3.0 Description of the Proposed Project

3.1 Introduction

Starbuck Power Company (SPC), LLC, of Bellevue, Washington (a division of PPL Global of Fairfax, Virginia) proposes to build a 1,200-megawatt, natural gas fueled, combustion turbine power plant. This section of the Environmental Assessment describes the proposed project based on information provided by SPC.

The project consists of the generation plant, a short (200-foot) natural gas pipeline connection to a nearby gas transmission line, and a 6-mile water pipeline. The proposed site is crossed by existing 500-kilovolt (kV) electrical transmission lines owned by the Bonneville Power Administration (BPA). The plant would be connected to these BPA transmission lines at the site. BPA has determined that an additional transmission line from the project to the Lower Monumental Dam switchyard would be needed for system reliability. BPA is currently developing the route location and facilities design for this transmission line. Its studies on the transmission system are expected to be completed in March 2001.

Section 3.2, Description of the Proposed Project, provides information on the following aspects of the Starbuck Power Project:

- Location (Section 3.2.1)
- Project Facilities (Section 3.2.2)
- Construction Activities (Section 3.2.3)
- Operation (Section 3.2.4)
- Schedule and Workforce (Section 3.2.5)
- Costs (Section 3.2.6)

3.2 Description of the Proposed Project

3.2.1 Plant Site Location

SPC plans to construct the plant on approximately 40 acres of a 100-acre site located about 6 miles northwest of the town of Starbuck in Columbia County, Washington (Figure 3-1). State Route (SR) 261, a two-lane highway, is nearly adjacent to the southwest side of the property; a strip of land approximately 10 feet wide is situated between SR 261 and the SPC property. This strip of land is owned by the U.S. Army Corps of Engineers (Corps). SPC would need an easement for the Corps to access the property. A Union Pacific rail line passes several hundred feet southwest of the highway.

The site is located at the top of a steep bluff above the Snake River, approximately 200 feet above normal river elevation, between Little Goose Dam and Lower Monumental Dam. SPC has an option on the property, which is currently owned by the BAR-Z Ranch. Figures 3-2 and 3-3 show the property boundaries and provide a legal description and site characteristics. Although much of the property has been used for grazing in the past, and is currently grazed, the property is currently zoned for industrial use.

As shown in Figure 3-2, two 500-kV transmission lines cross near the center of the property. The project would be constructed on the portion of the property southeast of those lines. The terrain in the area of the plant site slopes generally to the south, away from the river.

3.2.2 Project Facilities

3.2.2.1 Generation Plant

Plant Components

As proposed, the Starbuck Power Project would generate approximately 1,200 MW of electrical power using combined-cycle combustion gas turbines (CGTs), heat recovery steam generators (HRSGs), steam turbine generators (STGs), and air-cooled condensers. The project would include four CGTs equivalent to Siemens Westinghouse Model 501F CGTs, four three-pressure HRSGs equipped with supplemental duct firing, two STGs, two air-cooled condensers, and associated support equipment. Other key plant facilities include the switchyard, control and administration facilities, parking and transfer areas for a mobile water treatment facility, water storage facilities, and a gas metering station.

The electrical generation equipment would be arranged within two “power blocks,” each in a “two-on-one” configuration. In such a configuration, each of two CGTs is directly connected to an electric generator and a HRSG. Steam produced by the two HRSGs is combined and directed to a single STG.

The layout of the generation plant is shown in Figure 3-4. Figure 3-5 presents a computer-generated rendering of the plant.

Buildings and Structures

The largest structure onsite, the generation building, would house the power generation and control equipment and the administrative and general support areas. All four CGTs would be arranged in a parallel orientation in the generation building. Exhaust generated by the CGTs would be routed to the adjacent outdoor HRSG. Steam generated by each block of two HRSGs would be directed to the block’s STG area inside the main building. With the exception of the air inlet filters and electrical transformers, all major CGT equipment would be fully enclosed by the generation building. The CGT structure would also house and support one overhead maintenance crane to service all four combustion turbines.

The CGT area within the generation building would be approximately 90 feet high, 120 feet wide, and 515 feet long. Each of the adjacent four HRSG exhaust stacks would be 20 feet in diameter; the actual stack height would be determined as a result of the air quality and dispersion modeling. For the purposes of this EA, the stack height has been assumed to be 150 feet.

Each of the two STG structures, located at the ends of the generation building, would house one STG and associated pumps and equipment, condensate polisher, other equipment required for the operation of the STGs, and equipment necessary for the entire plant. All major STG equipment except the STG electrical transformers and air-cooled condensers would be fully enclosed within the generation building. Each STG structure would consist of three floors: a ground floor, mezzanine level, and the steam turbine operation floor. Each STG structure would also house an overhead crane for the maintenance of the steam turbine.

The approximate overall size of each STG area in the generation building would be 90 feet high, 100 feet wide, and 180 feet long.

The control/administration structure would be a separate enclosed area located directly adjacent to the Block 1 STG area (western end of the generation building). The first floor of this building is intended for administration and general support facilities. The second floor would house emergency battery and electrical support equipment. The third floor (matching the steam turbine operation floor elevation in the Block 1 STG area) would house the project's main control facilities.

The control/administration area within the generation building would be approximately 60 feet high, 90 feet wide, and 100 feet long.

The air-cooled condensers would be located adjacent to the western and eastern ends of the generation building. These facilities would be covered but not enclosed. Each condenser would be approximately 120 feet high, 180 feet wide, and 215 feet long.

Two other enclosed buildings would support operation and house necessary equipment. These structures consist of a Fire Water Pump Building and a Switchyard Control Building. The Fire Water Pump Building would house two redundant fire water pumps for maintaining fire-fighting water system pressure. Each of these two buildings would be a single-story structure, similar in appearance to the generation building.

The approximate size of the Fire Water Pump Building would be 20 feet high by 30 feet square, and the Switchyard Control Building would be approximately 20 feet high, 20 feet wide, and 40 feet long.

As described in Section 3.2.4 (Operation), each HRSG would be equipped with a selective catalytic reduction (SCR) system that uses ammonia injection to minimize production of oxides of nitrogen (NO_x). The aqueous ammonia storage and transfer system would consist of skid-mounted equipment intended to vaporize and dilute aqueous ammonia. This equipment would be located adjacent to each SCR, and a common ammonia storage vessel, ammonia transfer pumps, vaporizer, associated piping, and controls. An unloading station for trucks would be located at the common ammonia storage tank. The ammonia storage station would be 25 feet high, 30 feet wide, and 30 feet long. The system would return displaced ammonia vapor to the unloading vehicle. The ammonia storage tank would be sized to store approximately a 1-week supply of aqueous ammonia. A spill containment facility would be provided around both the truck unloading station and the ammonia storage tank.

Buildings on the site would consist of a steel framework covered with painted metal panels. The buildings, air-cooled condenser, exhaust stacks, and other large outdoor equipment would be painted neutral colors to minimize visual impact. Design and construction of the buildings and other structures would be completed in accordance with appropriate codes and standards.

In addition, the following facilities and equipment would be constructed onsite:

- Two cylindrical aboveground storage tanks to supply service water for the steam cycle, general site use, and for fire-fighting water. Each 500,000-gallon tank would be approximately 40 feet in diameter and 40 feet high.
- A transfer area for parking temporary mobile equipment used to generate demineralized water for the steam cycle. The area would also include permanent pumps and equipment necessary to transfer the water generated to storage and to the plant.
- A gas metering station to connect to and meter the natural gas fuel supply.
- An open-air, insulated 500-kV electrical switchyard with "flying tap" connection to the existing 500-kV transmission lines.
- A sanitary treatment system for onsite treatment of sanitary wastes.
- A tile field for disposal of wastewater.

Site Access

Two roadways would be constructed for plant access and egress from SR 261. At present, SPC anticipates that the only changes to SR 261 would be construction of the highway connections associated with the egress/ingress roadways. According to the Washington State Department of Transportation (Trepanier pers. comm.), these new driveways are to be constructed in accordance with Washington state access management under Title 468 Washington Administrative Code (WAC) and Chapter 47.50 Revised Code of Washington (RCW). These roadways would create an entrance "loop" intended to provide effective truck access to the temporary water treatment facilities as well as access to the generation plant. A parking area would be established along the entrance loop next to the demineralization transfer and storage facilities for this trailer-mounted equipment.

A road would be constructed around the site perimeter, with access branch roads to specific areas, such as the generation building and the HRSG equipment. Passenger vehicle parking would be provided outside the control/administration area of the generation building.

Site Security

The power plant would be surrounded by a chain link security fence approximately 8 feet high and topped with three strands of barbed wire. Automatically or manually operated swing gates would be provided at all roads crossing the fence, and lockable personnel gates would be added where appropriate. The electrical switchyard would have its own perimeter fence and gates of similar construction to prevent unauthorized access to the high-voltage equipment in the switchyard. The gas metering station would be likewise equipped.

Exterior lighting would be provided throughout the site as required for security and safety. Illumination levels would be established in accordance with the IES Handbook and code requirements.

3.2.2.2 Natural Gas Pipeline

A 36-inch-diameter natural gas mainline owned by Pacific Gas and Electric (PG&E) Gas Transmission-Northwest (GT-NW) is approximately 200 feet from the southeast corner of the project site. The Corps owns the property between the GT-NW pipeline and the project site. SPC plans to obtain an easement from the Corps to install a 20-inch-diameter pipeline connecting the project to the GT-NW main pipeline. SPC would be responsible for installing and maintaining this 200-foot-long pipeline.

GT-NW would install, own, operate, and maintain a mainline block valve, two mainline taps, and a building enclosing the required metering equipment and the control room with Supervisory Control and Data Acquisition (SCADA) equipment. The latter would include communications equipment and a flow computer.

In the remainder of this document, the 200-foot-long segment of natural gas pipeline is considered part of the generation facility.

3.2.2.3 Electrical Transmission Connections

In January 2000, SPC requested that BPA interconnect the project to the BPA 500-kV transmission lines that extend between the Little Goose and Lower Monumental Dams. BPA completed a System Impact Study in June 2000. The study identified the following requirements for interconnecting the project to BPA's transmission grid:

- a switchyard at the project site and an interconnection to the existing 500-kV transmission lines that extend over the property; and
- a 15-mile 500-kV transmission line from the project site to the Lower Monumental Dam switchyard.

BPA is performing a Facilities Study that would identify the route of the transmission line to the Lower Monumental switchyard and would establish the design of the additional equipment and upgrades. Completion of the Facilities Study is scheduled for March 2001.

As a result of the Starbuck Power Project and other proposed generation projects, BPA would also have to construct a 70-mile 500-kV transmission line from the McNary switchyard to the John Day switchyard to prevent overloading of lower voltage lines in the area.

In summary, electricity would be transported from the Starbuck Power Project into the BPA regional distribution system by connecting to the two BPA 500-kV transmission lines that cross over the property at the northwest end of the plant site. Power generated by the project would be routed to a switchyard located under the transmission lines, then routed into the transmission system. When appropriate, power would also be routed from the switchyard into the BPA regional transmission system through a separate 500-kV transmission line extending from the project to the Lower Monumental Dam switchyard.

The switchyard and the transmission line to the Lower Monumental Dam switchyard would be constructed and operated by BPA and are not a part of this Environmental Assessment. Impacts associated with construction and operation of these facilities would be addressed in the draft state/federal (SEPA/NEPA) EIS that would be prepared for the Starbuck Power Project. BPA will conduct an analysis of cumulative impacts on their transmission system for the draft SEPA/NEPA EIS, as well as an analysis of cumulative impacts on air quality and natural gas supplies.

Impacts associated with construction and operation of the 70-mile line from the McNary Dam switchyard to John Day Dam switchyard would be addressed in a separate NEPA Draft EIS prepared by BPA for that project.

3.2.2.4 Water Supply and Discharge

Air-cooled condensers would be used for the project, with total water usage expected to reach approximately 74,000 gallons per day (gpd). SPC has secured an option to purchase 100 gallons per minute (gpm), or up to 144,000 gpd, of water from the town of Starbuck's existing water right. As proposed at the time of preparation of this EA, SPC would install a new well near the existing town well and construct and operate a 6-mile-long, 4-inch-diameter, PVC water pipeline from the town of Starbuck to the project site. SPC plans to locate this line primarily within an abandoned railroad right-of-way that parallels SR 261 from Starbuck to just south of the project site (Figure 3-6). Where it must cross the Tucannon River, the pipeline would be routed north from the abandoned right-of-way to SR 261, where it would run parallel to the roadway, then cross the river on the highway bridge. After crossing the river, the pipeline would be routed back to the abandoned right-of-way.

In the vicinity of the plant site, the pipeline route would extend northward from the abandoned right-of-way, pass through an existing culvert under the active Union Pacific Railroad line, and cross SR 261 to the plant.

According to the Department of Ecology (Neve pers. comm.), SPC also has two pending water right applications on file with Ecology, one for groundwater withdrawal and one for surface water withdrawal. These applications request 300 gpm for continuous power generation and domestic supply. The groundwater application requests this amount from up to seven wells, and the surface water application requests a point of diversion from the Snake River. SPC is looking into existing water rights for potential use in mitigation that may allow the new applications to be processed without limitation (Neve pers. comm.).

Sanitary wastes would be directed to a septic tank and an onsite drainfield. Project wastewater (approximately 51 gpm) would be routed to a detention pond and allowed to infiltrate into the soil. A portion of this water would be used for landscape irrigation. Project stormwater would be collected in a retention pond located at the south end of the property and discharged into a “tile field” through a system of perforated pipes. The tile field would be engineered to provide a sand/gravel filtering material.

3.2.3 Construction Activities

3.2.3.1 Generation Plant

The 40-acre site of the generation plant and the switchyard (the project footprint) would be graded to an elevation of approximately 708 feet above mean sea level (MSL) using a balanced cut-and-fill operation. Preconstruction elevations range from about 720 feet MSL on the northern portion of the site to approximately 690 feet MSL on the southeast portion.

The sequence of the primary construction activities follows:

- temporary site security fencing installed;
- excavation and boulder removal, with unsuitable material and boulders used onsite as non-structural fill;
- stormwater retention basin excavated and surrounding embankments installed;
- structural fill installed, site graded to rough grade elevation, and underground portion of stormwater drainage system constructed;
- roadway base constructed;
- major foundations for equipment and buildings constructed;
- underground utilities constructed;
- equipment installed and building erected;
- finish road surfaces constructed; and
- site graded to finish grade elevation.

During construction, the plant access roads would be surfaced with aggregate. The switchyard area, gas conditioning station, and some equipment and access areas would also be surfaced with aggregate after major construction activities are completed.

The undeveloped areas to the east and west of the condensers would be used for laydown areas and fabrication areas. These areas would be unpaved or surfaced with aggregate during construction. After construction, the areas would be returned to their preconstruction state by seeding with grasses common to the locale.

Materials and equipment would be transported to the site by trucks using existing roadways; however, it is not clear at this time how heavy, oversized loads, such as the combustion turbines, would be transported to the site.

3.2.3.2 Stormwater Collection and Treatment During Construction

Stormwater runoff would be controlled during construction to minimize soil erosion and the associated potential impacts. Silt fences and temporary swales would lead the majority of the runoff to a retention basin for discharge through percolation. Perimeter silt fences around the construction zone would be installed to remove sediment from runoff before it reached the site boundary. Additional localized silt fences would be used as required during construction to minimize erosion and transport of soil. Temporary swales would be moved to accommodate areas being excavated or filled. Once the preliminary cut-and-fill work is complete, the swales would likely remain in place until final grading. Wherever possible, temporary swales would be located for incorporation into the permanent stormwater collection system. The perimeter silt fence would not be removed until the site is stabilized.

As elements of the permanent stormwater collection system are installed, they would be used to collect construction runoff. Inlets to the permanent system would be protected by silt fencing intended to prevent sediments from entering. Seeding and mulching would be used where practical for slope stabilization as rough grading is completed.

3.2.3.3 Water Pipeline

The water pipeline would be installed through excavation and burial of PVC pipe along the route selected. At the present time, SPC is proposing to install the pipeline primarily within an abandoned railroad right-of-way. SPC has not conducted geotechnical evaluations of the route or design studies of the water delivery system. Construction would likely consist of the following activities:

- Excavation of the pipeline trench;
- Fabrication of pipe segments;
- Installation of the pipe in the trench;
- Trench backfilling; and
- Hydrostatic testing.

Trenching may require replacement of some culverts that pass through the railroad bed and appear to be close to the surface of the bed. Where this route leaves the right-of-way, it may pass through wetlands where special construction techniques would be required. SPC will provide information on the construction methods to be used in their Application for Site Certification.

3.2.4 Operation

3.2.4.1 Generation Plant

The proposed combined-cycle plant has been designed to recover waste heat from the exhaust of the combustion gas turbine (CGT) and to use that heat to produce additional power. Air drawn through the inlet of the CGT would be filtered, cooled (as appropriate to enhance efficiency), compressed by the rotating compressor blades, and delivered to the combustor at substantially increased pressure and temperature. In the combustor, fuel (natural gas) would be mixed with the compressed inlet air and burned. The high-temperature, high-pressure exhaust gas mixture would then expand and move across the turbine rotor blades–which are connected to the CGT rotor–causing the rotor blades and rotor to spin. The CGT rotor shaft would drive a generator that produces electrical power.

Exhaust would exit from the CGT and flow directly to the HRSG where the heat from the exhaust would be used to generate steam. The HRSGs would also be equipped with natural gas-fired duct burners. These appliances can be used at the discretion of the plant operators to add heat and thereby to increase the steam-generating capability of the HRSGs.

Each HRSG would be equipped with a selective catalytic reduction system to remove oxides of nitrogen, which are byproducts of the combustion process. The SCR system would inject a mist of diluted ammonia into the exhaust stream before it passes through a catalyst. The ammonia would react with NO_x in the presence of the catalyst to produce nitrogen and water. Each HRSG would also include a catalyst reactor section to control carbon monoxide emissions generated by the CGT.

Each pair of HRSGs in the power block would supply high-pressure, intermediate-pressure, and low-pressure steam to the STG. Reheat design would characterize each STG: Exhaust steam from the high-pressure section would be returned to the HRSGs and reheated to increase steam cycle efficiency. The STG would consist of three pressure sections operating together to extract the maximum energy from the steam. The steam in turn would rotate the turbine shaft, which itself would drive a generator producing electrical power.

Exhaust steam from each steam turbine would be directed through a large exhaust duct and into an air-cooled condenser. Each air-cooled condenser would consist of a series of finned tube modules. Fans located below the modules would produce upward airflow through the modules and across the exterior of the finned surfaces for heat removal. Heat removed from the process within the condenser would pass into the atmosphere. The condensed steam, or condensate, formed within the condenser would drain by gravity to a collection tank. Condensate pumps would transfer the condensate from the collection tank to the two HRSGs, where it would be reused to generate steam.

As the water in this type of closed system circulates, impurities concentrate in the system. To prevent the precipitation of solids and formation of scale, approximately 51 gpm of water would be removed from the cycle ("blowdown") and routed to the tile field. Demineralized make-up water would be added after blowdown removal to maintain the appropriate amount of water in the steam production cycle.

Because reducing the concentration of dissolved solids is important to the efficient operation of the process, the water in the closed system is routed through a condensate "polisher" to remove solids (calcium, magnesium, silica and other ionic constituents). This treatment reduces the potential for scaling as the steam is recycled and concentrated. In addition, a flash tank would be included to capture, clean, and reuse a large amount of the blowdown. Total water usage for the project is expected to be approximately 74,000 gpd. A facility of similar size using wet cooling instead of dry cooling would use many times this volume of water.

Each power block would be equipped with a 100% steam turbine bypass system that would divert steam to the air-cooled condenser during startup or in the event the power transmission system could not accept electricity from the project.

Approximately 2 gpm of sanitary wastewater would be routed to a septic tank and an onsite drainfield.

3.2.4.2 Emission Controls

Dry Low-NO_x Combustion

Dry low-NO_x combustors would be included in the CGTs to limit the production of NO_x during combustion. These combustors are designed to maintain a fuel-to-air ratio such that the quantity of oxygen in the air introduced into the combustion process is just sufficient to allow the fuel to burn. This "lean" ratio results in a relatively cool combustion zone. NO_x is produced in high-temperature zones; therefore, the lower temperature in the combustion zone would minimize NO_x production.

Selective Catalytic Reduction

Each HRSG would be furnished with a complete Selective Catalytic Reduction (SCR) system to control concentrations of NO_x generated by the combustion turbine and duct firing. Aqueous ammonia (NH_3) would be used in the SCR system for NO_x control.

The SCR catalyst reactor would be located in a temperature zone of the HRSG intended to optimize the performance of the catalyst at all normal operating loads and ambient temperatures. The rate of ammonia injection would be governed by the inlet NO_x concentration, as measured by a continuous emissions monitoring system (CEMS). Injections of ammonia would be adjusted at the lowest possible rate to maintain the required outlet NO_x concentration. The ammonia slip, or level of unreacted ammonia, from the SCR would be minimized through good operating practices and proper instrumentation.

Carbon Monoxide Catalyst

Each HRSG would be furnished with an integral carbon monoxide (CO) catalyst reactor section intended to control concentrations of CO generated by the CGT. The CO catalyst reactor section would be located in a temperature zone of the HRSG where the catalyst would be most effective at all normal operating loads and ambient temperatures.

3.2.4.3 Process Water

As described earlier, SPC has an option to purchase 100 gpm from the town of Starbuck's existing water right. Water would be supplied from a new well installed adjacent to the existing well in the town of Starbuck and routed to the site via a 6-mile-long pipeline. Water would be piped to two bulk service/fire-fighting water storage tanks. Each of these 500,000-gallon storage tanks would be designed to retain 300,000 gallons of water for emergency fire-fighting requirements. The remaining 200,000 gallons in each tank would be routed through the mobile demineralization equipment prior to introduction into the plant.

The demineralization system would consist of mobile water treatment equipment rented from a supplier. Raw water would likely be treated using reverse osmosis followed by mixed bed demineralization. When the ion exchange resins in the mixed bed exchangers could no longer capture and hold dissolved solids, they would be removed from the system and regenerated offsite.

3.2.4.4 Fire Protection

Wet standpipe systems with sprinklers would be provided in the areas below the turbine operating floor in the generation building. Deluge fire protection systems would be provided for the step-up electrical transformers. Both the sprinkler and deluge systems would operate automatically. In addition, hose stations would be provided in accordance with code requirements and standard practice recommendations throughout the enclosed buildings. An underground fire water supply loop would encircle the main site area inside the perimeter road with branch lines as required. Hydrants would be provided outdoors along this loop for fire protection outside the buildings. Operation of the hydrants and hose stations would be manual.

Water for these systems would be supplied from two service/fire-fighting water storage tanks. Two redundant pumps located in the Fire Pump Building would provide pressure for the fire-fighting water system. One pump would be powered by an electric motor, and the second would be driven by a diesel engine so that fire-fighting water could be provided if electric power were lost. A pressure maintenance pump would maintain system fire-fighting water pressure at all times. The common fire-fighting water pumps and water storage system would provide fire-fighting capability throughout the site.

Total flooding gaseous systems would be used within the enclosures surrounding CGTs. These automatic systems would be equipped for backup manual initiation and would comply with CGT manufacturer's standards for "clean-agent" fire extinguishing systems to avoid ozone depletion.

Portable dry chemical fire extinguishers would be located throughout the facility in accordance with code requirements and recommended practices. Each extinguisher would be selected as appropriate for the type of fire expected and the equipment or area to be protected.

An integrated fire detection system would be provided in the main structures of the facility. This system would use appropriate heat or smoke detectors for the equipment or area being protected and would trip alarms automatically. The fire detection system would be interconnected throughout the plant to provide local alarms and alarms in the central control room.

In addition to the active fire protection systems described above, passive fire protection (such as fire-rated walls, doors, and protected egress routes) would be included in the structural and architectural design of the facility in accordance with National Fire Protection Act (NFPA) 101 and 850 and the state and local codes.

3.2.4.5 Stormwater Control During Operation

The main site area of the plant was divided into two primary drainage areas for purposes of runoff design. Drainage Area 1 consists of the switchyard area on the northern portion of the site. Drainage Area 2 contains the remainder of the developed site, including the power generation area. The balance of the 100-acre property would either be undisturbed or returned to its existing state once construction is complete.

In Drainage Area 1, the switchyard area would be surfaced with a crushed rock base, to permit percolation into the soil below. Grading would result in a level terrain, facilitating percolation and retarding runoff respective of current levels. The equipment in the switchyard would be gas-insulated, not oil-insulated, and would contain no spillable oil. The equipment in the switchyard would be supported on small concrete foundations surrounded by the crushed rock surface. There would be no sizable impervious surfaces and no candidate surfaces for potential oil contamination. No retention basin is planned for Area 1. General drainage in the switchyard area would run to the east. Excess runoff would be allowed to drain to the undeveloped area east of the switchyard for further percolation. A small swale draining to the southeast would be located north of the northern perimeter road to direct runoff from the ridge around the switchyard area.

Impervious surfaces in Drainage Area 2 would include the generation building, the air-cooled condensers, and paving for parking areas and access roads. A stormwater retention basin included in the design would collect site runoff from these areas for later discharge by percolation. The design rationale for the stormwater collection system would be to control runoff flows offsite and to allow percolation of water to the existing aquifer in such a way as to duplicate the flows and percolation of the undisturbed site.

Stormwater falling on the facility's major structures would be collected in gutters at the roof edges and routed to drain piping. These pipes would discharge into common underground storm sewers, which would convey the stormwater to the retention basin. Runoff from paved roads and other outdoor areas that might potentially contain oil or other chemical contaminants would be routed through an oil-water separator prior to discharge to a separate wastewater collection system and retention basin. Similar routing would be used for runoff collected from containment areas around transformers and spill collection areas at the ammonia storage tank.

Discharge volumes from the stormwater collection and retention system would approximate existing flow rates.

3.2.4.6 Contamination Control During Operation

All areas housing chemicals would be protected with concrete containment. All indoor areas with potential for oil or lubrication spills would also be protected by concrete containment structures. Drains in these locales would be directed to a second oil/water separator. Treated water from this oil/water separator would be discharged as wastewater and would not be directed to the stormwater collection system.

Fuel oil storage onsite during operation would be limited to the diesel fuel reserved for the diesel pump used for fire suppression, known as the diesel firewater pump. A concrete containment area located beneath the tank and the filling hook-up would be provided to capture and contain spills and overfills. A drain line would connect the containment area to a separate holding volume and ensure spilled diesel fuel would not reach the stormwater collection system.

3.2.5 Schedule and Workforce

3.2.5.1 Construction

Construction of the plant would take place over a 2-year period. The peak labor force during plant construction would be approximately 550 individuals, and this peak would last for 3 months.

The water pipeline would be constructed concurrently with the plant and would require approximately 2 months to complete. Work on the pipeline would be accomplished when plant construction activities are not at their peak. The peak workforce for the pipeline would be approximately 40 individuals.

3.2.5.2 Operation

The plant would be operated 24 hours per day, 7 days per week. A total of 35 individuals would be employed at the plant, which would be operated in three shifts.

3.2.6 Costs

3.2.6.1 Construction

The total capital cost of the project would be approximately $688 million (all costs are presented as 1999 dollars). The construction cost of the plant, the natural gas pipeline, and the water pipeline would be approximately $540 million. The cost of the BPA transmission line is not included in this amount.

Over the 30-year life of the project, property taxes would total approximately $47 million, or approximately $1.5 million per year.

3.2.6.2 Operation

Annual operating costs would be approximately $26 million. An additional $120 million per year would be spent to purchase and transport natural gas. These expenditures would result in annual sales tax revenues of approximately $3 million to Columbia County and $21 million to the state. In addition, the state would accrue approximately $4.3 million per year in taxes on natural gas.