 and Part 71, respectively. There are no releases to the environment from solid radioactive wastes created at Peach Bottom Units 2 and 3. In 2000, Peach Bottom Units 2 and 3 made 115 shipments of solid radioactive waste with a volume of 186 m^3 (6557 ft^3) and a total activity of 5.4 TBq (146 Ci) (Exelon 2001e). These shipments are representative of the shipments made in the past 5 years and are not expected to change appreciably during the license renewal period.

2.1.5 Nonradioactive Waste Systems

The principal nonradioactive effluents from the Peach Bottom Units 2 and 3 consist of hazardous (chemical) wastes, lubrication oil wastes, and sanitary wastes. The Peach Bottom site is a small quantity hazardous material generator, with generation amounts less than 1000 kg/yr (2200 lb/yr). The lubrication oils are normally injected into the auxiliary boiler fuel feed. Some lubrication oil may be disposed of as waste, typically 7600 L/yr (2000 gal/yr) for offsite disposal. Spent batteries and discarded fluorescent lights are recycled. Sanitary waste is sent to the onsite sewage treatment plant, which treats a volume of approximately 6800 L/day (1800 gal/day), and can handle up to 57,000 L/day (15,000 gal/day). The sanitary treatment facility is an extended aeration type with sludge settling and chlorination facilities. The liquid effluents from the sewage treatment plant are discharged to the circulating water discharge canal, from which they are discharged into Conowingo Pond (AEC 1973).

2.1.6 Plant Operation and Maintenance

Routine maintenance performed on plant systems and components is necessary for safe and reliable operation of a nuclear power plant. Maintenance activities conducted at Peach Bottom Units 2 and 3 include inspection, testing, and surveillance to maintain the current licensing basis of the plant and to ensure compliance with environmental and safety requirements. Certain activities can be performed while the reactor is operating. Others require that the plant be shut down. Long-term outages are scheduled for refueling and for certain types of repairs or maintenance, such as replacement of a major component. Each of the two nuclear units is refueled on a 24-month schedule, resulting in an average of one refueling every year for the site. During refueling outages, site employment increases by as many as 800 workers for temporary duty (typically, 30 to 40 days). PECO provided an appendix (Appendix A) in the *Updated Final Safety Analysis Report* (PECO 2001b) regarding the aging management review to manage the effects of aging on systems, structures, and components in accordance with 10 CFR Part 54. The Peach Bottom Units 2 and 3 license renewal application describes the programs and activities that will manage the effects of aging during the license renewal period. Exelon expects to conduct the activities related to the management of aging effects during plant operation or normal refueling and other outages, but plans no outages specifically for the purpose of refurbishment. Exelon has no plans to significantly add additional full-time staff (non-outage workers) at the plant during the period of the renewed licenses.

2.1.7 Power Transmission System

Philadelphia Electric Company (PECO, now Exelon) built only one transmission line, the Peach Bottom-to-Keeney line, for the specific purpose of connecting Peach Bottom Units 2 and 3 to the transmission system (Exelon 2001a). Beginning at the Peach Bottom south substation (Figure 2-4), this 500-kilovolt-transmission line (designated as the 5014 line) runs approximately 55 km (34 mi) eastward to the Keeney substation in northwestern Delaware. The transmission line right-of-way is 90 m (300 ft) (or more) wide. In Pennsylvania and Maryland the right-of-way is maintained by Exelon. In Delaware the right-of-way is maintained by Conectiv Power Delivery. “Right-of-way” is a general term used to identify the land over which a transmission line travels. The right-of-way passes through land that is primarily a mixture of farmland and woodlands. These lands generally continue to be used in the same fashion as they were before the line was constructed (Exelon 2001a). The transmission right-of-way also contains other transmission lines, most notably the 230-kV line from the Colora to the Cecil substations, which shares the right-of-way for approximately 19 km (12 mi).

Exelon designed the 5014 Line in accordance with the 1967 edition of the National Electrical Safety Code® (NFPA 1967) and industry guidance that was current when the line was designed. To ensure that design standards are maintained throughout the life of the transmission line, Exelon conducts transmission line and right-of-way surveillance and maintenance. Routine aerial patrols are conducted twice each year and include checks for encroachments, broken conductors, broken or leaning structures, and signs of burned trees or charred vegetation, any of which would be evidence of clearance problems. Once every three years, all lines are inspected from the ground and measured for clearance at selected locations. Problems noted during any inspection are brought to the attention of the appropriate organizations for corrective action. The right-of-way is maintained on a five-year cycle by mowing and trimming and on a three-year cycle by the use of herbicides. The maintenance of the transmission right-of-way in Delaware is pursuant to the Memorandum of Understanding between Conectiv and the U.S. Fish and Wildlife Service (NRC 2002). Because the 5014 Line is integral to the larger transmission system, it would remain a permanent part of the transmission system even if Peach Bottom Units 2 and 3 are no longer operated.

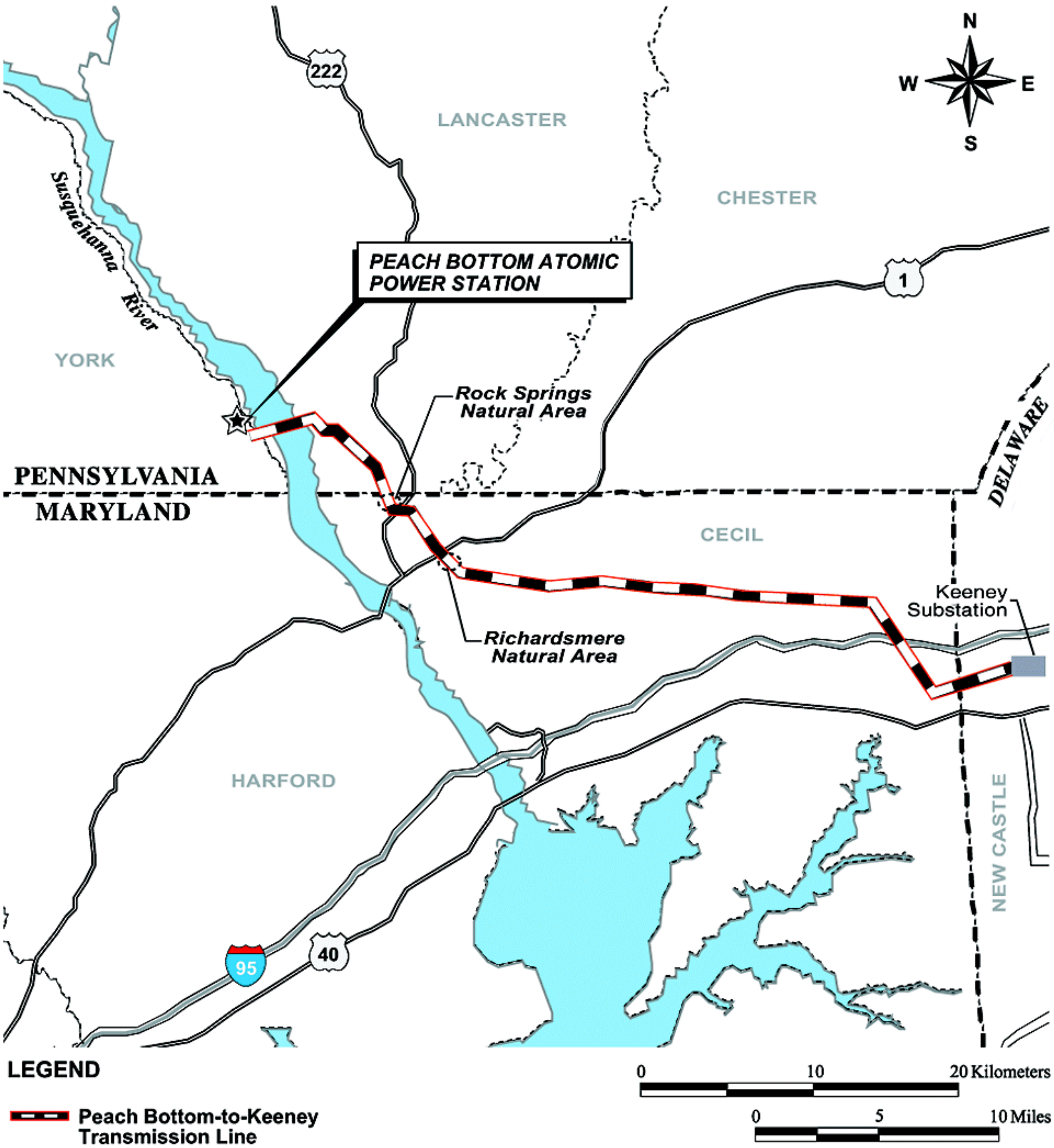

Figure 2-4. Peach Bottom Transmission Line Map

2.2 Plant Interaction with the Environment

Sections 2.2.1 through 2.2.8 provide general descriptions of the environment near Peach Bottom Units 2 and 3 as background information. They also provide detailed descriptions where needed to support the analysis of potential environmental impacts of refurbishment and operation during the renewal term, as discussed in Chapters 3 and 4. Section 2.2.9 describes the historic and archaeological resources in the area, and Section 2.2.10 describes possible impacts on other Federal project activities.

2.2.1 Land Use

The Peach Bottom site is located in Peach Bottom Township, York County, Pennsylvania, on the west side of Conowingo Pond. The plant site is approximately 31 km (19 mi) southwest of Lancaster, Pennsylvania; 48 km (30 mi) southeast of York, Pennsylvania; and 61 km (38 mi) north of Baltimore, Maryland. York is the county seat of York County. The Peach Bottom site consists of 248 ha (620 ac) of land. All industrial facilities associated with the site are located in York County. The area around the site is predominantly rural, characterized by farmland and woods (Exelon 2001a).

Section 307 (c)(3)(A) of the Coastal Management Act [16 USC 1456(c)(3)(A)] requires that applicants for federal licenses that conduct an activity in a coastal zone provide a certification that the proposed activity complies with the enforceable policies of the State's coastal zone program. The Peach Bottom site, located in York County, is not within the Pennsylvania coastal zone, and due to its distance (approximately 80 km [50 mi]) from the coastal zone, does not affect the Pennsylvania coastal zone. However, the Maryland coastal zone extends to Conowingo Pond from which Peach Bottom Units 2 and 3 withdraw and discharge water. The Maryland Department of the Environment issued the Certification of Compliance with the Maryland Coastal Zone Management Program on April 23, 2002.

2.2.2 Water Use

The Peach Bottom site acquires all its cooling water and potable water from Conowingo Pond. Conowingo Pond has a surface area of 3600 ha (9000 ac) and varies from 0.8 to 2.4 km (0.5 to 1.5 mi) in width. Exelon withdraws approximately 5700 m^3/min (1.5 million gpm) of process and potable water from Conowingo Pond.

From 1952 to 1999, the mean monthly average flow at the Susquehanna River at Holtwood Dam (approximately 10 km (6 mi) upstream from Conowingo Pond) was 1070 m^3/s

(38,370 cfs), with minimum and maximum monthly average flows of 42 m^3/s (1500 cfs) and 26,700 m^3/s (941,900 cfs) respectively. Normal pond elevation is approximately 33 m (109 ft) above mean sea level; during maximum Conowingo Dam operational drawdown, the elevation is about 30 m (99 ft) above mean sea level.

The Susquehanna River Basin Commission (SRBC) is the governing body that regulates withdrawals and diversions from the Susquehanna River. The Peach Bottom site is authorized to withdraw from Conowingo Pond per SRBC Resolution Numbers 93-04, 91-2, and 83-4.

Exelon also operates the Muddy Run Pumped Storage Facility approximately 8 river km (5 river mi) north of the Peach Bottom site. The pumped storage facility withdraws water from the Conowingo Pond at night and releases water to it during daytime periods of peak electric demand. With the operation of the pumped storage facility, the volume of Conowingo Pond varies from about 300 million m^3 (240,000 acre-ft) to 400 million m^3 (322,000 acre-ft) daily.

Cooling process water discharges into a discharge basin and discharge canal before final discharge to the Conowingo Pond. Sanitary waste water is processed in an onsite treatment plant and is also discharged to the discharge canal. Exelon does not withdraw groundwater for cooling or potable water. The Peach Bottom site does have several closed groundwater wells and four wells that provide non-potable water to remote facilities. One well in the Hazardous Materials Yard is 60 m (200 ft) deep and provides 0.02 m^3/min (6 gpm) for washing hands or rinsing equipment. A second well at the South Substation is 90 m (300 ft) deep and provides 0.004 m^3/min (1 gpm) to a toilet at the substation. Water from a third well at the Salt Storage Facility is used for washing trucks and the well at the North Substation provides water to a toilet. These two wells have withdrawal rates similar to the wells at the Hazardous Materials Yard and the South Substation.

Groundwater seeps intermittently from springs in the cliffs behind the Peach Bottom site. Each reactor building and the low-level radioactive waste storage building have sumps that collect the seepage which eventually evaporates. Groundwater that seeps from behind the low-level waste building also discharges to the storm drains.

2.2.3 Water Quality

In accordance with the Federal Water Pollution Control Act (also known as the Clean Water Act), the quality of plant effluent discharges is regulated through the National Pollutant Discharge Elimination System (NPDES). The Pennsylvania Department of Environmental Protection (PDEP) is authorized by the U.S. Environmental Protection Agency (EPA) to issue discharge permits in Pennsylvania. The Peach Bottom site's NPDES permit (PA0009733) regulates all discharges to the Susquehanna River including process and cooling water, sanitary waste water, and storm water.

The NPDES permit (PA0009733) issued by PDEP in 2000 requires continuous monitoring of discharge temperature, but does not stipulate a maximum instantaneous discharge limit. In the event of a joint occurrence of low river flows (less than 85 m^3/s [3000 cfs]) and high ambient river water temperatures (greater than 29 °C [85 °F]), the NPDES permit requires the Peach Bottom site to take appropriate measures to ascertain the potential effects on the local fish community and notify PDEP. If cooling towers are required, tower startup will be initiated following station operating procedures.

Sodium hypochlorite can be injected into the condenser system to control biofouling when the mechanical system is out of service for an extended period. The NPDES permit (PA0009733) limits the instantaneous maximum total residual chlorine concentration at the outfall to 0.20 mg/L (2×10^{-6} lb/gal). Exelon also uses an quaternary-amine-based molluscide to control the Asiatic clam (*Corbicula fluminea*); Exelon is required to monitor and report to PDEP use of the molluscide. Any new regulations promulgated by the EPA or PDEP would be reflected in future permits.

2.2.4 Air Quality

The Peach Bottom site has a humid continental climate characterized by dominance from tropical air masses in summer and polar air masses in winter. Precipitation occurs throughout year with a typical increase in summer rainfall. Meteorological records for southeastern Pennsylvania (i.e., Harrisburg-Middletown area) are generally representative of the Peach Bottom site. The data from this area indicates that lowest precipitation amounts for the year generally last for about a month or two, typically in February and/or March. Mean or normal daily maximum temperatures for southeastern Pennsylvania range from 0 to 4.5 °C (32 to 40 °F) in January to 26.7 to 32.2 °C (80 to 90 °F) in July and August (NOAA 2001a). Normal minimum temperatures range from about -9.4 to -3.9 °C (15 to 25 °F) in January to about 15.6 to 21.1 °C (60 to 70 °F) in August. The mean annual precipitation ranges from 102 to 127 cm (30 to 40 in.). Normal monthly precipitation ranges from 5 to 8 cm (2 to 3 in.) in the dry season (i.e., February) to 8 to 13 cm (3 to 5 in.) in the wet season (NOAA 2001b).

Thunderstorms occur on average between 20 to 30 days per year (NOAA 2001a). During the period June through August, the daily occurrence of thunderstorms is about 5 to 7 days per month. Based on statistics for the 30 years from 1954 through 1983 (Ramsdell and Andrews 1986), the probability of a tornado striking the site is expected to be about 1×10^{-4} per year.

The wind resources are expressed in terms of wind power classes, ranging from class 1 to class 7 (Elliott et al. 1986). Each class represents a range of mean wind power density or approximate mean wind speed at specified heights above the ground. The wind energy resource in southeastern Pennsylvania is limited. The annual average wind power for this part of the State is rated 1 or 2. Areas designated class 3 or greater are suitable for most wind energy applications, whereas class 2 areas are marginal and class 1 areas are generally not wind power suitable.

Air quality in a given area is a function of the air pollutant emissions (type of pollutant; rate, frequency, duration, exit conditions, and location of release), atmospheric conditions (climate and meteorology), the area itself (size of airshed and topography of the area), and the pollutants transported from outside the area. Air quality within a 50 km radius of the Peach Bottom site is in compliance with National Ambient Air Quality Standards for all pollutants except ozone. The Peach Bottom site is in attainments with the exception of being in an ozone nonattainment area. Localized sources of emissions include man-made sources of industrial-, residential-, and transportation-related emissions. Natural sources of wind-blown dust contribute to temporary increases in air pollution.

The Peach Bottom site is located in York County, Pennsylvania, which is part of the South Central Pennsylvania Intrastate Air Quality Control Region (AQCR) (40 CFR 81.105). York County, and Lancaster County, immediately across the Susquehanna River from the site, are designated as a nonattainment areas for ozone and classified marginal. Nearby, the Metropolitan Philadelphia Interstate AQCR includes counties in Pennsylvania (Bucks, Chester, Delaware, Montgomery, and Philadelphia), New Jersey (Burlington, Camden, Gloucester, Mercer, and Salem), and Delaware (New Castle(40 CFR 81.15). These counties are designated as nonattainment for ozone (40 CFR 81.15, 81.105, and 81.339).

The Metropolitan Baltimore Intrastate AQCR is also near the site, and encompasses the following areas in Maryland: Anne Arundel County, Baltimore City, Baltimore County, Carroll County, Harford County, and Howard County. All counties in the Metropolitan Baltimore Intrastate AQCR are designated nonattainment for ozone and several zones within Baltimore City and Baltimore County do not meet primary standards for total suspended particulates (40 CFR 81.28 and 81.321). No Prevention of Significant Deterioration Class I areas exist within 100 km (62 mi) of the Peach Bottom site (Clean Air Act).

There are four diesel generators with rated capacities of 2600 kW (3490 hp) and two 52 MMBTU/hr boilers at the Peach Bottom plant (PECO 2001b). The diesels are used for emergency backup power and the boilers are used for space heating and to aid unit start-up. The diesel generators are tested with a 2-hour burn every two weeks. An endurance test involving a 24-hr burn is conducted once every two years. The four units are on a staggered endurance test schedule, with 1 of the 4 units tested every six months. Emissions from these sources are regulated under Pennsylvania's Permit Operating Program under the Title V State permit number 67-05020 issued by the Commonwealth of Pennsylvania, Department of Environmental Protection, Air Quality Program. The current air emissions permit expires on February 29, 2004.

2.2.5 Aquatic Resources

For Peach Bottom Units 2 and 3, the staff has reviewed the 1966-1974 pre- and post-operational fish studies and the 1997-1999 studies that assessed the impact of zero-cooling-tower operation. These studies indicate that the species composition of the Conowingo Pond fish community has not changed significantly, with one exception. This exception is the installation of fish passage facilities at Conowingo Dam and other dams upstream of Peach Bottom Units 2 and 3 which have resulted in anadromous fish populations that migrate past the Peach Bottom site.

The resident fish of Conowingo Pond are, for the most part, common warm-water species (e.g., gizzard shad [*Dorosoma cepedianum]*, spotfin shiner [*Cyprinella spiloptera]*, channel catfish [*Ictalurus punctatus]*, tessellated darter [*Etheostoma olmstedi]*, and bluegill [*Lepomis macrochirus]*) that have a wide distribution from the southeastern U.S. to Canada (Normandeau Associates, Inc. 1998, 1999, 2000). Conowingo Pond is well known for its largemouth (*Micropterus salmoides*) and smallmouth bass (*M. dolomieui*) fishing, and also provides opportunities for striped bass (*Morone saxatilis*) and walleye (*Stizostedion vitreum*) fishing. Local and regional fishing clubs and organizations use Conowingo Pond for bass fishing tournaments during the spring, summer, and fall. The heated discharge from Peach Bottom Units 2 and 3, which attracts baitfish and game fish during most months of the year, is an especially popular fishing spot in winter.

The relative abundance of the gizzard shad changed during the 1970s and 1980s. They were introduced into Conowingo Pond during 1972 (PECO 1975). The gizzard shad is now one of the dominant species in the reservoir in terms of numbers and biomass. Large numbers of gizzard shad are lifted into Conowingo Pond every spring from the lower river, along with alewife (*Alosa pseudoharengus*) and American shad (*A. sapidissima*), and are likely to remain an important part of the ecosystem near the Peach Bottom site. During 1999, more than 950,000 gizzard shad were trapped below the Conowingo Dam and were lifted to Conowingo Pond (Susquehanna River Anadromous Fish Restoration Cooperative 2000).

Aside from the increase in the gizzard shad population, the only other significant change in the fish community of Conowingo Pond over the last 25 years has been the increase in numbers of anadromous fish (e.g., American shad, blueback herring [*A. aestivalis*], alewife, and striped bass) moving through Conowingo Pond during the spring and fall. No anadromous fish were collected during 9 years (1966-1974) of monitoring Conowingo Pond's fish populations to assess potential impacts of the Muddy Run Pumped Storage Facility and Peach Bottom Units 2 and 3 (PECO 1975). During 1972, a consortium of utilities, and Federal, regional, and State agencies began trapping and transporting anadromous fish from downstream of Conowingo Dam to upriver locations. Fish lifts and fish ladders have been installed at Conowingo Dam and the other mainstem dams and transporting has been discontinued. Completion of the fishway at York Haven Dam, during spring 2000, gave migratory shad and river herring access to mainstem spawning areas and tributaries between the York Haven Dam and Harrisburg, Pennsylvania. Large numbers of adult American shad and blueback herring now move through Conowingo Pond during the spring, to upstream spawning locations (Susquehanna River Anadromous Fish Restoration Cooperative 2000). Juvenile shad and herring move downstream through the Pond during the fall en route to the Chesapeake Bay. The appearance of these anadromous species in Conowingo Pond is an indication of the success of the Susquehanna River anadromous fish restoration program. This program has dramatically increased the numbers of anadromous fish ascending the Susquehanna River during the spring to spawn.

The number of American shad trapped at Conowingo Dam and transported (prior to 1997) and lifted (from 1997 to present) upstream increased from 139 during 1980 to 15,964 during 1990 (Susquehanna River Anadromous Fish Restoration Cooperative 2000.), and to more than 150,000 during 2000 (Pennsylvania Fish & Boat Commission 2000). Additionally, large numbers of river herring (more than 130,000 during 1999) and substantial numbers of striped bass (1231 during 1999) also passed upstream at the Conowingo fish lift (Susquehanna River Anadromous Fish Restoration Cooperative 2000).

Only three freshwater mollusc taxa were collected in more than 8 years (1967-1974) of pre- and post-operational benthic monitoring conducted in support of Peach Bottom Units 2 and 3's CWA Section 316(a) Demonstration (Philadelphia Electric Company 1975). They included two common sphaerid genera, *Pisidium* and *Sphaerium*, and a single Unionid *(Utterbackia imbecilis*). Both the sphaerids and *Utterbackia* are common in lakes, reservoirs, and sluggish rivers of the Midwest and Northeast. The most significant change in the Conowingo Pond mollusc community during the last several decades has been the appearance and rapid colonization since the mid-1980s of the exotic Asiatic clam, *Corbicula* sp.

2.2.6 Terrestrial Resources

The Peach Bottom site is located within the northern piedmont ecoregion (Omernik 1987). Prior to European settlement the region was dominated by oak-chestnut forests which have subsequently been lost or altered because of timber cutting, farming, and the introduction of chestnut blight in the early 1900s. Second growth forests in the plant vicinity are now characterized as oak-hickory or oak-tulip tree assemblages with a variety of subcommunity types depending on the local terrain (USAEC 1973). Most of the land in the vicinity of the Peach Bottom site and the Peach Bottom-to-Keeney transmission line is rolling hills covered with a mixture of farmland (including row crops, pasture, and old fields) and woodlots. Landuse, vegetative communities, and wildlife habitats in both areas have not changed significantly over the past 25 years.

In the vicinity of the Peach Bottom site and transmission line, there are three terrestrial species listed as threatened or endangered by the U.S. Fish and Wildlife Service (FWS) and one species that has been delisted by the FWS (Table 2-1). An additional 53 species listed as threatened, endangered, or of concern by the States of Pennsylvania and/or Maryland are known to occur near the Peach Bottom site or the associated transmission right-of-way (Table 2-1).

Table 2-1. Federal and State Endangered, Threatened, and Candidate Plant and Terrestrial Animal Species Currently or Historically Occurring in the Vicinity of the Peach Bottom Site or the Peach Bottom-to-Keeney Transmission Line.

Scientific Name	Common Name	Federal Status[a]	PA Status[a,b]	MD Status[a,c]
Cryptotis parva	least shrew	—	E	—
Myotis leibii	eastern small-footed myotis	—	T	—
Neotoma magister	eastern woodrat	—	T	E
Sorex fumeus	smoky shrew	—	—	T
Ammodramus henslowii	Henslow's sparrow	—	—	T
Asio flammeus	short-eared owl	—	E	—
Bartramia longicauda	upland sandpiper	—	T	E
Botaurus lentiginosus	American bittern	—	T	—
Casmerodius albus	great egret	—	T	—
Cistothorus platensis	sedge wren	—	T	T
Dendrocia fusca	Blackburnian warbler	—	—	T
Falco peregrinus	peregrine falcon	DM	E	E
Haliaeetus leucocephalus	bald eagle	T	E	E
Ixobrychus exilis	least bittern	—	T	—
Lanius ludovicianus	loggerhead shrike	—	E	E
Nyctanssia violacea	yellow-crowned night heron	—	E	—
Oporornius philadelphia	mourning warbler	—	—	E
Pandion haliaetus	osprey	—	T	—
Rallus eleganus	king rail	—	E	—
Ambystoma tigrinum	tiger salamander	—	—	E
Pseudotriton montanus	mud salamander	—	E	—

Table 2-1. (contd)

Scientific Name	Common Name	Federal Status[a]	PA Status[a,b]	MD Status[a,c]
Clemmys muhlenbergii	bog turtle	T	E	T
Opheodrys aestivus	rough green snake	—	T	—
Pseudemys rubriventris	red-bellied turtle	—	T	—
Speyeria idalia	regal fritillary	—	E	E
Agrimonia microcarpa	small-fruited agrimony	—	—	E
Agrimonia striata	woodland agrimony	—	—	E
Arethusa bulbosa	dragon's mouth	—	E	—
Aster depauperatus	serpentine aster	—	T	E
Bromus latiglumus	broad-glumed brome	—	—	E
Carex buxbaumii	Buxbaum's sedge	—	—	T
Carex hitchcockiana	Hitchcock's sedge	—	—	E
Carex hystericina	porcupine sedge	—	—	E
Carex mesochorea	midland sedge	—	—	E
Carex polymorpha	variable sedge	—	E	—
Clematis occidentalis	purple clematis	—	—	E
Deschampsia caespitosa	tufled hairgrass	—	—	E
Desmodium rigidum	rigid tick-trefoil	—	—	E
Dodecatheon amethystinum	jeweled shooting-star	—	T	—
Euphorbia purpurea	glade spurge	—	E	E
Gentainopsis crinita	fringed gentian	—	—	E
Gentiana andrewsii	fringe-tip closed gentian	—	—	T
Helonias bullata	swamp pink	T	—	E
Hydrastis canadensis	goldenseal	—	—	T
Leptochloa fascicularis	long-awned diplachne	—	—	E
Panicum oligosanthes	few-flowered panicgrass	—	—	E
Pycnanthemum verticillatum	whorled mountain mint	—	—	E
Rhynchospora globularis	grass-like beakrush	—	—	E
Sanguisorba canadensis	Canada burnet	—	—	T
Scleria reticularis	reticulated nutrush	—	E	—
Scutellaria leonardii	Leonard's skullcap	—	—	T

Table 2-1. (contd)

Scientific Name	Common Name	Federal Status[(a)]	PA Status[(a,b)]	MD Status[(a,c)]
Scutellaria nervosa	veined skullcap	—	—	E
Solidago speciosa	showy goldenrod	—	—	E
Sporobolus heterolepsis	northern dropseed	—	—	E
Stenanthium gramineum	featherbells	—	—	T
Talinum teretifolium	fame flower	—	—	T
Tomanthera auriculata	eared false-foxglove	—	E	—

(a) T = Threatened; E = Endangered; DM = Delisted, monitored for first 5 years
(b) Pennsylvania status as of 11/13/01, (PDCNR 2001)
(c) Maryland status as of 11/13/01, (MDNR 2001)
— = Not listed or protected (or does not occur in the state)

Bald eagles are listed as threatened by the FWS and as endangered by the Pennsylvania Game Commission. There are at least 4 active bald eagle nests within the Pennsylvania portion of Conowingo Pond, with the closest nest to the Peach Bottom site being on Little Bear Island, approximately 5 km (3 mi) upstream (Brauning and Peebles 2001). There are also approximately 6 nests between Conowingo Dam and the Maryland/Pennsylvania border (David Brinker, Md. DNR, Personal communication). The lower Susquehanna River is an important bald eagle area in Pennsylvania, and is one of the few areas in the state where eagles can be observed year round. Recent surveys indicate that as many as 10 to 15 eagles are in the vicinity of the Peach Bottom site during the summer breeding season and up to 20 birds over-winter in the vicinity of the Peach Bottom site (Brauning and Peebles 2001). In especially cold weather, as many as 15 to 20 birds at a time have been observed perched near the Peach Bottom Units 2 and 3 discharge canal, which may be the only nonfrozen part of the river.

The bog turtle is known to occur in York and Lancaster counties, Pennsylvania; Cecil County, Maryland; and New Castle County, Delaware. Exelon commissioned a survey for bog turtle habitat at the Peach Bottom site and along the Peach Bottom-to-Keeney transmission line (Tetra Tech 2000a). This survey conformed to accepted protocol for a Phase 1 survey as described in *Guidelines for Bog Turtle Surveys* (FWS 2000). No areas of suitable bog turtle habitat were identified during these surveys. Although the transmission line traverses a number of streams, most of these are incised channels through upland habitats, without adjacent bogs, swamps, or marshy meadows that constitute the required habitat for bog turtles.

The peregrine falcon was formerly listed as threatened by the FWS, but was removed from the list of endangered and threatened species in 1999 (FWS 1999). Status monitoring of this species will continue through at least 2004. Peregrines are very rare in the vicinity of the Peach

Bottom site and only one individual has been observed over-wintering on Conowingo Dam. A historic nest site is located several miles upstream from Peach Bottom site, but has not been occupied in over 100 years.[a]

One additional Federally listed species, the swamp pink (*Helonias bullata*) (Federal Threatened, Maryland Endangered, Delaware Conservation Concern) is known to occur in Cecil County, Maryland and New Castle County, Delaware. However, the known populations of swamp pink in these counties are all located along the fall line between the Piedmont and coastal plain ecoregions, which primarily lies south of Interstate 95 in Cecil County and these populations are not located near the Peach Bottom-to-Keeney transmission line.[b] The swamp pink was not observed during field surveys of the Peach Bottom-to-Keeney transmission line conducted by the Maryland Department of Natural Resources during the late 1980s or during subsequent evaluations (e.g., MDNR 1998).

The Peach Bottom-to-Keeney transmission line does not cross any Federal or State parks, wildlife refuges, or wildlife management areas. PECO cooperated with the Maryland Nature Conservancy to establish and protect two natural areas crossed by the Peach Bottom-to-Keeney transmission right-of-way. The 42-ha (103-ac) Rock Springs Powerline Natural Area is located near Rock Springs, Maryland, and the 22 ha (55-ac) Richardsmere Powerline Natural Area is located near Richardsmere, Maryland. Both of these natural areas are managed to protect rare plant species (Wiegland 1988a,b; MDNR 1998). The Peach Bottom-to-Keeney Transmission line occupies approximately 30% and 4.5% of the Rock Springs and Richardsmere Natural Areas, respectively.

The transmission line right-of-way is maintained by a combination of trimming, mowing, and application of approved herbicides (PECO 2000). Trees are trimmed on a 5-year cycle, with mowing conducted as needed. Herbicides are applied on a 3-year cycle and consist of both broadcast foliar and basal stem treatments. Certified applicators perform this work, and they primarily use non-restricted use herbicides. Hand cutting, instead of herbicide treatments, is generally used in wetlands. Sensitive areas (such as the Rock Springs and Richardsmere Powerline Natural Areas) are marked on maps carried by the maintenance field crews. The applicant supports an ongoing study to determine the effects of various right-of-way maintenance techniques on wildlife (Yahner et al. 2001).

(a) Personal communication with Dan Brauning, Pennsylvania Game Commission, November 15, 2001.
(b) Personal communication with David Brinker, Maryland Department of Natural Resources, November 30, 2001.

2.2.7 Radiological Impacts

Exelon has conducted a radiological environmental monitoring program (REMP) around the Peach Bottom site since 1974. Through this program, radiological impacts to workers, the public, and the environment are monitored, documented, and compared to the appropriate standards. The objective of the REMP is the following:

- Provide representative measurements of radiation and radioactive materials in the exposure pathways and of the radionuclides that have the highest potential for radiation exposures to members of the public.

- Supplement the radiological effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and the modeling of the environmental exposure pathways.

Radiological releases are summarized in the annual reports titled *Annual Radiological Environmental Operating Report Peach Bottom Atomic Power Station Units 2 and 3* (Exelon 2001b) and *Radioactive Effluent Release Report* (Exelon 2001e). The limits for all radiological releases are specified in the Peach Bottom *Offsite Dose Calculation Manual*, and these limits are designed to meet Federal standards and requirements (PECO 2001a). The REMP includes monitoring of the aquatic environment (fish, invertebrates, and shoreline sediment), atmospheric environment (airborne radioiodine, gross beta, and gamma), terrestrial environment (vegetation), and direct radiation.

Review of historical data on releases and the resultant dose calculations revealed that the doses to maximally exposed individuals in the vicinity of Peach Bottom site were a small fraction of the limits specified in the EPA's environmental radiation standards 40 CFR Part 190 as required by 10 CFR 20.1301(d). For 2000, dose estimates were calculated based on actual liquid and gaseous effluent release data (Exelon 2001c). Calculations were performed using the plant effluent release data, onsite meteorological data, and appropriate pathways identified in the ODCM.

During 2000, Peach Bottom Units 2 and 3 did not release any strontium-90 or strontium-89 in the gaseous effluents. Liquid effluents containing radioactive materials, including strontium-90 and strontium-89 were released into the discharge canal. The only time that strontium was released in the liquid effluents was during the third and fourth quarters of 2000. In the third quarter a total of 5.4×10^{-1} MBq (1.46×10^{-5} Ci) of strontium-89 were released. In the fourth quarter the effluents were: 4.3×10^{-3} MBq (1.16×10^{-7} Ci) of strontium-89 and 4.48×10^{-4} MBq (1.21×10^{-8} Ci) of strontium-90. The releases and average diluted concentrations were well below the NRC regulatory limits. The quantities of materials released in all effluents during 2000 are comparable to the quantities released in the past 5 years and is expected to remain similar during the license renewal period.

Exelon performs an assessment of radiation dose to the general public from radioactive effluents, assuming a person was located 400 m (1300 ft) east of the vents (on or near Conowingo Pond) for 10 hours a day, 5 days each week, for 50 weeks of the year, inhaling gaseous effluents from both Peach Bottom Units 2 and 3 (Exelon 2001c). For 2000, the total body dose to this hypothetical person from inhalation was estimated to be 1.08×10^{-3} mSv (1.08×10^{-1} mrem) or 0.02 percent of the annual limit of 5 mSv (500 mrem). For dose due to liquid effluents, Exelon assumes a person is located 460 m (1500 ft) below the discharge canal and stands on the bank of the Conowingo Pond for 67 days per year and is exposed to direct radiation from the cooling canal sediments, which have deposits of radioactive materials from the effluent releases from both Peach Bottom Units 2 and 3.

For 2000, the estimate of dose to a hypothetical person from this shoreline deposition was 3.41×10^{-5} mSv (3.41×10^{-3} mrem) or 0.06 percent of the annual limit of 6.0×10^{-2} mSv (6 mrem). Evaluation of doses from gaseous effluent releases from the two units for the same year resulted in an annual dose due to noble gases of 1.1×10^{-3} mGy (1.1×10^{-1} mrad) for gamma radiation and 6.32×10^{-4} mGy (6.32×10^{-2} mrad) from beta air dose. These are 0.50 percent and 0.16 percent, respectively, of the annual limits (see Section 2.1.4) (Exelon 2001c). These doses, which are representative of the doses from the past 5 years, demonstrate that the impact to the environment from radioactive releases from Peach Bottom Units 2 and 3 is SMALL.[a]

The applicant does not anticipate any significant changes to the radioactive effluent releases or exposures from Peach Bottom Units 2 and 3 operations during the renewal period; therefore, the impacts to the environment are not expected to change.

(a) The doses are very small fractions of the 40 CFR Part 190 limits, i.e., annual dose equivalent not to exceed 0.25 mSv (25 mrem) to the whole body, 0.75 mSv (75 mrem) to the thyroid, and 0.25 mSv (25 mrem) to any other organ of any member of the public.

2.2.8 Socioeconomic Factors

The staff reviewed the applicant's environmental report (ER) (Exelon 2001a) and information obtained from several county, city, and economic development staff during a site visit to York County from November 6 through 8, 2001. The following information describes the economy, population, and communities near the Peach Bottom site.

2.2.8.1 Housing

Approximately 1000 employees work at Peach Bottom Units 2 and 3 (about 275 contract employees and approximately 735 permanent employees). Approximately 35 percent of Exelon's employees live in York County, 30 percent live in Lancaster County, 13 percent live in Chester County (mostly on the western edge of the county), 10 percent live in Harford County, Maryland, and the rest live in other locations (see Table 2-2). Table 2-3 presents further breakdown of the residency, by city and county, of 735 permanent employees at Peach Bottom Units 2 and 3. Tables 2-2 and 2-3 do not contain the residences of the contract employees. Location information is not available for contractor employees, but the geographic distribution of their residences is assumed to be similar to that of the permanent employees. Given the predominance of Exelon employees living in York and Lancaster counties and the absence of the likelihood of significant socioeconomic effects in other locations, the focus of the analyses undertaken in this SEIS is on these two counties.

Table 2-2. Peach Bottom Units 2 and 3—Employee and Contract Employee Residence Information by County

County	Number of Personnel	Percent of Total Personnel
York County PA	260	35
Lancaster County PA	223	30
Chester County PA	99	13
Harford County MD	71	10
Subtotal	653	89
Total Permanent Employees	735	100
Contractor Employees	275	—
Total Plant Personnel	1010	—

Source: Exelon 2001d

Table 2-3. Peach Bottom Units 2 and 3—Permanent Employee Residence Information by County and City

County and City[a]	Number of Exelon Personnel	Percent of Exelon Personnel
YORK COUNTY, PA		
South Part of County		
Delta	46	6.3
Airville-Brogue area	38	5.2
Fawn Grove-New Park area	17	2.3
Felton	14	1.9
Stewartstown	10	1.4
Subtotal	125	17.0
North Part of County		
Red Lion	57	7.8
York, Dover, East York, West York	44	6.0
Dallas Town	20	2.7
Subtotal	121	16.5
Total Named Places	246	33.5
Total York County	260	35.4
LANCASTER COUNTY, PA		
South Part of County		
Quarryville	42	5.7
Pequea	14	1.9
Holtwood	11	1.5
Kirkwood	10	1.4
Subtotal	77	10.5
North Part of County		
Lancaster, Roherstown, Landisville, Salunga	48	6.5
Willow Street	33	4.5
Millersville	17	2.3
Subtotal	98	13.3
Named Places	175	23.8
Total Lancaster County	223	30.3

Table 2-3. (contd)

County and City[a]	Number of Exelon Personnel	Percent of Exelon Personnel
CHESTER COUNTY, PA		
Lincoln University	18	2.4
West Chester	12	1.6
Nottingham	11	1.5
Oxford	11	1.5
Total Named Places	52	7.1
Total Chester County	99	13.5
Harford County, MD		
Bel Air	25	3.4
Total Harford County	71	9.7
Other counties	82	11.2
Grand Total	735	100.0

(a) Addresses are for both townships (rural areas) and incorporated cities and towns. Only cities and towns with at least 10 employees are shown.
Source: Exelon 2001d

Exelon refuels each nuclear unit on a 24-month cycle, or about one refueling outage per year for the site. During these refueling outages, site employment increases by as many as 800 temporary workers for 30 to 40 days. Most of these temporary workers are assumed to be located in same geographic areas as the permanent Exelon staff.

Table 2-4 provides the number of housing units and housing unit vacancies for York and Lancaster counties for 1990 and 2000, the latest years for which information is available. Both York County and Lancaster County have urban development boundaries (UDBs) within which development is to take place, but otherwise do not have growth-management controls.

Table 2-4. Housing Units and Housing Units Vacant (Available) by County During 1990 and 2000

	1990	2000	Approximate Percentage Change 1990–2000
	YORK COUNTY, PA		
Housing Units	134,761	156,720	16.3
Occupied Units %	95.5	94.6	-1.0
Vacant Units %	4.5	5.4	20.0
	LANCASTER COUNTY, PA		
Housing Units	156,462	179,990	15.0
Occupied Units %	96.5	95.9	-0.6
Vacant Units %	3.5	4.1	17.1

(a) USCB 2001b, 2001c

2.2.8.2 Public Services

- **Water Supply**

In Pennsylvania, the counties do not operate public water supply systems. Local municipalities, authorities, and private water companies are subject to regulation under the Federal Safe Drinking Water Act and provide drinking water to residents who are not on individual wells. In York County, approximately 25 percent of the residents obtain drinking water from individual onsite wells or springs. York County has 320 water supply systems. Many of these systems are small, with 34 of the providers serving fewer than 100 people. The remaining systems range in size from the Railroad Borough system (serving approximately 320 people) to the York Water Company (serving over 140,000 people). The primary water sources for the larger systems in the county are surface water, while the smaller systems rely on groundwater.

There are over 200 permitted wells and springs used as water sources for water supply systems in York County (York County Planning Commission 1998). York County has projected water use through 2010 at roughly 180,000 m^3/day (48 million gpd). In 1996, the average daily use was approximately 120,000 m^3/day (32 million gpd).

Water systems in York County have been evaluated in the York County Water Supply Plan as to their ability to meet existing and projected water requirements for their respective service populations. These determinations provide the basis for recommended facility improvements, cost estimating, and preparation of regional solutions by the planning commission. Determination has been made of systems' adequacy with regards to source, treatment, treated storage, and transmission/distribution capacities. Of the 80 community systems, 51 are considered adequate to meet existing maximum daily demand (MDD) and 44 are adequate to meet 2010 projected MDD. One system was deemed inadequate to meet treatment capacity for current MDD and eight were inadequate for 2010 MDD. These eight were also projected to experience source capacity problems. Only 36 of the 80 community systems provide adequate treated storage capacity for existing one-day distribution needs. These 36 are also projected to have adequate one-day storage capacity by the year 2010. Only 9 of the 43 mobile home park systems have adequate one-day distribution storage. Only four systems received adequate ratings under all pumping and piping criteria (York County Planning Commission 1998). The County found that all York County water systems are currently producing water that meets existing treatment requirements. Most systems, especially the large regional ones, are in good condition and many of the smaller ones are also adequate and viable to meet demand. For those systems in need of improvements, alternatives were evaluated and County-based solutions identified (York County Planning Commission 1998).

In Lancaster County, approximately 64 percent of the households are served by public water suppliers, while private on-lot water wells serve the remaining 36 percent. In 1993, approximately 2.2 percent of the County's population was served by one of 75 small water suppliers. Most residents receive their water from one of 34 large community water suppliers. Between 1986 and 1993, water supplied by these systems increased by 12 percent. Although these larger systems draw water from both ground and surface sources, they are increasingly dependent on groundwater to meet growing public demand. To meet these demands, large community water suppliers have completed major system improvements, drilled new wells, and extended service lines. In some cases, new authorities have been created and water systems have merged. Lancaster County has projected water use through 2010 at about 320,000 m^3/day (85 million gpd). In 1993, average daily consumption was 250,000 m^3/day (66 million gpd). An analysis by the County of the large community water suppliers indicates that approximately one-third have sufficient water to meet 2010 demands. One-third may lack sufficient water for this period, while the remaining systems have an excess supply. About half the systems with insufficient water could interconnect with other systems that have excess water. Others would probably need to find new water sources (Lancaster County 1997).

Both York and Lancaster counties anticipate water supply challenges in the future. According to the data, there will be shortages in some areas and excess supply in others. Future industries and residents will be encouraged to locate in areas with an adequate water supply infrastructure.

- **Education**

In October 2000, there were 16 school districts in York County with total enrollment of 67,000 students attending York County mainstream public schools. This represents an increase of approximately 1900 students since 1997 (Pennsylvania Department of Education 2001). The total enrollment in the 16 school districts in Lancaster County was 69,000, an increase of only about 100 since 1997 (Pennsylvania Department of Education 2001).

Although the region's school districts themselves do not keep track of Peach Bottom employee children, Table 2-5 shows the total average daily attendance for those school districts that likely serve most of these children.

There are 75 elementary schools (including primary learning centers) in York County. In October 2000, these schools (and some middle and intermediate schools with 5th and 6th graders) had an enrollment population of 36,260 in grades K-6 (Pennsylvania Department of Education 2001). The combined enrollment in the 98 elementary schools in Lancaster County, grades K-6, was 37,301 in October 2000 (Pennsylvania Department of Education 2001).

There are 20 junior high schools, intermediate schools, and middle schools in York County and 24 in Lancaster County. In October 2000, those in York County had an enrollment of 10,825 7th and 8th graders and Lancaster County had a total of 11,079 7th and 8th graders (Pennsylvania Department of Education 2001).

There are 19 senior high and technical high schools in York County and 23 in Lancaster County. In October, 2000, the enrollment in the York County schools numbered 19,941 students in grades 9-12 and 20,518 in Lancaster County (Pennsylvania Department of Education 2001)

Post-secondary education in York County is provided at Penn State University/ Commonwealth College, York College of Pennsylvania, and several technical schools, all in the city of York. Lancaster County has Millersville University of Pennsylvania in Millersville, Franklin and Marshall College and Harrisburg Area Community College/Lancaster Campus community college in Lancaster, Elizabethtown College in Elizabethtown, and several limited-purpose and technical schools in Lancaster (Pennsylvania Department of Education 2001).

Table 2-5. School Districts with Significant Numbers of Peach Bottom Site-Related Students

District	City	Current Average Daily Attendance
South Eastern	Delta	3163
Red Lion	Red Lion	5425
York City	York	7589
York Suburban	York	2654
West York Area	York	2999
Central York	York	4145
Lancaster City	Lancaster	11,203
Manheim Township	Lancaster	5011
Lampeter-Strasburg	Willow Street	3052
Penn-Manor	Millersville	5319
Conestoga Valley	Lancaster	3590
Solanco	Quarryville	4361
Oxford Area	Oxford, Nottingham	3165
West Chester Area	West Chester	11,609
Harford County	Bel Air	35,900

Source: Pennsylvania Department of Education 2001; Action Realty 2001; Harford County Public Schools 2002

- **Transportation**

York County is served by Interstate 83 (I-83), which enters the county from the north and ends in downtown Baltimore. The largest capacity highway in the immediate vicinity of the Peach Bottom site is Pennsylvania Highway 74, which is a north-south road. U.S. Highway 30 (U.S. 30) is the major east-west highway that traverses the middle of the county, about 20 miles to the northwest of the Peach Bottom site.

Road access to the Peach Bottom site is via State Route 2104 (Lay Road), which is a two-lane paved road. State Route 2104 (Lay Road) intersects State Route 2043 (Flintville Road) approximately two miles from the plant. Employees commuting to and from work generally use State Route 2104 (Lay Road), State Route 2024 (Paper Mill Road), State Route 2043 (Flintville Road), State Route 2026 (Atom Road), and State Route 2045 (Broad Street Extension), along with principal State Routes 74 and 372. State Route 372 crosses the Susquehanna River north of the Peach Bottom site, providing access to Lancaster County.

Flintville Road (which becomes Maryland State Route 623) connects with U.S. 1 in Maryland and is used by commuters from the south. While the Pennsylvania Department of Transportation does not compute level-of-service determinations on road capacities, local residents and Exelon employees agree that the area is extremely rural and there are no traffic-related issues.

Both York County and Lancaster County are well-served by Class I railroads, but there is no rail service to the Peach Bottom site.

2.2.8.3 Offsite Land Use

Within the Commonwealth of Pennsylvania, counties are the first subdivision of government below the state level and are further divided into municipalities, including cities, boroughs, and townships. Counties are required by the Commonwealth to prepare and adopt comprehensive plans. The area within 10 km (6 mi) of the Peach Bottom site includes parts of York and Lancaster counties in Pennsylvania, and sections of Harford and Cecil counties in Maryland. This section will focus on the Pennsylvania counties of York and Lancaster, because approximately 66 percent of the permanent Peach Bottom site workforce lives in these communities. In York County, there are 72 municipalities (including Peach Bottom Township where the Peach Bottom site is located), and in Lancaster County, there are 60. Both York and Lancaster counties have experienced significant growth in the last decade. The comprehensive plans of both counties share the goal of encouraging growth and development in identified areas. Prevention of suburban sprawl and the preservation of open space and farmland were goals identified as priorities in both plans. In York County, proposed growth areas are identified and development is promoted within the areas. New development beyond growth areas is directed to areas around existing boroughs and villages.

The York County Growth Management Map designates established and interim growth areas, as well as established rural areas. In Lancaster County, the designation of “Urban” and “Village Growth Boundaries” have been made to encourage growth around existing villages and urban areas and to prevent development sprawl into rural and agricultural areas. Delta Borough, with a population of 741 (Pennsylvania State Data Center 2000b) is the municipality nearest to the Peach Bottom site and is located southwest of the site. No major metropolitan areas occur within 10 km (6 mi) of the Peach Bottom site. However, one urban area (Baltimore Metropolitan Statistical Area) with a population of 100,000 or more is approximately 60 km (40 mi) southwest of the site (Exelon 2001a).

York County has a total land area of 236,049 ha (583,040 ac) with the predominant land use being agriculture (63.6 percent), followed by residential (20.5 percent). Lancaster County covers approximately 245,785 ha (607,360 ac), and, like York County, the predominant land use is agricultural (64.5 percent) with approximately 158,634 ha (392,000 ac) in agricultural land (Rural Pennsylvania 2001).

There are three hydroelectric facilities within 13 km (8 mi) of the Peach Bottom site. The Muddy Run Pumped Storage Hydroelectric Facility is approximately 8 km (5 mi) upstream on the east side of the Susquehanna River; the Holtwood Dam and Hydroelectric Facility is approximately 10 km (6 mi) upstream; and the Conowingo Dam and Hydroelectric Facility is approximately 13 km (8 mi) downstream in Maryland (Exelon 2001a).

No national parks or other Federally reserved areas have been identified within 10 km (6 mi) of the Peach Bottom site; however, two protection areas for management of rare plant species were established by PECO in cooperation with the Maryland Nature Conservancy. The Rock Spring Powerline Natural Area is a 42-ha (103-ac) parcel approximately 11 km (7 mi) southeast of the site near Rock Springs, Maryland, and the Richardsmere Powerline Natural Area near Richardsmere, Maryland is a 22-ha (55-ac) parcel approximately 16 km (10 mi) southeast of the Peach Bottom site (Exelon 2001a).

2.2.8.4 Visual Aesthetics and Noise

The Peach Bottom units, including Units 2 and 3 and supporting structures, can be seen and heard from the Conowingo Pond itself, from the public access boat ramp and picnic areas immediately upstream of the plant, and from private residences along the shores of Conowingo Pond. The most visible features of the Peach Bottom site structures are the emission stacks from Units 2 and 3, the containment structures, cooling towers, and intake screens. Cliffs rising on the west side of Conowingo Pond, trees, and vegetation shield the main plant structures from view from the west, although the stack and meteorological tower are tall enough to be seen from public roads and rural residences. The Peach Bottom Plant is also visible from the Conowingo Pond at night because of outside lighting used at the Peach Bottom site and lighting used on the Units 2 and 3 emission stack and the meteorological tower. There is no visible vapor plume from Units 2 and 3 operations because the cooling towers are not normally used.

Noise from the Peach Bottom Units 2 and 3 is noticeable by users of the Conowingo Pond and facilities upstream of the plant. Noise transmission across Conowingo Pond is facilitated by the lack of barriers on the pond. Cliffs, vegetation, and trees largely screen residents living to the west from noise generated by the plant.

2.2.8.5 Demography

Population was estimated from the Peach Bottom site out to a distance of 80 km (50 mi).

Exelon used 1990 census data from the U.S. Census Bureau website (USCB 1999) and geographic information system software (ArcView®) to determine demographic characteristics in the vicinity of the Peach Bottom site. NRC guidance calls for the use of the most recent USCB decennial census data, which in the case of the Peach Bottom site, was the 2000 census (USCB 2001a). The Census Bureau provides updated annual projections, in addition to decennial data, for selected portions of its demographic information. Section 2.11 (Minority and Low-Income Populations) of the environmental report used 1990 minority and low-income population demographic information, because updated projections were not available by census tract. Exelon chose to also use 1990 data in discussing total population, so that the data sets would be consistent throughout its site environmental report. The NRC staff used 2000 census data in this section and in discussing minority populations.

As derived from Census Bureau 2000 information, at least 452,400 people live within 32 km (20 mi) of the Peach Bottom site. Applying the GEIS sparseness measures, Peach Bottom site has a population density of 139 persons/km^2 (360 persons/mi^2) within 32 km (20 mi) and falls into the least sparse category, Category 4 (having greater than or equal to 46 persons/km^2 [120 persons/mi^2] within 32 km [20 mi]). As estimated from Census Bureau 2000 information, at least 5,270,600 people live within 80 km (50 mi) of the Peach Bottom site. This equates to a population density of 258 persons/km^2 (671 persons/mi^2) within 80 km (50 mi). Applying the GEIS proximity measures, the Peach Bottom site is classified as being "in close proximity," Category 4 (having greater than or equal to 73 persons/km^2 [190 persons/mi^2] within 80 km [50 mi]). According to the GEIS sparseness and proximity matrix, Peach Bottom site ranks of sparseness Category 4 and proximity Category 4 result in the conclusion that the Peach Bottom site is located in a high population area. All or parts of 24 counties are located within 80 km (50 mi) of the Peach Bottom site (Figure 2-1). Of the counties, 10 are in Pennsylvania, 10 are in Maryland, 2 are in Delaware, and 2 are in New Jersey. The Baltimore Metropolitan Statistical area is the largest metropolitan area within 80 km (50 mi) of the Peach Bottom site. Other sizable cities and towns (within 80 km [50 mi]) include Reading, Harrisburg, Chester, Lancaster, and York, Pennsylvania, and Wilmington, Delaware (Environmental Systems Research Institute Undated). Approximately 66 percent of Peach Bottom site employees live in Lancaster and York counties. The remaining 34 percent is distributed across 18 counties, with numbers ranging from 1 to 99 people. The towns of Red Lion, Delta, Lancaster, Quarryville, and York have the highest numbers of employees in residence, with 7.8, 6.3, 6.0, 5.7, and 5.2 percent, respectively.

Both Lancaster and York counties' populations are growing at faster rates than those of the Commonwealth of Pennsylvania as a whole. Between 1980 and 1990, the Commonwealth's population increased by 0.1 percent, while Lancaster and York counties increased by 17 and 9 percent, respectively. The Commonwealth of Pennsylvania as a whole is projected by the Census Bureau to have the second smallest (5 percent) population increase of all 50 States during the period from 1995 to 2025 (USCB 1997). Projections for the period from 2000 through 2020 show Lancaster and York counties surpassing the Commonwealth's growth rate with population increases of 23 and 9 percent, respectively.

The larger towns nearby the Peach Bottom site include York, 48 km (30 mi) to the northwest; Red Lion, 32 km (20 mi) to the northwest; Quarryville, 16 km (10 mi) to the northeast; and Lancaster, 31 km (19 mi) due north. Between 1990 and 2000, York County experienced a population growth from 339,600 (in 1990) to 381,800 (in 2000), a 12.4 percent increase over the decade (USCB 2001a), while Lancaster County grew from 422,800 to 470,700, an increase of 11.3 percent. The greatest relative population growth within the 80-km (50-mi) radius around the Peach Bottom site between 1990 and 2000 occurred in Carroll County, Maryland, northwest of Baltimore (22.3 percent).

Table 2-6 shows estimated populations and annual growth rates for the two counties with the greatest potential to be affected by license renewal activities.

Table 2-6. Regional Demographies

	Population and Average Annual Growth Rate (as a Percent) during the Previous Decade			
	Lancaster County		York County	
Year	Number	Percent	Number	Percent
1980[(a)]	362,346	1.3	312,963	1.5
1990[(a)]	422,822	1.7	339,574	0.9
2000[(b)]	486,046	1.5	382,047	1.3
2010[(b)]	540,823	1.1	403,133	0.6
2020[(b)]	597,975	1.1	415,934	0.3
2030[(c)]	655,832	0.9	442,813	0.6
2035[(c)]	684,004	0.9	452,392	0.4

(a) USCB 1995
(b) Pennsylvania State Data Center 2000a
(c) Tetra Tech NUS 2000b

- **Resident Population Within 80 km (50 mi)**

  Table 2-7 presents the population distribution within 80 km (50 mi) of the Peach Bottom site for the year 2000.

Table 2-7. Population Distribution within 80 km (50 mi) of the Peach Bottom Site

0 to 16 km (0 to 10 mi)	16 to 32 km (10 to 20 mi)	32 to 48 km (20 to 30 mi)	48 to 64 km (30 to 40 mi)	64 to 80 km (40 to 50 mi)	Total
43,879	408,481	873,103	2,028,471	1,916,694	5,270,628

Source: USCB 2001a

The population centers within the 16-km (10-mi) area are the town of Delta, Peach Bottom Township, Drumore Township (Drumore), and Fulton Township (Wakefield). The populations of these settlements in the year 2000 were 741, 4412, 2114, and 2688, respectively. Most of the new residential development within the 16-km (10-mi) radius has been in Peach Bottom Township, west of the Peach Bottom site, and south of the Pennsylvania/Maryland border in Harford County.

The county planning departments for York and Lancaster counties project relatively low population growth for Peach Bottom Township in York County, Drumore and Fulton Townships and nearby areas. This area has relatively less growth than other parts of the two counties. There are several residential developments that have started in the vicinity of York, Shewsbury Township, Hanover/Penn, and Fairview/Newberry areas (York County Planning Commission 1995, 1997).

- **Transient Population**

The transient population in the vicinity of the Peach Bottom site can be identified as daily or seasonal. Daily transients are associated with places where a large number of people gather regularly, such as local businesses, industrial facilities, and schools. Table 2-8 presents information on the major employers and number of employees for facilities located within 16 km (10 mi) of the Peach Bottom site.

Seasonal transients result from part-time residents who may reside in southern Pennsylvania during the summer tourist season or pursue recreational activities there throughout the year. Lancaster County, for example, claims 5 million tourists per year. (York County does not have a comparable estimate of the number of visitors. The 1999 Pennsylvania Economic Impact Report [D. K. Shifflet and Associates 2000] estimates visitor spending in York County at $774 million, compared with $1357 million in Lancaster County, indicating about 57 percent as much activity in York County). Conowingo Pond is regularly used for bass fishing tournaments in the spring, summer, and fall. The heated discharge at the Peach Bottom site, which attracts baitfish and game fish in most months of the year, is an especially popular fishing spot in winter. Susquehannock State Park, across the Susquehanna River and upstream from the Peach Bottom site, has drawn nearly 97,000 visitors per year during the years 1999 and 2000.[(a)]

Table 2-8. Major Employment Facilities Within 16 km (10 mi) of the Peach Bottom Site

Firm	Number of Employees
Cecil County	
Fawn Grove Manufacturing Company	100
H.E. Shallcross and Sons	35
Harford County	
Blue Ridge Flooring Company	65
C.D. Miller	NA
Maryland Green Marble Corporation	16
Maryland Lava Company	70
Miller Chemical and Fertilizer Corporation	21
McMorquodale Color Card Company	22
Maryland Ceramic and Steatite Company	45
Whitefore Packing Company	150
Petti Frocks, Inc., Assoc.	84
R. Roberts and Son	20
B.G.S. Jourdan & Sons	55
The Susquehanna Electric Company	65
York County	
Weldon Packing Company	NA
Snyder Packing Company	100
PECO Energy	64
South Eastern School District (Fawn Grove)	281
Lancaster County	
Pennsylvania Power & Light Company	150

Source: Table 2.2.12 in Peach Bottom Atomic Power Station, Final Safety Analysis Report (PECO 2001b) (table updated January 1994)
NA = not available

(a) Telephone contact with staff at Gifford Pinchot State Park in Lewisberry, Pennsylvania, January 31, 2002. (Gifford Pinchot staff manage information on Susquehannock State Park.)

- **Agricultural Labor**

There are 2200 farms in York County and 5910 in Lancaster County (Pennsylvania Agricultural Statistics Service 2001). The main agricultural products within the 80-km (50-mi) radius of the Peach Bottom site are livestock and dairy, corn, and hay. As a result, around 5900 hired farm workers are present at some time during the year in Lancaster County (about 3800 for less than 150 days per year) and 2200 in York County (1700 for less than 150 days per year) (USDA 1997a, 1997b). Both counties are entirely within the 80-km (50-mi) circle. Almost all of the laborers on farms in the area are believed to be resident in the area. Migrant labor plays little or no role.

2.2.8.6 Economy

Both Lancaster County and York County have experienced steady growth in population and economic activity during the last decade. Both counties are designated as metropolitan statistical areas, ranking 89th and 108th of the 276 metropolitan statistical areas in the country in 2000 (USCB 2001d), with populations of approximately 423,800 and 339,600, respectively. Both counties are located in south-central Pennsylvania, on the western edge of the highly urbanized and industrial region extending from Boston, Massachusetts, to Washington, DC. Both counties have ready access to domestic and international markets, with a transportation network consisting of interstate highway access to major north-south and east-west routes, trucking and rail terminals, two international airports, and two international ports (EDC 2000b, Lancaster Chamber of Commerce and Industry 2000, YCEDC 2000).

Historically, both Lancaster and York counties' economies were deeply rooted in agriculture. In recent years, both counties have become more economically diversified. In Lancaster County, services is now the largest employment sector (26 percent of the labor force) (Lancaster Chamber of Commerce and Industry 2000), with health services as the leading employment group, closely followed by the eating and drinking establishments group (EDC 2000a). The manufacturing sector employs 25.3 percent of the labor force (Lancaster Chamber of Commerce and Industry 2000), with the "production of food and related products" as the major employment group within this category (EDC 2000a). Lancaster County has the distinction of being the most productive non-irrigated farming county in the United States, with total agricultural receipts of $938 million annually (EDC 2000a). In York County, the manufacturing sector leads employment with 29 percent, followed by services at 23.4 percent (York County Chamber of Commerce and Visitors Bureau, Pennsylvania 2000). There are more than 1000 manufacturing companies that employ nearly 53,000 people (YCEDC 2000), with the industrial machinery and equipment industry group in the lead. The health services industry employs the greatest number of the services' sector groups (Pennsylvania Labor Market Information Database System 2000a).

The 1999 unemployment rate for the Commonwealth of Pennsylvania was 4.4 percent. In comparison, Lancaster and York counties had 1999 unemployment rates of 2.7 and 3.6 percent, respectively (Pennsylvania Labor Market Information Database System 2000b).

The Peach Bottom Atomic Power Station thus is an important employer, but by no means the most important economic entity in York and Lancaster counties. It ranks 21st on the list of York County's top 100 employers, and employs 1.3% of the 60,000-plus employees working for those 100 employers.

County planning officials expect the future area of growth for York County to be in the north end of the county. The southeast part of the county is expected to remain largely rural because it is largely undeveloped, has relatively little infrastructure and few major highways, and has strong desires for agricultural preservation.

Population in Lancaster County (moderate growth forecast) is projected to increase from approximately 423,000 (1990) to around 684,000 (2035), or approximately 62 percent over the 45-year period. York County population is projected to increase from approximately 340,000 (1990) to around 452,000 (2035), or approximately 33 percent (see Table 2-6).

Exelon is a significant property taxpayer in York County. Until recently, however, all tax payments went to the Commonwealth of Pennsylvania and then were distributed back to local government units by formula. The year 2000 is the first year when taxes were paid directly to local governments.

In the past, PECO paid property taxes to the Commonwealth of Pennsylvania on its generating, transmission, and distribution facilities. Under authority of the Pennsylvania Utility Realty Tax Act (PURTA), property taxes collected from all utilities (water, telephone, electric companies, railroads, etc.) were redistributed to the taxing entities within the Commonwealth. In Pennsylvania, these entities include the counties, cities, townships, boroughs, and school districts. The distribution of PURTA funds is determined by a formula, and is not necessarily based on the individual utility's effect on a particular government entity. PURTA distributions, along with other revenue sources such as residential property taxes and assessments, fund operations of various government entities. In York County, for example, funds from these revenue sources, including PURTA distributions, are used for the Court of Common Pleas, county parks, county corrections facilities, the county nursing home, maintenance of the county real estate appraisal program, and voter registration files (Noll 2000a). Peach Bottom Township uses revenue funds, including PURTA distributions, to maintain township roads, operate and maintain sewage treatment facilities, develop and implement planning and zoning regulations, and issue building permits (Baldwin 2000).

Table 2-9 lists annual budget figures for York County, Peach Bottom Township, and the South Eastern School District (in York County) for the years 1996 through 2000. Exelon determined that past tax information would not provide the best assessment of the Peach Bottom site's impact for two reasons. First, there has been no direct correlation between the taxes paid by a utility to PURTA and the PURTA allocation to the taxing entities. A number of other variables were factored into the PURTA decision-making process when allocating funds to various taxing authorities. Second, PURTA taxes were based on depreciated book value; realty taxes now will be based on assessed value. For these reasons, past revenues are not necessarily a good measure of future property tax payments to a county (or other taxing authority).

Table 2-9. Local Government Budgets and Projected Taxes for Peach Bottom Units 2 and 3

Year	Annual Budget for York County[a]	Annual Budget for Peach Bottom Township[b]	Annual Budget for South Eastern School District[b]
1996	$156,503,053	unavailable	$18,508,364
1997	$163,833,299	$1,214,435	$19,420,951
1998	$182,894,802	$1,315,494	$20,314,174
1999	$205,933,243	$1,355,026	$21,772,021
2000	$205,907,177	$1,690,094	$23,330,009
Estimated Year 2000 Peach Bottom property taxes (% of 2000 Budgets)	$151,000 (0.07%)	$30,000 (1.8%)	$840,000 (3.6%) plus $420,000 subject to possible refund (1.8%)

(a) Baldwin 2000
(b) Noll 2000b

Pennsylvania recently changed the basis for calculating PURTA taxes for tax year 1998 and beyond from the utilities' depreciated book value to the local taxing authority's assessed value. In addition, effective January 1, 2000, generating facilities are no longer included in the realty taxes paid to the Commonwealth under PURTA. Power generating companies will now be required to pay realty taxes on these facilities directly to the county, township, and school district in which they are located. Distribution and transmission facilities will remain taxable under PURTA. The amounts of property taxes to be paid by Exelon for the Peach Bottom site to York County, Peach Bottom Township, and the Southeastern School District have not yet been determined. Until a determination is made, Exelon agreed to pay York County $151,000 per year, beginning in 2000; Peach Bottom Township $30,000 per year, beginning in 2000; and the

Southeastern School District $840,000 per year, beginning in 2000. These funds are non-refundable. In addition, Exelon will pay the school district $420,000 per year, beginning in 2000, that could be refunded, pending the final determination. These figures would constitute a small portion of the operating budgets of the three local government units affected.

2.2.9 Historic and Archaeological Resources

This section discusses the cultural background and the known historic and archaeological resources at the Peach Bottom site and in the surrounding area.

2.2.9.1 Cultural Background

The region around the Peach Bottom site is rich in prehistoric and historic Native American and EuroAmerican cultural resources including over 350 National Register of Historic Places property listings in three counties surrounding the Peach Bottom site (Exelon 2001a). Known examples of older prehistoric sites are rare but Native American archaeological sites that date after 4000 BC are fairly common in the area. The majority of recorded prehistoric archaeological sites were found within the first terraces above the Susquehanna River. In the vicinity of the Peach Bottom site, these terraces are under waters of the Conowingo Pond (which was formed when Conowingo Dam was constructed across the Susquehanna River in 1928) or not present at all within the steeply sloped and modified terrain.

The lower reaches of the Susquehanna River encompass one of the areas in North America longest settled by Europeans. Their occupation began in the Seventeenth Century. Just downstream from Conowingo Pond, the remains of the Susquehanna and Tidewater Canal (1840) are still visible and there are the archaeological remains of Lapidum, a settlement destroyed by the British in the War of 1812.

Early contact with European colonists and events associated with that contact make it difficult to associate present-day tribal groups with the territory in the vicinity of the Peach Bottom site. The contacts led to tribal movements, alliances with either the French or English, armed conflicts, epidemics, shifting inter-tribal confederacies, and eventual removal, or extinction in some cases, as the European expansion took place. The contacts took place so early that the record provides a poor basis for inferences concerning the owners of the land at the time the colonists arrived.

For the Peach Bottom site, the original occupants of the Susquehanna River valley were the Susquehannocks, a confederacy of at least five tribes with more than 20 villages. Adjacent to the Susquehannocks were the Shawnee to the west in Pennsylvania; the Delaware (also known as Lenni-Lenape, as well as the closely related Nanticoke) in southeastern Pennsylvania, New Jersey and Delaware; and the Piscataway (also Canoy) to the south in Maryland. The

Susquehannocks suffered the most as a culture and were nearly gone by the early 1700s; by 1763 they were essentially extinct although many remaining individuals had moved to other tribes. Along with the decline of the Susquehannock, other tribes moved into the Susquehanna River valley, including the Shawnee and the Piscataway who spread northward along the river, establishing a town at the mouth of Canoy Creek in 1718 (near present day Bainbridge upriver from Peach Bottom).

A series of treaties beginning in the 1750s and continuing for the next two or three decades effectively removed tribal entities from the region. The Delaware and Shawnee primarily moved first to the Ohio River Valley and then to Oklahoma and Kansas, respectively, where they exist today.

Today, there are no Federally recognized Indian tribes in Pennsylvania, New Jersey, Delaware, or Maryland. There are three State-recognized remnant groups of the Lenni-Lenape and Nanticoke, and there are two remnant groups of Piscataway who have petitioned the State of Maryland for recognition. Among the reasons the Piscataway desire at least State recognition involves repatriation of nearly 500 Piscataway burials currently held by the Maryland Historical Trust and Smithsonian Institution. One of the Piscataway groups is known as the “Piscataway-Canoy Confederation,” a name that at least connotes a historical relationship to the Susquehanna River valley in southern Pennsylvania. Today, the Piscataway (numbering nearly 25,000 individuals) live primarily in southern Maryland.

2.2.9.2 Historic and Archaeological Resources at Peach Bottom Site

In 1972, I. F. Smith, an archaeologist from the William Penn Museum, conducted an evaluation of the Peach Bottom property. Although the extent and methodology of his efforts were limited, the archaeologist concluded that there were no archaeological sites in the areas of Units 2 and 3, and that likely areas for discovery of archaeological resources were no longer intact at the time of his visit (Smith 1972a). Smith stated:

> …it is the flood plain and terrace that are the most likely areas to find Indian settlements and these are obviously no longer susceptible to investigation at Peach Bottom because they have either been built upon in the past or flooded by the backwaters of Conowingo Dam. (Smith 1972b: USAEC 1973)

No historic architectural, historic landscape, traditional cultural property, or archaeological sites have been recorded on the Peach Bottom site (Exelon 2001a). The applicant’s environmental report indicates that no artifacts have ever been found within the Peach Bottom site boundary (Exelon 2001a). The staff did not conduct further historic and archaeological site file searches at record repositories in Pennsylvania, Maryland, and Delaware.

The utility right-of-way that includes the Peach Bottom-to-Keeney, Delaware transmission line crosses part of a feeder canal for the Chesapeake and Delaware Canal system (Delaware SHPO 2001). This feeder canal was dug in the early 1800s but never used for its intended purpose to transport agricultural goods (Guider 1974). Completion of a rail line in 1826 eliminated the need for the canal. The Delaware State Historic Preservation Office recognizes the feeder canal as historically important: it is a rare remnant of the mostly altered canal system and it reflects canal construction techniques of the early Nineteenth Century (Delaware SHPO 2001).

The utility right-of-way at the intersection with the feeder canal is approximately 122 m (400 ft) wide. The right-of-way was in place before the Peach Bottom line was added and it presently includes three other overhead transmission lines and at least one underground utility easement. The right-of-way is clear of trees, but grass and brush covered. A gravel surfaced utility road meanders through the right-of-way and crosses the remnant trench for the feeder canal underneath the Peach Bottom line.

The old feeder canal alignment remains a visible and well-defined feature along much of its original route through present-day woodlands. It displays less definition and more in-filling as it passes under the transmission right-of-way. The changes under the transmission right-of-way are cumulative effects from a range of human and natural activities that extend back in time to a period well before the addition of the Peach Bottom-to-Keeney, Delaware transmission line to the utility right-of-way.

The New Castle County Natural Resources Conservation Service has aerial photographs of the area of concern in its files. These photographs date to 1937, 1946, 1954, 1961, 1968, 1977, 1982, 1988/89, and 1998. Staff review of these aerial photographs indicates that the feeder canal remained relatively intact until after 1968. At that time, and before 1977, small noticeable changes began to occur: first, a utility road crossed the feeder canal at a new place in the transmission right-of-way and below the present-day Peach Bottom-to-Keeney, Delaware transmission line. Second, a series of accumulative changes began, which continue to the present, resulting in gradual loss of vegetation along the alignment of the canal and a progressive loss of sharpness in the features of the canal as viewed from the air. The loss of distinct edges of the feeder canal may also occur in the wooded areas.

2.2.10 Related Federal Project Activities and Consultations

The staff reviewed the possibility that activities of other Federal agencies might impact the renewal of the OL for Peach Bottom Units 2 and 3. Any such activities could result in cumulative environmental impacts and the possible need for the Federal agency to become a cooperating agency for preparation of the SEIS.

NRC is required under Section 102 of the NEPA to consult with and obtain the comments of any Federal agency that has jurisdiction by law or special expertise with respect to any environmental impact involved. NRC consulted with the FWS. Consultation correspondence is included in Appendix E.

2.3 References

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10 CFR Part 50. Code of Federal Regulations, Title 10, *Energy*, Part 50, "Domestic Licensing of Production and Utilization Facilities."

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10 CFR Part 61. Code of Federal Regulations, Title 10, *Energy,* Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste."

10 CFR Part 71. Code of Federal Regulations, Title 10, *Energy,* Part 71, "Packaging and Transportation of Radioactive Material."

40 CFR Part 81. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 81, "Designation of Areas for Air Quality Planning Purposes." Available at: http://frwebgate.access.gpo.gov/cgi-bin/multidb.cgi . Accessed December 14, 2001.

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