SECTION 2

Proposed Action and Alternatives

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Proposed Action and Alternatives

2.1 Introduction

Starbuck Power Company, L.L.C. (the Applicant), of Bellevue, Washington, is proposing to build a 1,200-megawatt (MW), natural-gas-fired, combustion turbine power plant. Related project facilities include a natural gas pipeline and an electrical transmission line.

2.1.1 Background

The generation plant site is adjacent to State Route 261 (SR-261) and is about 6 miles northwest of the Town of Starbuck, in Columbia County, Washington. The Applicant's property is approximately 100 acres in size, with approximately 50 acres to be disturbed during construction; of the 50 acres, approximately 40 acres will be used for the generation plant and altered for the life of the project. The remaining 50 acres will not be disturbed, but land use will be altered for the life of the project. Currently, this property is used for cattle grazing and an existing house is rented. These activities will be discontinued with the construction and operation of the generation plant.

The general location in Washington State is about 60 miles north of Walla Walla, 30 miles northwest of Dayton, 70 miles northeast of Pasco, and 50 miles south of Ritzville (refer back to Figure 1.1-1). This area is arid, with about 9 to 12 inches of precipitation, and is often subjected to southwesterly winds.

The existing gas pipeline will deliver natural gas to the generation plant. It is located within 200 feet of the site's property line and lies to the southwest of the generation plant site. An approximately 1,200-foot-long gas lateral will be built from the gas pipeline to a metering/regulatory station (M/R station) located on the Applicant's property. Two 200- to 300-foot-long gas pipeline connections will be built from the M/R station to the gas turbines in each power block.

Two existing 500-kilovolt (kV) electrical transmission lines bisect the approximately 100-acre site. Approximately 40 acres to the southeast of the transmission lines will be used for the generation plant and the gas facilities. Of the approximately 60 acres to the north of the transmission lines, approximately 10 contiguous acres will be used for parking (4 to 5 acres) and for stockpiling topsoil (4 to 5 acres) during construction. This will also be the location for the onsite well serving the plant, and a portion of the Bonneville Power Administration (BPA) switchyard that lies underneath the transmission lines will extend into the northern portion of the property. A new 500-kV line will be built to the north of the existing lines, and it will extend from the generation plant site to Lower Monumental Dam.

2.1.2 Project Components and Jurisdictional Overview

The Starbuck Power Project (SPP) is composed of two main components: (a) energy facilities under the purview of the Energy Facility Site Evaluation Council (EFSEC) that include the

proposed generation plant, the step-up substation, the gas pipeline connections, and the onsite well and (b) "related facilities." For the purposes of this Application for Site Certification (ASC), "related facilities" are those that are part of the SPP but are not under EFSEC jurisdiction for permitting. Instead, they fall under BPA, Federal Energy Regulatory Commission (FERC), or Surface Transportation Board jurisdiction. These related facilities include the BPA switchyard, the proposed BPA 500-kV transmission line, Gas Transmission-Northwest's (GTN) gas lateral and M/R station, and a railroad spur.

The SPP components are defined in the following four subsections so as to maintain consistency of use throughout this ASC (see Figure 2.1-1).

2.1.2.1 Facilities Under EFSEC Jurisdiction

The following proposed project components are under EFSEC jurisdiction:

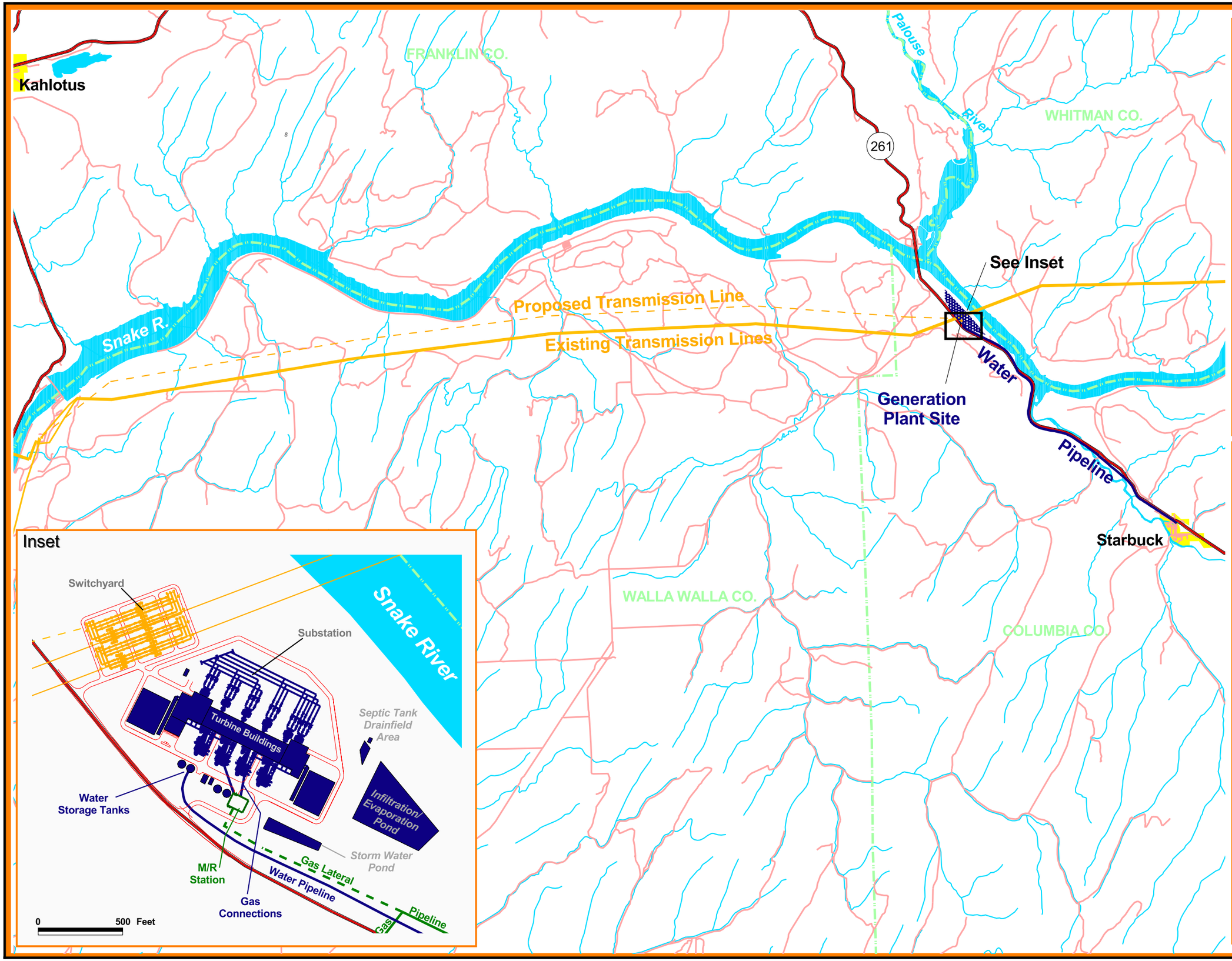
- **Generation plant site**: The approximately 100-acre parcel where the generating equipment, M/R station, and substation will be located.
- **Generation plant**: The proposed power plant facility that will consist of a combustion gas turbine (CGT) building and steam turbine-generators (STGs), heat recovery steam generators (HRSGs), air-cooled condensers, control and administration facilities, facility parking and driveway areas, water supply well, wastewater disposal facilities (including septic tank and drain field system for sanitary wastewater, infiltration/evaporation pond for housekeeping wastewater, and stormwater pond), and water storage facilities (not all inclusive).
- **Step-up substation (substation)**: The step-up substation that will interconnect the generation plant to the BPA switchyard.
- **Gas connections:** Two short (approximately 200 to 300 feet) natural gas pipelines on the generation plant site that will connect the proposed M/R station to the combustion turbines in each power block.
- **Onsite well:** A well located on the generation plant site that will withdraw water from a shallow aquifer (not the deeper Grande Ronde Basalt formation aquifer system) at a depth of approximately 190 feet.

  The proposal includes an onsite well for water supply. The Washington State Department of Ecology (Ecology) is currently processing a 300-gallons-per-minute (gpm) groundwater right application for the SPP. The Applicant will also provide water quantity mitigation for use of this well. Ecology is expected to recommend approval of the water right application and related mitigation sometime in 2001.

  If the proposed onsite well is not feasible, then an alternative water supply source will be town water from the Town of Starbuck, delivered to the generation plant site via a pipeline approximately 6 miles long and 4 inches in diameter. This water pipeline will also be under EFSEC's jurisdiction. This ASC summarizes the water pipeline alternative, and the Applicant will provide additional details if EFSEC does not approve the proposed onsite well.

Figure 2.1-1
Project Components

Application for Site Certification Starbuck Power Project Starbuck, Washington



N

1 0 1 2 Miles

Legend

Color	Components
	EFSEC -Power Plant -Water Pipeline -Gas Connection
	BPA -Transmission Line -Switchyard
	FERC -Gas Pipeline/Lateral -M/R Station

- Proposed Water Pipeline
- Proposed Transmission Lines
- Existing Transmission Lines
- State Routes (SR)
- Secondary Roads
- County Boundary

Throughout this ASC, the gas connections are considered part of the generation plant. Because of their proximity to the generation building and their location on the Applicant's property, the gas connections have the same onsite environmental impacts as the generation plant.

2.1.2.2 Facilities Under BPA Jurisdiction

The following project components are under BPA jurisdiction:

- **Existing transmission lines:** Two existing 500-kV lines that connect Little Goose Dam to Lower Monumental Dam.
- **Proposed transmission line:** A proposed 500-kV line from the generation plant to Lower Monumental Dam that will generally parallel two existing 500-kV lines.
- **Proposed switchyard:** The proposed BPA electrical facility, located on the generation plant site, that will tie into one of the existing 500-kV lines passing over the site and into the new line to Lower Monumental Dam. It can switch power from one existing transmission line to another, as necessary.

The switchyard will be located mostly within the existing BPA transmission corridor right-of-way (ROW), but some additional ROW will need to be acquired from the Applicant to accommodate the entire switchyard. The switchyard will function as a breaker system to move power from one transmission line to another if it becomes necessary. The switchyard and proposed transmission line will be subject to BPA approval.

In analyzing the impact of the generation plant on the BPA transmission system, BPA determined that an additional transmission line from the generation plant to the Lower Monumental Dam switchyard is needed for system reliability. It is anticipated that this transmission line will be located approximately 1,200 feet north of the existing transmission corridor. A detailed description of this new transmission line and associated environmental impacts will be presented in a separate environmental impact statement (EIS) and submitted as part of a joint National Environmental Policy Act and State Environmental Policy Act (NEPA/SEPA) review of the SPP. However, a summary of certain aspects of the transmission line is provided in this ASC.

2.1.2.3 Facilities Under FERC Jurisdiction

The following proposed project components are under FERC jurisdiction:

- **M/R station:** A GTN-installed gas facility on the generation plant site that will measure and control the flow of gas from the gas mainline to the combustion turbines in each power block.
- **Gas lateral:** A proposed gas lateral pipeline that will connect the GTN mainline to the M/R station.

The gas lateral will extend approximately 1,200 feet from the existing GTN "A" line to connect into the M/R station located adjacent to the generation plant. FERC will review both the M/R station and the gas lateral; however, certain aspects of the gas facilities are summarized in this ASC.

2.1.2.4 Facility Under Surface Transportation Board Jurisdiction

Union Pacific Railroad will build a railroad spur to serve the generation plant. Because this spur will be a "common carrier," environmental review of this facility is exempt from EFSEC jurisdiction and lies with the Surface Transportation Board; however, a summary of certain aspects of the railroad spur is provided in this ASC.

2.1.3 The Applicant

Starbuck Power Company, L.L.C., is the Applicant submitting this ASC for the siting, construction, operation, and restoration of the SPP. The Applicant believes that this ASC is substantially complete and meets the requirements established in Chapter 80.50 of the *Revised Code of Washington* (RCW) and Title 463 of the *Washington Administrative Code* (WAC).

Starbuck Power Company, L.L.C., is a limited liability company formed under Chapter 25.15 RCW. The Applicant filed its Certificate of Formation with the Secretary of the State of Washington in August 1998. The Applicant was formed to develop, permit, construct, own, and operate the SPP. At the time of the Applicant's formation, Northwest Power Enterprises, Inc. (NPE), held all ownership interests in the Applicant. PPL Global, L.L.C. (PPL), a Delaware limited liability company, acquired from NPE all ownership interests in the Applicant pursuant to a Purchase and Sale Agreement dated November 30, 2000. PPL currently is the sole holder of all ownership interests in the Applicant.

PPL was formed in 1994 to acquire domestic and international independent power projects and is headquartered in Fairfax, Virginia. To date, PPL has invested in or committed more than $3 billion to projects in the United States, Latin America, and Europe. PPL is a wholly owned subsidiary of PPL Corporation, a Fortune 500 company. The corporation has approximately $5.7 billion in annual revenues and $12.4 billion in assets, and it serves more than 6 million customers.

In 1999, PPL acquired 1,158 MW of hydropower and coal generating resources from the Montana Power Company. These generating resources are now held by PPL Montana, a subsidiary of PPL Global Corporation.

2.1.4 Cross-Reference Guidance Table to 463-42 WAC

463-42 WAC specifies EFSEC format and content requirements for ASCs. The format and contents of this ASC are based on these regulations and on further recommendations from EFSEC's consultant, Jones & Stokes, summarized in the March 2001 *Starbuck Power Potential Site Study* and additional guidance received between March and August 2001. Table 2.1-1 provides cross-reference guidance between the information presented in this ASC and the requirements of 463-42 WAC.

TABLE 2.1-1
Cross-Reference Guidance Table for 463-42 WAC

WAC Name and Number	Cover Letter Only	Environmental Report Only	Technical Appendices Only	Both Environmental Report and Technical Appendices*	Document Location
Purpose and scope (463-42-010) *	—	X	—	—	Section 1.2 Section 2.2.1
General—Organization—Index (463-42-012) *	NR	NR	NR	NR	NR
General—Description of Applicant (463-42-015)	—	X	—	—	Section 2.1.3
General—Designation of agent (463-42-025)	X	—	—	—	Cover letter
General—Fee (463-42-035)	Submitted with cover letter	—	—	—	Cover letter
General—Where filed (463-42-045) *	X	—	—	—	Cover letter
General—Form and number of copies (463-42-055)	X	—	—	—	Cover letter
General—Full disclosure by Applicant (463-42-065)	X	—	—	—	Cover letter
Assurances (463-42-075)	—	—	X	—	Appendix A
General—Mitigation measures (463-42-085)	—	—	—	X	Section 1.3.1 (Table 1.3-1) Section 1.3.4 Section 2.2.8 Section 2.2.9 Throughout Section 3 Appendices D,E,F,G,H,I,J,M
General—Sources of information (463-42-095)	—	—	X	—	Appendix B

TABLE 2.1-1
Cross-Reference Guidance Table for 463-42 WAC

WAC Name and Number	Cover Letter Only	Environmental Report Only	Technical Appendices Only	Both Environmental Report and Technical Appendices*	Document Location
General—Graphic material (463-42-105)	—	—	—	X	Throughout entire ASC
General—Specific contents and applicability (463-42-115)	X	—	—	—	Cover letter
Proposal—Site description (463-42-125)	—	X	—	—	Section 1.3.1.1 Section 2.1.1 Section 2.2.2
Proposal—Legal descriptions and ownership interests (463-42-135)	—	—	—	X	Section 2.1.3 Appendix C
Proposal—Construction onsite (463-42-145)	—	—	—	X	Section 2.1.2 Section 2.2.4 Section 2.2.6.1 Section 2.2.7.1 Appendix F
Proposal—Energy transmission systems (463-42-155)	—	X	—	—	Section 1.3.1 Section 2.1.1 Section 2.1.2 Section 2.2.3.6 Section 2.2.5.12 Section 2.2.6.2 Section 2.2.7.2
Proposal—Water supply system (463-42-165)	—	X	—	—	Section 1.3.1.2 Section 2.1.2.1 Section 2.2.3.2 Section 2.2.4.1 Section 2.2.5.4 Section 2.2.6.1 Section 2.2.6.2

TABLE 2.1-1
Cross-Reference Guidance Table for 463-42 WAC

WAC Name and Number	Cover Letter Only	Environmental Report Only	Technical Appendices Only	Both Environmental Report and Technical Appendices*	Document Location
Proposal—System of heat dissipation (463-42-175)	—	X	—	—	Section 2.2.5.1 Section 2.4.3
Proposal—Characteristics of aquatic discharge system (463-42-185)	NA	NA	NA	NA	NA
Proposal—Wastewater treatment (463-42-195)	—	—	—	X	Section 2.2.3.1 Section 2.2.4.1 Section 2.2.5.6 Section 2.2.6.1 Section 2.2.6.2 Appendix D Appendix H
Proposal—Spillage prevention and control (463-42-205)	—	—	—	X	Section 2.2.3 Section 2.2.4.1 Section 2.2.4.3 Section 2.2.5.6 Section 2.2.5.7 Appendix E
Proposal—Surface-water runoff (463-42-215)	—	—	—	X	Section 2.2.3.1 Section 2.2.4.1 Section 2.2.5.5 Appendix H
Proposal—Emission control (463-42-225)	—	—	—	X	Section 2.2.4.2 Section 2.2.5.2 Appendix G
Proposal—Construction and operation activities (463-42-235)	—	X	—	—	Section 2.2.6
Proposal—Construction management (463-42-245)	—	—	X	—	Appendix F

TABLE 2.1-1
Cross-Reference Guidance Table for 463-42 WAC

WAC Name and Number	Cover Letter Only	Environmental Report Only	Technical Appendices Only	Both Environmental Report and Technical Appendices*	Document Location
Proposal—Construction methodology (463-42-255)	—	X	—	—	Section 2.2.4.1 Appendix F
Proposal—Protection from natural hazards (463-42-265)	—	—	—	X	Section 2.2.3.4 Appendix I
Proposal—Security concerns (463-42-275)	—	X	—	—	Section 2.2.3.3 Section 2.2.5.6
Proposal—Study schedules (463-42-285)	—	—	X	—	Appendix L
Proposal—Potential for future activities at site (463-42-295)	—	X	—	—	Section 2.2.5.12
Natural environment—Earth (463-42-302)	—	X	—	—	Section 3.1
Natural environment—Air (463-42-312)	—	X	—	—	Section 3.2 Appendix G
Natural environment—Water (463-42-322)	—	—	—	X	Section 3.3 Appendix D
Natural environment—Plants and animals (463-42-332)	—	X	—	—	Section 3.4 Section 3.5 Section 3.6 Section 3.7
Natural environment—Energy and natural resources (463-42-342)	—	X	—	—	Section 3.8

TABLE 2.1-1
Cross-Reference Guidance Table for 463-42 WAC

WAC Name and Number	Cover Letter Only	Environmental Report Only	Technical Appendices Only	Both Environmental Report and Technical Appendices*	Document Location
Built environment—Environmental health (463-42-352)	—	—	—	X	Section 3.9 Section 3.16 Appendix E Appendix I Appendix J
Built environment—Land and shoreline use (463-42-362)	—	X	—	—	Section 3.10 Section 3.11 Section 3.12 Section 3.14
Built environment—Transportation (463-42-372)	—	X	—	—	Section 3.15
Built environment—Public services and utilities (463-42-382)	—	X	—	—	Section 3.13
PSD permit application (463-42-385)	—	—	X	—	Appendix G
NPDES permit application (463-42-435)	—	—	X	—	Appendix H
Emergency plans (463-42-525)	—	—	—	X	Appendix I
Socioeconomic impacts (463-42-535)	—	X	—	—	Section 3.12
Criteria, standards, and factors utilized to develop transmission route (463-42-625)	—	—	X	—	Appendix J
Analysis of alternatives (463-42-645)	—	X	—	—	Section 2.4
Initial site restoration plan (463-42-655)	—	—	X	—	Appendix K

TABLE 2.1-1
Cross-Reference Guidance Table for 463-42 WAC

WAC Name and Number	Cover Letter Only	Environmental Report Only	Technical Appendices Only	Both Environmental Report and Technical Appendices*	Document Location
Detailed site restoration plan—Terminated projects (463-42-665) *	NA	NA	NA	NA	NA
Site preservation plan—Suspended projects (463-42-675) *	NA	NA	NA	NA	NA
Site restoration—Terminated projects (463-42-680) *	NA	NA	NA	NA	NA
Pertinent federal, state, and local requirements (463-42-685)	—	X	—	—	Section 2.6
Amendments to applications, additional studies, procedure (463-42-690)	NA	NA	NA	NA	NA

Key:
NR = No response necessary.
NA = Not applicable to initial ASC.
X = Located in ASC.
PSD = Prevention of significant deterioration.
NPDES = National Pollutant Discharge Elimination System.
ER = Environmental report.

* This section or subsection of WAC 463-42 does not require a response in the ASC or is not applicable to the initial ASC.

2.1.5 List of Preparers

Arnold, Tom. Planner with CH2M HILL. Co-wrote Section 3.8, Energy and Natural Resources. B.S., biology; M.S., environmental science.

Bard, Jim. Cultural resource specialist with CH2M HILL. Wrote Section 3.14, Cultural Resources. B.A., M.A., Ph.D., anthropology.

Bastasch, Mark. Environmental engineer with CH2M HILL. Wrote Section 3.9, Noise. B.S., M.S., environmental engineering.

Burkhardt, Tim. Environmental planner with CH2M HILL. Co-wrote Section 3.11, Visual Resources/Light and Glare. B.A., M.S., public health.

Caniparoli, Don. Senior environmental scientist and meteorologist with CH2M HILL. Wrote Section 3.2, Air Quality. B.S., atmospheric sciences; M.S., civil engineering.

Colton, Vicki. Environmental planner with CH2M HILL. Co-wrote Section 3.10, Land Use. B.S., communications.

Cupp, Suki. Senior ecologist with CH2M HILL. Assistant Project Manager. Wrote Section 3.4, Wetlands and Vegetation. B.S., botany; M.L.A., landscape architecture; M.F.R., ecosystems management (ABT).

Dethloff, Scott. Civil engineer with CH2M HILL. Senior reviewed Sections 1.0, Summary; 3.1, Earth; 3.3, Water Resources; and 3.16, Health and Safety; and Appendix E, Spillage Prevention and Control; Appendix F, Construction Management; Appendix I, Emergency Plan; Appendix K, Initial Site Restoration Plan; and Appendix L, Study Schedules. B.S., M.S., civil engineering.

Gates, Josh. Geographic information system specialist with CH2M HILL. Performed GIS analysis and generated figures. B.S., geography.

Guhlke, Marlena. Environmental scientist with CH2M HILL. Project Manager. Wrote Section 2.0, Proposed Action and Alternatives, and co-wrote Appendix H, National Pollutant Discharge Elimination System (NPDES) Permit Application. B.A., environmental quality measurement.

Heins, Patrick. Environmental technologist with CH2M HILL. Co-wrote Section 3.16, Health and Safety. B.S., environmental management; B.A., biology (environmental emphasis).

Henry, Mark. Hydrogeologist with CH2M HILL. Co-wrote Sections 3.1, Earth, and 3.3, Water Resources. Also oversaw project-specific issues related to hydrogeology. B.S., earth science.

Hintz, Monty. Project discipline engineer (civil) with Black & Veatch. Wrote the Stormwater Pollution Prevention Plan in Appendix H. B.S., civil engineering.

Hollen, Bruce. Biologist with CH2M HILL. Wrote Section 3.6, Wildlife. B.S., general biology.

Kapur, Raj. Water quality scientist with CH2M HILL. Co-wrote Appendix H, NPDES Permit related to the Stormwater Pollution Prevention Plan. B.S., petroleum engineering; M.S., environmental engineering.

Le, Tung. Transportation planner with CH2M HILL. Co-wrote Section 3.15, Traffic and Transportation. B.A., architecture; M.S., transportation engineering.

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Mengel, Denny. Environmental Scientist with CH2M HILL. Senior reviewed Section 3.6, Wildlife, and Section 3.13, Public Services. Ph.D., soil sciences; M.S., forestry; B.S., wildlife resources.

Miller, Mike. Geographic information system planner and analyst with CH2M HILL. Performed GIS analysis and generated figures. B.S., biology.

Nottage, Jonathan. Environmental scientist with CH2MHILL. Wrote Section 1.0, Summary, and co-wrote Sections 3.1, Earth; 3.3, Water Resources; and Appendix F, Construction Management Plan; Appendix J, Criteria; Appendix L, Study Schedules; and Appendix M, Mitigation. Edited Section 3.13, Public Services and Utilities. B.S., biology; M.A., business administration.

O'Shaughnessy, Sharon. Water rights/water resources specialist with CH2M HILL. Wrote Section 3.5, Agricultural Crops and Livestock; and Section 3.13, Public Services and Utilities. Co-wrote Section 3.10, Land Use. A.S., science.

Pitzler, Dan. Senior economist with CH2M HILL. Co-wrote Section 3.12, Population, Housing, and Economics. B.A., M.A., economics.

Plambeck, Carol. Senior editor with CH2M HILL. Managed the editing and production of this Application. B.A., history.

Playstead, Kurt. Economist with CH2M HILL. Co-wrote Section 3.12, Population, Housing, and Economics. B.S., economics.

Rice, Mian. Transportation planner with CH2M HILL. Wrote Section 3.15, Traffic and Transportation. M.S., civil engineering.

White, Greg. Fisheries and aquatic biologist with CH2M HILL. Wrote Section 3.7, Fisheries. B.S., fisheries; M.S., oceanography.

2.2 Description of the Proposed Action

This section provides information on the following aspects of the SPP:

- Purpose and need (Section 2.2.1)
- Location (Section 2.2.2)
- SPP facilities (Section 2.2.3)

- Construction activities (Section 2.2.4)
- Operation and maintenance (Section 2.2.5)
- Schedule and workforce (Section 2.2.6)
- Costs and revenues (Section 2.2.7)
- Mitigation measures inherent in the SPP design (Section 2.2.8)

2.2.1 Purpose and Need

The SPP is privately sponsored. EFSEC's role is to review and process the proponent's ASC. EFSEC recommends to the Governor approval or rejection; if approval, EFSEC prepares a draft Site Certification Agreement (SCA) for the SPP. The Applicant's objective is to construct, own, and operate a natural-gas-fired plant to generate electricity for sale, achieving long-term efficiency and commercial success by using the proposed site's features and the Applicant's experience with similar facilities.

United States laws and policies have encouraged private development of energy plants to supplement governmental and private utilities' generation. The purpose of the SPP is to serve the competitive market for electrical energy in the western United States. The SPP will be interconnected to transmission facilities serving the Western System Coordinating Council (the western United States) and will sell its output to entities in this geographic area. As is typical at this stage of the facility development process, the Applicant cannot yet identify which utilities or other entities will purchase the generation plant's output.

There is currently a significant power deficit within the Pacific Northwest, and that deficit is unlikely to recover soon. The Pacific Northwest Utilities Conference Committee (PNUCC) reports that the region has increased its energy demand by nearly 3,500 MW in the last 10 years. Yet, during that same period, power-generating resources have increased only 550 MW (PNUCC, 2000). Data from the BPA suggest that this imbalance between energy demand and production in the Northwest is projected to continue. According to BPA's 1999 Pacific Northwest Loads and Resources Study, BPA projected the regional energy deficit in 2001 to average 3,517 MW and to surpass 4,000 MW by 2008 (BPA, 1999).

Long-term need for the generation plant's output will be determined by the ability to generate power efficiently and in compliance with applicable laws and regulations. During the generation plant's useful life of approximately 30 years, the Pacific Northwest's need for generation capacity will likely rise and fall. In periods of generation shortfall, such as the deficit currently being experienced, the plant's output of 1,200 MW will clearly respond to a regional need. In periods of surplus power production, the need for the plant's output may depend on the price of that output relative to other generation sources. The Applicant believes that the following attributes will enable the SPP to generate electricity efficiently throughout its useful life (that is, its output will be capable of effectively responding to Pacific Northwest energy needs):

- **Technology:** The use of natural gas fuel in a combined-cycle combustion turbine generates electricity with significant efficiencies relative to other fuels and to other technologies that generate power using natural gas as fuel.

- **Scale:** The plant's relatively large capacity (1,200 MW) will allow plant operations to take advantage of economies of scale, further increasing efficiency and minimizing impacts on a per-kilowatt basis.

- **Proximity to fuel transmission sources:** The proposed site is within 200 feet of existing Pacific Gas & Electric (PG&E) natural gas transmission facilities (the GTN system). This will allow the generation plant access to the regional fuel supply with minimal economic and external costs associated with the construction of new gas lines.
- **Land use compatibility:** The Applicant meets regulatory standards and enhances compatibility with other local land uses by locating the generation plant at a site designated by the local land use jurisdiction (Columbia County) for industrial development and power plant use.
- **Absence of ambient air quality problems:** The plant will not be located within any federally designated nonattainment areas.

2.2.2 Location

The Applicant plans to contruct the generation plant on approximately 40 acres (the southeastern portion of an approximately 100-acre site that is transected by two 500-kV transmission lines). During construction, an additional 10 acres in the northwestern half of the property (contiguous with the 40 acres) will be disturbed, for a total of approximately 50 acres of disturbed property.

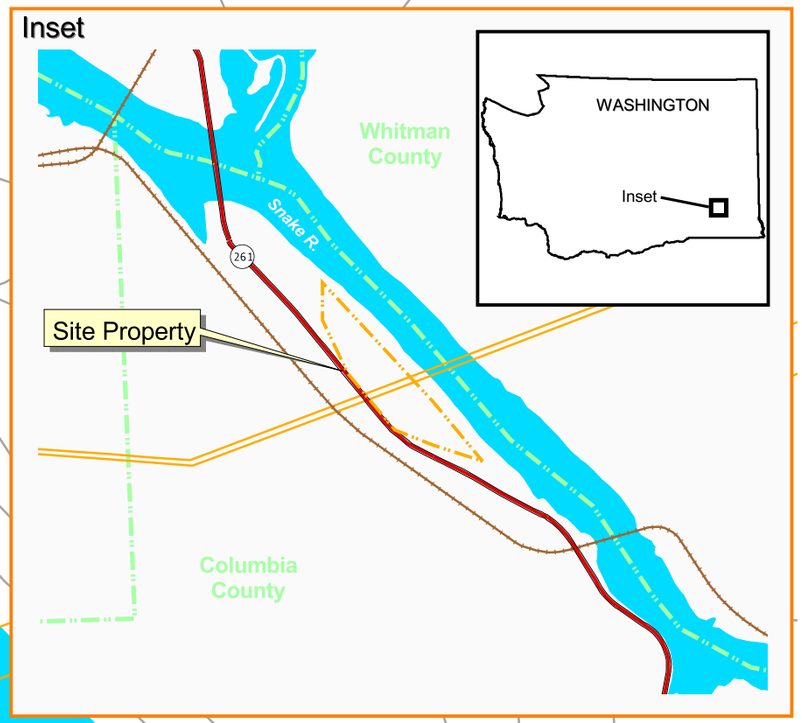
The site is located about 6 miles northwest of the Town of Starbuck in Columbia County, Washington (refer back to Figure 1.1-1). The site is a fairly level area located alongside a steep bluff of the Snake River, approximately 170 feet above normal river elevation and 350 feet back from the shoreline. SR-261 is adjacent to the southwest side of the property. A Union Pacific Railroad line parallels this highway and crosses it south of the generation plant site. The Columbia County Grain Growers grain elevators are adjacent to the southeast boundary of the site (see Figure 2.2-1). To the northwest, it is approximately 1.1 miles from the nearest residence at Lyons Ferry Marina; to the north-northwest, the site is approximately 1.5 miles from Lyons Ferry State Park.

The Applicant's property is surrounded in the immediate vicinity by U.S. Army Corps of Engineers (Corps) property that lies between the grain elevators facility and the Applicant's property, between the Snake River and the property, between SR-261 and the property (by only 10 feet), and to the north of the site. Beyond Corps property is agricultural land that is used primarily for grazing and is zoned A-1 Agricultural. Although most of the generation plant site has been used for grazing cattle in the past, it is zoned for industrial use (HI-1 Heavy Industrial), which allows the generation plant to be built with a conditional use permit. The Applicant has received a Certificate of Land Use Consistency from Columbia County, confirming that this project conforms with the County's *Comprehensive Plan* and zoning code and would qualify for a conditional use permit.

The Applicant has entered into an Option Agreement to purchase the property, which is currently owned by the Bar-Z Ranch, Inc. Figure 2.2-2 shows the property boundaries and provides a legal description and site characteristics. See Figure 2.2-3 for property ownership and tax parcel numbers within one-quarter mile of the Applicant's property.

Figure 2.2-1
Vicinity Map

Application for Site Certification Starbuck Power Project Starbuck, Washington



N

500 0 500 Feet

Whitman Co.
Columbia Co.
261
800
700
600
Snake River
Columbia Co.
Grain Growers

Legend

- Proposed Site Property
- Facility Buildings
- Facility Ponds
- Septic Tank and Drainfield
- Other Buildings
- Proposed Facility
- Facility Roads
- Facility Fence
- Proposed Gas Lateral
- PG&E "A" Gas Pipeline
- Transmission Lines
- State Routes (SR)
- Secondary Roads
- Union Pacific Railroad
- Contours 100 Foot

LEGAL DESCRIPTION

The following describes property including any and all fixtures, buildings and appertunances located thereon, in Columbia County, State of Washington.

All that part of the following described real property lying between the former Starbuck-Lyons Ferry Road and the south bank of the Snake River:

The south half of the southwest Quarter; the Northwest Quarter of the southwest Quarter and the southwest Quarter of the Northwest Quarter of Section 29; the north half of the Northwest Quarter of Section 32; all in Township 13 North, Range 37, East Of the Willamette Meridian.

SUBJECT to easement for electric power transmission line and access road as granted to the United States of America, as described in V-that Easement Deed recorded in Book 49 at page 486, records of Columbia County, Washington.

SAVE AND EXCEPT the following two tracts.

TRACT 1:

A tract of land lying in Government Lots 6 and 7 and the Southwest Quarter of the Southwest quarter of Section 29, the east half of the Southeast Quarter of Section 30, and the east half of the Northwest Quarter and the Northwest Quarter of the Northwest Quarter and the Northeast Quarter of the Southwest Quarter of Section 32, all in Township 13 north, Range 37, East of the Willamette Meridian, Columbia County, Washington, said tract of land being more particularly described an follows:

Beginning at the point of intersection with the North-South center line of said Section 32 and a line bearing North 55°03, 20" West from a point lying South 41°27'11" East a distance of 4,653.64 feet from the Northwest corner of said Section 32;

thence northerly along said north-south center line to a point lying 1,450.0 feet south of the north line of said Section 32; thence North 69°30' West, a distance of 1,450-00 feet; thence northerly along a straight line to a point on the north line of said Section 32, said point lying 725,0 feet easterly of the northwest corner of said Section 37, thence northerly along a straight line to a point on the west line of said Section 29, said point lying 1,100.0 feet southerly of the quarter corner on the west line of said Section 29; thence northerly along said west line of Section 29 a distance of 900.0 feet; thence southerly along a straight line to a point an the north-south center line of said Section 32 said point lying 400.0 feet southerly of the north, line of said Section 32; thence northerly along said north-south center line, a distance of 400.0 feet to the north line of said section 32; thence easterly along the north line of said Section 32 to the line of ordinary high water (south bank) of the Snake River; thence northwesterly along said line of ordinary high water to the west line of Section 29; thence southerly along said west line of Section 29 to the Quarter corner thereof; thence westerly along the north line of the east half of the Southeast Quarter of said Section 30, to the Northwest corner thereof; thence southerly along the west line of said east half of the Southeast Quarter to the existing center line of the Starbuck-Lyons Ferry County Road Mullen Road): thence southeasterly along said center lime to the west line of the east half of the Northwest quarter of said Section 32; thence southerly along said west line of the east half of the Northwest Quarter to a point lying 400.0 feet southerly of the Southeast corner of the Northwest Quarter of the Northwest Quarter of said Section 32; thence South 52° 38'00" East, a distance of 890.0 feet; thence South 34° 56'40" West, a distance of 460.0 feet; thence southeasterly along a straight line to the point of beginning.

TRACT 2 :

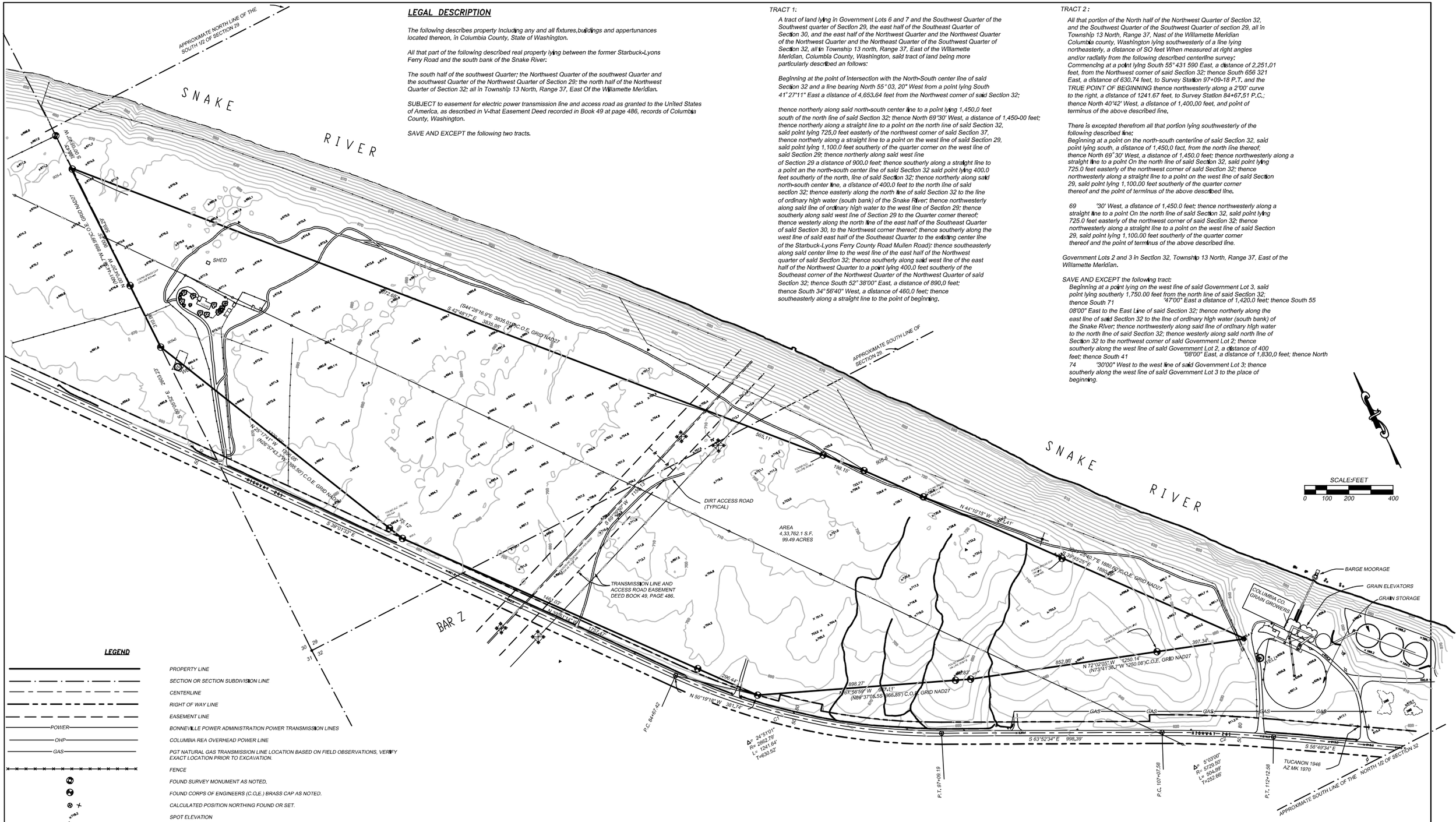
All that portion of the North half of the Northwest Quarter of Section 32, and the Southwest Quarter of the Southwest Quarter of section 29, all in Township 13 North, Range 37, Nast of the Willamette Meridian Columbia county, Washington lying southwesterly of a line lying northeasterly, a distance of SO feet When measured at right angles and/or radtally from the following descrlbed centerline survey: Commencing at a point lying South 55°431 590 East, a distance of 2,251.01 feet, from the Northwest corner of said Section 32; thence South 656 321 East, a distance of 630.74 feet, to Survey Station 97+09-18 P.T. and the TRUE POINT OF BEGINNING thence northwesterly along a 2'00' curve to the right, a distance of 1241.67 feet, to Survey Station 84+67.51 P.C.; thence North 40'42' West, a distance of 1,400.00 feet, and point of terminus of the above described line.

There is excepted therefrom all that portion lying southwesterly of the following described line: Beginning at a point on the north-south centerline of said Section 32, said point lying south, a distance of 1,450.0 fact, from the north line thereof; thence North 69°30' West, a distance of 1,450.0 feet; thence northwesterly along a straight line to a point On the north line of said Section 32, said point lying 725.0 feet easterly of the northwest corner of said Section 32; thence northwesterly along a straight line to a point on the west line of said Section 29, said point lying 1,100.00 feet southerly of the quarter corner thereof and the point of terminus of the above described line.

69 '30' West, a distance of 1,450.0 feet; thence northwesterly along a straight line to a point On the north line of said Section 32, said point lying 725.0 feet easterly of the northwest corner of said Section 32; thence northwesterly along a straight line to a point on the west line of said Section 29, said point lying 1,100.00 feet southerly of the quarter corner thereof and the point of terminus of the above described line.

Government Lots 2 and 3 in Section 32, Township 13 North, Range 37, East of the Willamette Meridian.

SAVE AND EXCEPT the following tract: Beginning at a point lying on the west line of said Government Lot 3, said point lying southerly 1,750.00 feet from the north line of said Section 32; thence South 71 '47'00" East a distance of 1,420.0 feet; thence South 55 08'00" East to the East Line of said Section 32; thence northerly along the east line of said Section 32 to the line of ordinary high water (south bank) of the Snake River; thence northwesterly along said line of ordinary high water to the north line of said Section 32; thence westerly along said north line of Section 32 to the northwest corner of said Government Lot 2; thence southerly along the west line of said Government Lot 2, a distance of 400 feet; thence South 41 "08'00" East, a distance of 1,830.0 feet; thence North 74 '30'00" West to the west line of said Government Lot 3; thence southerly along the west line of said Government Lot 3 to the place of beginning.



LEGEND

	PROPERTY LINE
	SECTION OR SECTION SUBDIVISION LINE
	CENTERLINE
	RIGHT OF WAY LINE
	EASEMENT LINE
POWER	*BONNEVILLE POWER ADMINISTRATION POWER TRANSMISSION LINES*
OHP	*COLUMBIA REA OVERHEAD POWER LINE*
GAS	*PGT NATURAL GAS TRANSMISSION LINE LOCATION BASED ON FIELD OBSERVATIONS, VERIFY EXACT LOCATION PRIOR TO EXCAVATION.*
	FENCE
	FOUND SURVEY MONUMENT AS NOTED.
	FOUND CORPS OF ENGINEERS (C.O.E.) BRASS CAP AS NOTED.
	CALCULATED POSITION NORTHING FOUND OR SET.
x718.2	*SPOT ELEVATION*
	BPA TOWER
	POWER POLE
720	*CONTOUR LINE*
WELL	*WELL*
	DECIDUOUS TREE
(XOX)	*RECORD DIMENSION AS NOTED.*
	TRENCH

Figure 2.2-2
Property Boundaries
Application for Site Certification
Starbuck Power Project
Starbuck, Washington

CH2MHILL

P:\Starbuck\155676\CAD TopoFig2.2-7.dwg

Figure 2.2-3
Property Ownership

Application for
Site Certification
Starbuck Power Project
Starbuck, Washington

500 0 500 1000 Feet

Whitman Co.
Columbia Co.
261
Snake River

Key

- Proposed Site Property
- Proposed Facility
- Facility Roads
- Facility Fence
- Transmission Lines
- State Routes (SR)
- Secondary Roads
- Union Pacific Railroad
- Parcel Boundaries
- Quarter-Mile Radius from Site

Property Owners

- Bar-Z
- BroLand
- Columbia Co Grain Growers
- US Government
- Bishop, C.M.

As shown on Figure 2.2-4, two existing 500-kV transmission lines cross the approximate center of the property. The generation plant will be constructed on the portion of the property southeast of those lines. The terrain in the area of the plant site slopes to the south, away from the river.

2.2.3 SPP Facilities

As described in Section 2.1.2, the SPP under EFSEC's purview consists of the following components:

- Generation plant
- Step-up substation
- Gas connections
- Onsite well

Related facilities that are not under EFSEC's purview, but are part of the overall SPP, include the following:

- Transmission line
- Switchyard
- M/R station
- Gas lateral
- Railroad spur

This ASC briefly describes the transmission line and switchyard, although BPA will develop, own, and independently review these electrical facilities. This ASC also briefly describes the M/R station and the gas lateral connecting the M/R station to the existing gas mainline, although FERC will review and permit these facilities independently. This ASC also includes some information on the rail spur (in Section 3.15.2.1), although Union Pacific Railroad will permit these facilities under "common carrier" status.

2.2.3.1 Generation Plant

Plant Components

As proposed, the plant will generate approximately 1,200 MW of electrical power through a combined cycle consisting of CGTs, HRSGs, STGs, and air-cooled condensers. The generation plant will include four Siemens Westinghouse Model 501F CGTs or equivalent; four HRSGs equipped with supplemental duct firing, foggers, and steam injection; two STGs; two air-cooled condensers; four exhaust stacks with a height of approximately 175 feet; and associated support equipment. Other key plant facilities to be located on the Applicant's property include the step-up substation, control and administration facilities, parking and transfer areas for a mobile deionized water treatment facility, ammonia storage tank, water supply well, water storage facilities, wastewater disposal facilities, and the M/R station.

The electrical generation equipment will be arranged within two "power blocks," each in a "two-on-one" configuration. In a two-on-one configuration, each CGT is directly connected to an electric generator and an HRSG. Steam produced by the two HRSGs is combined and directed to a single STG. The layout or site arrangement of the generation plant is shown on Figure 2.2-5. Figure 2.2-6 presents a computer-generated rendering of the plant.

Buildings and Structures

The Generation Building (Building 1) will be the largest structure on the site, housing the power generation facilities, control equipment, and administrative and general support areas. All four CGTs will be arranged in parallel in the Generation Building, and the exhaust they generate will be routed to the adjacent outdoor HRSG. Steam generated by each block of two HRSGs will be directed to the block's STG area inside the Generation Building. With the exception of the air inlet filters and electrical transformers, all major CGT equipment will be fully enclosed in the Generation Building. The CGT structure will also house and support one overhead maintenance crane to service all four combustion turbines. The approximate overall size of the CGT area of the Generation Building will be 90 feet high, 120 feet wide, and 515 feet long. Each adjacent four HRSG exhaust stack will be 20 feet in diameter and approximately 175 feet tall.

Two STG structures (STG Buildings 2 and 3), located at either end of the Generation Building, will each house one STG and associated pumps and equipment, one condensate polisher, other equipment required for STG operation, and equipment necessary for the entire plant. All major STG equipment (except the STG electrical transformers and air-cooled condensers) will be fully enclosed within the Generation Building. Each STG structure will consist of three floors: a ground floor, mezzanine level, and steam turbine operation floor. Each STG structure will also house an overhead crane for steam turbine maintenance. The approximate overall size of STG Building 2, located on the northwest end of the Generation Building, will be 90 feet high, 160 feet wide, and 180 feet long (30,000 square feet). The approximate size of STG Building 3, located on the southeast end of the Generation Building, will be approximately 90 feet high, 140 feet wide, and 160 feet long (23,000 square feet) (see Figure 2.2-5).

The control/administration structure (Building 5) will be a separate enclosed area located directly adjacent to the Block 2 STG area (Building 2) within the northwestern end of the Generation Building. The first floor of the control/administration structure will be used for administration and general support facilities. The second floor will house electrical support equipment and the emergency battery, which is needed to provide power during plant shutdowns. The third floor (matching the steam turbine operation floor elevation in the Block 1 STG area) will house the plant's main control facilities. The control/administration structure will be approximately 60 feet high, 90 feet wide, and 100 feet long.

The air-cooled condensers will be located adjacent to the northwestern and southeastern ends of the Generation Building; these facilities will be covered but not enclosed. Each condenser will be approximately 120 feet high, 180 feet wide, and 215 feet long.

Two other enclosed buildings, a Fire Water Pump Building and a Substation Control Building, will support operations and house necessary equipment. These buildings will be single-story structures, similar in appearance to the Generation Building. The Fire Water Pump Building will house two redundant fire water pumps for maintaining fire-fighting water system pressure. The Substation Control Building will operate the substation. The approximate size of the Fire Water Pump Building will be 30 square feet and 20 feet high, and the Substation Control Building will be approximately 20 feet high, 20 feet wide, and 40 feet long.

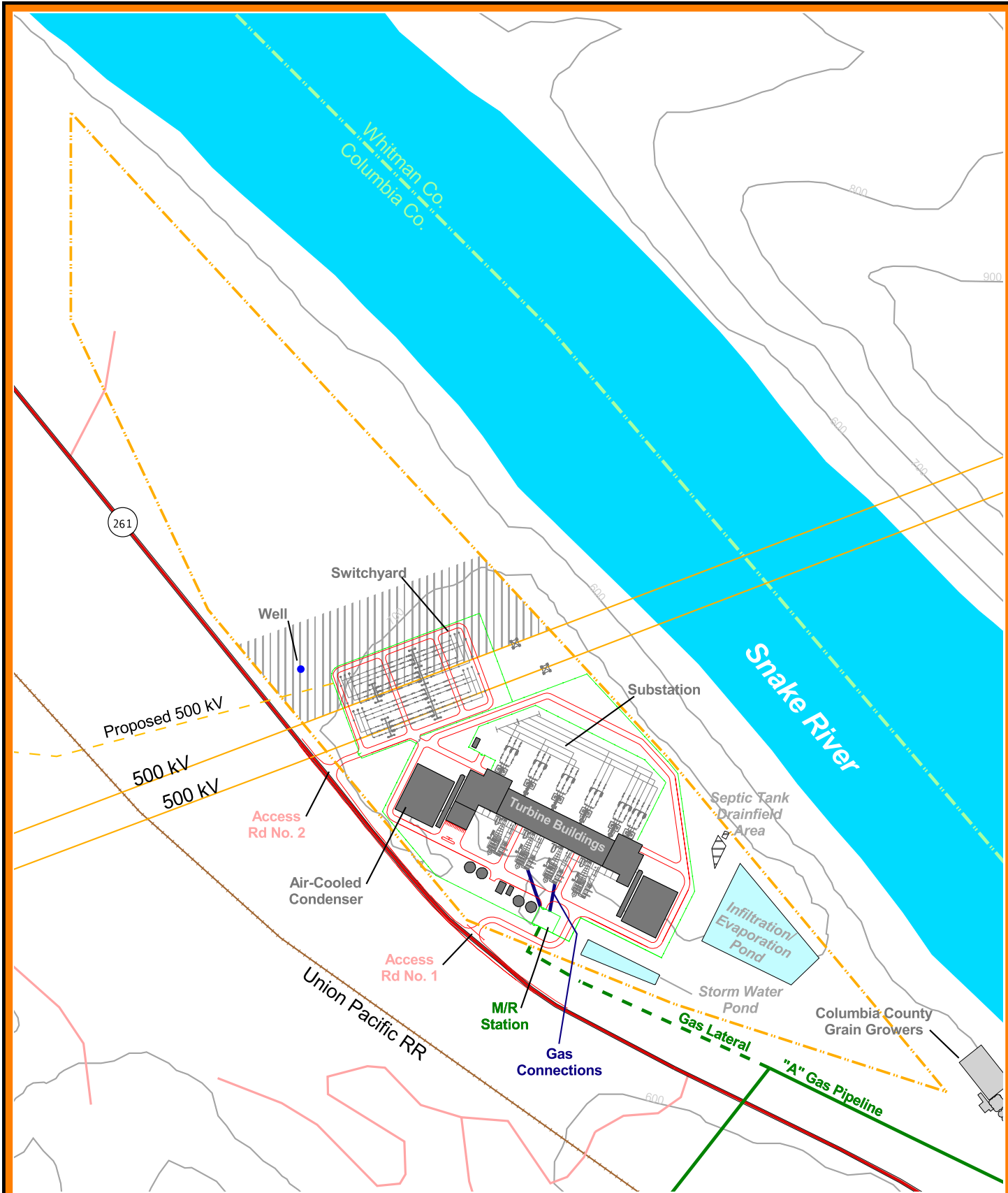


Figure 2.2-4
Generation Plant Site Map

Application for
Site Certification
Starbuck Power Project
Starbuck, Washington

Figure 2.2-5
Site Arrangement

Application for Site Certification Starbuck Power Project Starbuck, Washington

N

100 0 100 200 Feet

Key

1 - Combustion Turbine Building
2 - Steam Turbine Building Block 1
3 - Steam Turbine Building Block 2
4 - CT Air Inlet Filter
5 - Control/Administration Building
6 - Heat Recovery Steam Generator
7 - Exhaust Stack
8 - Emissions Monitoring Skid
9 - Exterior Steam Piping Piperack
10 - Isophase Bus Duct
11 - CT Generator Step-Up Transformer
12 - ST Generator Step-Up Transformer
13 - Steam Turbine Exhaust Duct to Condenser
14 - Air-Cooled Condenser
15 - Portable Water Treatment Equip. Parking
16 - Demin. Water Transfer Station
17 - Fire Pump Building
18 - Demin. Water Storage Tank
19 - Service/Fire Water Storage Tank
20 - Gas Metering Station
21 - SCR Ammonia Storage
22 - Parking
23 - Site Access Road
24 - Existing 500 kV Transmission Lines
25 - Step-Up Substation
26 - 75 Foot Easement to 500 kV Line
27 - Substation Control Building
28 - 500 kV Starbuck Switchyard (By Others)
29 - Site Perimeter Fencing and Gates
30 - Drainfield
31 - Relocated Existing Overhead Line (REA)
32 - Septic Tank
33 - Natural Gas Supply Line Corridor
34 - Stormwater Pond
35 - Infiltration/Evaporation Pond

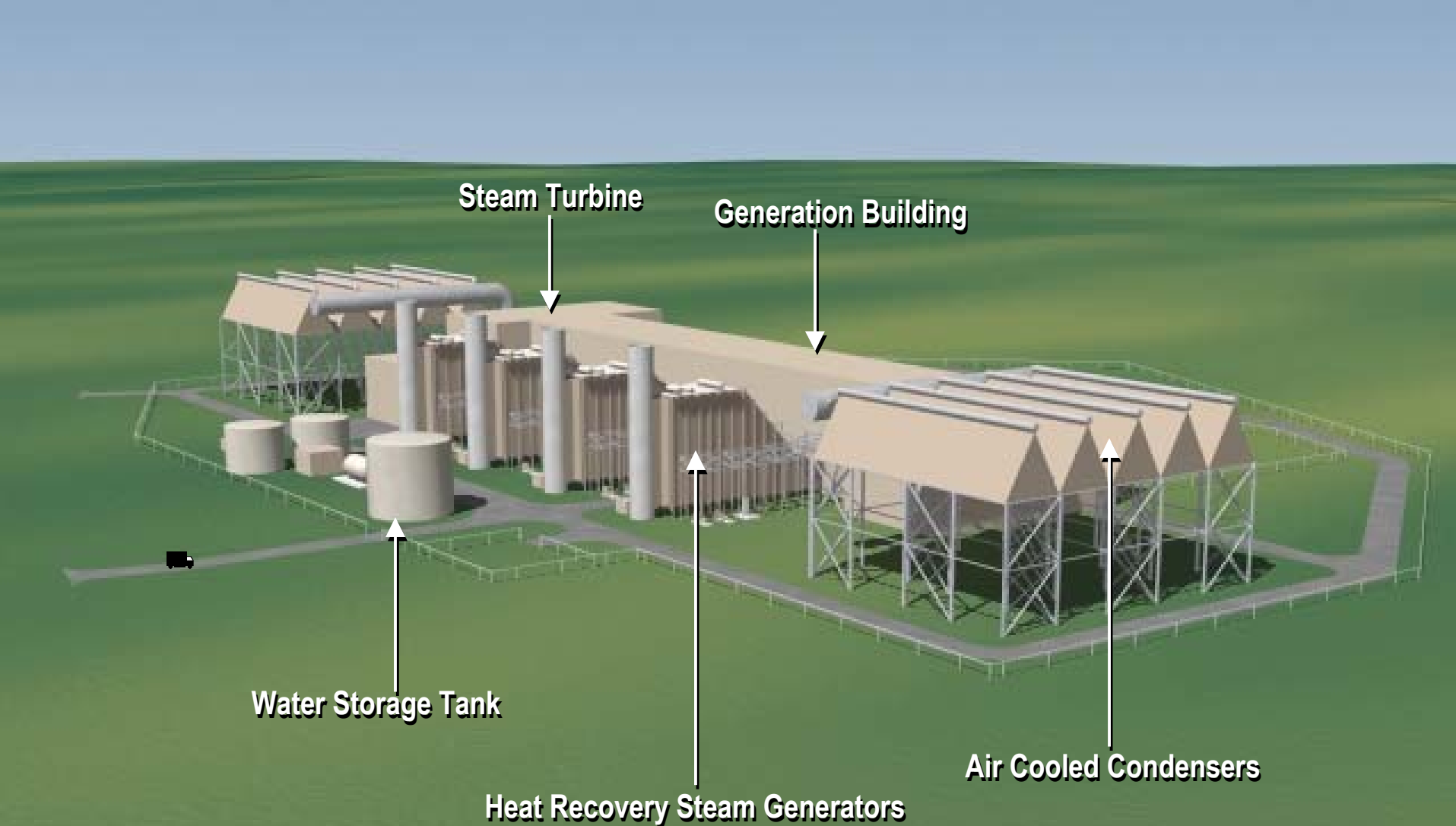


Figure 2.2-6
Computer Rendering of Generation Plant
Application for Site Certification
Starbuck Power Project
Starbuck, Washington

The HRSGs will be located outdoors and adjacent to the Generation Building. As further described in Section 2.2.5, each HRSG will be equipped with a selective catalytic reduction (SCR) system that uses ammonia injection to limit oxides of nitrogen (NO_x) production. The ammonia storage and transfer system will consist of skid-mounted, aqueous ammonia vaporizing and dilution equipment located adjacent to each SCR, and a common ammonia storage vessel, ammonia transfer pumps, vaporizer, associated piping, and controls. A truck-unloading station will be located at the common ammonia storage tank. The system will return displaced ammonia vapor to the unloading vehicle. The metal ammonia storage tank will be sized to store approximately a 1-week supply of aqueous ammonia (approximately 60,000 gallons). The ammonia storage station will be approximately 25 feet high, 30 feet wide, and 30 feet long. A spill containment facility will be provided around both the truck-unloading station and the ammonia storage tank.

Site buildings will consist of a steel framework covered with painted metal panels. The buildings, air-cooled condenser, exhaust stacks, and other large outdoor equipment will be painted in natural stone colors (browns similar to local basalt) to minimize visual impact. Design and construction of the buildings and other structures will be completed in accordance with the Uniform Building Code (UBC). In addition, the following facilities and equipment will be constructed on the site (refer back to Figure 2.2-4 for facility and equipment locations):

- **A water supply well** (onsite well) to the northwest of the generation plant site that will be the water supply source for the generation plant. It will withdraw water from the shallow aquifer at approximately 190 feet below ground surface (bgs) (about the same elevation as the Snake River) and within the gravels of the site.

  The Applicant currently is awaiting Ecology's recommendation on its 300-gpm water right application for the proposed onsite well that will serve as the water supply for the generation plant.

- **Two field-erected, cylindrical, aboveground storage tanks** to store the raw water supply for the steam cycle, fire-fighting water, and service (housekeeping and sanitary) water use. The 500,000-gallon steel tanks will be approximately 48 feet in diameter and 40 feet high, designed according to American Society of Mechanical Engineers (ASME) standards, coated with corrosion-resistant coating, and provided with safety relief valves. Two tanks are necessary to satisfy National Fire Protection Act (NFPA) 850 requirements of two separate fire water sources. Of the 500,000 gallons, 240,000 gallons will be dedicated fire water storage on the bottom of each tank; the remaining 260,000 gallons on the top will be available for service water. These tanks will be located south of the Generation Building.

  A demineralization facility transfer area for parking temporary mobile equipment used to generate demineralized water for the steam cycle. This area also will include permanent pumps and equipment to transfer the water generated to two field-erected steel storage tanks (500,000 gallon each, approximately 48 feet in diameter and 40 feet high) and on to the plant. These tanks for treated water will also be designed per ASME standards, coated with corrosion-resistant coating, and provided with safety relief valves. When the resins need to be replaced, the used material will be disposed of offsite

by a licensed contractor and new resins installed. The demineralized water tanks and demineralization transfer facility will be located south of the Generation Building.

- **An aqueous ammonia tank,** with a 60,000-gallon capacity and a 110 percent containment area, to store aqueous ammonia (19 percent concentration), which will be used at the generation plant to reduce air emissions. The ammonia tank will be an 11-foot-diameter, vertical steel tank designed according to ASME standards and with safety relief valves. Aqueous ammonia will be stored, handled, and managed in accordance with the Uniform Fire Code (UFC). The ammonia tank will be located south of the Generation Building between the demineralization facility and the raw water storage tanks.

- **A 500-gallon, welded-steel diesel tank** designed according to American Petroleum Institute (API) 650 and NFPA 30 for the storage of diesel fuel. It will be 4 feet in diameter with a concrete containment area sized to 110 percent of the total volume (550 gallons), and it will be stored inside the Fire Water Pump Building between the raw water storage tanks and the ammonia tank. It will contain diesel fuel for use as backup fuel for the fire control pump in case the electrical pump is not able to operate during a fire.

- **A step-up substation** to route the power from the generation plant to BPA's switchyard; it is located to the north of the Generation Building.

- **A septic tank and drain field system** for onsite treatment of sanitary wastes (approximately 1 gpm). The septic tank will be a double-compartment concrete tank sized for 1,000 gallons, and the drain field will be approximately 100 feet by 11 feet (1,100 square feet). The drain field will consist of drainage tiles laid in clean gravel and covered with topsoil. The septic tank and drain field system will be located to the east of the substation, and will be designed and constructed in accordance with 246-272 WAC.

- **A 1.3-acre (5 feet deep, 6.5 acre-feet) infiltration/evaporation pond** for storage and infiltration of process wastewater. "Process wastewater," as used in this ASC, is housekeeping water from equipment and plant drains. No wastewater will be generated from the power production processes, but the terminology is used on the basis of Ecology's definition of wastewater discharges in Ecology's regulations. The process wastewater (9 gpm) will flow through a 10,000-gallon oil-water separator (OWS) before being conveyed to the infiltration/evaporation pond. No blowdown water will be discharged because it will be recovered and reused. The infiltration/evaporation pond will be located east of the Block 2 Air Condenser.

- **A 2-acre (2 feet deep, 4 acre-feet) stormwater pond** (designed for a 24-hour/100-year event) for storage and infiltration of stormwater from the developed area. Stormwater from impervious surfaces, including stormwater from roofs and the access roads, will be directed to the stormwater pond. Parking areas will be graveled, not paved, and transformers will be covered. Stormwater from pervious surfaces is anticipated to infiltrate into the permeable ground with little to no runoff. The stormwater pond will be located south of the Block 2 air condenser and east of the No. 1 access road (main entrance to the facility, farthest to the south).

- **An M/R station** to connect to and meter the natural gas fuel supply from GTN's 16-inch-diameter gas lateral that will connect to GTN's 36-inch-diameter gas mainline. The M/R station will be located to the east of the No. 1 access road and south of the Block 2 HRSGs.

- **BPA's open-air, insulated, 500-kV electrical switchyard** that will provide one connection to an existing 500-kV transmission line and another connection to the new transmission line. The BPA switchyard will be located northwest of the generation plant.

There will be no back-up power supply. If the generation plant needs to restart, then it will do so by using a back-feed of power from BPA's transmission grid.

Generation Plant Site Access

Two roadways will be constructed for plant access to SR-261 in accordance with Washington State Department of Transportation (WSDOT) standards. One access road (designated No. 2 on Figure 2.2-7) will be located at an existing access road that BPA uses for transmission line maintenance. The other will be a new access point (designated as Access Road No. 1) farther to the south (see Figure 2.2-7). These access roads will create an entrance "loop" that provides effective truck access to the demineralization water treatment facilities. Access Road No. 2 will enter the BPA switchyard area and exit the switchyard to the plant facility. There will be gates at these switchyard entrances and exits, and BPA has provided the Applicant authorization to access the switchyard area as needed. Most traffic, including employees and visitors, will use Access Road No. 1 to enter the generation plant site. Both access roads are the only SR-261 connections associated with access road construction (refer back to Figure 2.2-4). The existing access roads to the property (except the one that currently serves the rental house) will be removed.

A parking area for the demineralization operations will be established along the entrance loop next to the demineralization transfer and storage facilities for this trailer-mounted equipment. A perimeter road will be constructed around the generation plant site (not the entire piece of property owned by the Applicant), with access branch roads to specific areas, such as the Generation Building and the HRSG equipment. Staff and visitor vehicle parking will be provided outside the control/administration area of the Generation Building.

2.2.3.2 Water Use and Water Rights

The generation plant will use air-cooled condensers, with total water usage expected to be up to 300 gpm (432,000 gallons per day [gpd], or 484 acre-feet). The Applicant proposes to use groundwater from a new onsite well as the plant's operational water supply and for the construction period. This well will be located north of the transmission lines (refer back to Figure 2.2-4). For redundancy and in case of a pump failure, a backup well may be drilled or a standby pump purchased to be readily available if needed.

The Applicant has a 300-gpm groundwater right application pending with Ecology. If granted, this water right will authorize the onsite well. The Applicant intends to propose water quantity mitigation to compensate for water withdrawn from the onsite well and used by the generation plant. The mitigation measures required to obtain an uninterruptible water right are acquisitions of existing water rights in an annual quantity equal to the annual quantity of water used by the generation plant during the low-flow period (Schlender, pers. comm.). The Applicant is in the process of acquiring water rights in the

Snake River system for mitigation purposes and intends to provide a specific mitigation plan for inclusion in the environmental impact statement prepared for the SPP.

The normal (average) pumping rate and the maximum or peak pumping rate during the year will be the same (approximately 300 gpm). The water pumping rate will be constant, and the storage tank level will vary as plant demands and operations change. When more water is available, it will be used for power augmentation steam injection. During the summer months, fogging will also be used for power augmentation. As operating conditions change, the employment of fogging or steam injection will be used, but at all times the use of water will remain basically constant at 300 gpm (see Section 2.2.5.1 for an explanation of fogging and steam injection processes).

The water quality of the onsite well will be similar to the water quality of two nearby wells: one at the Columbia County Grain Growers storage tank facility and the other currently serving a rental house on the Applicant's property (see Table 2.2-8 in Section 2.2.5.4 for water quality information on these wells compared with the Town of Starbuck's well).

2.2.3.3 Construction Security

A security fence will be the first structure built at the generation plant site during construction, and it will remain during operations. If the construction contractor decides to have more than one shift, then some lighting will be required for illumination of construction activities conducted at night.

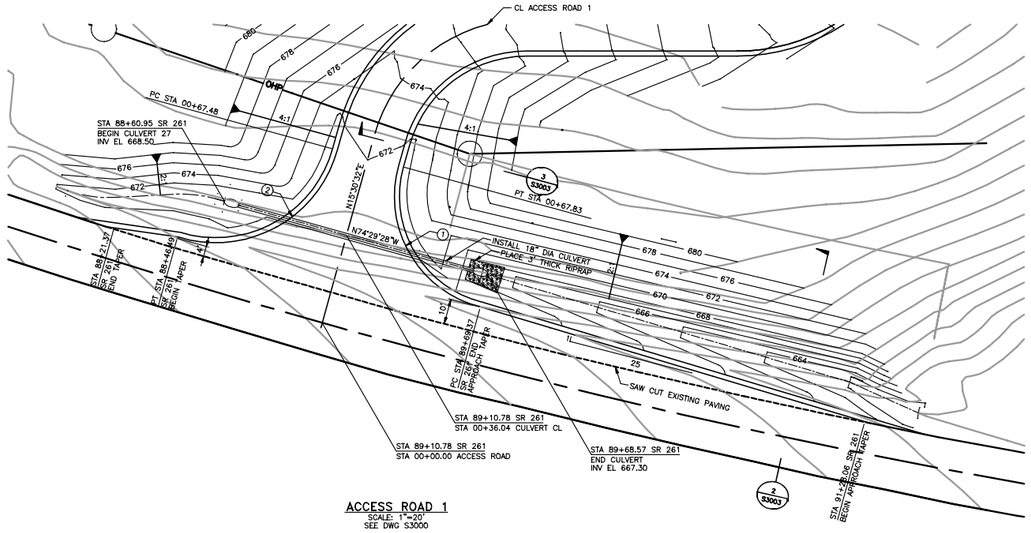
2.2.3.4 Protection from Natural Hazards

The generation plant is located in an area that is free from most natural hazards. Special protection from earthquakes, volcanic eruptions, floods, tsunamis, storms, avalanches, landslides, and other major natural disruptive occurrences, therefore, is not needed in the plant design. However, the generation plant will be designed to meet seismic zone 2 B (applies to all of eastern Washington and northern Oregon), based on UBC (1997; Figure 16-2, pp. 2-37).

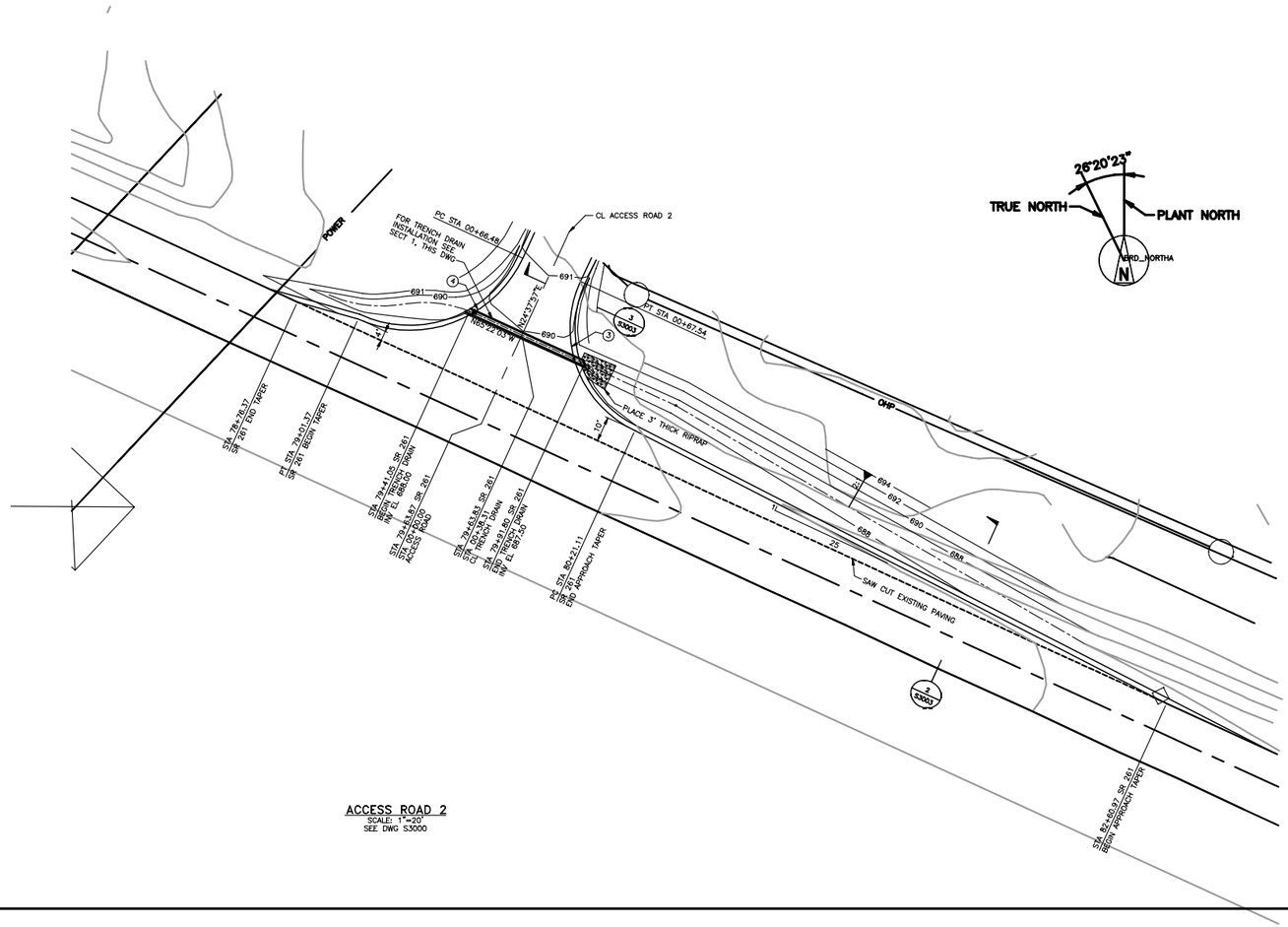
A Federal Emergency Management Agency (FEMA) report that presents nationally applicable guidelines for the seismic rehabilitation of buildings provides a more recent assessment of ground acceleration near the generation plant site. Maps accompanying the guidelines indicate that the spectral response acceleration in rock for earthquakes with a 10 percent chance of being exceeded in 50 years (roughly a 500-year event) is 0.15 g at short periods. Additionally, the spectral response acceleration in rock for earthquakes with a 10 percent chance of being exceeded in 50 years is approximately 0.05 g at a 1-second period (FEMA, 1997).

Information provided by the National Seismic Hazard Mapping Project of the United States Geological Survey (USGS) indicates similar ground acceleration values for the generation plant site (specifically the zip code area 99359). At short periods, the spectral response acceleration in rock for earthquakes with a 10 percent chance of being exceeded in 50 years is 0.16 g; and at a 1-second period the spectral response acceleration in rock for earthquakes with a 10 percent chance of being exceeded in 50 years is 0.05 g.

Appendix I to this ASC outlines an emergency response plan that includes responses to unlikely events related to natural hazard emergencies.

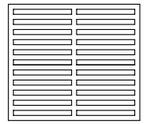


ACCESS ROAD 1
SCALE: 1"=20'
SEE DWG S3000

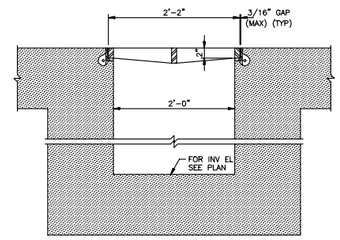


ACCESS ROAD 2
SCALE: 1"=20'
SEE DWG S3000

CURVE NO.	DELTA	RADIUS	LENGTH	TANGENT
1	90°55'21"	45.00'	71.41'	45.73'
2	91°32'13"	50.00'	79.88'	51.36'
3	89°59'54"	45.00'	70.68'	45.00'
4	89°40'26"	50.00'	78.26'	49.72'

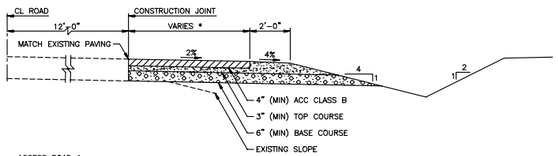


GRATE PLAN



ELEVATION

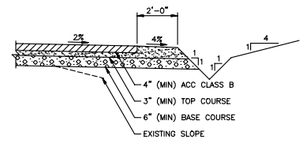
HEAVY DUTY TRENCH DRAIN
SECTION 1
NO SCALE
SEE THIS DWG



ACCESS ROAD 1
* VARIES FROM 0' AT STA 91+28.06 AND STA 82+60.97 TO 10' AT STA 89+69.37 AND STA 80+21.11

ACCESS ROAD 2
* VARIES FROM 4' AT STA 88+46.49 AND STA 79+01.37 TO 0' AT STA 88+21.37 AND STA 78+76.37

APPROACH SECTION FOR ACCESS ROAD 1 & 2
SECTION 2
NO SCALE
SEE THIS DWG



ACCESS ROAD 1 & 2
SECTION 3
NO SCALE
SEE THIS DWG

Figure 2.2-7
Access Road Commercial Approach
Application for Site Certification
Starbuck Power Project
Starbuck, Washington

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2.2.3.5 Gas Lateral and M/R Station

Throughout this ASC, the gas lateral and M/R station are considered related facilities rather than part of the generation plant. An existing 36-inch-diameter natural gas mainline ("A" line) owned by GTN is located approximately 200 feet from the southeast corner of the generation plant site. The Corps owns the property lying between the GTN pipeline and the generation plant site. GTN will obtain an easement from the Corps allowing GTN to install a 16-inch-diameter lateral pipeline, approximately 1,200 feet long, connecting its mainline to a gas M/R station that will be located on the Applicant's property. The connection of the mainline to the gas lateral will be through two new 16-inch-diameter lateral taps located on GTN's mainline system.

The Applicant will install and maintain two separate 12-inch-diameter meter runs (pipeline connections), 200 to 300 feet long, that will connect the M/R station to the combustion turbines. One meter run will be for power block units 1A and 1B, and one meter run will be for power block units 2A and 2B. The pipeline connections are considered part of the generation plant and will be operated and maintained by the Applicant. The operating pressure of the natural gas connections will accommodate delivery pressures to the combustion turbines at a range of 490 to 500 pounds per square inch gauge (psig). The pipeline connections will be designed for a 911 maximum allowable operating pressure (MAOP), and connections will be designed and constructed according to Washington Utilities and Transportation Commission (WUTC) standards, including inspection and quality control. The gas within the mainline is not odorized, and the gas used at the generation plant site will not be odorized.

GTN will design, procure materials, install/construct, own, operate, and maintain two lateral hot taps. These components will be designed for a 911 MAOP with a 0.5 design factor. Hot taps in conjunction with a new pipeline mainline valve set will be installed on the 36-inch-diameter mainline "A" pipeline (Scope of Work and Associated Costs for a Tap, Lateral, and Meter Station Installation, PG&E GTN, May 22, 2001).

GTN will design, procure materials, construct, own, and operate the new lateral. Cathodic protection of the pipe will be obtained from the mainline with a rectifier located nearby as required (Scope of Work and Associated Costs for a Tap, Lateral, and Meter Station Installation, PG&E GTN, May 22, 2001).

GTN will design, procure materials, construct, and operate the new M/R station. The Applicant will own the M/R station and will design, construct, own, and operate all equipment located downstream of the M/R station outlet (that is, all downstream piping, pressure regulation equipment, etc.) that composes the natural gas delivery system to the generation plant. The M/R station will consist of a building that encloses the required metering and the control room with supervisory control and data acquisition (SCADA) equipment, including communications equipment and a flow computer. Design, construction, and operation of all project components (including the taps, the lateral, and the M/R station) will conform with all federal, local, state, and GTN design and construction standards and specifications (see Figure 2.2-8 for piping diagram to interconnection point) (Scope of Work and Associated Costs for a Tap, Lateral, and Meter Station Installation, PG&E GTN, May 22, 2001).

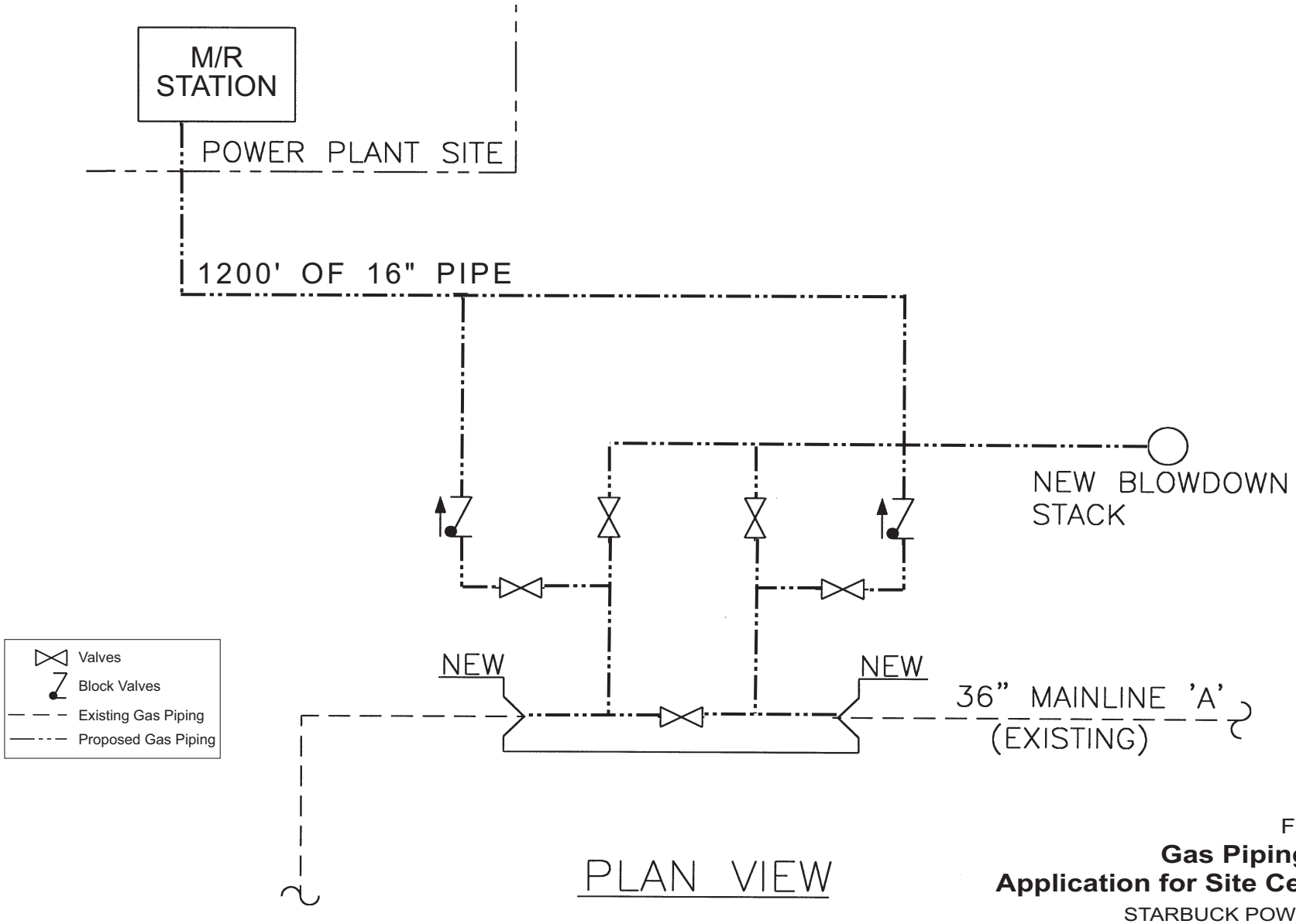


FIGURE 2.2-8
Gas Piping Diagram
Application for Site Certification
STARBUCK POWER PROJECT
STARBUCK, WASHINGTON

The M/R station, taps, and lateral connecting the existing gas mainline to the M/R station will be under FERC jurisdiction, and more information will be provided in a joint NEPA/SEPA environmental impact statement (EIS).

2.2.3.6 Transmission Lines and Switchyard

Facilities

Two existing BPA 500-kV transmission lines, extending between the Little Goose and Lower Monumental Dams, bisect the generation plant site. Electricity will be transported from the generation plant to the BPA regional distribution system by connecting to one of the existing transmission lines and connecting also to the new transmission line (refer back to Figure 2.1-1). The switchyard (to be located beneath the transmission lines) will be able to switch power from one transmission line to another line should that be necessary. Power generated will be routed to the Applicant's step-up substation, routed to the switchyard, and then routed into BPA's distribution system (refer back to Figure 2.2-4).

In January 2000, the Applicant requested that BPA interconnect the proposed generation plant to the transmission grid via the existing BPA 500-kV transmission lines. BPA completed a *System Impact Study* in June 2000 that identified the following interconnection requirements:

- A new switchyard at the generation plant site to serve as an interconnection to the existing 500-kV transmission lines that extend over the property and to connect to the new transmission line
- An approximately 16-mile-long, 500-kV, new (third) transmission line to connect the generation plant site to the Lower Monumental Dam switchyard ("the transmission line" for purposes of this ASC)

BPA has identified the route of the transmission line to the Lower Monumental Dam switchyard as a line located approximately 1,200 feet north of the existing lines. In May 2001, BPA completed the facilities study, which describes the preliminary design of the transmission line, additional equipment, and upgrades. In the event there is a problem delivering power through one of the existing 500-kV lines, power will be routed through the transmission line.

BPA will construct, own, and operate the new switchyard and transmission line. The transmission line is considered a related facility. Although the transmission line is an element of the SPP, it is not subject to EFSEC's permitting jurisdiction. The joint NEPA/ SEPA EIS for the transmission line project will be available as a reference document to this ASC.

Corridor Information

The length of the proposed transmission line corridor is approximately 16 miles and runs from the generation plant site to Lower Monumental Dam. The new transmission line will be approximately 1,200 feet north of the existing lines except where the lines converge to enter the generation plant and Lower Monumental switchyards. The ROW will be 150 feet or 75 feet on each side of the new transmission line.

The combined existing ROW for the existing lines from Lower Monumental Dam to Little Goose Dam is 275 feet: 150 feet for the northernmost line and 125 feet for the southernmost

line. The operations related to the transmission lines will be conducted within the corridor ROW and easements granted for access roads.

The width of the construction corridor for the new transmission line will be similar to the operational corridor, with access roads extending outside the 150-foot ROW in those areas where towers will be located. Laydown areas are usually located within the existing ROWs. Information on access roads, laydown areas, and culverts that may be required is not yet available because BPA is not far enough into design to describe these items. This information will be available in the joint NEPA/SEPA EIS for the transmission line.

A central storage area for materials is tentatively planned at the Hanford area to service several BPA transmission line projects that are scheduled to be built in about the same time frame. Materials will be transported by truck from this central storage area to the transmission line corridor.

New transmission line towers will be made of metal (similar to existing towers) and will be approximately 120 to 140 feet high, although structures could vary from 100 to 170 feet. Conductors will be arranged in a triangular configuration, with 46 feet between the bottom two conductors, and the third conductor 34 feet higher at the centerline. There will be one or two overhead groundwires, with another groundwire 21 feet over the top conductor, set not quite as wide as the bottom conductor. (See Figure 2.2-9 for a graphic representation of a transmission line tower.)

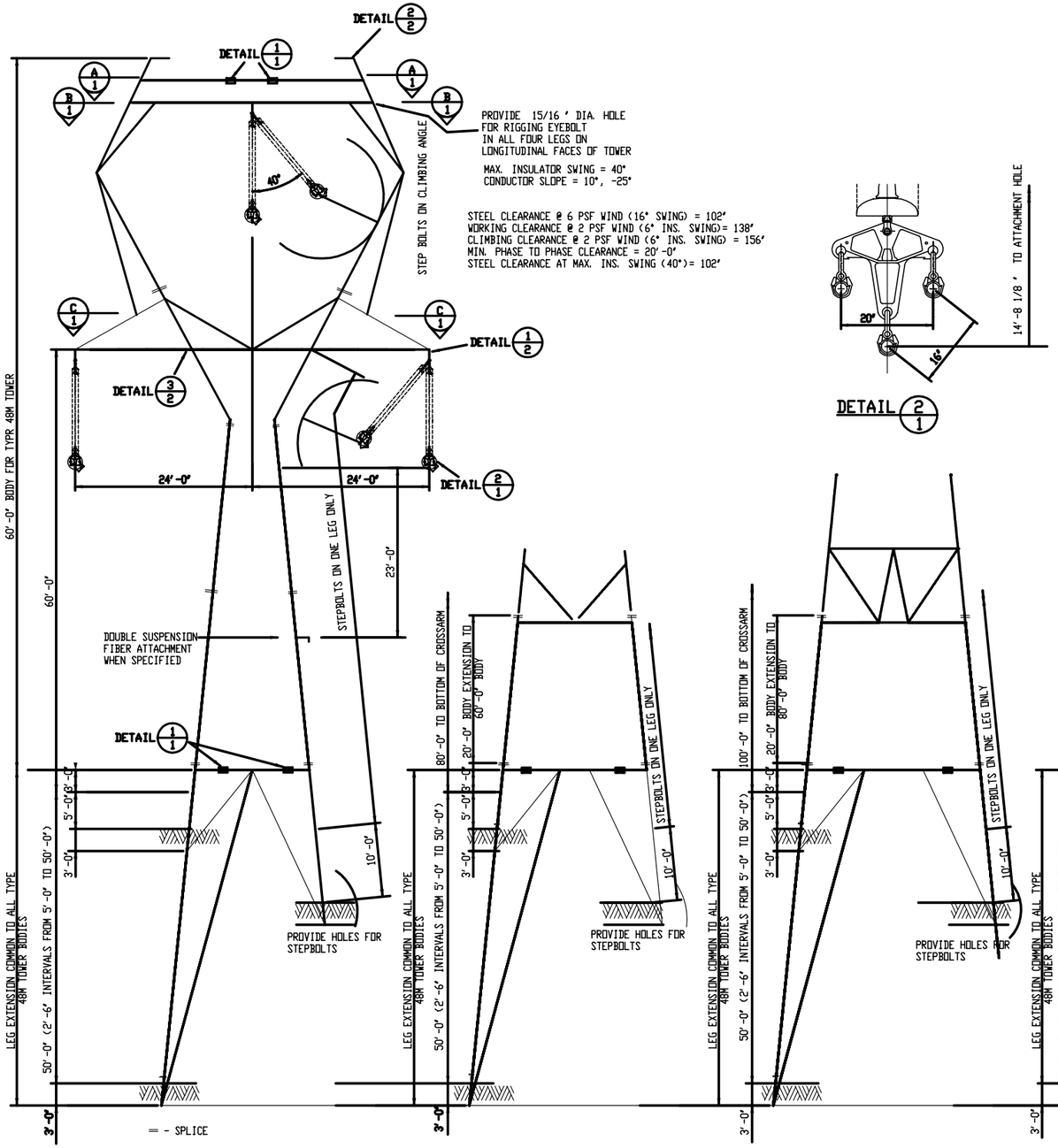
The transmission line will be constructed concurrently with the generation plant and will require approximately 16 months. The peak workforce will be approximately 80 to 95 individuals, interspersed along the 16-mile-long transmission corridor. Switchyard and transmission line construction work closest to the plant will occur near the end of plant construction activities to avoid coinciding with peak construction at the plant. There is a potential for some overlap of peak construction in the first quarter of 2004, when some transmission line and switchyard workers will be working during the plant's peak working time (see Section 2.2.6.1). Any overlap, however, would be for only a short time—a month at the most (Smith, pers. comm.).

2.2.4 Construction Activities

Construction activities for EFSEC-permitted elements of the SPP (the generation plant, substation, gas connections, and onsite well) are discussed in this subsection. Construction activities that pertain to the related facilities (the transmission lines, switchyard, M/R station, gas lateral, and rail spur) are addressed briefly in this ASC. More detailed environmental review information on these related facilities will be provided in the joint NEPA/SEPA EIS. The rail spur will be included in the joint NEPA/SEPA EIS because it is a "connected action."

2.2.4.1 Generation Plant

The approximately 40-acre generation plant site will be graded to an elevation of approximately 707.5 feet above mean sea level (msl), foundations at 708 msl, using a balanced cut-and-fill operation. Preconstruction elevations range from about 720 msl on the northern portion of the site to approximately 690 feet msl on the southeast portion. Approximately 5,000 cubic yards (yd^3) of topsoil (Elmer, pers. comm.) will be removed from



NOT TO BE USED FOR CONSTRUCTION

Figure 2.2-9
Transmission Tower Design
Application for Site Certification
Starbuck Power Project
Starbuck, Washington

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the surface to allow construction on the gravel below. Until the generation plant is constructed, this topsoil will be stored on a portion of the 10 acres reserved to the northwest of the BPA transmission lines. The topsoil will be hauled back to cover exposed disturbed areas before they are seeded with native grasses or plants.

Recommended Native Seed Mix for the Generation Plant Site

The following list relies heavily on early succession disturbance species because noxious weed presence on the project site is extensive. Because the availability of native seed sources can vary a great deal, the list allows some substitution for the forbs. The lupine and larkspur are marked with an asterisk(*) because, although they are native plants, local ranches may have concerns about having these plants on or near grazing land.

Grasses

- *Aristida longiseta* (Red threeawn)
- *Bromus carinatus* (Mountain brome)
- *Danthonia unispicata* (Onespike danthonia)
- *Elymus elymoides (AKA Sitanion hystrix)* (Bottlebrush squirreltail)
- *Festuca idahoensis* (Idaho fescue)
- *Koeleria macrantha* (Prairie junegrass)
- *Oryzopsis hymenoides* (Indian ricegrass)
- *Pseudoroegneria spicata* (Bluebunch wheatgrass)
- *Poa secunda* (Sandberg's bluegrass)
- *Stipa columbiana* (Columbia needlegrass) or *Stipa occidentalis* (western needlegrass)

Forbs

It is often difficult to find forb seed sources, and the availability varies from year to year. For that reason, this list gives choices under some Genera.

- *Achillea millefolium (*Western yarrow)
- *Balsamorhiza sagittata* (Arrowleaf balsamroot)
- Buckwheat: *Eriogonum compositum* (Northern buckwheat), *Eriogonum heracleoides* (Wyeth buckwheat), and/or *Eriogonum umbellatum* (Sulfur buckwheat)
- Lomatium: *Lomatium dissectum* (Fern-leaf lomatium), *Lomatium nudicaule* (Barestem lomatium), and/or *Lomatium triternatum* (Nine-leaf lomatium)
- Milkvetch: *Astragalus filipes* (Basalt milkvetch) and/or *Astragalus purshii* (Pursh's milkvetch)

At least eight of the following forb species are recommended:

- *Anaphalis margaritacea* (Western pearlyeverlasting)
- *Sphaeralcea coccinea* (Scarlet globemallow)

- *Delphinium nuttallianum** (Upland larkspur)
- *Geranium viscossimum* (Sticky geranium)
- *Ranunculus glaberrimus* (Sagebrush buttercup)
- *Phlox longifolia* (Longleaf phlox) or *Phlox speciosa* (Showy phlox)
- *Plantago patagonica* (Indian-wheat)
- *Gaillardia aristata* (Blanket flower)
- *Senecio integerrimus* (Western groundsel)
- *Eriophyllum lanatum* (Woolly sunflower)
- *Wyethia amplexicaulis* (Northern mules ears)
- Lupine*: *Lupinus sericeus* (Silky lupine) or *Lupinus sulphureus* (Sulphur lupine)
- Paintbrush: *Castilleja cusickii* (Greenm). (Cusick's paintbrush) and/or *Castilleja lutescens (Greenm.)* (Rydb. Pale paintbrush)
- *Penstemon: Penstemon humilus* (Lowly penstemon) and/or *Penstemon speciosus* (Showy penstemon)

Shrubs

- *Artemisia tridentata ssp. wyomingensis* (Wyoming big sagebrush)

In moister areas, such as the bottoms of draws where moisture collects, it is recommended that the following species be added to the mix:

- Grasses: *Danthonia unispicata* (Onespike danthonia), *Elymus glaucus* (Blue wildrye), or *Leymus cinereus* (Basin wildrye)
- Shrubs*: Artemisia cana* Silver (sagebrush) and/or *Crataegus douglasii* (Black hawthorn)

Construction Sequence

The sequence of the primary construction activities will be as follows:

- Convert an existing residential house that lies to the northwest of the Applicant's property into an office for use during construction. After construction, demolish the house and outbuildings.
- Drill a new onsite well and provide ancillary equipment and piping for water supply during construction and operation.
- Remove and relocate the Columbia Rural Electric Association (CREA) electrical line that transects the Applicant's property. CREA will be responsible for the relocation.
- Install temporary site security fencing and apply best BMPs for erosion control (specific BMPs related to stormwater management during construction are presented later in this subsection [2.2.4.1]).

- Excavate and remove boulders, using unsuitable material and boulders onsite as nonstructural fill. Topsoil will be removed and replaced on nonbuilt disturbed areas before these areas are seeded with native plant species. The cut volume is 197,898 yd^3 and the fill volume is 184,174 yd^3, leaving approximately 14,000 yd^3 of grub-and-clear material (onsite soil consisting mostly of gravel and cobbles, with some boulders) that cannot be used for onsite fill because it is in excess of the fill needed for site preparation. Because this material is soil and inert, it is not subject to special disposal regulations and will be disposed of at a nearby quarry. Absent EFSEC, the SPP might require a surface mining reclamation permit as a result of grading and excavation activities associated with the SPP's infiltration/evaporation ponds. The Applicant believes that the SPP's planned restoration activities, both in connection with completion of pond construction and following plant retirement, would satisfy otherwise applicable reclamation permit requirements and policies, or otherwise applicable requirements for a waiver from the permit requirement. The Applicant will continue to work with the Washington State Department of Natural Resources (NDR) on this process.
- Cut and fill the southernmost portion of the property to achieve a suitable site for placement of all facilities, including the wastewater disposal systems.
- Install structural fill, grade the site to rough grade elevation, and construct the underground portion of stormwater drainage system.
- Construct the roadway base.
- Construct the major foundations for equipment and buildings.
- Construct the underground utilities.
- Install the equipment and erect buildings.
- Finish the constructed road surfaces.
- Grade the site to finished grade elevation and reapply topsoil for seeding of native species.

Construction equipment includes (but is not limited to) crawler backhoes, backhoes, front-end loaders, bulldozers, scrapers, graders, dump trucks, vibratory plate, rammer/jumping jack, compressors, asphalt distributor, asphalt pavers, asphalt cutter/grinders, asphalt compactors, pickup trucks, pipe benders, portable welders, flatbed trucks, and water trucks. Laydown and staging areas will be located on the southeast side of the BPA transmission lines where the generation plant will be built. The undeveloped areas to the east and west of the condensers will be used for the laydown and fabrication areas. These areas will be unpaved or surfaced with aggregate during construction; after construction, they will be returned to their preconstruction state by seeding them with native species common to the area. The topsoil, previously removed and stockpiled on the northwest side of the Applicant's property, will be relocated to disturbed areas before they are seeded.

Construction Stormwater Control

Stormwater runoff will be controlled during generation plant construction to minimize soil erosion. BMPs will include the use of silt fences and temporary swales to direct most of the runoff to a stormwater pond, where it will be infiltrated through soil. Perimeter silt fences

will be installed to remove sediment from runoff before it reaches the site boundary. Additional localized silt fences will be used, as required during construction, to minimize erosion and transport of soil toward the perimeter silt fences. Locations of temporary swales will change, depending on the areas being excavated or filled. Once the preliminary cut-and-fill work is complete, the swales will remain in place until final grading. Wherever possible, the temporary swales will be located so that they will be incorporated into the permanent stormwater collection system. The perimeter silt fence will not be removed until total stability of the site is achieved. If hay bales are used to filter sediment from stormwater, then the hay will be weed-free. More information on BMPs is provided in Section 2.2.5 and in the Stormwater Pollution Prevention Plan in Appendix H).

The 2-acre (4 acre-feet) stormwater pond is located in the southwest portion of the generation plant site, east of access road No. 1 and south of the Block 2 air-cooled condenser. It is designed to accommodate a maximum stormwater event based on a 24-hour, 100-year storm event for this area, which has an average annual precipitation of 9.73 inches (at Lower Monumental Dam, approximately 15 miles west–southwest of the plant site) to 11.37 inches (at Little Goose Dam, approximately 8 miles east of the plant site). The areas used in stormwater calculations include 8.80 acres for asphalt and roofs, 12.6 acres for graveled areas, and 6.5 acres of grass for a total acreage of 27.9 acres. Travel times were calculated for the four drainage areas accounting for the distance to the stormwater pond, Manning's Coefficient, a 24-hour/100-year storm event, and slope. (For more detailed information on the design of the stormwater pond and conveyance systems, see the Stormwater Pollution Prevention Plan in Appendix H.)

The quality of stormwater collected will be the same as rainwater, with a potential for sediment and oils collected as the rainwater runs off surfaces to the stormwater pond. As the permanent stormwater collection system is installed, it will be incorporated into the construction stormwater collection system. Inlets to the permanent system will be protected by silt fencing to prevent sediments from entering the piping system. Seeding and mulching will be used (where practical) for slope stabilization as rough grading is completed (for additional information, see the Stormwater Pollution Prevention Plan in Appendix H).

No dewatering activities will be conducted during construction. Potential pollutants associated with construction are diesel fuel, lubrication oils, cleaning chemicals, concrete, disturbed sediments, and ammonia (when storage tank is initially filled). BMPs will be implemented to minimize and manage potential spills so that surface waters and groundwaters are protected. All petroleum products and cleaning chemicals will be stored and handled in temporary, lined swales or bermed areas. Any spills that occur will be captured, collected, and disposed of offsite at an approved disposal site by the contractor. Excess concrete will be stored within temporary, lined swales or bermed areas and disposed of offsite at an approved disposal site by the contractor. Construction activities will include erosion control and sediment stabilization techniques or BMPs to minimize disturbance of sediments, control and capture sediments in runoff or stormwater, and treat water with sediments. Runoff or stormwater will be routed to the stormwater pond before the water infiltrates to ground. Additional spill management information is provided below.

Construction Spill Management

The plant's spill prevention and control program during construction is summarized briefly below (see Appendix E for a more detailed description of Spillage Prevention and Control).

The following are sources of potential spills during construction:

- Construction equipment during construction activities
- Specific chemicals for treating equipment components
- Diesel fuel storage for construction equipment
- Lubrication oil (lube oil) for flushing and preparing turbines and transformers

Engineered safeguards will be employed to avoid spills. These safeguards will be designed so that, in the unlikely event a spill occurs, the spills will not reach surface water or groundwater.

During construction, the substances stored onsite will include the following:

- Several barrels of turbine lube oil during CGT and STG lube oil flushes. These oil barrels will be stored in temporary, lined, bermed areas to contain any leakage or spillage during the lube oil flushing process. Containment areas will be designed to hold 110 percent of the volume of material to be contained. Temporary containment areas will be lined with plastic or other impermeable material that will include coverage of container walls or bermed areas. The bulk of the lube oil being used for the flushing procedure will be contained in the permanent lube oil reservoirs provided by the CGT and STG manufacturers.
- Several gallons of common lube oil for construction equipment stored in protected areas of the warehouse/storage yard designated on the site.
- Several hundred gallons of lube oil for equipment during balance-of-plant operations (such as boiler feed pumps, condensate pumps, circulating water pumps, closed cooling water pumps) stored for short durations in lined bermed areas at the storage yard or in temporary warehouses where containment will be sized to 110 percent of the total volume needed to be contained.
- Temporary fuel supplies for construction equipment (typically provided by a fuel tanker truck specifically equipped for fueling operations and supplied by a local sub-contractor). In some cases (to be determined during mobilization), temporary 500-gallon gasoline and 500-gallon diesel fuel tanks may be used during construction. If used, they will be located within temporary bermed areas that are lined to contain leakage or spills, and they will be sized to 110 percent of the total volume needed to be contained.

The general contractor will be responsible for containing and cleaning spills during construction. General contractor responsibilities include training personnel, in accordance with 40 CFR 112, in how to avoid spills and containing and cleaning spills if they occur.

Certain plant systems or construction steps require special treatment of piping or equipment (such as acid-cleaning the HRSGs and pickling [lube oil piping]) to ensure proper condition of the completed plant. Types and quantities of chemicals to be used are not known at this time. Special work of this nature will be contracted to a firm or firms experienced in the particular process involved. The following will be required of these firms: (a) provide a Spill Prevention Countermeasures and Control (SPCC) Plan that addresses the required

chemicals in accordance with 40 CFR 112, (b) perform the work, and (c) provide spill protection and ultimate disposal of the chemicals in accordance with 40 CFR 112.

Roads and Parking During Construction

During construction, the plant access roads will be surfaced with aggregate. The substation area, M/R station, and some equipment and access areas will also be aggregate surfaced after major construction activities are completed.

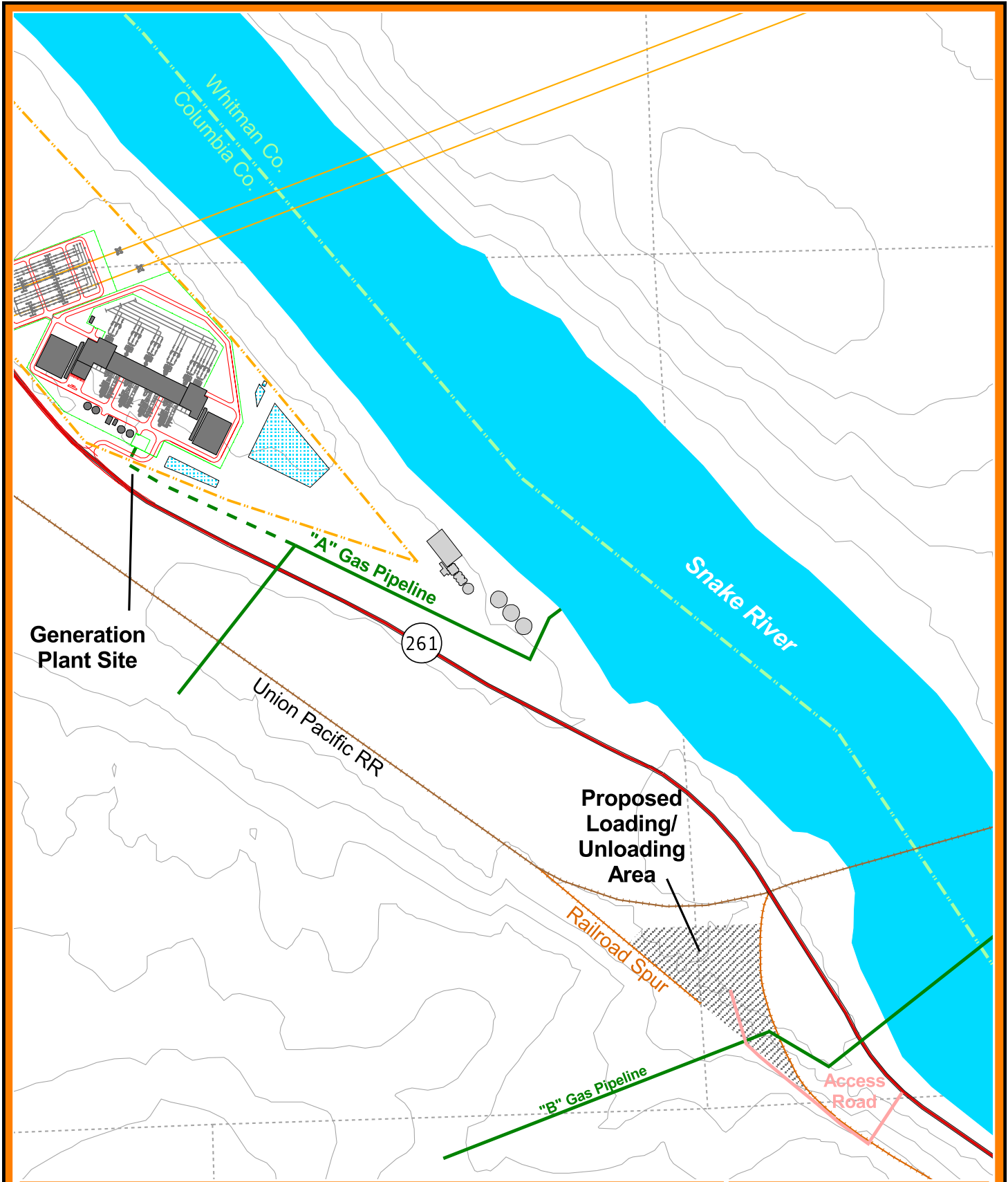
A temporary designated parking area (4 to 5 acres of the 10 acres reserved on the northwest side of the 500-kV transmission line corridor) will be provided for construction workers. The boundaries of this area will be well marked and the area limited to actual parking needs (approximately 700 vehicles at the peak) to minimize disturbances to the natural vegetation and wildlife. These parking areas will be unpaved or surfaced with aggregate during construction; after construction, they will be returned to their preconstruction state by seeding them with native species common to the area.

Materials and equipment will be transported to the site by trucks, from the north or south on SR-261 or from the southwest on Lyons Ferry Road, via existing connecting roadways. The exception is heavy equipment, which will be transported by rail and offloaded at a proposed spur or siding. It will be located on the abandoned railroad ROW that joins the existing Union Pacific Railroad line about 1 mile south of the generation plant site (see Figure 2.2-10). Union Pacific will construct, operate, and maintain the siding and unloading area. Union Pacific will lease the spur or siding from the current property owner, and the loading/unloading area will be separated by 200 feet from the main line to allow room for cranes and wheeled vehicles. An access road will be constructed from the railroad spur loading/unloading area to SR-261. Semitractor-trailers will pull low-boy wheeled trailers from the unloading site to the generation plant for installation. On their way, the semitractor-trailer units will cross the GTN "B" gas pipeline where the "B" pipeline crosses the abandoned railroad ROW that is used for a portion of the access road. This crossing is protected from heavy loads by a steeled casing placed there when the railroad track was in use. A few feet southeast of the gas pipeline crossing, the access road leaves the railroad ROW and runs toward the northeast to connect with SR-261. Materials carried by trucks will comply with maximum weight limits for roads and the Lyons Ferry bridge in accordance with 468-38 WAC and 46.44 RCW. In addition, the Applicant will commit to providing EFSEC with a traffic management plan for review and approval, and this plan will include the railroad spur traffic activity.

Water Supply During Construction

During construction, water from the proposed onsite well will be used for the following purposes:

- Dust control
- Miscellaneous water usage
- Filling and testing of water storage tanks (both service and fire protection and demineralizer system tanks)
- Hydrotesting and flushing of HRSGs, water pipeline systems, and steam pipeline systems



Legend

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Feet

- Railroad
- Abandoned Railroad
- State Routes (SR)
- Transmission Lines
- PG&E Gas Pipeline
- Other Buildings
- Section Lines
- Contours 100 Foot

Figure 2.2-10
Proposed Railroad Spur

Application for Site Certification
Starbuck Power Project
Starbuck, Washington

TABLE 2.2-1
Construction Water Usage Profile

Construction Water Usage	Total Gallons/ Month
Dust Control Water Truck; Block I	6,000,000
Dust Control Water Truck; Block II	4,400,000
Miscellaneous Water Usage; Block I	132,000
Miscellaneous Water Usage; Block II	143,000
Temporary Potable Water Usage; Block I	182,400
Temporary Potable Water Usage; Block II	197,600
Service/Fire Protection Pipe and Tank Tests and Fill; Block I	1,500,000
Service/Fire Protection Pipe and Tank Tests and Fill; Block II	1,500,000
Demineralizer System Tests and Tank Fill; Block I	800,000
Demineralizer System Tests and Tank Fill; Block II	800,000
HRSG 1 Hydrotest	150,000
HRSG 2 Hydrotest	150,000
HRSG 3 Hydrotest	150,000
HRSG 4 Hydrotest	150,000
Circulating and Closed Cooling Water Piping Hydrotests; Block I	400,000
Circulating and Closed Cooling Water Piping Hydrotests; Block II	400,000
Closed Cooling Water System Flushing; Block I	50,000
Closed Cooling Water System Flushing; Block II	50,000
Condensate and Boiler Feedwater Pipe Hydrotests and Flushes; Block I	200,000
Condensate and Boiler Feedwater Pipe Hydrotests and Flushes; Block II	200,000
Main Steam and Reheat Piping Hydrotests; Block I	100,000
Main Steam and Reheat Piping Hydrotests; Block II	100,000
Preboiler and HRSGs 1 and 2 Chemical Cleaning, Including Flushes; Block I	600,000
Preboiler and HRSGs 1 and 2 Chemical Cleaning, Including Flushes; Block II	600,000
Steam Blow HRSGs 1 and 2	10,000,000
Steam Blow HRSGs 3 and 4	10,000,000
Condenser Hydrotest and Cleaning; Block I	200,000
Condenser Hydrotest and Cleaning; Block II	200,000
Total	39,355,000

Notes:
1. Construction water usage numbers do not include water usage for initial operation, such as high HRSG blowdown during early operation to achieve boiler water chemistry and normal operational water requirements such as continuous and intermittent HRSG blowdown, cooling tower blowdown, CGT power augmentation, etc.
2. Construction water usage numbers are intentionally conservative and include +20 percent margin.
3. Assumed steam blow process. If air blow process is used by the contractor, the construction water requirement will be much lower than what is shown in the table.
4. Assumed that concrete source is from local ready-mix concrete supplier and that there is no onsite batch plant or no site construction water is needed for concrete.

- Potable water supply during construction
- Cleaning and flushing of boilers
- Steam blow of HRSGs
- Hydrotesting and cleaning of Block I and Block II

The different construction activities that will require water, and the volume of water needed for construction activities, are shown in Table 2.2-1, Construction Water Usage Profile. A total of 39,355,000 gallons will be needed for all construction activities during the approximately 2-year construction period.

High-purity water will be required to test the pressure integrity of power plant systems after erection and before cleaning or startup operations. The volume of water needed for hydrostatic testing, flushing, and cleaning activities is 150,000 gallons for each HRSG, or 600,000 gallons for all four HRSGs. Some of this water will be high-purity demineralized water, and inhibitors will be added to minimize corrosion of the tested systems. When these systems are drained for subsequent operations, the water will be tested prior to disposal. If the water is acceptable for infiltration (based on Ecology's requirements in the State Waste Discharge Permit), it will be routed to the oil-water separator and to the infiltration/ evaporation pond. High-purity water can be recycled by storing it in temporary tanks and using it for subsequent cleaning operations. Water from cleaning operations will be handled in the same manner as hydrostatic testing water: tested prior to disposal based on Ecology's requirements in the State Waste Discharge Permit and routed to the oil-water separator and to the infiltration/evaporation pond. If it cannot be sent to the infiltration/evaporation pond, it will be recycled for other cleaning activities and then taken offsite for disposal by licensed waste contractors.

The proposed onsite well will be located on the northwestern half of the Applicant's property near the northwest corner of the switchyard (refer back to Figure 2.2-4). A 100-foot buffer area will be established around the well to provide protection. The onsite well site will include a pumphouse (approximately 12 feet by 15 feet), pump, valves, meter, and ancillary equipment needed to pump the water from the well site to the demineralization unit and from there to the water tank reservoirs.

Demineralization will provide high-quality makeup water produced from portable ion exchange equipment. The equipment will be contained in a trailer (or other portable enclosure) and will be provided by a service contractor. When the ion exchange resins contained in the trailer are exhausted, the service contractor will provide another trailer containing freshly regenerated resins to replace the trailer with the exhausted resins. The service contractor will transport the trailer with the exhausted resins back to the service contractor's regeneration facilities at an offsite location. There the resins will be regenerated for reuse at the generation plant or at another plant. While this operation is somewhat costly, water consumption, wastewater management, and the storage and handling of sulfuric acid and sodium hydroxide at the generation plant site will not be needed for this operation because of the offsite processing.

Potable water for construction workers will be supplied by the onsite well in compliance with public water system regulations (246-290 WAC).

Onsite water will not be needed for concrete formulations because the concrete will be supplied by portable mixing trucks from the City of Dayton (for example, by Rock Hill Concrete) or by other local ready-mix suppliers.

Wastewater During Construction

Portable toilets will be used during construction for disposal of sanitary waste. A licensed independent contractor will be responsible for disposal of sanitary wastes from construction in accordance with applicable regulations. A safety trailer with showers and an eye wash will also be onsite during construction.

Noise Control During Construction

Construction of the generation plant is expected to be typical of other power plants in terms of schedule, equipment used, and types of activities. The noise level will vary, depending on the construction phase. Power plant construction generally can be divided into five phases, when different types of construction equipment are used: site preparation and excavation, concrete pouring, steel erection, mechanical, and cleanup. A high-pressure, steam-blow activity can be one of the noisiest activities associated with construction activities for a power plant, but it will be at the same noise level as a dump truck and within acceptable noise levels (see Section 3, Table 3.9-10 for typical noise levels from construction equipment). A blowout silencer or low-pressure blow techniques will be used for steam blows so that noise levels will be within standards for receptors.

The residence closest to the site is located approximately one mile away at the Lyons Ferry Marina. Average noise levels during construction are projected to be between 51 and 40 decibels A-weighted sound level (dBA) at the nearest residence. The construction noise may be audible but will not exceed current maximum exposure levels, given that noise levels as high as 61 dBA are currently experienced. Construction noise will be clearly audible at this residence when background noise is low. This will likely be the case during most of the construction phase. The construction noise levels at the hatchery and the campground, which are farther from the site than the nearest residence, will be lower than those calculated for the residence and will not exceed current exposure levels.

Noise control during construction will include the following measures:

- Noisy construction activities will be limited to the hours between 7 a.m. and 10 p.m.
- Construction equipment will be properly muffled (ensure that equipment has mufflers and is in good condition, no holes, etc.).
- Either low-pressure steam blows or a temporary blowout silencer will be used, and steam blows will be limited to daylight hours (7 a.m. to 7 p.m.)

2.2.4.2 Air Quality

Pollutant emissions during the construction period will consist of fugitive dust from excavation activities and vehicle exhaust both from onsite vehicles and from workers commuting to and from the site. Construction activities will be a temporary source of emissions and will not result in a significant impact to ambient air quality.

Common construction management measures will control dust from construction activities. These measures will include spraying the dust with water and washing vehicle wheels to mitigate dust traveling offsite. Dust from access roads will be controlled by use of aggregate and by watering as necessary to control dust during construction.

2.2.4.3 Gas Facilities

Gas Connections

The gas connections connecting the M/R station to the generation plant combustion turbines will be approximately 200 to 300 feet long. Therefore, construction impacts will be insignificant and managed as part of the plant construction.

The volume of water needed for hydrotesting the two pipeline connections will be approximately 4, 350 gallons. The water quality will be tested and must meet water quality standards of a State Waste Discharge Permit before the water is routed to the oil-water separator and then to the infiltration/evaporation pond. If the water does not meet water quality standards, it will be disposed of offsite at an approved disposal site by a licensed contractor.

M/R Station

The M/R station will be located on the Applicant's property and designed to comply with U.S. Department of Transportation (DOT), 49 *Code of Federal Regulations* (CFR), Part 192, DOT Office of Pipeline Safety, state and federal Occupational Safety and Health Administration (OSHA), and FERC environmental regulations. GTN's safety director reviews construction contractors site-specific safety and health plans and their DOT drug and alcohol policies. A resident inspector will be stationed at the job site. Part of this inspector's responsibilities will be to monitor safety performance by the construction contractor. In addition, GTN will provide a safety orientation conference with all contractor personnel regarding GTN safety requirements.

The M/R station will be constructed by contractors hired by GTN, in coordination with the generation plant construction activities and schedule. Stormwater and spill prevention management will be incorporated into the plans for the generation plant site. Laydown and staging areas and parking for construction workers will be the same as for the generation plant.

M/R station construction will include site grading, foundation work, and the erection of the metal meter building, including a building crane. Piping components (including the pipe, meters, and regulation) will be shop-fabricated where possible and trucked to the site. Final pipe spool fabrication will be by site personnel. Electrical interconnections will be performed onsite, with interconnection to a skid-mounted control building. This control building will be fabricated offsite and trucked in. The building will have all electrical racks and equipment installed and pretested as much as possible. Interior paneling and insulation will be installed onsite after local building code inspection (based on GTN's proposed Scope of Work, May 2001).

Gas Lateral

The gas lateral will connect into the gas mainline on Corps property and extend about 1,200 feet to the M/R station. It will be designed to meet DOT 192 regulations that define seismic engineering for pipelines. Risk of soil shifting, the pipe lay, and stress monitoring

with strain gauges in seismically sensitive areas will be addressed as required. UBCs with seismic design requirements for the localized design criteria are incorporated into all building structures and into the design of the piping support system located above grade (John Clemson, pers. comm.).

Before construction, GTN's operations personnel will mark the pipeline for excavation above grade through the use of pipe detectors. The gas lateral will be constructed by GTN contractors and coordinated with the generation plant construction activities. The contractor selected will have a completed site-specific safety and health plan before beginning work. The contractor will also have a random drug and alcohol policy and plan in effect in accordance with DOT regulations (John Clemson, pers. comm.).

Prior to excavation, the local One Call system will be notified, with all underground utilities in the area marked. GTN personnel will research the locations of the nearest mainline valves and prepare a procedure for the venting and evacuating of the pipeline. Senior operations management will approve this procedure (John Clemson, pers. comm.).

Contractor personnel will excavate the area near the pipeline in accordance with existing GTN company operating procedures, and GTN personnel will witness the excavation (John Clemson, pers. comm.).

Construction gases, including those used for welding and cutting (oxygen/acetylene) and for testing (nitrogen), will be stored onsite in accordance with OSHA regulations. It is unlikely that more than 500 cubic feet will be stored in bottles onsite at any given time (John Clemson, pers. comm.).

GTN will prepare an SPCC Plan for mainline and lateral construction. This document will specify how contractors will handle liquid wastes and spillable materials, including disposal of fuels and liquid waste. Included will be proper vehicle refueling methods, processes for the proper cleanup of spills, and GTN contacts (John Clemson, pers. comm.).

GTN personnel will ensure that the pipeline, once it has been blown down, has been evacuated of gas and is safe to cut and remove. The new, pretested mainline valve and branch lines with valving will be installed and tested, and the pipeline will then be placed back into service (John Clemson, pers. comm.).

Construction will include delivering the pipe via truck and then offloading and inspecting the pipe. While the pipe is being offloaded and inspected, the pipeline contractor will be clearing and grading the ROW, including topsoil separation where required. Ditching will follow, using a conventional trencher or excavators. After ditching, the pipe will be placed in the work area where it will be aligned and welded; the welds will then be X-rayed, and the field joint coating and pipeline coating inspections completed. Following this operation, the pipe will be lowered in the ditch and backfilled, followed by hydrotesting. The volume of water needed for hydrotesting of the lateral will be approximately 7,100 gallons. The water quality will be tested and must meet water quality standards of a State Waste Discharge Permit before the water is discharged to the oil-water separator and then to the infiltration/evaporation pond. If the water does not meet water quality standards, it will be disposed of offsite at an approved disposal site by a licensed contractor. The work area will then be cleaned up, with large rocks removed and signage installed. No wetlands will be

subjected to fill, and any fill materials required for padding will be imported from local sand and gravel yards or quarries (based on GTN's proposed Scope of Work, May 2001).

2.2.4.4 Transmission Line and Switchyard

BPA will construct the transmission line and switchyard. Construction will include preparing the sites for placement of the transmission line towers and access roads, preparing the site for the switchyard, installing equipment, and covering access roads and switchyard surface areas with aggregate. Natural vegetation will be reseeded under the transmission lines (Phil Smith, pers. comm.).

Emissions of pollutants during the construction period will consist of fugitive dust from excavation activities and vehicle exhaust both from onsite vehicles and from workers commuting to and from the site. Construction activities will be a temporary source of emissions and will not result in a significant impact to ambient air quality (Phil Smith, pers. comm.).

Personnel working on the switchyard construction will park at the designated parking area for generation plant workers on the northwest side of the transmission lines that bisect the Applicant's property. Transmission line workers will not have a designated parking area and will be dispersed along the ROW, although they may meet at a central location before traveling in construction vehicles to individual construction sites along the transmission line (Phil Smith, pers. comm.).

Transmission towers will be lattice steel structures that are anchored to the ground at four points requiring footings. The design of the footing varies in response to such factors as soil properties, bedrock depth, and the soundness of bedrock encountered. Typically, towers are attached to steel plates or grillages that are placed within an excavation and backfilled with either the originally excavated material or concrete. Conductors are attached to towers by means of glass, porcelain, or polymer insulators. Materials will be stored at an offsite central storage facility and hauled by truck to the construction sites (Phil Smith, pers. comm.).

The new switchyard for the SPP and switchyard modifications at Lower Monumental Dam will generally require the following:

- Installation of underground conduit runs and a grounding system
- Assembly and erection of metal equipment supports and dead-end towers
- Installation of such electrical equipment as circuit breakers and buses
- Installation of a metal chain-link fence around the periphery of the switchyard yard

In addition, a permanent entrance road (connecting the switchyard facility to the northernmost generation plant access road) and a control house will be constructed at the new switchyard for the SPP (Phil Smith, pers. comm.).

Additional design information related to footings or other foundation structures for the transmission lines is not yet available from BPA. This information includes dimensions, depths of installation, foundation locations for towers (plan view and cross section), width of the construction corridor, and erosion control structures (if needed). More information on transmission line construction will be available in the joint NEPA/SEPA EIS.

2.2.5 Operation and Maintenance

2.2.5.1 Generation Plant Operating Characteristics/Heat Dissipation

Peak fuel gas requirements for the generation plant will include peak gas loads defined as approximately 8.4 million standard cubic feet per hour (MMSCFH) with duct firing. Maximum turbine load will be four units on a gas consumption of 2.05 MMSCFH (each). Minimum turbine load is for one turbine on a gas consumption rate of 0.348 MMSCFH (each). There will not be an auxiliary boiler at this plant site, nor will there be any fuel gas for utility use such as space heating or water heating.

The proposed combined-cycle plant is based on proven technology and is designed for production efficiencies. The plant is designed to recover waste heat in the exhaust gases of each CGT to generate additional power (see Figure 2.2-11 and the Performance Data in Attachment A at the end of Section 2 that explain operating parameters).

The generation plant will be a combined-cycle plant consisting of two combined-cycle blocks. Each block will consist of two Siemens Westinghouse Power Corporation (SWPC) 501F CGTs equipped with inlet air foggers or evaporative coolers; two three-pressure HRSGs; a reheat STG that will have throttle conditions of 2257 pounds per square inch absolute (psia) and 1,050 degrees Fahrenheit (°F); and an air–cooled condenser.

The exhaust gases will exit from the CGT and flow directly to the HRSGs, where the heat from the exhaust gases will be used to generate steam. The HRSGs will also be equipped with natural-gas-fired duct burners that can be used, at the discretion of plant operators, to add heat to increase the HRSGs' steam-generating capability.

The CGTs will accept pipeline-quality gas, which will be burned in a dry, low NO_x (DLN) combustor. The DLN combustor will be capable of burning natural gas while emitting low levels of NO_x and carbon monoxide (CO) to the atmosphere. The combustion gases will be expanded through a turbine, which will rotate an alternating current (AC) generator. After expansion through the turbine section of the CGT, the exhaust gas temperatures will still be quite high, at approximately 1,100°F. The energy from this exhaust gas will be recovered by using the heat to generate steam in the HRSGs.

Each HRSG will consist of main steam super-heaters, evaporators, and economizers; reheater super-heaters; intermediate-pressure super-heaters, evaporators and drum, and economizers; and low-pressure super-heaters, evaporators and drums, and economizers. Each HRSG will be equipped with a selective catalytic reduction (SCR) system to control the concentration of NO_x, which are byproducts of the combustion process. The SCR system will inject a mist of diluted ammonia into the exhaust stream before it passes through a catalyst. The ammonia will react with NO_x in the presence of the catalyst to break the NO_x down into nitrogen and water. Each HRSG will also include a CO catalyst reactor section to control CO emissions generated by the CGT.

Each pair of HRSGs in the power block will supply steam at 1,050°F to a STG. Each STG will be of a reheat design, which means that exhaust steam leaving the high-pressure section will be returned to the HRSGs and reheated to increase steam cycle efficiency. The STG will consist of three pressure sections: high-pressure (HP), intermediate-pressure (IP), and low-pressure (LP) sections. Within the STG, the steam will expand through the high-pressure

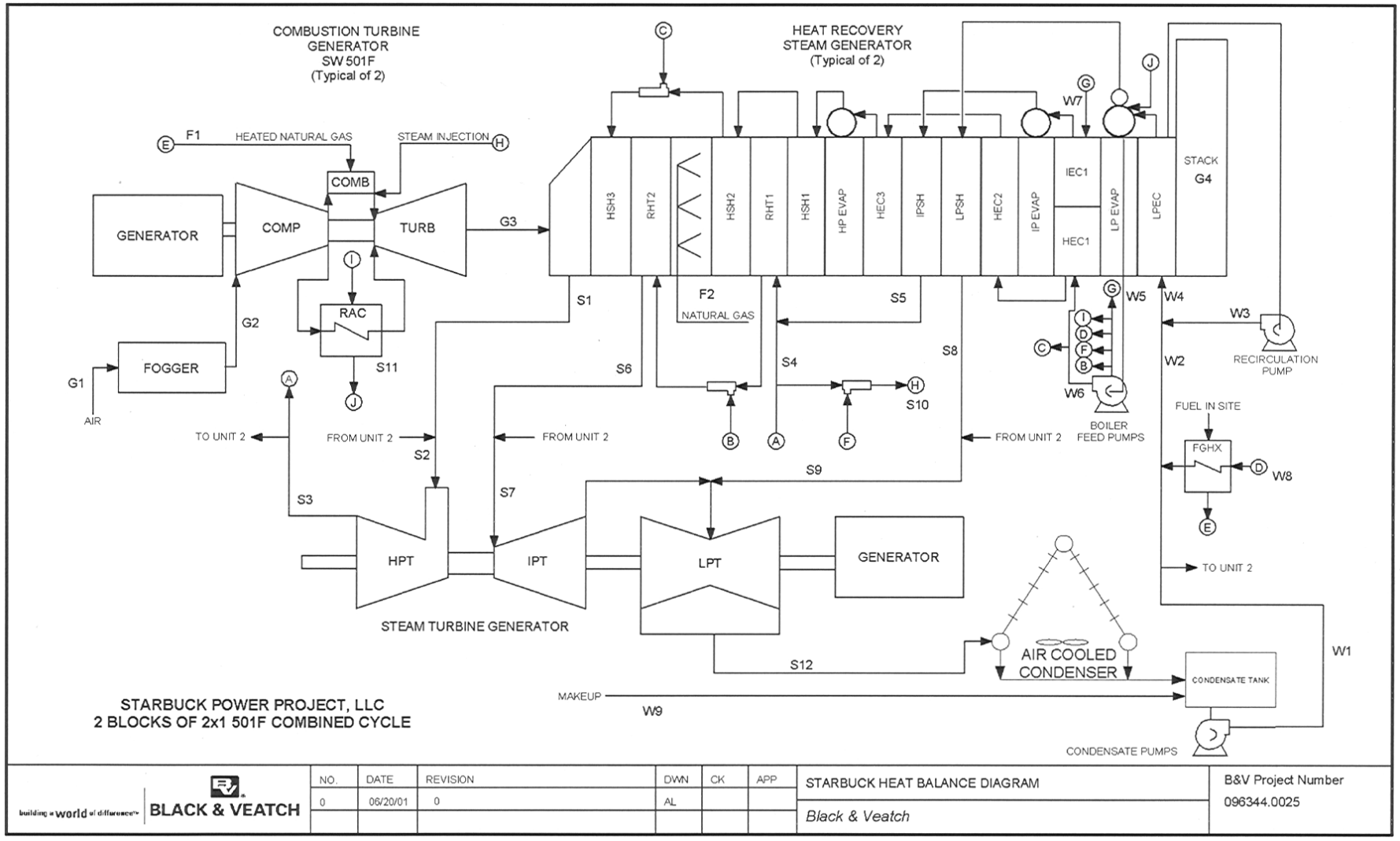


FIGURE 2.2-11
Heat Balance
Application for Site Certification
STARBUCK POWER PROJECT
STARBUCK, WASHINGTON

turbine section. The expansion in the turbine will convert the thermal energy in the steam into mechanical work (used to rotate a shaft), and a generator will convert the mechanical work of the shaft into electrical energy. After the steam has expanded through the high-pressure section, it will be sent back to the HRSGs and heated in the reheater section to 1,050°F. The reheat steam will then be sent back to the STG for admission to the IP turbine section. After the steam has expanded through the IP turbine section, LP steam from the HRSGs will be admitted into the turbine casing for expansion through the LP section. After the steam has expanded through the LP section of the STG, it will be ducted to the air-cooled condenser (ACC) so that the remaining energy can be rejected to the atmosphere, allowing the steam to condense into water for pumping back to the HRSGs to begin the process anew.

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

As the water in this type of closed system circulates, impurities in the water concentrate in the system. To minimize the precipitation of solids and formation of scale, a small quantity (29 gpm per block, or 58 gpm total) of water will be removed from the cycle ("blowdown"), recovered, and reused. To maintain the appropriate amount of water in the steam production cycle, demineralized makeup water will be added after blowdown removal.

To reduce the concentration of dissolved solids as well as corrosion products, the condensate in the closed system will be routed through a condensate "polisher" to remove the solids (corrosion products and dissolved solids) to reduce the potential of deposition and scaling in the cycle. Total water usage for the generation plant is expected to be up to 300 gpm, or 432,000 gpd. The water well will have a meter to measure water withdrawal from the well to ensure that water withdrawal does not exceed water right permit requirements.

Each power block will be equipped with a 100 percent steam turbine bypass system that will bypass steam to the air-cooled condenser during startup or in the event of a sudden load rejection.

The CGTs will be equipped with foggers. When the foggers are used (only during the summer when outside temperatures are hot), the incoming air will be misted in the inlet of the CGTs for up to 8 hours a day (depending on water availability). The mist will evaporate and go out through the stack without creating any discharge. The fogging system will atomize demineralized water in the inlet air duct. The atomized water droplets will be evaporated by the air. The evaporation process will lower the air temperature, which will increase the electrical output from the CGT. The water evaporated into the inlet air will not be recovered but will pass through the HRSG and eventually be lost out the stack.

The Starbuck generation plant cycle will include steam injection into the combustion turbines for power augmentation and supplemental firing of the HRSGs via burners mounted in the exhaust gas stream, which will burn natural gas. When the plant operates part-time in an unfired state, the steam production will be only the result of exhaust heat from the CGTs. However, during high-load requirement periods, the duct burners will be fired to allow increased steam production and more output from the STGs. If additional demand is required, then some of the cold reheat steam will be sent to the combustion turbines (steam injection) for power augmentation. This will further increase the net plant output. The demand of water for steam injection will be approximately 240 gpm per CGT. The use of a 500,000-gallon storage tank means there will be ample supply to allow approximately 5.5 hours of power augmentation during the hottest day. The tank will then need to be replenished (using the plant water supply) for the next 18.5 hours before it can begin power augmentation for another 5.5 hours.

2.2.5.2 Air Emission Controls

Regulatory Requirements

The generation plant is subject to the following New Source Review (NSR) requirements: prevention of significant deterioration (PSD) rules and notice of construction (NOC) requirements, 463-42-385 WAC (PSD Application), 40 CFR 52.21 (PSD rules), 173-400-113 WAC (NSR requirements, adopted by reference in 463-39-005 WAC), and 173-460-040 WAC (NSR requirements for toxic air pollutant sources). Emissions of particulate matter (PM), particulate matter less than 10 microns in diameter (PM_{10}), sulfur dioxide (SO_2), CO, NO_X, volatile organic compounds (VOCs), and toxic air pollutants (TAPs) are subject to NSR review. The NSR regulations require application of best available control technology (BACT) for each regulated air pollutant or toxic air pollutant having the potential to emit above the significant emission thresholds. The source also is required to demonstrate that the allowable emission increases will not cause an exceedance of the ambient air quality standards, PSD air increments, and Acceptable Source Impact Levels (ASIL). Appendix G includes the combined PSD and NOC Permit Application.

Applicable Emission Standards and Emissions Impacts

40 CFR 60, Subpart GG provides the standards of performance for stationary gas turbines. The *New Source Performance Standards* (NSPS) limit the SO_2 emissions in the exhaust gas to less than 0.015 percent by volume at 15 percent oxygen on a dry basis. The standards also restrict burning of any fuel that contains sulfur in excess of 0.8 percent by weight in a stationary gas turbine. The emissions of NO_X also are restricted on the basis of formulae provided in 40 CFR 60.332(a), which consider the heat rate and load of the gas turbine and the NO_X emission allowance for fuel-bound nitrogen. However, the emission limits for NO_X and SO_2 (based on the use of BACT) are much more stringent than the emission limits provided in the NSPS. As shown in Appendix G, the proposed emission limits for NO_X and SO_2 emissions from the combustion turbines at the generation plant after the application of BACT are much lower than the emission limits allowed per the NSPS.

When the duct burners are in operation, the HRSGs are subject to the requirements of 40 CFR 60, Subpart Da, Standards of Performance for Electric Utility Steam Generating Units for which Construction is Commenced After September 18, 1978. The duct burners will burn natural gas only and will not burn any solid, liquid, or other gaseous fuel. The standards limit PM emissions to less than 13 nanograms per joule (ng/J) or 0.03 pound per

million British thermal units (lb/million Btu) heat input. The standards also limit SO_2 and NO_X emissions to less than 0.20 lb/million Btu heat input. These limits do not apply during periods of startup, shutdown, or malfunction. Emissions from the duct burners will combine with the emissions from the combustion turbines and generally will be controlled using the same control technology that will be used for controlling emissions from the combustion turbines. As shown in Appendix G, the proposed emission limits for PM, NO_X, and SO_2 for combined emissions from combustion turbines and duct burners after the BACT has been applied are much lower than the emission limits allowed per the NSPS. More information on the heat input or output of the duct burners is found in the performance spreadsheet in Attachment I to Appendix G.

Ecology also has established emission limits. 173-400-040 WAC provides the general standards for maximum emissions from various sources and emission units. Visible emissions generally should be less than 20 percent opacity (except for 3 minutes in any 1 hour), and SO_2 content in the exhaust gas should not be more than 1,000 parts per million (ppm) on a dry basis, corrected to 7 percent oxygen, and based on an hourly average. 173-400-040 WAC also establishes standards for PM fallout, fugitive emissions, and odors. 173-400-050 WAC provides the emission standards for combustion and incineration units. The PM emissions are limited to 0.1 grain per dry standard cubic foot (gr/dscf) or 0.23 gram per dry cubic meter (g/m^3) at standard conditions, corrected to 7 percent oxygen. As shown in Appendix G, the PM and SO_2 emissions from all emission units at the generation plant are proposed to be well below the emission limits provided in 173-400-040 WAC and 173-400-050 WAC .

Ambient Air Quality Standards

The U. S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: NO_X, CO, SO_2, ozone (O_3), PM_{10}, and lead (Pb). These six pollutants have been assigned a primary standard that defines the levels of air quality that EPA has determined to be necessary for protecting the public health with an adequate margin of safety. Some of the pollutants have been assigned a secondary standard that defines a level for protection of public welfare from any known or anticipated adverse effects of a pollutant. The NAAQS established by EPA are provided in 40 CFR 50.

Ecology also has ambient air quality standards for PM, sulfur oxides (SO_X), radionuclides, and fluorides, which are provided in 173-470 WAC, 173-474 WAC, 173-480 WAC, and 173-481 WAC, respectively. State ambient air quality standards must be at least as stringent as the NAAQS, and they can be more stringent.

Ambient Air Increments

PSD regulations have established ambient air increments, which limit the increase in pollutant concentration over the baseline concentration for PM_{10}, SO_2, and NO_2. Ambient air increments have been established for three land classifications: areas designated as Class I, Class II, or Class III. The most stringent ambient air increments apply to Class I areas, which include wilderness areas and national parks.

Air Emissions Information

Criteria Pollutant Emissions

Combustion of natural gas in the combustion turbines and duct burners associated with the HRSGs will result in emissions of PM, PM_{10}, NO_X, SO_2, CO, and VOCs. The use of selective

catalytic reduction (SCR) as a control technology for NO_X will result in ammonia (NH_3) emissions that, in turn, will result in emissions of additional PM in the form of ammonium bisulfate [$2(NH_4(SO_4))$]. The use of an oxidation catalyst for control of CO emissions may result in oxidation of some of the SO_2 to sulfur trioxide, which combines with water to form sulfuric acid (H_2SO_4) mist.

Table 2.2-2 summarizes the emissions of criteria pollutants from the combustion turbines and duct burners associated with the HRSGs under different operating conditions. Table 2.2-2 identifies a total of 13 operating scenarios and also provides details of projected emission rates for NH_3, H_2SO_4 mist, unburned hydrocarbons (UHC), and PM in the form of $2(NH_4(SO_4))$.

In addition, combustion of diesel fuel in the fire pump will also result in emissions of PM, PM_{10}, NO_X, SO_2, CO, and VOCs. The maximum hours of operation for the diesel fire pump are 1 hour per day, with an annual limit of 10 hours per year. Table 2.2-3 summarizes the emissions of criteria pollutants resulting from combustion of diesel fuel in the fire pump.

TABLE 2.2-3
Criteria Pollutant Emissions from Diesel-Fuel-Fired Fire Pump

Parameter	Value
NO_X Emission Rate (as NO_2)	3.91 lb/hr
CO Emission Rate	0.17 lb/hr
SO_X Emission Rate (as SO_2) [a]	0.10 lb/hr
PM_{10} Emission Rate	0.04 lb/hr
PM Emission Rate	0.04 lb/hr
VOC Emission Rate [b]	0.13 lb/hr
UHC Emission Rate	0.13 lb/hr

Notes:
[a] Based on maximum fuel flow rate of 14.2 gal/hr, density of 7.1 lb/gal for diesel, 0.05% sulfur content in diesel, and conversion of all sulfur to SO_2.
[b] VOC emission rate is assumed to be the same as UHC emission rate.

Toxic Air Pollutant and Hazardous Air Pollutant Emissions

The generation plant has the potential to emit small quantities of TAPs and hazardous air pollutants (HAPs) that are regulated by Ecology and EPA. Various organic compounds associated with the combustion of natural gas will be released into the atmosphere from the stacks associated with combustion turbines. The use of SCR as the BACT for controlling NO_X emissions from combustion turbines and duct burners will result in ammonia emissions. The use of an oxidation catalyst for controlling CO emissions will result in oxidation of some of the SO_2 to sulfur trioxide, which combines with water to form H_2SO_4 mist. However, the use of an oxidation catalyst will also result in oxidation of some of the TAPs

TABLE 2.2-2
Criteria Pollutant Emissions from Combustion Turbines and Heat Recovery Steam Generators under Different Operating Conditions

	Scenario												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Parameter	**Operating Condition**												
HRSG Duct Firing	Fired Natural Gas	Unfired	Fired Natural Gas	Fired Natural Gas	Unfired	Fired Natural Gas	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired
Ambient Temperature (°F)	101	101	51.1	51.1	51.1	-20	-20	-20	-20	51.1	51.1	101	101
Inlet fogging Included	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No
Steam Injection Included	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No
CTG Load Level (percent of base load)	100%	100%	100%	100%	100%	100%	100%	85%	70%	85%	70%	85%	70%
Pollutant	**Emission Rate**												
NO_X (lb/hr as NO_2 with SCR)	19.1	15.7	19.8	19.0	16.6	21.0	18.6	16.4	14.1	14.5	12.5	12.6	11.1
NH_3 slip (lb/hr with SCR)	28.3	23.2	29.4	28.2	24.5	31.1	27.5	24.3	20.8	21.4	18.5	18.7	16.5
CO (lb/hr with catalyst)	21.3	15.2	21.9	21.7	16.1	23.6	18.1	16.0	13.7	14.1	12.2	12.3	10.8
H_2SO_4 mist (lb/hr)	1.18	1.05	1.24	1.23	1.12	1.36	1.25	1.12	0.97	0.99	0.86	0.87	0.77
SO_2 (lb/hr)	3.68	2.96	3.81	3.63	3.13	4.01	3.51	3.09	2.64	2.72	2.34	2.38	2.09
UHC (lb/hr as CH_4)	25.8	10.5	25.7	27.7	11.1	28.8	12.4	11.0	9.4	9.7	8.3	8.5	7.4
VOC (lb/hr as CH_4)	8.9	2.6	8.5	9.4	2.8	9.9	3.1	2.7	2.4	2.4	2.1	2.1	1.9
PM (lb/hr) [front and back excluding $2(NH_4(SO_4))$]	24.8	20.0	24.6	25.5	20.0	25.4	20.0	20.0	20.0	20.0	20.0	20.0	20.0
PM_{10} (lb/hr) [front and back excluding $2(NH_4(SO_4))$]	24.8	20.0	23.7	24.4	20.0	25.4	20.0	20.0	20.0	20.0	20.0	20.0	20.0
$2(NH_4(SO_4))$ (lb/hr)	1.58	1.41	1.67	1.66	1.50	1.84	1.69	1.51	1.30	1.34	1.16	1.18	1.04

CH_4 = methane.

and HAPs that are formed as a result of natural gas combustion in the CGTs and duct burners associated with the HRSGs.

HAPs will also be emitted as a result of the combustion of natural gas in the duct burners associated with the HRSGs and from the combustion of diesel fuel in the fire pump.

Table 2.2-4 summarizes TAP and HAP emissions from the combustion turbines and duct burners associated with the HRSGs and the diesel-fuel-fired fire pump. The table shows that the plant will not have the potential to emit more than 10 tons per year or more of any HAP or 25 tons per year or more of any combination of HAPs, and therefore does not qualify as a "major source" of HAPs.

2.2.5.3 Air Quality Impacts

An air quality impact assessment was conducted to evaluate the generation plant's compliance with applicable regulatory requirements. The assessment was conducted through an air quality modeling analysis and is described in detail in Appendix G.

The air quality modeling was conducted using standard EPA modeling techniques and meteorological data collected at the site. Results were compared with EPA criteria, including state and federal ambient air quality standards, PSD Class I and Class II increments, and Washington ASIL.

The dispersion modeling analysis for a PSD permit application generally involves two phases: a preliminary analysis and a full impact analysis. The preliminary analysis models only the relevant increase from the proposed new source itself. The full impact analysis expands the preliminary analysis to consider emissions from the proposed source, existing sources in the area, and consideration of background concentrations. Because there is only one source located within approximately 35 miles (50 kilometers [km]) of the site, this source was included in the preliminary impact analysis.

Table 2.2-5 summarizes the results of the criteria pollutant air quality analysis, showing that impacts are all well below the ambient standards. Impacts are below the applicable EPA screening levels for CO and SO_2. With the addition of conservative background concentrations, impacts for 24-hour PM_{10}, annual PM_{10}, and NO_X are well below the applicable ambient air quality standards and PSD increments.

TABLE 2.2-4
Summary of TAP and HAP Emissions from Combustion Turbines, Duct Burners Associated with HRSGs, and Diesel-Fuel-Fired Fire Pump

Pollutant	HRSG Emission Factor (lb/10^6 scf)	Maximum Short-Term Emission Rate per HRSG (lb/hr)	Combustion Turbine Emission Factor (lb/MMBtu)	Maximum Short-Term Emission Rate per Combustion Turbine (lb/hr)	Fire Pump Emission Factor (lb/MMBtu)	Maximum Short-Term Emission Rate for Fire Pump (lb/hr)	Maximum Annual Emission Rate for All Four Combustion Turbines and HRSGs and Fire Pump (tons/yr)
Ammonia	--	--	--	31.1 [a]	--	--	544.87
Sulfuric Acid Mist	--	--	--	1.36 [a]	--	--	23.83
Acetaldehyde	--	--	2.0 E-05	4.16 E-02	7.67 E-04	1.53 E-03	7.29 E-01
Acrolein	--	--	3.2 E-06	6.66 E-03	--	--	1.17 E-01
Ethylbenzene	--	--	1.6 E-05	3.33 E-02	--	--	5.83 E-01
PAH	2.59 E-05	7.01 E-06	1.1 E-06	2.29 E-03	1.68 E-04	3.36 E-04	4.02 E-02
Xylenes	--	--	3.2 E-05	6.66 E-02	2.85 E-04	5.70 E-04	1.17
2-Methylnaphthalene [b]	1.2 E-05	3.25 E-06	--	--	--	--	5.69 E-05
Anthracene [b]	--	--	--	--	1.87 E-06	3.74 E-06	1.87 E-08
Benzo(a)anthracene	--	--	--	--	1.68 E-06	3.36 E-06	1.68 E-08
Benzene	1.05 E-03	2.84 E-04	6.0 E-06	1.25 E-02	9.33 E-04	1.87 E-03	2.24 E-01
Chrysene [b]	--	--	--	--	3.53 E-07	7.06 E-07	3.53 E-09
Dichlorobenzene	6.0 E-04	1.62 E-04	--	--	--	--	2.84 E-03
Fluoranthene [b]	1.5 E-06	4.06 E-07	--	--	7.61 E-06	1.52 E-05	7.18 E-06
Fluorene [b]	1.4 E-06	3.79 E-07	--	--	2.92 E-05	5.84 E-05	6.93-E-06
Formaldehyde	1.125 E-02	3.04 E-03	1.065 E-04	2.22 E-01	1.18 E-03	2.36 E-03	3.93
Hexane	9.0 E-01	2.43 E-01	--	--	--	--	4.27
Napththalene	3.05 E-04	8.25 E-05	6.5 E-07	1.35 E-03	8.48 E-05	1.70 E-04	2.51 E-02
Phenanathrene [b]	8.5 E-06	2.30 E-06	--	--	2.94 E-05	5.88 E-05	4.06 E-05
Pyrene [b]	2.5 E-06	6.76 E-07	--	--	4.78 E-06	9.56 E-06	1.19 E-05
Toluene	1.7 E-03	4.60 E-04	6.5 E-05	1.35 E-01	4.09 E-04	8.18 E-04	2.38
Total HAP Emissions (Includes acetaldehyde, acrolein, ethylbenzene, PAH, xylenes, benzo(a)anthracene, benzene, dichlorobenzene, formaldehyde, hexane, naphthalene, and toluene)							1.35 E+01

[a] Maximum short-term emission rate for ammonia and sulfuric acid mist in lb/hr is per combustion turbine and HRSG.
[b] Not identified as a Class A TAP in 173-460-150 WAC or as a Class B TAP in 173-460-160 WAC. Emissions of these pollutants are represented in the emission factor for PAH.

TABLE 2.2-5
Results of Criteria Pollutant Air Quality Analysis

Pollutant	Averaging Period	Maximum Predicted Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	Ambient Air Quality Standard ($\mu g/m^3$)	PSD Class II Increment ($\mu g/m^3$)
NO_X	Annual	1.8	11	12.8	100	25
CO	1-Hour	129.8	NA	NA	40,000	NA
CO	8-Hour	31.6	NA	NA	10,000	NA
SO_2	3-Hour	9.3	NA	NA	1,300	512
SO_2	24-Hour	1.9	NA	NA	365	91
SO_2	Annual	0.3	NA	NA	80	20
PM_{10}	24-Hour	13.5	114	127.5	150	30
PM_{10}	Annual	2.1	28.8	30.9	50	17

Abbreviations:
CO = Carbon monoxide.
NO_X = Oxides of nitrogen.
PM_{10} = Particulate matter.
PSD = Prevention of significant deterioration.
SO_2 = Sulfur dioxide.
$\mu g/m^3$ = Micrograms per cubic meter.
NA = Not applicable (because the maximum predicted concentration is below the significant impact level).

Class I PSD Increment

PSD requires that impacts to Class I areas be evaluated. Recent guidance provided by federal land managers and the state air agency staff recommends that impacts to all Class I areas up to 200 km from the source be analyzed. Eagle Cap Wilderness Area, Hells Canyon Wilderness Area, and the Spokane Indian Reservation are Class I areas within 200 km of the site at distances of approximately 132, 140, and 140 km, respectively. The Class I analysis evaluates PSD Class I increments and visibility and sulfate and nitrate deposition.

Table 2.2-6 provides the results of the Class I PSD increment analysis. The maximum PSD increment is well below proposed Class I significance levels for all criteria pollutants in all Class I areas.

TABLE 2.2-6
Class I Ambient Air Quality Results for the Generation Plant

Area	SO_2 Annual ($\mu g/m^3$)	SO_2 24-hour ($\mu g/m^3$)	SO_2 3-hour ($\mu g/m^3$)	PM_{10} Annual ($\mu g/m^3$)	PM_{10} 24-hour ($\mu g/m^3$)	NO_X Annual ($\mu g/m^3$)
Eagle Cap Wilderness Area	8.0E-05	2.8E-03	1.2E-02	7.8E-04	2.0E-02	8.8E-05
Hells Canyon Wilderness Area	1.2E-04	2.6E-03	1.1E-02	1.1E-03	2.0E-02	2.1E-04
Spokane Indian Reservation	2.4E-04	1.1E-02	3.6E-02	2.0E-03	9.0E-02	5.5E-04
EPA Class I Significance Level	**0.1**	**0.2**	**1.0**	**0.2**	**0.3**	**0.1**
Class I Increment	**2**	**5**	**25**	**4**	**8**	**2.5**

Abbreviations:
EPA = U.S. Environmental Protection Agency.
NO_X = Oxides of nitrogen.
PM_{10} = Particulates less than 10 microns in diameter.
SO_2 = Sulfur dioxide.
$\mu g/m^3$ = Micrograms per cubic meter.

Visibility Impacts

Visibility impacts for each Class I area are presented in Table 2.2-7. As shown, impacts are less than the 5 percent change in extinction coefficient guidance criteria for each Class I area.

TABLE 2.2-7
Visibility Analysis Results
Maximum Percent Extinction Change

Area	Day	Year	Receptor Coordinate X (km)*	Receptor Coordinate Y (km)*	b_{ext} Modeled (1/Mm)	b_{ext} Background (1/Mm)	Extinction Change (percent)
Eagle Cap Wilderness Area	263	1998	303.907	-78.598	0.066	16.757	0.4
Hells Canyon Wilderness Area	291	1998	332.512	-12.00	0.138	17.451	0.79
Spokane Indian Reservation	344	1998	229.7	206.983	0.313	16.662	1.88

* Lambert conformal coordinate system with a reference north latitude of 46° and a reference west longitude of 121° and standard parallels of 42.5 and 48° north latitude and standard meridian of 121° west longitude.

b_{ext} = atmospheric light extinction.
Mm = megameter.

Deposition Impacts

Deposition results for nitrogen and sulfur are summarized in Table 2.2-8 for each Class I area. Incremental deposition rates attributable to the generation plant are less than 5 grams per hectare per year (g/ha/yr) for nitrogen and 3 g/ha/yr for sulfur at each Class I area. These rates are considered insignificant.

TABLE 2.2-8
Summary of Total Nitrogen (N) and Sulfur (S) Deposition Results

	Total N (g/ha/yr)	Total S (g/ha/yr)
Eagle Cap Wilderness Area	0.3	0.1
Hells Canyon Wilderness Area	0.2	0.1
Spokane Indian Reservation	0.5	0.2

g/ha/yr = grams per hectare per year.

Hazardous Air Pollutant Regulations

173-400-075 WAC provides the emission standards for sources emitting HAPs. The section adopts, by reference, the National Emission Standards for Hazardous Air Pollutants (NESHAP) provided in 40 CFR 61 and the maximum achievable control technology (MACT) standards provided in 40 CFR 63. EPA has proposed to delegate authority to implement these standards to Ecology, but the proposal is not yet final, so certain federal HAP regulations still apply directly.

Maximum potential HAP emissions from various emission units at the generation plant are less than 10 tons per year for a single HAP and less than 25 tons per year for a combination of HAPs. Therefore, the plant does not meet the definition of "major source," and does not

trigger the MACT standard regulations in 40 CFR 63. This also means that the case-by-case MACT requirements under Section 112(g) and 112(j) of the Clean Air Act and 40 CFR 63.42 do not apply to this proposal. The NESHAPs provided in 40 CFR 61 also are not applicable to the various emission units at the generation plant.

Toxic Air Pollutant Regulations

New sources emitting TAPs are subject to the requirements of 173-460 WAC. TAPs include carcinogens and noncarcinogens listed in 173-460-150 WAC and 173-460-160 WAC. The ASIL for the various Class A and Class B TAPs also are provided in 173-460-150 WAC and 173-460-160 WAC. The risk-based ASIL for a Class A TAP is defined as an annual average concentration that may cause an increased cancer risk of 1 in 1 million. ASILs for some of the Class A TAPs are based on 24-hour average concentrations instead of annual average concentrations. The threshold-based ASIL for a Class B TAP is determined by dividing the worker exposure limit (threshold limit value-time weighted average [TLV-TWA]) by 300. All of the ASILs for Class B TAPs are based on 24-hour average concentrations.

New sources emitting TAPs are required to use the BACT for toxics (T-BACT) for controlling emissions of the TAPs. In addition, the source is required to demonstrate that the TAP emissions after use of T-BACT are sufficiently low to protect human health and safety from potential carcinogenic or other toxic effects.

Toxic Air Pollutants

An acceptable source impact analysis is required for compounds with emissions greater than threshold levels to demonstrate that impacts from TAP emissions from the new source for these compounds are sufficiently low to protect human health and safety from potential carcinogenic or other toxic effects (173-460-070 and –080 WAC, adopted by reference in 463-39-005(4) WAC). The TAP impact analysis conducted for the generation plant shows that all concentrations are less than the appropriate ASIL for each air toxic compound analyzed. Table 2.2-9 summarizes the results of the toxics analysis.

TABLE 2.2-9
Results from Toxic Air Pollutants Analysis *

Pollutant	Averaging Period	Maximum Predicted Concentration ($\mu g/m^3$)	Acceptable Source Impact Level ($\mu g/m^3$)
Acetaldehyde	Annual	0.02884	0.45
Polycyclic Aromatic Hydrocarbons	Annual	0.00037	0.00048
Benzene	Annual	0.00058	0.12
Formaldehyde	Annual	0.06077	0.077
Acrolein	24-Hour	0.00382	0.02
Sulfuric Acid Mist	24-Hour	0.69044	3.3
Ammonia	24-Hour	15.78855	100

* Toxic dispersion modeling analysis for acetaldehyde, PAH, benzene, formaldehyde, and acroleiin will be revised based on the revised emission rates provided in Table 3.2-6. The revised emission rates for acetaldehyde, PAH, formaldehyde, and acrolein are lower, whereas the revised emission rate for benzene is higher.

Greenhouse Gas Emissions

The principal greenhouse gases are carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), tropospheric O_3, and chlorofluorocarbons (CFCs). The "greenhouse effect" refers to the trapping of solar radiation in earth's atmosphere, a consequence of the fact that these gases impede the reradiation of solar energy from the earth's surface more efficiently than they impede incoming solar radiation. Because they are distributed throughout the atmosphere, the net result is similar to that of a global greenhouse. CO_2 released as a result of fossil fuel combustion is believed to be the largest single source contributing to global warming. Fossil-fuel-burning electrical generating facilities produce large quantities of CO_2. An estimate of CO_2 emissions from the proposed generation plant is provided in Section 3.2.

Title 40, CFR 75, Appendix G provides a method for estimating emissions of CO_2 from natural-gas-fired units:

$$W_{CO_2} = \frac{Fc \; x \; H \; x \; U_f \; x \; MW_{CO_2}}{2000}$$

where

W_{CO_2} is CO_2 emitted from combustion in tons per hour (tons/hr)

Fc is carbon-based F-factor (1,040 standard cubic feet per million British thermal units [scf/MMBtu] for natural gas [40 CFR 75, § 3.3.5, Appendix F])

H is hourly heat input rate in million British thermal units per hour (MMBtu/hr)

Uf is 1/385 standard cubic feet of CO_2 per pound mole (scf/lb-mole) at 14.7 psia and 68°F, and

MW_{CO_2} is 44 pounds per pound mole (lb/lb-mole)

The nominal 1,200-MW, natural-gas-fired, combustion-turbine generation plant proposed by the Applicant will consist of two complete and separate combined-cycle power blocks. Each block will consist of two Siemens Westinghouse Model 501°F gas combustion turbines (or equivalent turbines), two HRSGs, one STG, and one air-cooled condenser.

CO_2 emissions were estimated for two scenarios (as described in Section 3.2). Table 2.2-10 summarizes the CO_2 emission rates for each scenario. It is estimated that between 957,000 and 1,100,000 metric tons of carbon equivalent per year will be emitted from the plant.

TABLE 2.2-10
CO_2 Emission Rates Based on Data Provided in Table 3.2-12

Parameter	Condition A	Condition B
Net Plant Power Output (kW)	1,059,428	1,178,134
Net Plant Heat Rate (Btu/kWh) (HHV)	7,000	7,231
Heat Input Rate (MMBtu/hr) [Net Plant Power Output * Net Plant Heat Rate]	7,416	8,519
CO_2 Emission Rate (tons/yr) [1040 * 44 * 8760* Heat Input Rate/(385 * 2000)]	3,860,725	4,434,988
CO_2 Emission Rate (MTCE/yr [tons/yr * 0.909 Metric tons/ton * 12 C/44 CO_2]	957,109	1,099,474

kW = kilowatt.
Btu/kWh = British thermal units per kilowatt-hour.
HHV = High heat value.
MMBtu/hr = Million British thermal units per hour.
MTCE/yr = Metric tons carton equivalent per year.

Permitting Requirements

EFSEC has adopted by reference Ecology permitting regulations in 173-400 WAC, 173-401 WAC, and 173-406 WAC (463-39-005 WAC). 173-400-110 WAC provides the NSR regulations requiring any new source to submit an NOC application and obtain an order of approval before construction begins. 173-400-113 WAC provides the requirements for new sources in attainment or unclassifiable areas and requires the new source to employ BACT for all pollutants whose emissions would increase. Because the generation plant is classified as a new major stationary source, it is subject to PSD requirements. The combined PSD/NOC application is included in Appendix G.

173-401 WAC establishes the requirements for the state air operating permit program consistent with the requirements of Title V of the Clean Air Act (CAA). Per the requirements of 173-401-500(3)(c) WAC, new sources that begin operating after EPA approves the state operating permit program are required to file a complete application to obtain the Chapter 401 permit within 12 months after commencing operation.

173-406 WAC provides the acid rain regulations adopted by Ecology that are consistent with the requirements of Title IV of the CAA. In accordance with the requirements of 173-406-301(2)(b) WAC , the designated representative of the affected source is required to submit a complete acid rain permit application to the permitting authority at least 24 months before the date on which the affected source commences operation.

The air operating permit application and the acid rain permit application are not included as part of this Application. They will be submitted to Ecology at a later date in accordance with the deadlines established in the regulations.

Climate Impacts

The generation plant will use a cooling system consisting of a direct air-cooled condenser. In a direct air-cooled condenser, the steam is piped from the turbine exhaust directly to air-

cooled steam coils. The steam condenses in the coils, with condensate draining to the bottom collection tank. This system eliminates the vapor plume typically associated with cooling towers. Therefore, the generation plant should not result in climate impacts related to plume shadows or ground-level fogging and icing.

Air Quality Control

Dust is not expected to be generated as a routine occurrence during normal operations at the generation plant. Other than compliance with the BACT and T-BACT requirements described above and detailed in Appendix G, no additional mitigation will be required. Good operating practices and procedures will be used to minimize odors from the generation plant.

A more detailed description of emission controls is presented in Section 3.2.1 and in Appendix G.

DLN Combustion

DLN combustors will 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 where the quantity of oxygen in the air introduced into the combustion process is just enough 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 will assist in reducing NO_x production.

SCR

Each HRSG will be furnished with a complete SCR system to control concentrations of NO_X generated by the combustion turbine and duct firing. Aqueous ammonia will be used in the SCR system for NO_X control.

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

Carbon Monoxide Catalyst

Each HRSG will be furnished with an integral CO catalyst reactor section to control CO concentrations generated by the combustion turbine and duct firing. The CO catalyst reactor section will be located in a temperature zone of the HRSG where the CO catalyst reactor will be most effective at all normal operating loads and ambient temperatures.

2.2.5.4 Water Supply Operations

As described in Section 2.2.3.2, the Applicant is awaiting Ecology's recommendation on its 300-gpm water right application that would authorize the proposed onsite well. The Applicant will operate and maintain an onsite well to ensure that water is delivered to the plant. Ongoing operation and maintenance elements will include periodically maintaining pumphouse equipment (such as pumps, valves, and meters), flushing distribution piping, and maintaining the storage tank.

On the generation plant site, water will be piped from the onsite well to two raw bulk water tanks for service/fire-fighting water storage. Each 500,000-gallon storage tank will be designed to retain 240,000 gallons (480,000 gallons total) of water for emergency fire-fighting requirements. The remaining 260,000 gallons in each tank (520,000 gallons total) can be used to supply the mobile demineralization equipment. Demineralized water will be stored in two demineralized-water tanks (each holds 500,000 gallons) before it is reused by the plant. Demineralized water is needed because it lessens and prevents scaling in equipment. No blowdown is discharged; instead, it is treated for reuse in the cycle.

The demineralization system will consist of skid-mounted mobile water treatment equipment rented from a supplier. A contract service agreement will place responsibility with the contractor for changing filters and disposing of spent materials at an approved offsite location. Raw water is expected to be treated by ion exchange demineralization. When the ion exchange resins become exhausted (that is, they can no longer capture and hold the dissolved solids), they will be removed from the system and regenerated offsite.

The water supplied from the onsite well(s) will be used for potable water during operations, and the Applicant will comply with Washington State Group A Public Water System regulations (246-290 WAC). Water quality will meet drinking water standards. Two local wells were analyzed for water quality and compared with that of the Town of Starbuck's water supply well, as well as a monitoring well at the generation plant site (see Table 2.2-11).

All water sources except one meet the drinking water standards set forth by the Washington State Department of Health. The exception is the new onsite monitoring well (B-6) that exceeded maximum contaminant levels for manganese and iron and tested positive for coliform bacteria. This well was not fully developed, and further development could reduce these exceedance levels. It is not unusual to find high levels of manganese and iron in Washington wells, but, because the nearby Columbia County Grain Growers' well and the rental house well are both under detection limits for these parameters, it is also likely that the future production well could be low in both manganese and iron. In addition, as a result of the well construction process, it is not uncommon to have a positive coliform test after a well has been drilled. Usually, disinfection of these newly drilled wells will provide future negative coliform analyses.

This paragraph explains how the water is used in the plant and what happens to it after it is used. Of the total maximum supply available (300 gpm), approximately 290 gpm will go to the raw water/fire storage tank and be routed to the mobile demineralization trailer for treatment. Of that amount, 262 gpm will be used for fogging and/or steam injection and will be evaporated. The remainder of the 290 gpm (28 gpm) will be used in the steam cycle to operate the steam turbines and will be evaporated. Condensate polishing is used in the steam cycle to limit the amount of blowdown required by the steam cycle.

TABLE 2.2-11
Water Source Analyses

WATER SOURCE:
1. Town of Starbuck Source S02
2. Town of Starbuck Source S01
3. Bar-Z Ranch Well
4. Columbia County Grain Growers Well
5. SPP Site Monitoring Well B6

	1	2	3	4	5
Parameter	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Calcium (Ca)	26.7	29.9	29.2	38.6	40.3
Magnesium (Mg)	10.4	11.7	7.7	11.3	16.0
Sodium (Na)	10	10.7	11	18	21
Potassium (K)			3.14	4.86	6.4
Sulfate (SO_4)	3.5	ND	22	29	30
Chloride (Cl)	0.6	ND	< 20	< 20	< 20
Nitrate (NO_3)	0.4	0.5	1.3	2.0	1.3
Nitrite (NO_2)			< 0.1	< 0.1	< 0.1
Total Nitrate/Nitrite-N			1.3	2.0	1.3
Ammonia (as N)			< 1	< 1	< 1
Silica (SiO_2)		27.3	16	18	22
M alkalinity (as $CaCO_3$)	148	150			
Alkalinity (as $CaCO_3$)			78	92	100
Hardness ($CaCO_3$)			107	146	171
Specific Cond. (uS)		308	208	281	468
TDS	300	175	211	242	237
TSS (NTUs)	254	0.3			
Color (units)	0.2	ND	< 5	< 5	60
Turbidity (NTU)	10		0.2	0.1	> 40
Orthophosphate		ND	< 0.1	< 0.1	0.65
Aluminum (Al)			< 0.05	< 0.05	11.3
Antimony (Sb)			< 0.005	< 0.005	< 0.005
Arsenic (As)			< 0.01	< 0.01	0.01
Barium (Ba)	0.0005		< 0.1	< 0.1	0.1
Beryllium (Be)	0.005		< 0.003	< 0.003	< 0.003
Cadmium (Cd)	0.01	ND	< 0.002	0.003	< 0.002
Chromium (Cr)	0.034	ND	< 0.01	< 0.01	0.05
Copper (Cu)		ND	< 0.2	< 0.2	< 0.2
Fluoride (F)		0.5	< 0.5	< 0.5	1.6
Iron (Fe)		0.14	< 0.1	< 0.1	27.4
Lead (Pb)			< 0.002	< 0.002	< 0.002
Manganese (Mn)		ND	< 0.01	< 0.01	0.34
Mercury (Hg)			< 0.0005	< 0.0005	< 0.0005
Nickel (Ni)			< 0.04	< 0.04	< 0.04
Selenium (Se)			< 0.005	< 0.005	< 0.005
Silver (Ag)			< 0.01	< 0.01	< 0.01
Thallium (Tl)			< 0.002	< 0.002	< 0.002

TABLE 2.2-11
Water Source Analyses

WATER SOURCE:
1. Town of Starbuck Source S02
2. Town of Starbuck Source S01
3. Bar-Z Ranch Well
4. Columbia County Grain Growers Well
5. SPP Site Monitoring Well B6

	1	2	3	4	5
Parameter	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Zinc (Zn)			0.20	0.02	0.03
Cyanide (CN)			< 0.05	< 0.05	< 0.05
Coliform			none present	none present	present

Notes:
ND = not detected, detection limit unknown.
> = not detected.
mg/L = milligrams per liter.

Sources:
Black & Veatch (2001).
Anatek Labs, Inc. (2001a).
Anatek Labs, Inc. (2001b).
CH2M HILL (C. Sauer) (2001).

In addition, the steam cycle blowdown is recycled. The blowdown is cooled and treated by ion exchange for reuse as makeup to the cycle. This reuse, during peak operation, saves 29 gpm per block or 58 gpm total of blowdown, thereby eliminating the use of 58 gpm of well water from the plant supply as well as eliminating the need to dispose of 58 gpm of water to the onsite infiltration/evaporation pond. Approximately 10 gpm will go to the service water system; of this, 1 gpm will be used for sinks, toilets, and showers and be disposed of as sanitary waste in the septic tank/drain field system in accordance with 246-272 WAC. The remaining 9 gpm will be used for housekeeping purposes (defined as process water in this ASC) and routed to equipment/plant drains, to be disposed of at the infiltration/evaporation pond in accordance with 173-216 WAC. (See Table 2.2-12, Table 2.2-13, and Figure 2.2-12.)

TABLE 2.2-12
Water Mass Balance

	Combustion Turbines / HRSGs	**Design**
1	Ambient operating temperature (°F)	51
2	Combustion gas turbine (CGT) fuel	Natural Gas
3	CGT manufacturer model	SWPC 501F
4	Net plant output (kW)	1,217,614
5	Combustion turbine output (kW per CGT)	201,690
6	Steam turbine output (kW)	220,920
7	Equipment operating condition	New
8	Block configuration	2 Blk - 2 on 1
9	Number of blocks	2
10	Number of combustion turbines (each block)	2
11	Number of heat recovery steam generators (each block)	2
12	Steaming rate of HRSG (pounds per hour)	***712,972***
13	HRSG blowdown temperature (°F)	200
14	NO_X water injection rate (kgs/s/CGT)	0
15	Percent of steaming rate to blowdown	***1.00***

TABLE 2.2-12
Water Mass Balance

	Combustion Turbines / HRSGs	Design
16	Fraction of nonrecoverable losses to blowdown	0.50
17	Cycles of concentration in the boiler	100
18	Duct firing in operation for WMB design basis	FIRED
19	Inlet cooling type	Fogger
20	Water requirement for foggers per CGT (gpm) (when used)	42.9
21	Inlet cooling nonrecoverable losses to CGT intake	100 percent
	Circulating Water System	
1	None – air-cooled condenser	N/A
	Miscellaneous	
1	Plant availability factor	1.0
2	Plant load factor	1.0
3	Plant water source	Well
4	Maximum onsite supply from water source (gpm)	300
5	Number of plant personnel onsite	***42***
6	Service water consumption (gal/employee/day)	***50***
7	Service water demand for plant equipment (gpm)	***9***
8	Plant area (square feet)	***714,000***
9	Potentially contaminated area (square feet)	***0***
10	Annual rainfall (inches per year)	9-12

Assumptions:

1. All potentially contaminated wastewaters collected (with the exception of CGT wash water) will be treated by the oil-water separator.
2. CGT wash water drains and chemical drains will be routed to the chemical sump. These wastes may contain surfactants, which would interfere with oil-water separation. Therefore, the sump will be monitored and, on high level, be pumped to a truck for offsite disposal.
3. Area drains account for local equipment drains and other miscellaneous drains.
4. A mobile demineralization system is proposed to provide the maximum cycle makeup requirements. Mobile demineralizers will be trucked offsite for regeneration and corresponding regeneration waste disposal.
5. There will be no contaminated storm drains.

Bold and Italicized Numbers = Key variable used by water mass.
kgs/s/ct = Kilograms per second per combustion turbine.
gal/employee/day = Gallons per employee per day.

TABLE 2.2-13
Water Consumptive Use

	Input Variables	Value
1	Block 1 steam losses (gpm)	14
2	Block 2 steam losses (gpm)	14
3	Peak fogging rate (gpm)	172
4	Average annual infiltration/evaporation pond loss (gpm)	3
5	Sanitary drains	1
6	Condensate polisher losses	0
	Calculations	
1	Fogger plus injection rate	262
	Block 1 steam losses (gpm)	14
	Block 2 steam losses (gpm	14
	Condensate polisher losses (gpm)	0
	Average annual infiltration/ evaporation pond loss (gpm)	3
2	**Total Average Annual Consumptive Water Use (gpm)**	**293**

Assumptions:

1. One-third of the pond losses are the result of evaporation.
2. Inlet air cooling and steam injection will be used continuously for power augmentation to the extent the water supply allows.
3. Consumptive uses are steam losses from the steam cycle, air cooler losses, condensate polisher waste losses, and one-third of the infiltration pond inlet flow.

2.2.5.5 Fire Protection System

In the event of a fire, the generation plant will be shut down. Wet standpipe systems with sprinklers will be provided in the areas below the turbine operation floor in the Generation Building. Deluge fire protection systems will be provided for the step-up transformers. Both the sprinkler and the deluge systems will operate automatically. In addition, hose stations will be provided in accordance with code requirements and standard practice recommendations throughout the enclosed buildings. An underground fire water supply loop will encircle the main site area inside the perimeter road, with branch lines as required. Hydrants will be provided outdoors along this loop for fire protection outside the buildings. Hydrant and hose station operation will be manual.

Water for these systems will be supplied from a service/fire-fighting water storage tank. As mentioned above, 480,000 gallons will be reserved for fire protection. Water in the two storage tanks can be replenished at a rate of 300 gpm. Pressure for the fire-fighting water system will be provided by two redundant pumps located in the Fire Water Pump Building. One pump will be powered by an electric motor, and the second pump will have a diesel engine drive so that fire-fighting water can be provided in the event that electric power is lost. A pressure maintenance pump will maintain system fire-fighting water pressure at all times. The common fire-fighting water pumps and water storage system will provide fire-fighting capability throughout the site.

Total flooding gaseous systems will be used within the enclosures surrounding the CGTs. These systems, which will operate automatically with back-up manual initiation, will be the CGT manufacturer's standard clean-agent fire extinguishing system to avoid stratospheric O_3 depletion. Portable dry chemical fire extinguishers will be located throughout the generation plant in accordance with code requirements and recommended practices. Each extinguisher will be selected as appropriate for the type of fire expected and the equipment or area being protected.

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

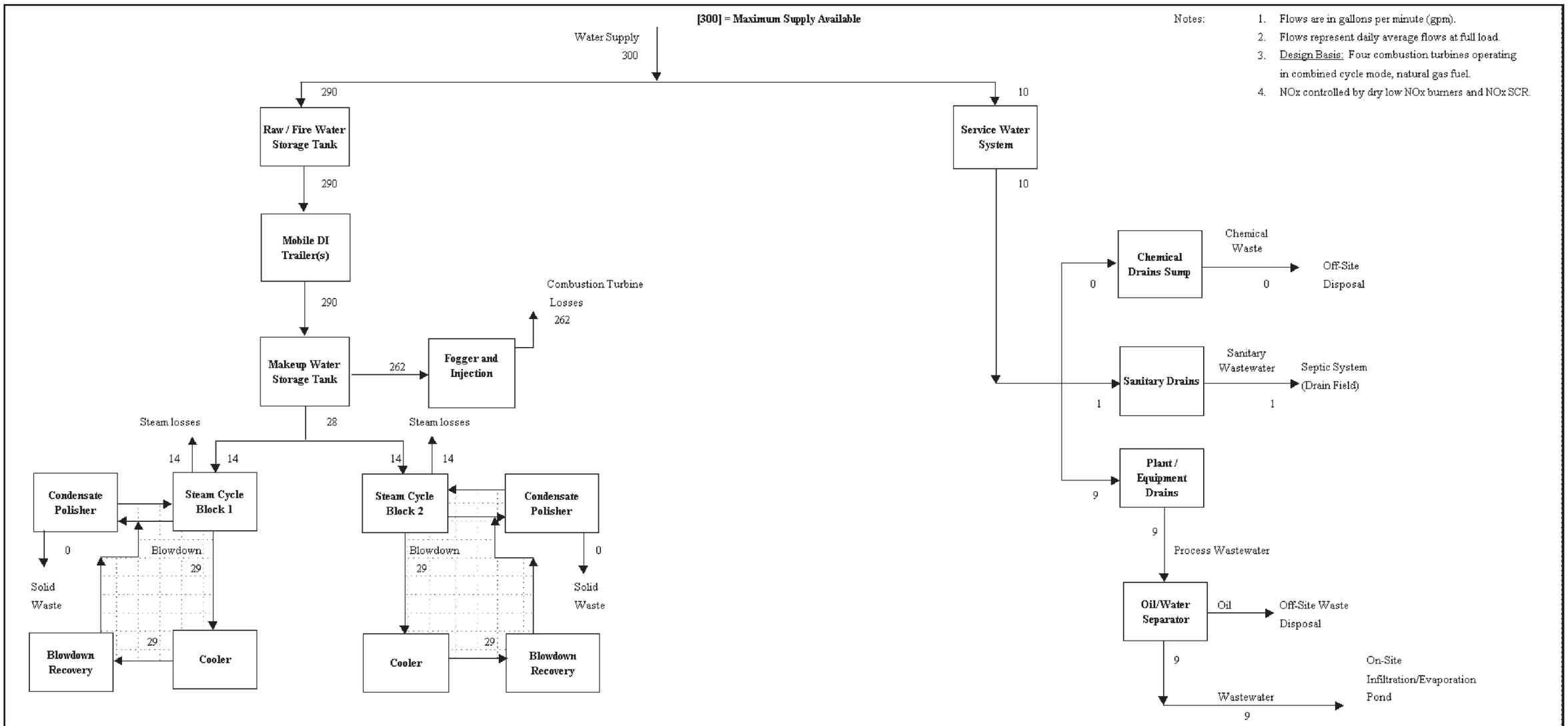
In addition to the active fire protection systems described above, passive fire protection (such as fire-rated walls, doors, and protected egress routes) will be included in the structural and architectural design of the plant in accordance with NFPA 101 and 850 and with state and local fire codes.

2.2.5.6 Wastewater Systems

The Applicant will operate and maintain the generation plant's wastewater systems (sanitary wastewater, housekeeping water from plant drains [process water], and stormwater from rainfall/precipitation). Wastewater from preoperational chemical cleaning will be hauled offsite by the chemical cleaning contractor.

Sanitary Wastewater

The onsite sanitary wastewater disposal system will have a septic tank with an average flow of 1 gpm and a maximum daily flow of 3 gpm of sanitary wastes to a drain field by gravity flow. The system will be designed, inspected, and maintained in accordance with 246-272 WAC. The septic tank will be a two-compartment tank with baffles. The baffles will separate the "scum" from the treated wastewater, which will flow from the septic tank to a drain field that is laid in a bed of gravel. Sludge that accumulates in the septic tank will be pumped out regularly by a contractor and disposed of at an approved disposal site. The drain field will need no maintenance as long as the septic tank is pumped regularly. If a leak were discovered in the sewer conveyance system (usually noticed by the odors from the water seeping to the surface and can be verified as sanitary wastewater with dye testing), the sewer line would be repaired immediately. If surface seepage occurred in the drain field (seldom occurs unless solids from the septic tank overflow into the drain field, and this is avoided by regular pumping of the septic tank), the drain field would be repaired or additional drain tile installed to reestablish proper drainage of the sanitary wastewater.



Rev	Date	Revision and Record of Issue	BY	CHK	APP								
E	07-Jun-01	Revised steam flow	JLB				COMBUSTION TURBINE FUEL	Natural Gas		CYCLE MAKEUP EFF.	100%		
D	22-May-01	Revised input variables	JLB				NOMINAL PLANT OUTPUT (MW)	1200		STEAM LOSSES	0.5%		
C	14-May-01	Changed to 300 gpm max supply	JLB				AV ANNUAL TEMP (F)	51		COOLING TOWER CYCLES	N/A		
B	01-May-01	Increased air cooling to 8 hours	JLB				DUCT BURNERS	FIRED		COMBUSTION TURBINE	SWPC 501F		
A	11-Apr-01	Preliminary Issue to Client	JLB				TURBINE CONFIGURATION	2 blk - 2 on 1		HEAT BALANCE	CASE 1		
							HEAT REJECTION SYSTEM	Air Cooled					

BLACK & VEATCH Corporation

Eng: JLB Dwg: JLB
Check: BAL Date: 02/11/01

Starbuck Power Company LLC
Starbuck Power Project

Maximum Use
Water Mass Balance

Drawing # 96344-DC-1004

Rev. E

FIGURE 2.2-12
Water Mass Balance Flow Diagram
Application for Site Certification
STARBUCK POWER PROGRAM
STARBUCK, WASHINGTON

With regard to septic tank effluent water quality, septic tanks are generally designed to physical criteria, not effluent criteria. However, an estimated performance of typical septic tank effluent quality is as follows:

Septic Tank/Drainfield Effluent

Parameter	Concentration (mg/L)
Ca	30
Mg	12
Na	11
M Alk	150
SO_4	4
Cl	1
SiO_2	27
Total Solids	74
BOD_5	85

Housekeeping (Process) Wastewater

The average flow of 9 gpm of process water (housekeeping water from equipment/plant drains) will be routed to an oil-water separator and then to an infiltration/evaporation pond. The maximum daily flow will be 29 gpm. The water is expected to concentrate about 25 percent because of evaporation from the infiltration pond. The assumptions for sizing the infiltration/evaporation pond for process wastewater are as follows:

- Infiltration rates used are based on 6- to 7-foot-deep test pits that were excavated to provide soil logs for review by the Columbia County Environmental Health District. The infiltration rates varied from 0.45 gallon per day per square foot (gpd/ft^2) to 0.80 gpd/ft^2. The estimated pond area was obtained using the lower 0.45 gpd/ft^2.
- The pond size was estimated for an inflow rate of 9 gpm. For 9 gpm, the required pond size is estimated to be 1.3 acres. The size estimate is based on an assumed pond depth of 5 feet, with the pond acting solely as an infiltration pond (no evaporation included). On the basis of the estimated depth to groundwater, it is assumed that the soil below the pond will be unsaturated. It is assumed that the pond will produce a saturated depth below the pond equal to one-half the depth of the water in the pond. Below this depth, unsaturated conditions are assumed. This estimate does not take into account the possibility that soil permeability may decrease with time. (The Applicant will minimize this phenomenon by removing any fines that may settle out at the top of the subgrade as a normal maintenance item and, thereby, restore the permeability of the soils.) Calculations are as follows (Black & Veatch, May 2001):

Percolation, Q, is calculated using the following:

$Q = KIA$

where: K = hydraulic conductivity as measured in the test pits

I = hydraulic gradient, is equal to 0.5 based on assumed saturated depth below pond

A= area

For a 1-foot-square area, Q = 0.45 gpd * 0.5 = 0.225 gpd

9 gpm is equal to 9 gpm * 60 m/h * 24 h/d = 12,960 gpd

Area for 9 gpm = 12,960 gpd/0.225 gpd/ft^2 = 1.3 acres

Conclusion:

For 9 gpm, the required pond size is estimated to be 1.3 acres.

In the unlikely event that changes in operation specifications for the wastewater pond result in the pond's capacity exceeding 10 acre-feet, the Applicant will comply with dam safety regulations pursuant to 173-175 WAC, if required.

The process wastewater will be routed to a 10,000-gallon oil-water separator and then to the infiltration/evaporation pond. The oil-water separator will be checked on a monthly basis or, if an oil spill incident should occur during plant operations, immediately after the spill. When needed, it will be cleaned out by a licensed contractor. This will be infrequent because unless a spill occurs, there will be little to no oil to be collected and disposed of. The oil-water separator will be provided with an alarm in the event that the oil compartment fills with oil, and maintenance action will then be required. When needed, a contractor will clean the oil-water separator and dispose of its contents at an approved disposal site.

Plant drains in areas where chemical contamination could occur will be diverted to a dedicated chemical drains sump (approximately 400 gallons in size). Wastewater from this sump will be collected and disposed of offsite by an approved contractor. There is no connection from the sump to the onsite disposal areas.

The infiltration/evaporation pond will be checked daily for structural stability and to determine whether any seepage is occurring from the hillsides below the earthen berms. If leaks or seepage occur on the hillside below the pond, the cause of the leakage will be determined, and based upon the investigation, design measures will be implemented to stop the leakage. If leaks in the conveyance system to the infiltration/evaporation pond are discovered, the pipelines will be repaired immediately. The perimeter of the infiltration/evaporation pond will be graveled, and any weeds that grow will be mowed before weed seeds are formed.

There will be no need to do hydrostatic testing of the infiltration/evaporation pond prior to operations.

The water in the onsite infiltration/evaporation pond for housekeeping water is expected to meet water quality standards because the housekeeping water is exposed to cleaning compounds and oils only. An oil-water separator will be used to capture any oil before the water enters the infiltration/evaporation pond. A completed wastewater discharge permit application is included as Appendix F to this ASC, as would otherwise be required under 173-216 WAC. The Applicant anticipates that Ecology, in its role as permit reviewer, will provide the testing and monitoring procedures and criteria necessary to ensure that housekeeping wastewater is protective of groundwater quality. The Applicant will adhere to Ecology's requirements. For the constituents examined, preliminary analyses of the source indicate that the water should meet groundwater standards as presented in 173-200 WAC (Black & Veatch, 2001).

Stormwater Pond

The stormwater pond, designed for approximately 1 gpm on a yearly average and to handle a 24-hour/100-year storm event, will be checked for structural stability after each storm event. The assumptions and calculations for the 2-acre stormwater pond are based on the following:

The 100-year storm event of 89 cubic feet per second (cfs) was calculated using the following guidelines from the *Highway Runoff Manual* published by WSDOT. A 100-year, 24-hour duration rainfall volume of 4 inches was obtained from the manual. The curve numbers (CN) from hydrologic soil group D (Starbuck) were 73 for grass and 98 for parking lots, gravel, pavements, and roofs. These values were combined as follows to obtain weighted CN value of 92.17:

Weighted CN = ((CN1*A1)+(CN2*A2)+……(CNn*An))/(A1+ A2+……An)

To calculate the travel time, T_t in minutes, four segments were used. The T_t values for the four segments were 2.46, 3.8, 6.9, and 3.8. The T_t value for a sheet flow of up to 300 feet was calculated by using Manning's kinematic solution.

$T_t = (0.42(n_s L)0.8)/((P2)0.527(s_o)0.4)$

where:

T_t = travel time (min)

n_s = sheet flow Manning's coefficient = 0.011

L = flow length (ft) = 3

P2 = 2-year, 24-hour rainfall (in) = 2

s_o = slope of hydraulic grade line (land slope, ft/ft) = 0.053

After a maximum of 300 feet, the travel time was calculated by dividing the length (L) of each segment by each segment's average velocity (V).

$T_t = L/(60*V)$

$V = (k)(s_o 0.5)$

where:

k = time of concentration velocity factor (ft/s); for shallow concentrated k = ks = 27, for channel

flow (intermittent) k = kc = 42.

so = slope of flow path (ft/ft)

Summing these travel times together, a time of concentration of 17 minutes, or 0.28 hour, was calculated.

Hec-1 was used to size the stormwater pond. The constraints placed on this stormwater pond were a peak inflow of 82 cfs, a peak outflow of 10 cfs, and a peak stage elevation of

691.75 feet. The required volume for this pond was 3.7 acre-feet. It has been sized to 4.0 acre-feet.

The perimeter of the stormwater pond will be graveled, and any weeds that grow will be mowed before weed seeds are formed. The pond will be inspected daily for structural integrity and observed for any side leakage from the earthen berm that encloses the captured stormwater. If leaks or seepage occur on the hillside below the stormwater pond, the cause of the leakage will be determined, and based upon the investigation, design measures will be implemented to stop the leakage. Drainage channels and the stormwater collection system will be inspected periodically, especially during or after a storm event, to ensure that stormwater is continuously directed to the pond for infiltration into the ground. Any obstacles to flow will be removed and the collection system repaired as needed.

There will be no need to do hydrostatic testing of the stormwater pond prior to operations.

Stormwater Control During Operation

There are no surface waters in or near the operational area of the generation plant site. The main site area of the plant is divided into three primary drainage areas for purposes of runoff design (see Figure 2.2-13). Drainage Area 1 consists of the substation on the northern portion of the site. Drainage Area 2 contains the area east and south of the Block 2 steam turbine building, including the area beneath the Block 2 air-cooled condenser. Drainage Area 3 is the southern half of the developed site, including the remainder of the power block, the Block 1 air-cooled condenser and common equipment areas.

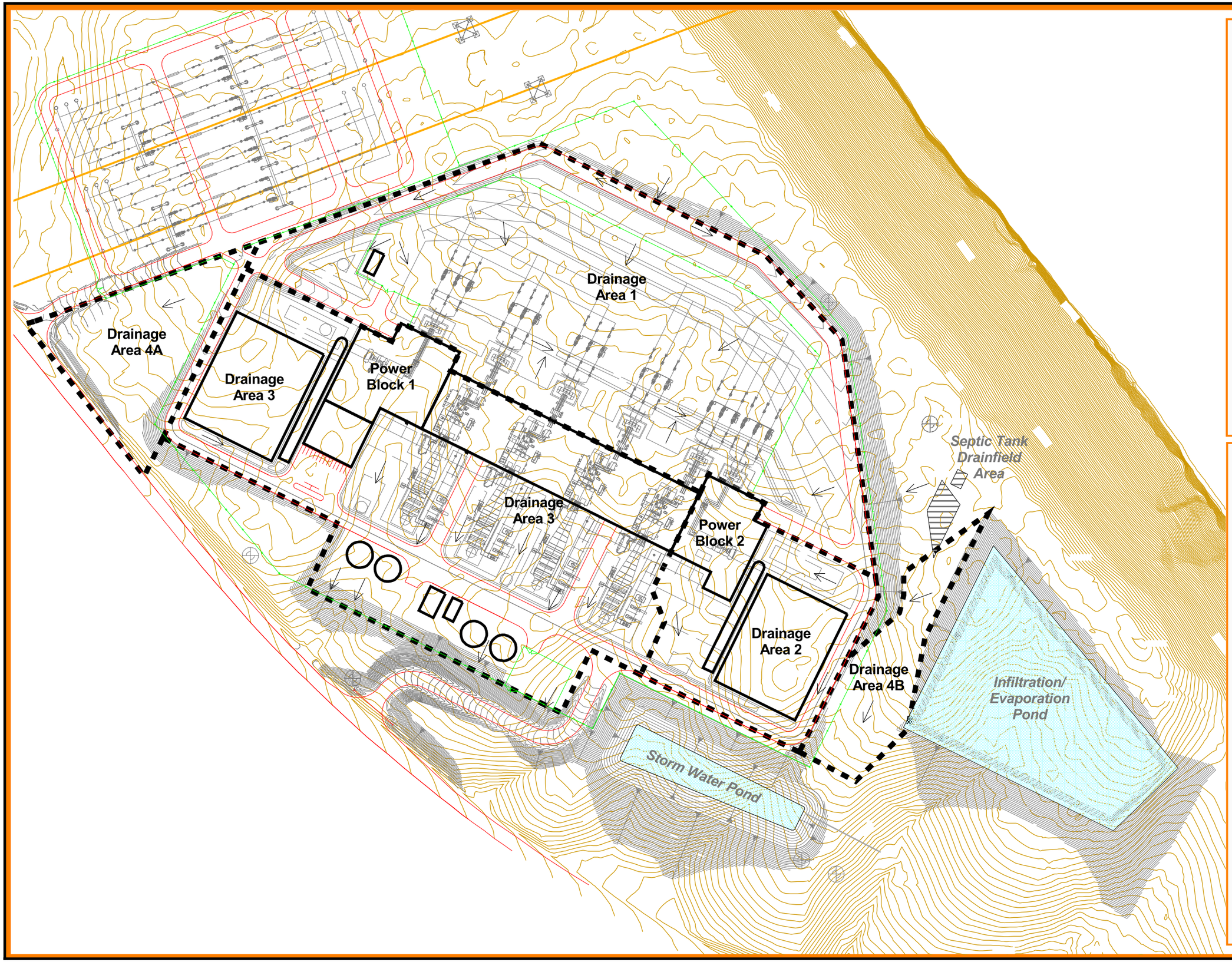
A fourth and fifth area, Drainage Areas 4a and 4b, will remain undeveloped but will be disturbed during construction, either by installation of the tile field or during construction laydown. Area 4A lies west of the Block 1 air-cooled condenser, and Area 4B lies east of the Block 2 air-cooled condenser. Areas 4a and 4b are intended to be returned to their preconstruction state after construction is complete, and runoff will be collected and routed to the stormwater pond as part of the stormwater management system. On the basis of results of the preliminary runoff calculations for a combination of Drainage Areas 1, 2, 3, 4a, and 4b, the holding volume of the stormwater pond was determined to be 4 acre-feet. Details of the preliminary grading and drainage for the site are included on the Site Conceptual Grading Plan in the SWPPP (see Appendix H).

The runoff from the five areas described above will be routed to the single stormwater pond located south of the Block 2 air-cooled condenser in the lowest elevation area of the developed site. The collected stormwater will be allowed to infiltrate into the soil. In this manner, no runoff from the five areas will leave the site as surface runoff. Runoff from the undeveloped and undisturbed areas onsite will flow and dissipate unchanged from the preconstruction conditions. The delineation of the five areas described above, as well as details for the stormwater collection systems described below, are provided in the SWPPP (Appendix H).

Runoff from the northern part of Drainage Area 1, including the north and east perimeter road and substation area, will surface flow to a central shallow swale located in the substation. The swale will slope from west to east and drain to the headwall entrance of an underground, reinforced-concrete pipeline located east of the substation. The underground

Figure 2.2-13
Grading and Drainage

Application for Site Certification Starbuck Power Project Starbuck, Washington



N

100 0 100 200 Feet

Legend

- Proposed Facility
- Facility Buildings
- Facility Ponds
- Septic Tank and Drainfield
- Facility Roads
- Facility Fence
- Transmission Lines
- Contours - Existing
- Contours - Finished 1 Foot Interval
- Drainage Area Boundary
- Grade to Drain (Flow Arrow)

pipeline will turn south, run beneath the elevated Block 2 air-cooled condenser, and empty into the stormwater pond located south of the loop road.

In Drainage Area 1, the substation area will be surfaced with a crushed-rock base that allows infiltration into the soil below. Grading in this area will result in a more level terrain compared with the existing terrain, and gently sloped to allow more infiltration and slower runoff than now occur. The equipment in the substation will be gas insulated (not oil insulated so it has no spillable oil) and supported on small concrete foundations surrounded by the crushed-rock surface. Thus, there will be no significant impervious surfaces and no potentially oil-contaminated surfaces in these two areas. Because postconstruction runoff rates from Drainage Area 1 are expected to be similar to the existing runoff rates, an additional stormwater pond is not planned for this area. General drainage in the substation area will be to the east, and excess runoff not immediately infiltrated will be allowed to drain to the perimeter road east of the substation and will be directed to the stormwater pond by a culvert. A small swale draining to the southeast will be located north of the north perimeter road to direct runoff from the ridge around the substation area to the stormwater pond.

Drainage Area 2, the area within the loop road east and south of the Block 2 steam turbine building, will drain to a culvert located at the southwest corner of the Block 2 air-cooled condenser. The culvert will be installed beneath the south loop road and will drain into the stormwater pond to the south.

Runoff from Drainage Area 3, which includes most of the buildings, equipment, and other impervious surfaces in the generation plant, will be routed to an underground stormwater collection system. Stormwater will enter the system through roof drains and piping (buildings), area drains (tanks and outdoor equipment), and catch basins and curb inlets (paved areas). The collected runoff will be routed in underground lateral piping to a central storm sewer main located south of the power block. The sewer main will slope from west to east and drain into the stormwater pond.

Impervious surfaces in Drainage Area 3 include the Generation Building, the Block 1 air-cooled condenser, and access roads. Parking in this area will be covered with gravel and not paved, and electric transformers will be covered. The stormwater pond (designed for a 24-hour/100-year storm event) is designed to retain the site runoff from the roofs in these areas prior to infiltration into soils.

Precipitation falling on the generation plant's major structures will be collected in gutters at the roof edges and routed to drain piping that connects to a common underground stormwater collection system, which will convey stormwater to the stormwater pond. There will be no heating, ventilating, or air-conditioning (HVAC) units located on the roofs, which eliminates the concern of oil releases from these units into stormwater collected from the roofs.

Runoff from paved roads and the graveled parking area may have oil drippings from vehicles, but the quantity of oil released is not enough to warrant an oil-water separator prior to the stormwater pond. Water will be routed to ditches, where infiltration will occur, and excess water will flow to the stormwater pond. The oil spill containment areas around the covered transformers and the unloading and spill collection areas at the ammonia

storage facility will be visually inspected after a storm event and weekly to detect any oily sheen or ammonia odor. If an oily sheen or odorous material is detected, then the water will be tested for oil or ammonia before stormwater is released to the stormwater pond. If contamination is suspected, the water will be pumped out by a licensed contractor and disposed of offsite at an approved disposal site. Stormwater will be managed in accordance with 463-38 WAC.

Runoff from the two disturbed areas will also be routed to the common stormwater pond. Stormwater in Drainage Area 4a will surface flow to a catch basin at the west end of the underground storm sewer main serving Drainage Area 3. Collected stormwater will flow with the Drainage Area 3 runoff to the stormwater pond. Stormwater in Drainage Area 4b will flow into an existing shallow surface swale located east of the east perimeter fence. The existing swale will drain into the stormwater pond through a new culvert included in the north wall of the basin.

Volumes collected and retained by the stormwater system will be designed to be similar to preconstruction flow rates (see Figure 2.2-13 for identification of drainage areas).

The water in the onsite stormwater pond is expected to meet groundwater quality standards because the stormwater collected onsite will have little exposure to surface areas that would contribute chemical contamination to the water. The impervious surface areas will consist of the roofs and driveways. Because no equipment will be located on the roofs, there are no sources of chemical contamination to roof water. The driveways will constitute a small percentage of the site surface area, and the parking areas will be graveled, which will minimize exposure to oil from vehicles. The transformers will be covered with roofs, and secondary collection areas will be at the demineralization facility and any onsite sources that have a potential for a chemical spill. A completed stormwater permit application for both construction and operation, as well as a stormwater management plan, is included in Appendix H to this ASC. The Applicant anticipates that Ecology, in its role as permit reviewer, will determine the testing and monitoring procedures and criteria required to ensure that stormwater is protective of groundwater quality pursuant to 173-200 WAC. The Applicant will adhere to Ecology's requirements. This is standard procedure for stormwater permits.

BMPs are explained in the SWPPP (in Appendix H of this Application) and include the following:

- Stabilization and sediment trapping, including silt fences, sediment traps (catch basins), weed-free straw bale dikes, storm sewers, inlet protection, culvert inlet and outlet protection (rock or riprap), and a stormwater pond
- Erosion and runoff control, including temporary swales leading to the stormwater pond and perimeter silt fences
- Pollutant control other than sediment on construction sites, including sanitary wastes, paints, petroleum products, and surplus concrete
- Good housekeeping practices that reduce the risk of potential pollutants entering stormwater

- Spill prevention and response planning, including containment areas around storage tanks and spill response plans

2.2.5.7 Spill Prevention

Spill prevention and control measures during operation, in accordance with 40 CFR 112, are summarized below.

The following are sources of potential spills during operation and maintenance:

- Lubrication oil from turbine or generator lube oil system reservoirs:
  - Steam turbine lube oil: approximately 5,000 gallons per steam tube casing, or 10,000 gallons total
  - Combustion turbine lube oil: approximately 4,500 gallons per CGT in the CGT mechanical package, or 18,000 gallons total
- Aqueous ammonia: 60,000-gallon tank
- Diesel fuel: 500-gallon tank
- Transformer oil:
  - CGT transformer oil: approximately 12,000 gallons per CGT (48,000 gallons total), with 110 percent containment provided by concrete walls and floor
  - STG transformer oil: approximately 15,000 gallons per STG (30,000 gallons total), with 110 percent containment provided by concrete walls and floor
  - Auxiliary transformer oil: approximately 3,000 gallons per transformer (6,000 gallons total), with 110 percent containment provided by concrete walls and floor
- Aqueous ammonia: two 55-gallon drums or approximately 100 gallons in chemical feed area, with 110 percent containment provided by concrete walls and floor
- Hydrazine: one 55-gallon drum in chemical feed area, with 110 percent containment provided by concrete walls and floor
- Tri-sodium phosphate: ten 55-pound bags or approximately 500 pounds (dry) in chemical feed area, where it will be protected by storing it above the level of the floor

Listed above are all of the materials to be stored onsite that will need containment or special protection measures. There is no source of a spill from the demineralization unit because all chemical storage and handling will be managed offsite by a licensed contractor.

Engineered safeguards will be employed to avoid spills, and they will include, as appropriate, the following:

- Dikes around tanks to contain the tank volume
- Tank level indicators
- Controls or alarms to avoid overfilling

- Special truck-unloading connections to avoid mixing of chemicals
- Failsafe controls for valves and pumps
- Tank overflows directed to controlled areas

The Applicant will submit to EFSEC, for its review and approval, the specific safeguards that may be identified later in the design process.

All liquid storage areas will be above ground in concrete floor areas with concrete curbing or dikes whose enclosed volume will be designed to contain the volume of the tank plus 10 percent as a margin of safety.

The diked areas within the plant will drain into an oil-water separator before disposal at the infiltration/evaporation pond. As mentioned in the preceding subsection, for containment areas that are outside and uncovered, containment-trapped rainwater will be visually inspected after each storm event and weekly for an oily sheen or an ammonia odor. If an oily sheen or odorous material is detected, this rainwater will be tested for oil or ammonia before it is drained to the stormwater pond. If, however, the water is suspected to be contaminated, then the liquid will be pumped out by a licensed contractor and disposed of offsite at an approved location.

In addition to the stormwater collection system described earlier, all chemical storage areas within structures will be protected with concrete containment areas. All indoor areas with potential oil or lubrication spills also will be protected by concrete containment structures, with drains directed to a 10,000-gallon oil-water separator. Treated water from this oil-water separator will be directed to the infiltration/evaporation pond. Fuel oil stored onsite during operation will be limited to the diesel fuel (500 gallons) stored for the diesel firewater pump. A concrete containment area designed to hold the entire 500 gallons, plus an additional 10 percent, will be provided beneath the tank and the filling hookup to capture and contain filling spills and overfills. A drain line will connect the containment to a separate holding tank to ensure that spilled diesel fuel does not reach the stormwater collection system. Any spilled fuel captured will be disposed of offsite at an approved location (for additional information, refer to the SPCC Plan in Appendix E). The SPCC Plan will be updated after plant design is more complete and submitted to EFSEC for review before construction begins.

2.2.5.8 Ammonia Management

Aqueous ammonia will be used at the generation plant to control air emissions (NO_x). The use of ammonia at this type of plant is standard for the industry and is successfully managed at plants with comparable designs. To prepare for an unexpected emergency or accident, an emergency response plan and SPCC Plan will be developed for the ammonia storage and transfer system. The plan will meet OSHA and Washington Safety and Health Administration (WSHA) federal and state standards for employee protection that will include having available proper emergency response equipment (such as respiratory apparatus). The truck-unloading system will be designed for safe transfer of ammonia reagent from the truck to the aqueous ammonia storage tank so any leaks during transfer will be captured for offsite disposal. The system will also return displaced ammonia vapor

to the unloading vehicle. The ammonia storage tank will be sized to store approximately a 1-week supply (60,000 gallons) of 19 percent aqueous ammonia and designed so that the ammonia reagent can be stored safely. A common spill containment will be provided around both the truck-unloading station and the ammonia storage tank sized to hold the entire 60,000 gallons plus an additional 10 percent. If a spill or leak occurs, then the contents within the containment area will go offsite for disposal at an approved location (see Appendix E for more details).

2.2.5.9 Site Security

The generation plant site will be surrounded by a chain-link security fence that is approximately 8 feet high and topped with three strands of barbed wire. Automatically or manually operated swing gates will be installed at two roads intersecting the fence, and lockable personnel gates will be added where appropriate. The switchyard will have its own separate perimeter fence and gates of similar construction to deny unauthorized access to the high-voltage equipment in the switchyard. The M/R station also will have its own perimeter fence for security and safety purposes.

Exterior lighting will be provided throughout the generation plant site to the extent required for security and safety. Illumination levels will be in accordance with the *Illuminating Engineering Society Handbook* (IESNA, 2000) and UBC requirements. Illumination will be limited to that portion of the property that will be developed with plant structures and facilities. Lighting fixtures will direct the light downward and will be shielded to minimize light projected to adjacent and nearby areas. The stacks do not need special warning lights per Federal Aviation Administration (FAA) code requirements because the stacks are only 170 feet tall (under the 200-foot height at which FAA codes apply). More detailed information on lighting can be found in Section 3.11 of this ASC. There will also be alarms, cameras, and personnel with security responsibilities to secure the generation plant facilities. There will not be anyone whose sole responsibility is to be a security guard. For more information on security concerns, refer to Appendix I.

An emergency response plan will be available to provide for public safety and environmental protection in the event of a natural disaster or major incident relating to or affecting the generation plant. The emergency plan addresses the following events:

- Construction: includes fire prevention, hazardous materials released, fertilizers, paint, construction waste, petroleum products, and security
- Plant evacuation: includes immediate shutdown of all hot work (such as welding, cutting, drilling, grinding, and smoking), turn-off of all natural gas lines and isolation of all flammable material, and shutdown of all motorized equipment (such as generators, compressors, and vehicles)
- Fire and explosion: includes prevention, housekeeping, hot work, smoking, immediate action, notification, and fire suppression system
- Natural gas release onsite: includes immediate actions and secondary actions

- Natural gas release offsite (GTN): describes how operators will be trained to recognize hazardous conditions along the gas pipeline and trained in the overall operation of the pipeline, in the specific emergency response plan, and in the training program
- Chemical spill or release: specifies procedures and primary responsibilities, and actions to take
- Oil spill or release: specifies immediate actions and secondary actions to contain and control spills
- Abnormal weather: explains procedures for inclement weather (fog and/or icing)
- Earthquake: specifies immediate actions, preparedness activities, and actions
- Volcanic eruption: specifies immediate actions in case of a volcanic eruption
- Medical emergency: specifies immediate actions in case of a medical emergency
- Plant blackout: explains what to do to protect equipment
- Plant bomb threat: explains immediate actions
- Ammonia release onsite: specifies immediate actions
- Ammonia release offsite: specifies immediate and secondary actions

Each section of the emergency response plan addresses the issues associated with a given scenario. Generation plant managers, supervisors, and employees will receive regular training to ensure that effective and safe action will be taken to reduce and limit the results of an emergency at the generation plant site. For more information on security concerns, refer to Appendix I.

2.2.5.10 Noise Control

Noise modeling was conducted to predict the environmental noise emissions during normal generation plant operations, which excludes intermittent activities (such as startup, shutdown, steam release, bypass operation, and any other abnormal or upset operating conditions). During generation plant startup and shutdown, plant noise may be 2 to 3 dBA higher than during normal operation. During certain upset conditions, steam vents may open. These steam vents are necessary to quickly release steam pressure from the boiler and piping. Any such noise events would be part of an emergency event. These noises would be short term and would occur rarely, if ever.

The anticipated primary noise sources during operations are the CGT inlets, the HRSG packages, and the air-cooled condensers. Anticipated secondary noise sources include the combustion turbine, steam turbine, and auxiliary equipment (located in the generation plant), the generator step-up transformers (GSUT), and the building ventilation systems.

The nearest residence is at the Lyons Ferry Marina, approximately 1.1 miles northwest of the generation plant site. The predicted generation plant sound level at this nearest residence is approximately 45 dBA, which is below the required nighttime level of 50 dBA for Class A environmental designation for noise abatement (EDNA) (residential) receptor. Plant sound

levels at both the hatchery and the Lyons Ferry Campground will not exceed the Class A EDNA noise standard.

The generation plant noise emissions are required not to exceed 70 dBA at all Class C EDNA (industrial and agricultural) property boundaries. Modeling indicates that the generation plant will comply with this requirement (see Section 3.9.3.2 for more detailed information on noise modeling).

Certain steam vents may open during generation plant startup and shutdown. These vents will be silenced to ensure that the sound level is fully compliant with the 50-dBA Class A EDNA (residential) requirement and the 70-dBA Class C EDNA (industrial and agricultural) property boundary requirement.

Low-frequency noise and increase in ambient (background) conditions are discussed in Section 3.9. In summary, there will be no adverse reaction to low-frequency noise because levels are below the 75 decibels C-weighted sound level (dBC) recommended in American National Standards Institute (ANSI) B133.8, below the 65 dBA recommended for 31.5 and 63 hertz (Hz) in ANSI S12.9-1996/Part 4, and comply with the state of Oregon's nighttime octave band requirements. In addition, in accordance with Federal Transit Administration (FTA) guidance, the generation plant will not significantly increase ambient noise levels.

The generation plant will comply with noise regulations and will include the following measures during operation:

- The combustion turbine, steam turbine, and associated auxiliary equipment will be located within an acoustically insulated building.
- The combustion turbine inlet will be equipped with an 8-foot-long silencer.
- The HRSG equipment will not actually generate noise and will serve as an effective combustion turbine exhaust silencer. However, the HRSG will radiate part of the combustion turbine exhaust noise out the stack and through the duct and boiler walls. No HRSG mitigation is anticipated to be necessary beyond the inherent equipment mitigation.

Gas Facilities

Peak fuel gas requirements for the power plant include peak gas loads defined as approximately 8.2 MMSCFH with duct firing. Maximum turbine load will be four units on a gas consumption of 2.05 MMSCFH (each). Minimum turbine load is for one turbine on a gas consumption rate of 0.348 MMSCFH (each). The M/R station and pipeline designs will accommodate required delivery pressures to the combustion turbines at a range of 490 to 550 psig.

M/R Station

The M/R station will be designed in accordance with ANSI design standards and will have passive fire protection (such as fire-rated walls and doors and protected egress routes) in accordance with NFPA 101 and 850 and the UFC. In addition, safety valves and alarms will be incorporated into the gas facility.

In accordance with DOT regulations, GTN has guidelines and procedures to be followed in the event of a pipeline emergency. GTN's *Operations and Maintenance Instructions* (OMI),

Section V, describes emergency procedures including Section V-5, Procedure for Handling Calls Concerning Pipeline Emergencies; Section V-10 addresses the procedures for responding to a pipeline emergency; and Section V-11 is the Procedure for Responding to a Compressor Station Emergency Involving Leaking Gas or Fire. The procedures include the training of employees on emergency procedures, establishing liaisons with appropriate fire, police, and other community officials; and informing the public on how to identify and report an emergency condition (John Clemson, pers. comm.).

An emergency information manual will be provided to generation plant personnel. This manual lists emergency precautions for facilities, work and home phone numbers, and instructions on who to call in an emergency. The meter station will be monitored and controlled 24 hours a day by a remote dispatch center located in Portland, Oregon (John Clemson, March 13, 2001).

GTN's OMI Section FF-2 identifies the procedure for handling natural gas leaks. In general, whenever a leak is reported or is discovered by noncompany personnel or it is reported by GTN's Gas Dispatch, the district foreman will initiate an investigation to locate and confirm the leak by the most expedient means possible.

No compressed gases will be stored permanently at the M/R station during operations.

Once construction activities and programming are completed, GTN's operations crew will start up and commission the new equipment. Work includes (but may not be limited to) purging and packing the lateral, setting up the meter station valve, calibrating instruments, commissioning the SCADA link to GTN gas control, and sequencing the valves. The following regulation related to the M/R station will be followed:

> Each pressure limiting station, relief device (except rupture discs), and pressure regulating station and its equipment must be subjected at intervals not exceeding 15 months, but at least once each calendar year, to inspections and tests to determine that it is:
>
> - In good mechanical condition,
> - Adequate from the standpoint of capacity and reliability of operation for the service in which it is employed
> - Set to function at the correct pressure, and
> - Properly installed and protected from dirt, liquids, or other conditions that might prevent proper operation (49 CFR 192.739, Pressure Limiting and Regulating Stations: Inspection and Testing, October 21, 1982, incorporated by reference in 480-93-010 WAC)

DOT, 49 CFR 192, Part 7 dictates inspections for the M/R station and the pipeline/lateral and their frequency. Included will be mainline valves operation, temperature and pressure calibrations, flow measurement calibrations, and cathodic inspection of the pipeline.

Pipeline Lateral

GTN will maintain the pipeline lateral in accordance with applicable regulations. Maintenance will include inspecting the pipeline integrity to determine structural soundness

(system may be shut down to run a pig through the pipe only if normal inspection procedures revealed a need for an internal check on the lateral) and checking on pressures and valves as follows:

> Each transmission line valve that might be required during any emergency must be inspected and partially operated at intervals not exceeding 15 months, but at least once each calendar year. (49 CFR 192.745, Valve Maintenance, October 21, 1982, incorporated by reference in 480-93-010 WAC).

Pipeline Connections

The pipeline connections will be designed according to ANSI design standards. In addition, safety valves and alarms will be incorporated into the gas connection system.

The Applicant will maintain and operate the pipeline connections from the M/R station to the combustion turbines. The primary maintenance activity that the Applicant will undertake for the gas pipeline connections (between the metering station and the CGTs) is to use a contractor to test the release valve in accordance with the regulation described above (49 CFR 192.745, incorporated by reference in 480-93-010 WAC).

In addition, maintenance will include inspecting the pipeline integrity to determine structural soundness (system may be shut down to run a pig through the pipeline connections only if normal inspection procedures revealed a need for an internal check on the pipeline connections), checking on pressures, and providing scrubber maintenance if necessary. Pipeline connections maintenance will be scheduled the same time as the plant maintenance so that any shutdown of the pipeline connections will be simultaneous to the plant shutdown.

Transmission Lines and Switchyard

BPA will operate and maintain the existing and proposed transmission lines and switchyard. The switchyard will be unstaffed, and maintenance personnel will visit it routinely, probably on a weekly basis. BPA's maintenance program includes routine and emergency maintenance and repair of electrical equipment, tower structures, conductors, communications equipment, and buildings. This maintenance is usually conducted by helicopter. Lines are flown an average of once every 3 to 4 months or 6 to 8 weeks if they are critical lines. Helicopter teams look for damaged insulators, damaged support members, washed-out roads, encroachments, and other hazardous material on the ROW. Aerial inspections are followed up by a yearly ground inspection for each line.

Transmission line and switchyard operations will be addressed further in the joint NEPA/SEPA EIS, which will be available as a reference document to this ASC.

Potential for Future Activities at the Site

Although there is space available for an expanded generation facility on the northwest side of the property (approximately 60 acres), the Applicant has no plans for future expansions or additions on the Applicant's property or on land adjacent to this property. An exception is that, throughout the life cycle of the generating plant, this property will be used as the site for the water supply onsite well and a portion of the BPA switchyard will be within this area. The remaining portion of this property will be returned to its natural state, and the geological formations (ripple marks from the Missoula Floods) will be preserved.

2.2.6 Schedule and Workforce

2.2.6.1 Schedule

The overall schedule for construction and operation of the generation plant is shown in Table 2.2-13 and also in the bar diagram in Table 2.2-14, which provides a breakdown of the schedule by month so that if the schedule should change, then the number of months planned for design, construction, and other activities can be determined.

TABLE 2.2-13
Schedule for Construction and Operation (by Date)

	Generation Plant	Gas Facilities	Transmission Line	Onsite Well
Design	September 2002 to May 2003 (nine months)	May 2003 to August 2003	August 2001 to November 2002	July 2002
Site Preparation	September 2002 to mid-March 2003	December 2003	November 2003 to May 2004	August 2002
Construction	September 2002 to mid-September 2004	December 2003 to April 2004	November 2003 to May 2004	August to October, 2002
Major Components Delivery				
Block 1	November 2003 (or 14th month)	N.A.	N.A.	N.A.
Block 2	Spring 2004	N.A.	N.A.	N.A.
Startup Testing		April, 2004 to September, 2004	N.A.	
Block 1	August 2004	N.A.	N.A.	N.A.
Block 2	October 2004	N.A.	N.A.	N.A.
Commercial Operation	December 2004 to January 2005	September 2004	May – June 2004	December 2004 to January 2005

N.A. = not applicable.

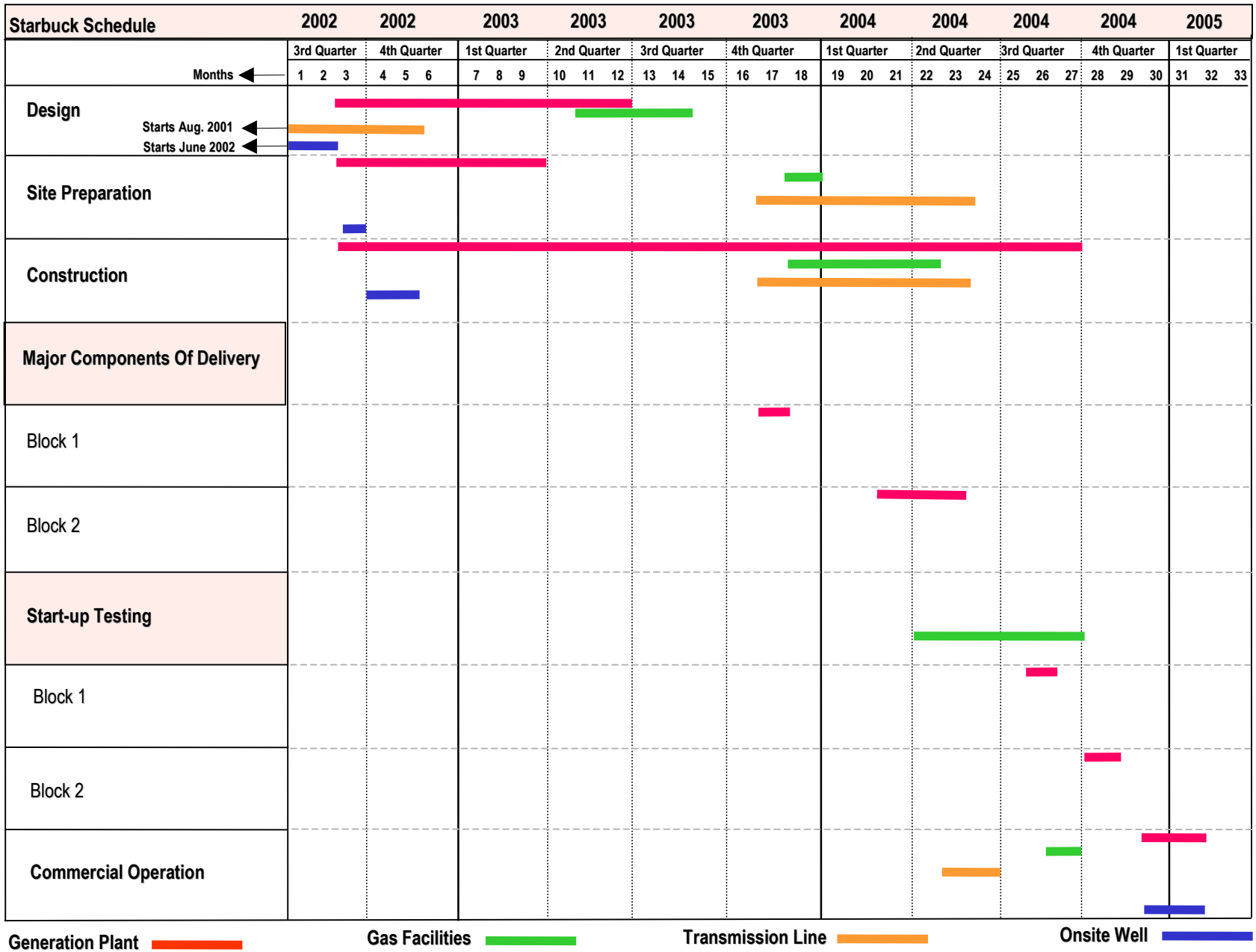
Generation Plant

Generation plant construction will take place over a 2-year period after EFSEC issues an SCA. Construction should begin with site preparation in the fall-winter of 2002 and be completed by fall-winter 2004. Analyses were done on the generation plant based on both 25-mile and 75-mile areas, depending on the guidance of the *Starbuck Power Project Potential Site Study* (Jones & Stokes, 2001). For the population, housing, and economics analyses, a 75-mile area was studied.

The SPP (which includes the generation plant, the electrical transmission facilities, and the gas facilities) will have a maximum workforce total of approximately 800 individuals, divided among the project components as follows:

- Generation plant site: 678 individuals directly related to construction for about 3 months (see Figure 2.2-14). There are 700 workers maximum when the 678 construction workers are added to the 22 indirect craft workers (those working in the area because of additional jobs created in restaurants, gas stations, etc., as a result of the construction workers).

Table 2.2-14
Schedule for Construction and Operation (by Month)



- M/R station and gas lateral: 20 individuals at peak construction
- Transmission line: 95 individuals at peak construction

The construction workers for the transmission line will be interspersed along the 16-mile-long transmission corridor. The peak construction period for construction workers at the switchyard, the transmission line near the generation plant, and gas facilities will coincide for about 1 month with the peak construction period for the generation plant. Figure 2.2-14 shows the average composition by skill and indicates by month the anticipated peak workforce for the generation plant site. The schedule in Table 2.2-14 shows how the timing of project components relates to each other. Primary jobs will be sitework, formwork, placement, reinforcement, arch and metals, piping, balance of plant/mechanical equipment, turbine erection, HRSG erection, electrical instrumentation and control, and painting (see Figure 2.2-15).

The total peak workforce is estimated to be 700 people. The peak labor force will occur approximately midway through the construction period. The total peak workforce includes 668 direct workers and approximately 32 supporting indirect craft workers (for example, security guards, equipment operators, attendants, inspectors). The average number of workers varies throughout the construction period, with approximately 235 workers for the first 9 months, 350 workers for months 10 and 11, 640 for the next 6 months (months 12 to 17), 500 for the next 2 months (months 18 and 19), 320 for the next month (month 20), 200 for the next month (month 21), and an average of 28 workers a month for the last 4 months (months 22 to 25).

Observation of other large construction projects in Washington State reveals that workers often are willing to commute up to 2 hours to work on a desirable, relatively long-term project. It is estimated that roughly 80 percent of the workers on the SPP will commute from within the 75-mile radius study area, particularly from the Tri-Cities (Richland, Pasco, and Kennewick) and Walla Walla. The Tri-Cities area has workers skilled in many of the trades required for this project, in part because of the many U.S. Department of Defense (DOD) projects in the area. The Tri-Cities is approximately 1.25 to 1.5 hours from the site. Spokane also has a large, skilled labor force, but it is approximately 2 to 2.5 hours from the site and may be too far for many workers. Some workers will also be likely to come from Walla Walla, about 1 hour away. A small number of employees will likely commute from smaller communities in Columbia County and the overall study area (refer back to Figure 1.1-1).

Table 3.12-13 (in Section 3.12) identifies available temporary housing units within a 1-hour drive of the project site. For this study, it is assumed that in-migrating workers would attempt to find temporary housing within a 1-hour commute of the project site. Therefore, housing units in the Tri-Cities area are not included in this table. Temporary housing units are defined to include the following:

- Hotel and motel rooms
- Spaces in recreational vehicle (RV) parks and campgrounds
- Rental housing units

The roughly 20 percent of workers that will come to the project from outside the region will require temporary housing. For this analysis, it is assumed that all of the indirect employment opportunities generated by the project will be filled by persons within the 75-mile-

radius study area; therefore, these workers will not require temporary housing. During the peak of construction, when a total of approximately 668 direct workers will be employed, it is estimated that housing will be required for at most 140 workers. Those workers that require housing will be likely to stay in mobile home parks, RV parks or recreational areas, and motels in the nearby communities of Washtucna, Kahlotus, Dayton, Starbuck, and Pomeroy, or in larger population centers such as the Tri-Cities or Walla Walla. A small percentage of those workers (an estimated 5 to 10 percent) will rent homes and apartments. It is unlikely that a significant number of workers will buy or build homes for their families and move their families into the area during construction.

An Internet search and a telephone survey with employees of motels within approximately 1 hour of the site indicate that there are an estimated 3,340 temporary housing units located within a 1-hour commute to the generation plant site (CH2M HILL, unpublished). During the peak summer season, it is estimated that there are approximately 923 vacant units. Vacancy rates in temporary housing facilities included in the survey have been higher than in other areas as a result of the depressed economy in many of the rural communities. Thus, it is anticipated that there will be more than enough temporary housing available for the 140 construction workers estimated to require temporary housing.

In a worst-case scenario, assuming that all 668 direct workers during the peak construction period in-migrate and that the identified temporary housing facilities have a vacancy rate of 15 percent, workers would probably have to expand their search for temporary housing to include the entire 75-mile-radius study area. When the Tri-Cities and other communities in the larger area are included, there is likely to be sufficient temporary housing within the overall study area for all the direct workers during the peak construction period.

Should conditions change in the future, the Applicant and the contractor may consider adding additional housing options, such establishing a work camp near the site or using Seneca Foods' established work camp during the agricultural company's off-season (July through March). Currently, Seneca Foods operates a temporary housing facility for a portion of its peak-season workforce from April to June; this facility includes group sleeping quarters, a dining area, and bathroom facilities.

During the summer, RV parks and campgrounds that house construction workers will have higher occupancy rates than normal. This could affect tourists and recreation seekers who usually stay at the campground sites.

The construction workers will also affect the economy by paying for rental space, whether they stay in rental homes, apartments, motels, RV parks, or campgrounds. During the construction period, many campground and motel proprietors will benefit from a more consistent revenue stream, particularly if they accommodate the construction workers with weekly rates or group discounts. The greatest impact to the rental industry can occur during the off-season months, when rooms or campsites that otherwise would be vacant can be rented to construction workers.

The City of Dayton and the communities surrounding it are accustomed to the influx of temporary workers. During the annual asparagus harvest from April to June, an estimated 1,200 to 1,400 seasonal workers come to the area. As discussed above, Seneca Foods has temporary housing for a portion of its workers. The remaining workers are housed in group

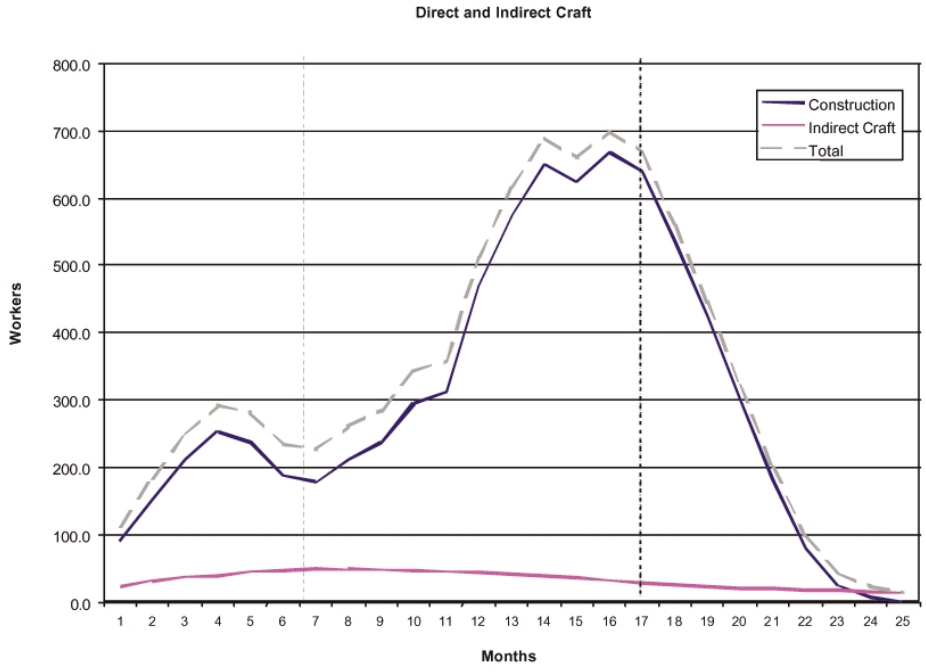


FIGURE 2.2-14
Total Workers Onsite Over Time

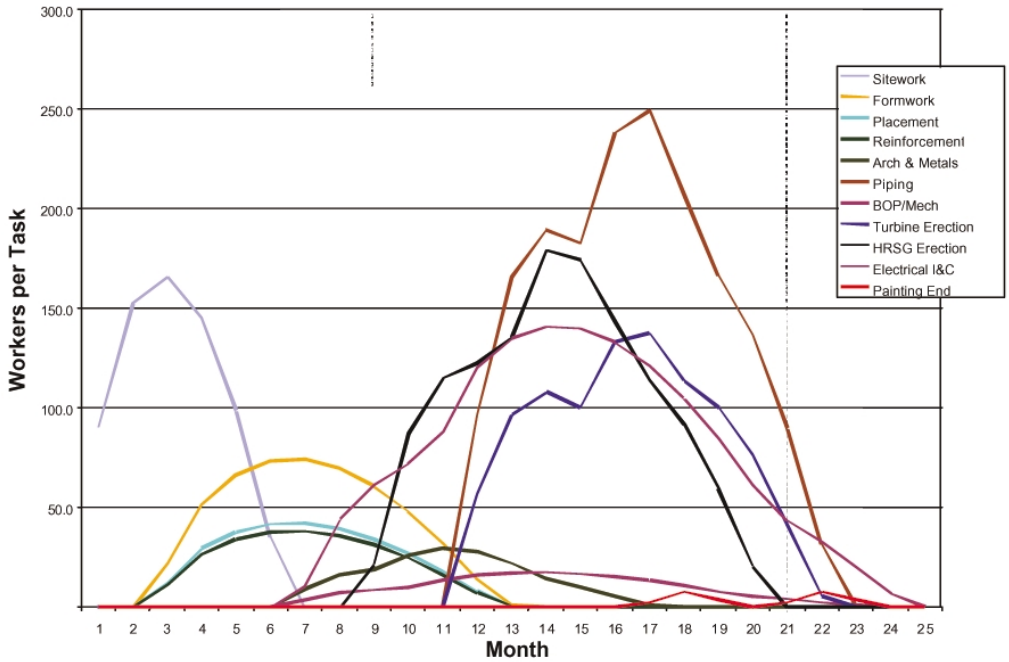


FIGURE 2.2-15
Construction Workers Onsite Per Month Per Job Activity

housing in Walla Walla and Milton-Freewater, and a small number (approximately 70 dwelling units) are housed in farms and shared rental housing arrangements in Dayton and Walla Walla. One real estate agent mentioned that almost all of the rental houses and mobile homes in the Dayton area are occupied during the asparagus season (Young, pers. comm.). Very few of these workers stay in local campgrounds, RV parks, or motels because of the relatively high cost of those accommodations compared with the other options available to them (Lindquist, pers. comm.).

Although local temporary housing more than sufficiently houses anticipated in-migrating construction workers, impacts to temporary housing may increase if the peak plant construction period coincides with the peak asparagus-harvesting season (April to June). The result of this impact will be a possible temporary increase in local rental rates and the potential need for workers at the generating plant or at the food processing plant to commute from longer distances during the peak season.

Generally, normal working hours will start between 7:00 and 8:00 a.m. and end between 5:00 and 6:00 p.m. The contractor will decide how many shifts will be planned; if an additional shift is desired, then the contractor will determine the working hours for that shift and will need to address nighttime noise, roadway traffic, and lighting before construction at night can occur.

The actual average hourly wage data by trade will depend on the contractor selected to complete the project; thus, the data are unavailable at this time. The average hourly wage during construction will be approximately $21.63, which is nearly double the average wage of Columbia County.

Water Supply and Wastewater

Onsite Well

The Applicant will construct the onsite well during the fall of 2002 to make water available for site preparation work and dust control. The construction can be completed within a short time (a few weeks to a month), depending on drilling operations. Only three to four people will be needed to drill the well.

Wastewater Systems

The Applicant will construct the wastewater systems. The stormwater pond will be one of the first construction activities at the site to capture runoff and control erosion. It will be built during the fall of 2002, and only two to three people will be needed for excavation and bank stabilization.

The septic tank and drain field for the sanitary wastes and the process water infiltration/ evaporation pond are expected to be built toward the end of the construction period (fall to winter 2004). Only two to three people will be needed to excavate, install, and stabilize these systems.

Gas Facilities

The Applicant will construct two 200- to 300-foot-long gas connections that extend from the combustion turbines to the M/R station concurrently with the generation plant. This construction will require only a few workers.

GTN will construct both the M/R station and the gas lateral concurrently with plant construction, and some construction workers will be working on the gas facility during the peak time for plant construction activities (for approximately 1 month). The peak workforce for the gas facility construction will be approximately 20 individuals. The gas facility construction will require approximately 3 months to complete.

Transmission Line and Switchyard

BPA will construct both the transmission line and the switchyard concurrently with plant construction; this construction will require approximately 9 to 12 months. Work conducted at the switchyard and the transmission line that is closest to the plant will be accomplished near the end of plant construction activities to minimize coinciding with peak construction at the plant. There is a potential for some overlap of peak construction in the first quarter of 2004, when some transmission line and switchyard workers will be working during the plant's peak working time. This overlap would be for only a short time, a month at the most.

The peak workforce for transmission line and switchyard construction will be approximately 80 to 95 individuals. The switchyard peak workforce will be approximately 40 to 50, and the transmission line peak workforce will be approximately 40 to 45 and will be interspersed along the 16-mile-long transmission corridor as needed.

Nonpeak workforce periods will occur at both the beginning and the end of project construction and will consist of 28 to 32 workers for transmission line and switchyard construction (assuming that the switchyard and transmission line construction will be concurrent during these times). The nonpeak workforce for the switchyard will be about 10 workers, and the nonpeak workforce for the transmission line portion of the project will be about 18 to 22 workers.

2.2.6.2 Operation and Maintenance

Generation Plant

The generation plant will begin power generation in late 2004 or early 2005. It will operate 24 hours per day, 7 days per week. A total of approximately 42 individuals (40 is a "rounded off" figure for use in this ASC) will be employed at the plant, which will be operated in two shifts (approximately 30 individuals in the first shift and 10 individuals in the second shift).

The generation plant will shut down and conduct general maintenance 2 weeks every year and major maintenance 4 weeks every 6 years. The existing workforce will usually be able to perform the maintenance under the direction of a licensed contractor. If additional skilled laborers are needed, the contractor will provide them.

Payroll expenses during operations will constitute approximately $3.8 million of the estimated $27 million in total operating costs (see Section 3.12, Figure 3.12-4, which compares the average hourly wage rates for Columbia County, the study area, Washington State, and the generation plant). The average hourly wage during operation will be approximately $28.35, which is approximately 97 percent higher than the study area average and about 152 percent higher than the county average. The higher annual wages paid by the generation plant will have a positive impact on the overall per capita income in the study area and will benefit businesses as workers spend their disposable income.

Water Supply and Wastewater Systems

Onsite Well

The onsite well will be ready to deliver water to the construction site in the fall of 2002. The plant maintenance personnel will maintain the onsite well along with other facility maintenance, so there will be no need for additional personnel.

Wastewater Systems

Plant personnel will inspect, maintain, and operate the wastewater systems (sanitary, process, and stormwater). Stormwater pond maintenance will begin in the fall of 2002, and the process water infiltration/evaporation pond and the septic tank/drain field for the sanitary wastes will be maintained after construction is completed in fall–winter 2004.

Gas Facilities

The gas lateral, the M/R station, and the gas connections will be ready to deliver gas by fall–winter 2004. The workforce associated with the M/R station and gas lateral will be only a few individuals (existing GTN staff), who will check the station and lateral operations and provide maintenance on a periodic basis.

Transmission Lines and Switchyard

BPA will perform all maintenance activities for the transmission lines and switchyard. These electrical facilities will be ready to transmit power before the plant needs the distribution/ switchyard system (plant needs to begin production in fall–winter 2004). These facilities' maintenance workforce will be about the same as that currently used to oversee the existing 500-kV lines in this area. One or two additional employees may be necessary to oversee and maintain BPA switchyard operations.

2.2.7 Costs and Revenues

2.2.7.1 Construction Costs

SPP Costs

Table 2.2-15 presents the total capital costs (approximately $750 million [all costs are presented in 2001 dollars and include the substation and gas connections]).

TABLE 2.2-15
Capital Costs, Starbuck Power Project

Generation plant (includes step-up substation, water supply system, wastewater systems, and gas connections)	**Approximate Millions**
Purchase contracts	$340
Construction contracts	$136
Indirect costs	$96
Generation plant total	**$572**
Gas facilities (gas lateral and M/R station)	**$3.7**

TABLE 2.2-15
Capital Costs, Starbuck Power Project

Electrical transmission facilities ($16.08 million will be rolled into BPA's rates and recovered from firm service tariffs)	**Approximate Millions**	
Transmission line	$13.7	
Switchyard	$8.63	
Modifications to Lower Monumental switchyard	$2.38	
Electrical transmission facilities total		**$24.7**
Project Soft Costs		
Land purchase	$0.17	
Development costs (includes permitting)	$16.67	
Owner's engineer	$2.5	
Financing (includes interest during construction)	$100	
Contingency	$30	
		$150
Railroad spur		**$0.25**
TOTAL ESTIMATED COST TO CONSTRUCT THE SPP (including generation plant, gas facilities, electrical transmission facilities, and railroad spur)		**$750 million**

Table 2.2-16 presents the engineering, procurement, and construction (EPC) breakdown for the SPP.

TABLE 2.2-16
Typical EPC Breakdown

Project X	**Description**	**Total $**	**Percent of Total Contract Value**
Estimate Summary			
Purchase Contracts:			
61.0000	Civil/structural	$9,405,312	1.64
62.0000	Mechanical	$287,413,539	50.23
63.0000	Electrical	$34,526,691	6.03
64.0000	Control	$3,713,890	0.65
65.0000	Chemical	$4,623,016	0.81
	Subtotal purchase contracts:	**$339,682,448**	59.37

TABLE 2.2-16
Typical EPC Breakdown

Project X	Description	Total $	Percent of Total Contract Value
Construction Contracts:			
71.0000	Civil/structural construction	$29,537,824	5.16
72.0000	Mechanical/chemical construction	$50,232,943	8.78
73.0000	Electrical/control construction	$19,437,670	3.40
78.0000	Service contracts and construction indirects	$36,548,433	6.39
	Subtotal construction contracts:	**$135,756,870**	23.73
	Total direct costs	**$475,439,319**	**83.10**
Indirect costs:	**Total indirect costs**	$96,707,453	16.90
Total project EPC Costs		$572,146,772	100.00

2.2.7.2 Operation and Maintenance Costs

Generation Plant

There are fixed and variable operation and maintenance costs for the generation plant. Fuel is a variable cost: the fuel costs vary depending on whether, and to what extent, the plant is operated. A number of other plant operation and maintenance costs are similarly variable, while others are fixed. Fixed operation and maintenance costs are costs that are required to be incurred for the plant regardless of whether, or to what extent, the plant is actually operating.

Annual nonfuel (excludes purchase of natural gas) operation and maintenance costs (year 2001 U.S. dollars) range from approximately $10 million a year to approximately $71.2 million (every sixth year needs major maintenance), with an annual average variable operation and maintenance cost of approximately $23.7 million.

Annual nonfuel fixed operation and maintenance costs (year 2001 U.S. dollars) are about $5,517,200 per year. These costs are estimated to be approximately $3,684,700 for labor, $386,500 for supplies and materials, $450,000 for rentals, $96,000 for contracted services, and $720,000 for routine maintenance.

Natural gas costs are estimated at $120 to 200 million per year, depending on changes in the gas price.

Transmission Lines and Switchyard

An agreement with BPA will be negotiated for the use of BPA's transmission lines and interconnecting facility at the plant site. This use is expected to cost approximately $15 million per year.

2.2.7.3 Revenues

Sales and Use Taxes During Construction

The Applicant will purchase power generation equipment from domestic and foreign contractors and vendors. The estimated cost of construction and equipment (excluding indirect costs) is $475 million. These costs will be subject to the state and local sales and use tax rate of unincorporated Columbia County of 7.5 percent. Washington State levies a 6.5 percent sales or use tax on products sold or used within the state, while an additional 1 percent is retained by local government: 0.85 percent is retained by the city in which the purchase is made, and 0.15 percent is retained by the county. In this case, the plant is located in unincorporated Columbia County, and the county will receive the full 1 percent sales and use tax on products purchased or used within the county. For purchases made within the state that include onsite construction or installation, state and county sales tax will be charged by the contractor or seller. For out-of-state purchases that are constructed or installed at the site, local and state use tax will be assessed.

Table 2.2-17 displays the estimated state and local sales and use taxes to be generated by generation plant construction. For this analysis, it was assumed that sales and use taxes will be levied on all purchase and construction contracts at the unincorporated Columbia County rate of 7.5 percent. Under this assumption, the project will generate an estimated $35.7 million in sales and use tax, $30.9 million of which will be paid to the state, and $4.8 million of which will be paid to Columbia County. The sales and use tax revenues generated from construction of the generation plant will be a one-time benefit to the state and county.

TABLE 2.2-17
Estimated Sales and Use Tax

Jurisdiction	Sales and Use Tax Generated
State	$30,903,556
County	$4,754,393
TOTAL	**$35,657,949**

Sales and Use Taxes During Operations

During operations, the Applicant expects to spend approximately $120 to $200 million per year for natural gas. Washington State currently taxes the purchase or use of natural gas at a rate of 3.852 percent. The purchase or use of natural gas for the generation plant will result in estimated tax revenues to the state of approximately $4.6 to $7.7 million annually.

The plant will also experience annual operation and maintenance expenses, exclusive of fuel costs, that will be subject to sales and use taxes. Average annual operation and maintenance expenses less fuel costs are estimated to be $23.7 million (Black and Veatch, 2001). Thus, annual operation and maintenance costs (excluding fuel) are projected to result in approximately $1.5 million in sales and use tax revenue to the state and approximately $237,000 in revenue to the county.

During operations, it is likely that 19 percent aqueous ammonia will be purchased locally, and the plant is estimated to require 9,600 pounds of aqueous ammonia per day. The

current price for aqueous ammonia is 0.1275 cent per pound (Capwell, 2001), making the annual cost of this material $428,400 (assuming 350 days per year of operations). On the basis of these assumptions and a state tax rate of 6.5 percent, the sale of aqueous ammonia will generate approximately $27,846 annually in state sales and use tax. Local sales and use tax revenues received by Columbia County for purchases of aqueous ammonia, assuming a 1 percent tax rate, will average $4,284 per year.

Property Tax Impact

The generation plant will have a significant positive impact on the fiscal environment for Columbia County and its taxpayers. Assuming that the valuation of the generation plant property, including land and improvements, will be approximately $500 million, the total assessed value of property in the county will increase from $253 million to $753 million, a 298 percent increase. The increased assessment and the accompanying taxes paid by the plant owners will allow the county to lower its levy rates. The basis for the reduction is the state's 106 percent limit on the growth of local and state levies. According to the County Assessor (Carlton, 2001), the result will be an increase in the county's total property tax revenues and, eventually, a significant decrease in the amount of property taxes paid to the county by existing taxpayers. This analysis reflects tax levies approved by voters at the time of preparation of this ASC. Future property tax levies may result in a material change to the projections provided here.

Special levies already passed by the citizens of local taxing districts will be unaffected by the project; they will continue to generate the same amount of tax revenues as approved by the voters, while at the same time the levy rate per $1,000 will be reduced substantially.

The generation plant will be located in the county's taxing district of rural Starbuck, located outside the town. It is in this taxing district that there will be the greatest reduction in the levy rates of all the taxing districts in the county; the levy rate for the Starbuck area will decrease by approximately 74 percent if the generation plant is assessed at $500 million.

This beneficial impact will be phased in over a number of years. During construction, when additional public services will be required, few or no tax dollars will be due to the county. As an example, if construction begins in December of 2001, then the first tax assessment occurs after July 31, 2002, for the amount of new construction that is complete at that time (example 25 percent) and is added to the total county tax base for 2002. This 25 percent assessment will be due and payable in the first and second half of 2003. Assuming that the plant is 75 percent complete at the time of the July 31, 2003, assessment, property taxes will be due and payable in 2004. The 100 percent new construction assessed after July 31, 2004, will be due and payable in 2005, 1½ years after construction is complete.

The Applicant will seek an agreement with the county to advance the timing of the county's receipt of property tax payments. This will help match the timing of county receipt of such revenues with construction-related public safety. The agreement would authorize the Applicant to prepay a portion of property taxes that would be due during commercial operation of the SPP. In the alternative, the agreement would provide a credit against property taxes due after the SPP achieves commercial operation in an amount equal to funds advanced by the Applicant to cover construction-related public safety personnel and facilities. To the extent that the town rather than the county incurs such expenses, the Applicant will encourage the county and town to enter into an interlocal agreement,

providing for payment of town expenses from the funds advanced to the county by the Applicant.

Table 2.2-18 displays the potential impact of the estimated property tax reductions on an average household in the town once the county tax base reflects the entire plant assessment (such as in 2005). For this example, it was assumed that the median household income in the town was equal to the estimated average median household income for Columbia County in 2000. In 2001, the average household in the town will pay an estimated $263.44, or 1.0 percent of its household income, in property taxes on property assessed at an average of $24,700. If the generation plant is assessed at $500 million and total property tax revenues are held constant, the annual property tax bill for the average household will decrease by about 59 percent.

TABLE 2.2-18
Impact of Property Tax Reduction on Average Household in Starbuck

Average assessed value of home in Starbuck [a]		$24,700
2000 average median household income, Columbia County [b]		$29,265
	Current	**Impact of $500 Million Assessment**
Consolidated levy ($/1,000) [a]	$10.66553	$4.316407
Average annual property tax payment	$263.44	$106.62
Percent of median household income paid to property taxes	1.0 percent	0.36 percent

[a] From Columbia County Department of Assessment (2001); consolidated levy for Assessor's Code C-35 (Town of Starbuck).
[b] Estimate from Washington State Office of Financial Management (2001).

2.2.8 Mitigation Measures Inherent in the SPP Design

The following subsections describe project design features that provide mitigation or environmental benefits.

2.2.8.1 Generation Plant

Combined-Cycle Plant

A combined-cycle, gas-fired plant uses heat more efficiently to generate electrical power than does a simple-cycle generation plant. Gas-fired combustion turbines produce electricity, and the heat generated from the gas-fired turbines is used in HRSGs to produce steam. This steam, in turn, operates steam turbines to produce additional electricity from the generation plant.

Advanced-technology, high-efficiency, Type F series CGTs with DLN burners will be used. To further reduce NO_x emissions, each CGT outlet train will be equipped with selective catalytic reduction (SCR).

Air-Cooled System

An air-cooled system was chosen instead of a wet-cooled system for the generation plant. An air-cooled design conserves a tremendous amount of water because the plant needs less than 432,000 gpd, while a typical wet-cooled plant, comparable in size to the SPP, needs more than 8 million gpd. The generation plant water consumption represents only approximately 5.4 percent of a typical wet-cooled system.

Operating a plant with minimal use of water resources is important in an area where water conservation is crucial to conserve resources, to maintain flows in the Snake and Tucannon Rivers, and to avoid fisheries impacts to salmon.

No Surface Water Discharge

The generation plant is designed so that there will be no wastewater discharge to any surface water body, including the nearby Snake River. Blowdown water will be recycled by treating and reusing it in the generation cycle. All wastewater is collected and treated for disposal in infiltration/evaporation ponds or through a drain field for infiltration into the ground. The generation plant is about 170 feet above groundwater, which allows filtering of water before it reaches the groundwater. All process wastewater released into the ponds will be slightly warmer than well temperature (groundwater is typically between 48°F and 54°F) because the water will warm up as it is exposed to piping that is subjected to surface air temperatures. There will be no thermal impacts to fish, however, because the infiltrated water that could eventually reach the groundwater and flow toward the Snake River will have cooled during infiltration to approximately the temperature of the Snake River or groundwater.

Air Emission Technology for Combustion Turbines and HRSGs

The best available control technology (BACT) will be used to minimize air emissions from the CGTs and HRSGs as follows (see Attachment E of Appendix G for more detailed information):

- NO_X: SCR plus DLN combustion at 2.5 parts per million by volume, dry (ppmvd) (corrected to 15 percent O_2), based on a 24-hour averaging basis, with 10 ppmvd ammonia slip (corrected to 15 percent O_2), based on a 24-hour average basis is proposed as BACT for NO_X.

- CO: Catalytic oxidation will be used as the BACT for control of CO emissions from the combustion turbines at SPP.

- VOCs: The plant will use selected catalytic oxidation and good combustor design for controlling VOC emissions from combustion turbines at the SPP. A VOC emission limit of 4.2 ppmvd corrected to 15 percent O_2 on a 24-hour average basis, either with or without the duct burner operating, is proposed as BACT for the combustion turbines.

- PM and PM_{10}: Pipeline-quality natural gas will be the only fuel used in the combustion turbines at the SPP and is accepted as BACT. Each combustion turbine will emit no more than 21.3 pounds per hour (with or without the duct burner being in operation) of PM and 21.0 pounds per hour (with or without the duct burner being in operation) of PM_{10} on a 24-hour average basis. These emission limits do not include expected emissions of $2(NH_4)(SO_4)$), but they do include both front and back halves of the stack exhaust analysis.

The generation plant is located in an attainment area, which avoids the cumulative air quality impacts that would occur if it were located in a nonattainment area. The Applicant has elected to make the necessary capital purchase of state-of-the-art equipment capable of meeting 2.5 ppm for NO_x emissions. In addition, the Applicant will not use diesel fuel for operation startup and, therefore, has eliminated the emissions associated with a considerable volume of diesel fuel. Also, the Applicant is proposing CO_2 mitigation, explained in more detail in Section 3.2.2.2 of this ASC.

Noise Mitigation

Plant equipment will meet all requirements of state regulations under 173-60 WAC and will incorporate several noise mitigation features, including the following:

- Each CGT will be located within an acoustic enclosure, which will be equipped with acoustically insulated doors and silenced ventilation openings.
- The CGTs, STGs, and much of the auxiliary equipment will be located within the insulated Generation Building, which will be designed to contain the equipment noise emissions.
- The combustion turbine inlet will be equipped with a silencer.
- The HRSG equipment will function as an effective combustion turbine exhaust silencer. The HRSG equipment itself will not generate noise, but it will radiate a portion of the combustion turbine exhaust noise that enters the equipment. The HRSG is anticipated to provide sufficient exhaust silencing. No specific noise mitigation measures, beyond the inherent equipment noise attenuation, are anticipated for the HRSG equipment.
- The fin-fan coolers will be equipped with fans that achieve the specified equipment noise emissions.

No Diesel Storage for Emergency Startups

The generation plant will have no diesel storage onsite for emergency startup purposes. This choice eliminates the environmental concerns associated with large-scale diesel storage, the potential for a spill to groundwater or surface water, and site cleanup.

2.2.8.2 Natural Gas Pipeline

The M/R station will be located on the Applicant's property, which will provide more security and fewer environmental risks than if it were located away from the generation plant site.

2.2.8.3 Water Supply Choice

Onsite Well

Selecting an onsite well to supply the generation plant with water will result in fewer environmental impacts than using the alternative water pipeline (although water pipeline environmental impacts are likely insignificant). Eliminating the 6-mile-long water pipeline from the SPP would also eliminate the following:

- The associated excavation that could affect the natural habitats along the pipeline route
- The potential for leaks or pipe breakage (especially at the Tucannon River crossing)

- The need to use the Town of Starbuck's public water system

No Surface Water Discharge

The SPP is designed to have no discharges to surface waters (that is, the Snake River), and it will meet water quality standards discharges to ground. This "no discharge option" removes potential impacts to fisheries in the Snake River and is a better alternative than a surface water discharge.

2.2.8.4 Transmission Line and Switchyard

Transmission Line

The transmission line route was evaluated both north and south of the existing 500-kV transmission line corridor. The northern route was selected because it is not technically feasible to connect to the Lower Monumental Dam switchyard from the south. The design difficulty is caused by a lack of space to locate transmission towers and to provide for the proper connection at the switchyard, and the northern route is best for circumventing the nearby Corps airfield.

Switchyard

The switchyard will be located directly underneath the existing BPA 500-kV lines that transect the generation plant site because that places the switchyard on the Applicant's property and close to the generation plant. This option will result in fewer impacts than if the switchyard were located farther away from the generation plant site.

2.2.9 General Mitigation Measures

A detailed account of the mitigation measures recommended to mitigate possible adverse impacts on the physical or human environments is contained in Appendix M.

2.3 Description of the No Action Alternative

The No Action Alternative would result in no construction or operation of a 1,200-MW electric generation plant at the generation plant site. It also would prevent the construction and operation of other related major projects, including the transmission line, the switchyard, the M/R station, and the gas lateral. The No Action Alternative would prevent the SPP from generating 1,200 MW of electricity. This electricity would have been available to augment the supply of power to the Pacific Northwest, which is suffering from a power shortage. Customers would need to obtain power from other sources, each having its own environmental impacts.

The No Action Alternative would also eliminate environmental impacts from the generation plant (see Table 2.3-1). However, because the site is already zoned industrial, the No Action Alternative would not rule out similar impacts from other industrial development at the site. Finally, the No Action Alternative would eliminate the local benefits to economically depressed Columbia County and nearby local communities in the form of tax revenues and opportunities for employment.

TABLE 2.3-1
No Action Alternative

Environmental Resource	Positive Impacts	Negative Impacts
Earth	No ground disturbance from site development, such as increased potential for runoff/erosion, and no disturbance of a unique geologic feature ("ripples" caused by the Missoula Floods).	The proposed action will preserve the geologic "ripples" located on the northwest portion of the property that were created by the Missoula Floods. There is no guarantee that other project proponents would do the same.
Air	No air emissions generated.	None.
Water	300-gpm groundwater withdrawal would not occur (although the Applicant will mitigate this withdrawal).	Town of Starbuck loses revenue if 100-gpm water supply option is not exercised (even without the water pipeline, the Applicant will pay the town for maintenance of the option).
Wetlands	Not applicable.	Not applicable.
Vegetation	No habitat loss from facilities. The project will control noxious weeds.	Noxious weeds would continue to invade the site.
Agricultural	Land use may remain agricultural within a zone designated as heavy industrial.	Loss of potential property tax revenues generated by the plant, which the county could use to reduce tax burden to farmers. Less ground is currently being cultivated because of the decline in grain prices and the high cost of production. This adds to the county's depressed economic state because there is less need to purchase fertilizers, seed, fuel, supplies, etc.
Wildlife	No habitat disturbance or potential to disturb wildlife.	About 50 acres of the northwest portion of the property would remain in its natural state. There is no guarantee that other project proponents would do the same.
Fish	None – existing conditions stay the same.	Reduced flexibility in operation of hydroelectric system because thermal power from the SPP would not be available to help meet energy demands.
Energy and Natural Resource	None.	Unavailability of SPP may contribute to power shortages and increase energy costs to consumers.
Noise	No added noise to the area.	None.
Land Use	Land use remains agricultural.	Land would not be used as zoned: for industrial development.
Visual Resources	No change.	None, assuming no other industrial development occurs on the site.
Population, Housing, Economics	None.	Loss of potential sales and property taxes, which could boost Columbia County's revenues. Loss of jobs or opportunities to boost economy in this economically depressed area.
Public Services and Utilities	None.	Loss of potential revenues for improvement of existing public services and utilities , including law enforcement and emergency services.

TABLE 2.3-1
No Action Alternative

Environmental Resource	Positive Impacts	Negative Impacts
Cultural Resources	No potential to disturb cultural resources.	No opportunities for tribal members to be involved in oversight activities during plant construction, or to study and protect existing resources.
Traffic and Transportation	No increase in traffic.	No plant-related revenues available for road improvements.
Health and Safety	No risk to health and safety caused by the generation plant.	No revenues available for health and safety planning and response.

2.4 Alternatives to the Proposed Action

For the purpose of this ASC, the cooling system design, water supply options, and choice of the southern portion of the Applicant's property are the alternatives used to compare environmental resources. Before these alternatives are described (below), the site selection process is briefly reviewed.

2.4.1 Alternative Generation Plant Locations

SEPA does not require an alternative site analysis because the Applicant is a private company, and the site is already zoned for industrial use that allows for siting of power plants. However, the Applicant did review several sites before selecting the proposed site. That analysis is briefly summarized below.

SPC looked at seven alternative sites in 1993, eight sites altogether, to locate the power generation plant (see Figure 2.4-1). These sites are as follows:

- Site 1: Vicinity of Wallula
- Site 2: State Highway 124, East of Wallula
- Site 3: Near Touchet Road
- Site 4: State Highway 124, Near Eureka
- Site 5: Disturbed Area Near Existing Site
- Site 6: Area in the Vicinity of Lyons Ferry Road
- Site 7: Across Snake River, Northeast of Existing Site
- Site 8: Existing Starbuck Site

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Figure 2.4-1
Alternative Generation Plant Sites

Application for Site Certification Starbuck Power Project Starbuck, Washington

FRANKLIN CO.

WHITMAN CO.

COLUMBIA CO.

Palouse River

261

Site 7

Site 6

Site 5

Generation Plant Site (Site 8)

Starbuck

Tucannon River

N

1 0 1 2 Miles

Legend

- Alternative Plant Locations
- Existing Transmission Lines
- Highways
- State Routes (SR)
- US Highways
- Secondary Roads
- County Boundary

WASHINGTON

Project Area

Inset

Franklin Co.

Site 4

Site 3

124

Snake River

12

Walla Walla Co.

Site 2

Site 1

Columbia River

Wallula

0 2 4 Miles

WASHINGTON

Inset

Table 2.4-1 summarizes these sites and lists the advantages and disadvantages of developing each site. Based on the information known at that time (1993), the current SPP generation plant site was chosen as the best site at which to develop a gas-fired, combined-cycle power plant. This choice reflects the decision to select a site that would have minimal environmental impact and also meet development requirements (for example, all sites except the SPP site needed the acquisition of a property option agreement).

TABLE 2.4-1
Advantages and Disadvantages of Potential Sites

Site	Advantages	Disadvantages
Site 1: Vicinity of Wallula	Possible wet-cooled system. Industrial setting. Port of Walla Walla.	Several miles to gas supply (pipeline). Nearby transmission line is 230 kV with PacifiCorp (step up to 500-kV is a problem and added expense to transmission costs). BPA 500-kV transmission line is 2 miles away and ability to tap it is uncertain.
Site 2: State Highway 124, East of Wallula	Pacific Gas Transmission (PGT) gas supply at this site. PacifiCorp 230-kV substation at this site. Irrigation nearby for potential water supply to site.	PacifiCorp transmission rates add to costs. BPA 500-kV transmission line is about 2 miles away and ability to tap it is uncertain.
Site 3: Near Touchet Road	PGT gas supply at this site. PacifiCorp 230-kV at site.	No water nearby. Area is remote. PacifiCorp rates. BPA 500-kV several miles away and ability to tap it is uncertain.
Site 4: State Highway 124, near Eureka	BPA 500-kV transmission line at site. Possible to connect to gas supply. Potential water supply in vicinity. Industrial setting.	4 miles to gas supply.
Site 5: Disturbed Area Near Existing Site	Adjacent to PGT. Adjacent to 500-kV transmission line. Same owner as existing site.	Smaller than existing site. Not under option.
Site 6: Area in the Vicinity of Lyons Ferry Road	Close to PGT gas supply. Close to 500-kV transmission line. Farmland with little chance of cultural artifacts.	No property or water option agreement.
Site 7: Across Snake River, Northeast of Existing Site	Adjacent to PGT gas supply. Adjacent to 500-kV transmission line.	Remote, no road access. No water supply likely.

TABLE 2.4-1
Advantages and Disadvantages of Potential Sites

Site	Advantages	Disadvantages
Site 8: Existing Starbuck Site	Adjacent to 500-kV transmission line. Adjacent to PGT gas supply. Land under option. Site feasibility well under way; no need to start over at new site. No known view issues.	Possible cultural resources issues, which could apply to all sites. Use of an existing groundwater right current option with Town of Starbuck to pipe water 6 miles to the site as an alternative supply – for use in an air-cooled system.

2.4.2 Northwest Site Alternative

An existing BPA transmission line divides the 100-acre Starbuck property into a northwest site (approximately 60 acres) and a southeast site (approximately 40 acres), each of which was reviewed for location of the generation plant. The southeastern portion was chosen for the generation plant site because it provides easier access to the generation plant, is closest to the gas mainline, and preserves geological features on the northwestern half of the 100-acre property. A more detailed comparison of the proposed action and the northwest site alternative is shown in Table 2.4-2.

2.4.3 Alternative Generation Plant Designs

The following narratives discuss each design alternative in further detail. Table 2.4-2 compares these design alternatives with the proposed action.

2.4.3.1 Wet-Cooled System Design Alternative

The Applicant considered a wet-cooled system for the generation plant because it would lower the cost of plant operations. An air-cooled system was chosen for the following two reasons: (a) difficulty of securing enough water to supply a water-cooled system and (b) to conserve water. The air-cooled design will use 300 gpm or up to 432,000 gpd. In comparison, a water-cooled system would require more than 8 million gpd, an increase of approximately 94.6 percent in water usage. Of the 8 million gallons consumed by a wet-cooled system, approximately 80 percent of this water evaporates.

2.4.3.2 Configuration of Generation Plant Alternative

The Applicant configured the layout of the generation plant on the basis of plant design changes that saved space at the site. The initial layout was for two separate 500-MW blocks with each block having its own control room. That design would have required more space for facilities, thereby requiring a larger footprint area and a larger disturbed area compared with the selected design. The current design consists of two combined-cycle power blocks, each in a two-on-one configuration, with associated support facilities. Two-on-one configuration means that two CGTs, each directly connected to an electric generator, will send hot exhaust gas to two dedicated HRSGs. Steam produced by the two HRSGs will be combined and directed to a common STG.

TABLE 2.4-2
Comparison of Proposed Action and Other Alternatives

Environmental Resource	Proposed Action	Northwest Site Alternative	Wet-Cooled System Alternative	Different Configuration Alternative	Water Pipeline Alternative
Earth	50 acres disturbed during construction. Geologic features created by the Missoula Floods will be preserved.	Geologic features created by the Missoula Floods would be destroyed.	Same as proposed action.	Same as proposed action.	Same as proposed action with the addition of ground disturbance for a 6-mile-long, 30-foot-wide water pipeline construction corridor.
Air	Minimal, short-term construction impacts limited to dust, engine exhaust. Increased emissions for NOx, SO_2, and PM but regulated to meet air quality standards.	Same as proposed action.	Results in a vapor plume and the potential for associated climate impacts.	Same as proposed action.	Same as proposed action with additional potential for dust and engine exhaust impacts during pipeline construction.
Water	Withdraw 300 gpm from shallow aquifer via onsite well.	Same as proposed action.	Would require higher water consumption—about 8 million gpd for similarly sized plant.	Same as proposed action.	Use 100 gpm from Town of Starbuck's water system. Fogging would be done less frequently and steam injection would not be possible, resulting in less flexibility in plant production operations.
Wetlands	No wetlands at site so there is no impact.	Same as proposed action for wetlands.	Same as proposed action for wetlands.	Same as proposed action for wetlands.	No wetlands occur along the water pipeline corridor, but some wetlands are adjacent to the route and those will need protection.

TABLE 2.4-2
Comparison of Proposed Action and Other Alternatives

Environmental Resource	Proposed Action	Northwest Site Alternative	Wet-Cooled System Alternative	Different Configuration Alternative	Water Pipeline Alternative
Vegetation	Disturbance to nonwoody vegetation consisting mostly of noxious weeds.	Same as proposed action.	Same as proposed action.	Footprint is smaller but not enough to make much difference in ground disturbance activities. However, more land could be restored to natural state following construction.	No impacts. No vegetation is present on railroad bed composed of solid rock.
Agricultural	Loss of 100 acres of land for agricultural use as range land for cattle.	Same as proposed action.	Same as proposed action.	Same as proposed action.	Same as proposed action except temporary disturbance of adjacent agricultural operations during pipeline construction.
Wildlife	40 acres of vegetation habitat would be permanently removed and wildlife species displaced. Surface area free from structures would be revegetated to natural state.	Same as proposed action.	Same as proposed action.	Less ground available for revegetation because the footprint is larger.	Same as proposed action except wildlife along pipeline route may be disturbed during construction.
Fish	No impacts to fish.	Same as proposed action.	Higher water usage would affect surface water resources used by fish.	Same as proposed action.	Same as proposed action.
Energy and Natural Resources	Natural gas consumption to produce energy. Also concrete, steel, gravel, and sand to build facilities.	Same as proposed action.	Same as proposed action.	Same as proposed action.	Additional sand for bedding materials and for the pipeline materials would be required.

TABLE 2.4-2
Comparison of Proposed Action and Other Alternatives

Environmental Resource	Proposed Action	Northwest Site Alternative	Wet-Cooled System Alternative	Different Configuration Alternative	Water Pipeline Alternative
Noise	Increase in noise levels, but within noise standards.	Same as proposed action.	Generally, the same as proposed action. Wet-cooling towers might be slightly less noisy.	Same as proposed action.	Same as proposed action except for additional noise generated during pipeline construction.
Land Use	Located in industrial zone currently used for agricultural purposes. Has a Certificate of Land Use Consistency from Columbia County for plant.	Same as proposed action.	Same as proposed action.	Same as proposed action.	Same as proposed action. Water pipeline allowed in proposed route.
Visual Resources	Low to moderate impact on users at Lyons Ferry State Park, recreationalists and others on the Snake River, and those at the Columbia County Grain Elevators. Moderate impact for those traveling on SR-261.	Same impact.	Vapor plume visible under certain weather conditions, which is not seen with air-cooled systems. Higher water volume need might require additional infrastructure (e.g., well houses), causing visual impacts. Wet-cooling towers are shorter and less visible than air-cooled condensers.	Larger building footprint (two buildings) would result in larger visual impact. Location at the NW vs. SE corner of the site would have greater impact on viewers at State Park (would be closer).	Water pipeline would be buried, but it would be visible at two bridge crossings.

TABLE 2.4-2
Comparison of Proposed Action and Other Alternatives

Environmental Resource	Proposed Action	Northwest Site Alternative	Wet-Cooled System Alternative	Different Configuration Alternative	Water Pipeline Alternative
Population, Housing, Economics	No significant impacts from temporary increase in population and need for housing during construction. No significant impacts to population and housing during operations. Would improve local economy and increase tax revenues in an economically depressed area.	Same as proposed action.	Same as proposed action.	Same as proposed action.	Population impacts would be about the same as proposed action – a few more construction workers would be in the area. Housing impacts would be about the same except for the few more construction workers. Would provide additional revenue to the Town of Starbuck.
Public Services and Utilities	No significant impacts on public services and utilities including police, emergency, and parks. Close to natural gas mainline (gas pipeline is within 200 feet of property line).	Same as proposed action in respect to local services. Natural gas pipeline is about 0.5 mile from the northwest portion of the property.	Would require a higher water volume that would affect the Town of Starbuck if the town supplied the water. Same distance from natural gas pipeline.	Same as proposed action.	Impacts would be greater because of the need to construct and maintain the water pipeline as part of the Town's public system. Same distance from natural gas pipeline.
Cultural Resources	Potential for impact in certain project-related areas – not anticipated at plant site.	Same as proposed action.	Same as proposed action.	Same as proposed action.	Same as proposed action. There is a potential for impacts along the pipeline route—no resources have been found.

TABLE 2.4-2
Comparison of Proposed Action and Other Alternatives

Environmental Resource	Proposed Action	Northwest Site Alternative	Wet-Cooled System Alternative	Different Configuration Alternative	Water Pipeline Alternative
Traffic and Transportation	Moderate temporary increase in local traffic during construction. Easy access from SR-261.	Same as proposed action. Access from SR-261 not as convenient as the proposed action.	Same as proposed action.	Same as proposed action.	Additional traffic during pipeline construction for about 2 months.
Health and Safety	Potential for spills of petroleum products or chemicals during construction—aqueous ammonia, lube oil, and transformer oil during operations. No significant impact related to risk of explosion at generation plant.	Same as proposed action.	Same as proposed action.	Same as proposed action.	Same as proposed action.

2.4.3.3 Water Pipeline Water Supply Alternative

As a water supply alternative to the proposed onsite well, the Applicant has secured an option to purchase up to 100 gpm (or up to 144,000 gpd) of water from the Town of Starbuck under the town's existing water right. The Applicant would construct a water pipeline, primarily along an abandoned railroad bed, connecting the generation plant to the town's water supply system. Impacts to environmental resources associated with implementing the water pipeline alternative would be greater than those associated with the proposed onsite well. However, as mitigated, the environmental impacts (including potential impacts to wetlands, fisheries, wildlife, plants, erosion, and transportation) associated with the water pipeline are considered insignificant (see Table 2.4-2 for a more detailed comparison of the water pipeline alternative with the proposed action).

The following subsection describes the water pipeline proposal.

Water Pipeline Proposal

Under the water pipeline alternative, an approximately 6-mile-long, 4-inch-diameter water pipeline would be constructed to connect the town's water system to the generation plant site in order to supply water to the plant (see Figure 2.4-2).

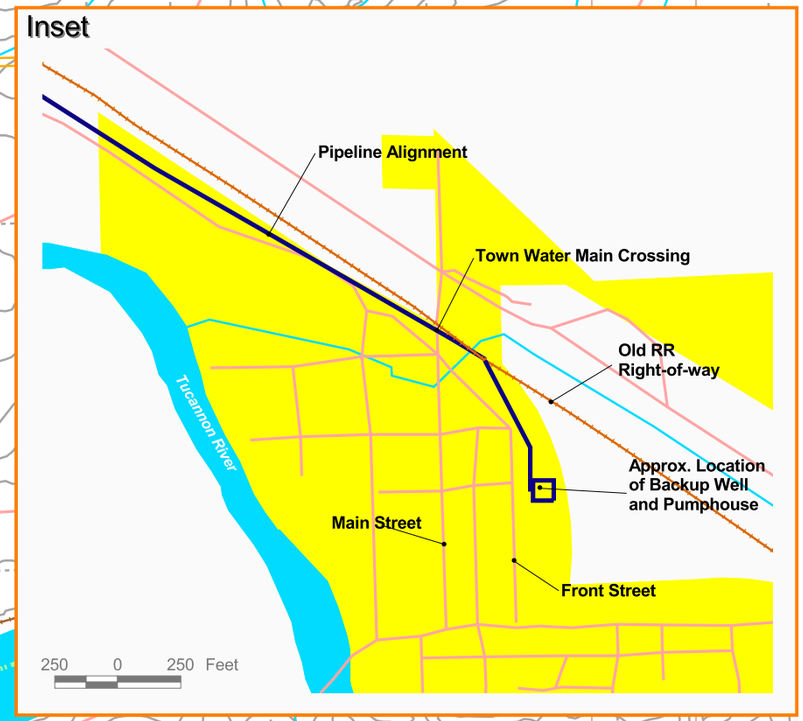
If this water pipeline were necessary, the Applicant would locate it primarily within an abandoned railroad ROW that parallels SR-261 from the town to just south of the generation plant site (refer back to Figure 2.2-7). Use of the abandoned railroad ROW would result in fewer environmental impacts (including potential impacts to wetlands, erosion, plants and animals and their habitats, and transportation) than any other route in the Tucannon River valley (such as within the SR-261 ROW).

The pipeline would begin at the town's wellhouse and follow the street ROW until it reached the abandoned railroad ROW. This area contains no vegetation or wetlands. The pipeline would stay in the ROW until it reached the Tucannon River.

To cross the Tucannon River, the pipeline would be routed north from the abandoned ROW to SR-261 and parallel the roadway, crossing the river on the highway bridge. The land downstream from the bridge between the ROW and the bridge is not in wetlands, and there is no vegetation other than some nearby shrubs and weeds. After crossing the river over the bridge, the pipeline would be routed back to the abandoned ROW and continue northward. Again, there is no wetland, and little vegetation other than grass and weeds. The pipeline would continue to follow the railroad ROW until it was approximately 1 mile southeast of the generation plant site, where it would meet the existing railroad track owned by Union Pacific Railroad and currently in use. At this point, the water pipeline would turn toward SR-261 and cross the highway over the railroad bridge to be on the Snake River side of the highway. The land near the bridge is rocky, with no vegetation or wetlands in the area. The pipeline would then be routed northwest following SR-261 to the plant site. The pipeline would enter the property from the SR-261 ROW and terminate at the water storage tank on the Applicant's property. The property currently has only grass and weeds.

Figure 2.4-2
Water Pipeline

Application for Site Certification Starbuck Power Project Starbuck, Washington



N

1320 0 1320 2640 Feet

Starbuck Power Plant Property

Columbia Co. Grain Growers Lyons Ferry Elevators

Hwy. Bridge Crossing RR, Pipeline Attached To North Side of Bridge

Snake River

261

Active RR Line

Approx. Location of Storage Tank

PG&E "A" Gas Pipeline

Active RR Line

Whitman Co.
Columbia Co.

PG&E "B" Gas Pipeline

End Abandoned RR Line

Pipeline Alignment Leaves Exst RR Right of Way and Onto Exst Unimproved Roadway

Tucannon R.

261

Pipeline Alignment, Centered in Exst RR Grade Right of Way (RR Line Abandoned, Tracks and Ties Removed, TYP)

Tucannon River Bridge, Pipeline Attached to South Side of Bridge

Centurytel Utilities Crossing

Powers Road

SR-261

Starbuck (see inset)

Legend

- Proposed Site Property
- Proposed Water Pipeline
- Gas Pipeline
- Transmission Lines
- Facility Buildings
- Other Buildings
- State Routes (SR)
- Secondary Roads
- Railroad
- Abandoned Railroad
- Contours 100 Foot

Under the pipeline alternative, the generation plant's water supply would be pumped from the existing town wellhouse through a proposed pipeline to the plant water storage tank. An automated switch at the tank would be set up to turn the pipeline pump on and off, as needed. A second wellhouse within 200 feet of the existing town wellhouse would be constructed to provide redundancy and supply reliability in case of pump failure at the existing wellhouse. Backflow prevention devices would be installed to prevent backflows of potentially contaminated water into the system. This is a preventive design feature that is required by the Washington State Department of Health, which regulates public water systems. The pipeline would be flushed annually and valves checked on a regular basis.

Construction Schedule and Workforce

The Applicant would construct the water pipeline concurrently with plant construction. Water pipeline construction would require approximately 2 months and would be accomplished at a time when plant construction activities are not at peak levels (early stages of plant construction). The pipeline would be ready to deliver water during most of the construction period, but because it would take several months to build the pipeline, and because of the need to not delay construction, offsite water would be hauled by truck from the Town of Starbuck until pipeline water was available. The peak workforce for the water pipeline construction would be approximately 35 individuals.

Construction Methodology and Stormwater Control

The water pipeline would be installed through excavation and burial of pipe along the selected route to the generation plant. The railroad bed would provide a stable foundation for excavation and placement of the 4-inch-diameter pipeline, as well as allow the pipe to be placed above any wetlands in the Tucannon River valley. Construction would consist of the following activities:

- Excavating the pipeline trench
- Fabricating pipe segments
- Installing the pipe in the trench
- Backfilling the trench
- Conducting hydrostatic testing

Stormwater runoff would be controlled to minimize soil erosion during water pipeline construction on the abandoned railroad ROW. Because the diameter of the water pipeline would be small (4 inches), a narrow (1.5- to 2-foot-wide) trench 4 feet deep could be excavated for pipeline placement, minimizing the exposure of disturbed areas to stormwater. Also, the pipeline would be installed in up to 500-foot-long segments, with each segment covered as pipe was laid, to further minimize the exposure of disturbed areas. No more than 50 feet of exposed pipe would be left uncovered at the end of a shift day. Temporary swales would direct and control most of the runoff. Perimeter silt fences, weed-free hay bales, or other sediment control mechanisms would be installed to remove sediment from runoff before it reached land adjacent to the abandoned railroad bed or entered nearby wetlands or the Tucannon River. Additional localized silt fences would be used, as required during construction, to minimize erosion and transport soil toward the perimeter silt fences and vulnerable habitat areas. Locations of temporary swales would vary, depending on the areas being excavated or filled. The perimeter silt fence would not

be removed until total stability of the site was achieved. Seeding of native species and mulching would be used where practical for slope stabilization and site restoration.

Construction activities would be monitored as pipeline construction approached the Tucannon River bank and when the pipeline was placed on the SR-261 bridge. The buried segment on the north bank of the highway bridge would be on high ground above any wetlands and floodway but within the 200-foot shoreline buffer area. The segment on the south bank of the highway bridge would also be laid on a high bank that lies within the 200-foot shoreline buffer area and above the nearby wetlands to the south. Excavation equipment would access the high bank area from the abandoned railroad ROW so as to avoid these wetlands. In addition, utility owners would be contacted and a construction plan approved by the utilities for the following utility crossings:

- Near the Town of Starbuck, where the pipeline would cross the town trunk sewer that runs from the town to the disposal field
- At Powers Road, where the pipeline would cross a telephone cable
- South of the SR-261 bridge that crosses the Union Pacific Railroad track, where the pipeline would cross the "B" gas pipeline
- Near the generation plant site, where the pipeline would cross the "A" gas pipeline

According to WSDOT staff members who participated in an onsite visit in April 2001, the highway bridge over the Tucannon River and the highway bridge crossing the Union Pacific Railroad would handle the additional weight of the filled 4-inch-diameter water pipeline. A traffic management plan would be submitted to EFSEC for review of traffic on SR-261 during the pipeline construction.

Laydown and staging areas would be conducted within the ROW of the abandoned railroad bed. Some existing culverts would need to be relocated at a greater depth, or the pipeline could be constructed beneath them.

A visual survey of the abandoned railroad bed did not reveal any noticeable surface stains or indications of prior spills or contamination. Because there is no visual evidence of a prior spill or of contaminated soils, and because the water pipeline is an alternative water supply, there are no immediate plans to sample the railroad ROW for potential contamination. However, if the water pipeline were to be constructed and the Applicant determined that sampling would be prudent, then a sampling program would be conducted after EFSEC had approved a sampling protocol. This protocol would specify number of soil samples to be collected, distance between samples, depth of samples collected, type of test or analysis to be done, and identification of anticipated chemical to be found (that is, petroleum hydrocarbons). If contaminated soils were found during sampling or during excavation, then a testing and cleanup plan would be developed and submitted to EFSEC for approval before construction continued. If hazardous materials were discovered, then the excavated soils would be removed offsite and disposed of in a permitted facility, in accordance with a cleanup plan. Clean soil would be hauled in and used to fill the excavated trench.

Pollutant emissions during the construction period would consist of fugitive dust from excavation activities and vehicle exhaust both from onsite vehicles and from workers

commuting to and from the site. Construction activities would be a temporary source of emissions and would not be expected to result in a significant impact to ambient air quality.

For more detailed information on the water pipeline, refer to the Water Pipeline Memorandum (CH2M HILL, May 2001) in Attachment B.

Maintenance and Operations

If the water pipeline were built, it would be ready to deliver water to the generation plant in fall to winter 2004 for operations. The pipeline would need only occasional oversight for detecting potential leaks and for structural stability, particularly at the SR-261 bridge crossing. There would also be periodic maintenance of the town wellhouse equipment (pump, valves, and meters) and the point of delivery at the generation plant (valves). The maintenance personnel at the generation plant would include these oversight duties within their job responsibilities; as a result, there would be no need for additional personnel. The Town of Starbuck's maintenance employee would also contribute to this occasional pipeline/wellhouse supervision.

Power Generation

Use of the pipeline as the water supply for the generation plant at 100 gpm would result in 200 gpm less than what is possible under the onsite well proposal (300 gpm). This smaller quantity of available water would result in less power being generated because the 100-gpm limitation would prevent the use of plant processes that can augment power production (for example, would reduce the hours of fogging that can occur to only 3 hours a day for 3 months of the year and prevent the use of steam injection). With additional water available under the onsite well option, the power plant can use these special processes to augment power production, namely, fogging more frequently and using steam injection (see Section 2.2.4.3, Gas Facilities, for a description of these processes). Use of these processes depends on weather conditions, which will affect the extent to which these processes are used. There is a potential of generating approximately 60 additional MW; however, the average annual output of the plant is calculated to be 1,200 MW because output will vary annually.

Costs and Revenues

The total capital cost of the water pipeline and new well in the Town of Starbuck would be approximately $1.44 million.

The revenues for the Town of Starbuck resulting from the water pipeline service fees to the Applicant would be $52,600 year.

2.5 Benefits or Disadvantages of Reserving SPP Approval for a Later Date

Postponing approval of the SPP to a later date would delay construction. The disadvantages of delaying construction would affect the SPP's ability to alleviate the power shortfalls that already exist in the Pacific Northwest. Delay could increase the potential for rolling blackouts and other problems associated with inadequate power supplies. Construction delays would also promote uncertainty in electric markets and could contribute to cost increases associated with such uncertainty.

Delaying construction of the SPP would probably encourage the construction of other projects to meet the region's current power needs. Some of those other projects are not regulated by EFSEC. Because of economies of scale, the use of air cooling, and the rigorousness of the EFSEC process, the SPP is likely to have fewer unmitigated environmental impacts than other facilities.

Delaying approval could be viewed as misuse of important resources. EFSEC, BPA, the Applicant, and interested parties (such as Columbia County) have already invested substantial time and effort in analyzing and addressing the potential impacts of the SPP and its related facilities. If approval were delayed, completion of the approval process would require reviewing and perhaps redoing some of the work that has already been done. Also, delaying the project for later implementation would result in similar impacts at a later time.

Postponing project approval to a later date has no apparent benefits.

2.6 Pertinent Federal, State, Local, and Other Requirements

EFSEC's Site Certification Agreement (SCA) for power plant permitting will encompass all local, state, and federal permits and approvals that would be required if EFSEC were not involved in the permitting process. An SCA must be obtained before SPP construction can begin. The SPP will comply with the substantive SCA requirements associated with these permits. Although state and local permits and approvals will be issued by EFSEC, the Applicant will provide all requested information and attend coordination meetings with appropriate agencies as needed.

Table 2.6-1 lists all applicable federal, state, local, and other permits and related requirements that would apply to construction of the SPP if this project were not under EFSEC jurisdiction. Under the Applicant's proposal, water will be supplied to the generation plant by an onsite well. If a water pipeline must be built to supply water to the generation plant, then the number and types of permits would increase. Those permits that apply only to the water pipeline are not included in Table 2.6-1.

TABLE 2.6-1
Applicable Federal, State, Local, and Other Permit Requirements

Permit or Requirement	Agency/Statute and Regulation	Applicable Section
Federal		
2.6.1.1 National Environmental Policy Act (NEPA)	BPA is lead agency 42 USC §§ 4321 et seq., 40 CFR 1500 et seq., 10 CFR 1021	All
2.6.1.2 Threatened or Endangered Species Assessments	BPA is lead agency; National Marine Fisheries Service (NMFS), and U.S. Fish and Wildlife Service (USFWS) are consultation agencies Endangered Species Act, § 7; 16 USC § 1531 et seq.; 50 CFR 402	Wildlife and Vegetation Fisheries

TABLE 2.6-1
Applicable Federal, State, Local, and Other Permit Requirements

Permit or Requirement	Agency/Statute and Regulation	Applicable Section
2.6.1.3 Historic Preservation/ Landmark Review	BPA is lead agency	Cultural Resources
	National Historic Preservation Act, § 106; 16 USC § 470 et seq.; 36 CFR §§ 60-63, 800; Historic Sites, Buildings, Objects, and Antiquities, 16 USC § 469 et seq.; 36 CFR §§ 296.1; 43 CFR §§ 7.1 et seq.	
2.6.1.4 Gas Pipeline Safety Approval	U.S. Department of Transportation (DOT), Office of Pipeline Safety	Proposed Action
	49 CFR 192; 480-93-010 WAC	
2.6.1.5 Easement and Rights-of-Way	U.S. Army Corps of Engineers	Proposed Action, Water Resources, and Transportation Sections: Easements for Access Roads, Gas Pipeline, and Railroad Spur
	(Road and railroad spur) CFR Title 10 USC § 2268	
	(Gas pipeline) 30 USC § 185	
2.6.1.6 Air Emissions	U.S. Environmental Protection Agency (EPA)	Air Quality
	Clean Air Act – 40 CFR 50	Appendix G
	Acid Rain - 40 CFR Part 72, 75, 76	Proposed Action
	Precipitation Act of 1980, Title 4, 42 USC § 8901 et seq.	
2.6.1.7 Spill Prevention	EPA	Proposed Action
	Spill Prevention Countermeasure and Control Plans	Appendix E
	40 CFR 112	
State of Washington		
2.6.2.1 State Environmental Policy Act (SEPA)	EFSEC	All
	197-11 WAC	
2.6.2.2 Prevention of Significant Deterioration (PSD) of Air Quality Permit	Washington State Department of Ecology	Air Quality
	70.94 RCW; 173-400 WAC; 173-460 WAC; 40 CFR 52.21	Appendix G
2.6.2.3 Air Operating Permit	Washington State Department of Ecology	Air Quality
	70.94 WAC; 173-401 WAC	Appendix G
	(Application must be filed within 1 year after facility begins operation.) 173-401-500(3)(c) WAC	
2.6.2.4 Noise Regulations	Washington State Department of Ecology	Noise
	173-60 WAC; 173-62 WAC	Proposed Action

TABLE 2.6-1
Applicable Federal, State, Local, and Other Permit Requirements

Permit or Requirement	Agency/Statute and Regulation	Applicable Section
2.6.2.5 Water Rights Permit	Washington State Department of Ecology 90.44 RCW	Proposed Action Water Resources: Water Supply
2.6.2.6 Public Water Supply Approval	Washington State Department of Health 246-290 WAC	Proposed Action Water Resources: Water Supply
2.6.2.7 Road Approach Construction Permit	Washington State Department of Transportation (Regulations of Permits) 468-52-040 WAC	Traffic and Transportation: Road Access
2.6.2.8 NPDES Stormwater Permit for Construction Activities	Energy Facility Site Evaluation Council 463-38 WAC	Water Resources: Appendix H (Stormwater)
2.6.2.9 NPDES Stormwater Permit for Industrial Activities	Energy Facility Site Evaluation Council 463-38 WAC	Water Resources: Appendix H (Stormwater)
2.6.2.10 State Waste Discharge Permit	Washington State Department of Ecology, Water Quality Program 90.48.160 RCW; 173-216 WAC	Water Resources: Wastewater Disposal Appendix D (Process Water)
2.6.2.11 Natural Gas Pipeline Construction Approval	Washington Utilities and Transportation Commission 80.28 RCW; 480-83 WAC	Proposed Action
2.6.2.12 Electrical Construction Permit	Washington Department of Labor and Industries 296-746 WAC	Proposed Action Population, Housing, and Economics
2.6.2.13 Boiler Construction and Certification and Construction Safety	Labor and Industries Title 296 WAC General Safety and Health Standards, Title 155 WAC Construction Workers, Title 104 WAC Board of Boiler Rules	Proposed Action
2.6.2.14 Surface Mining Permit	Washington State Department of Natural Resources 78.44 RCW	Earth Proposed Action
Local – Columbia County		
2.6.3.1 Conditional Use Permit or Special Use Permit Certification of Compliance (March 5, 2001)	Columbia County Planning Department Comprehensive Land Use Plan and Zoning Ordinance	Land Use
2.6.3.2 Building Permit	Columbia County Building Department 1997 Uniform Building Code of Washington State (revised July 1998)	Proposed Action

TABLE 2.6-1
Applicable Federal, State, Local, and Other Permit Requirements

Permit or Requirement	Agency/Statute and Regulation	Applicable Section
2.6.3.3 Onsite Sewage Disposal System Permit	Columbia County Health Department	Proposed Action
	246-272 WAC	Water Resources
2.6.3.4 Fire Code Compliance	Columbia County Fire Marshal	Proposed Action
	Uniform Fire Codes (UFC) §§ 4.108 and 80.103	Appendix I (Emergency Plan)
		Health and Safety
Other		
2.6.5.1 Railroad Track Crossing	Union Pacific Railroad	Proposed Action
Easement and Rights-of-Way	Authorization letter from Railway Auditing and Management Services (property management company for Union Pacific Railroad)	Traffic and Transportation

2.6.1 Federal Permit Requirements

The following federal permit requirements must be substantially complied with under EFSEC's jurisdiction.

2.6.1.1 NEPA

Compliance with NEPA is required before any federal permits or approvals can be issued related to the construction or operation of the proposed 500-kV transmission line. NEPA is intended to ensure that government officials consider environmental impacts when making decisions about projects. BPA is the lead federal agency for NEPA review and will consult with other federal agencies, including the following:

- EPA
- FERC
- Corps
- DOT

Statement of Compliance

BPA is cooperating with EFSEC to prepare a joint NEPA/SEPA EIS for the SPP that will include the generation plant and related facilities (transmission line, switchyard, gas lateral, and M/R station). The rail spur will be included in the NEPA/SEPA EIS as a connected action to the project.

2.6.1.2 Threatened or Endangered Species Assessments

The Endangered Species Act (ESA) provides for the conservation of endangered and threatened species and the ecosystems upon which they depend. The ESA establishes, for

federal agency actions, a "procedural obligation to consult" with the U. S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS).

The consultation process generally involves three steps. First, a federal agency (in this case, BPA) proposing to take action inquires of USFWS and NMFS whether a protected species may be present in the area affected by the project. Second, if there is reason to believe the federal action may affect a protected species, then the agency must consult with USFWS and NMFS and avoid jeopardizing the species. The agency prepares a biological assessment to determine whether the species (if present) or its habitat will likely be affected by the action. USFWS and NMFS review the biological assessment for completeness, determine whether the federal action will adversely affect the species, and may suggest alternatives to reduce or eliminate impacts of the action on the species.

Statement of Compliance

The Applicant is coordinating with BPA and EFSEC on ESA review. A USFWS response letter dated December 29, 2000, identified threatened or endangered species that are known to exist on or near the generation plant site or near the water pipeline, gas lateral, or transmission line routes. The Applicant has requested and received an updated species list from USFWS, dated August 7, 2001. A biological assessment addressing potential impacts to any federal threatened or endangered species will be prepared concurrently with the EIS and will include the information obtained from the updated species list.

The generation plant site has a history of agricultural use within an industrial zone and is not immediately adjacent to any streams with existing anadromous fish habitat. The Applicant has consulted with NMFS to confirm these conclusions. There are no species listed by NMFS within the SPP area that are expected to be affected by the SPP. The Applicant also has consulted with USFWS about the potential for listed wildlife or plants within the SPP area and will continue this consultation after more field surveys are completed.

2.6.1.3 Historic Preservation and Landmark Review

The Washington State Historic Preservation Office (WSHPO) must be consulted when projects are subject to review under Section 106 of the National Historic Preservation Act of 1966 (NHPA). This act requires that all federal agencies consider the effect of their actions on historic properties. Requirements of Section 106 review apply to any federal undertaking, funding, licensing, or permitting. WSHPO is consulted to help determine whether the site has been surveyed, whether historic resources have been identified onsite, and whether the property is listed or eligible for listing on the National Register of Historic Places (NRHP). If projects adversely affect property that meets NRHP criteria, then WSHPO and, as appropriate, interested tribes, will participate in finding acceptable ways to avoid or mitigate that adverse effect. Although the federal agency involved is responsible for initiating and completing Section 106 review, the Applicant may make direct contact with WSHPO.

Statement of Compliance

The Applicant is coordinating with BPA and WSHPO, as appropriate, to comply with the requirements of NHPA Section 106. A cultural resource survey was conducted at the generation plant site in November 1999, and no tribal or historical resources were

discovered. A second survey was conducted in April 2001 for the water pipeline and gas pipeline corridors, and no tribal or historic resources were discovered in these pipeline corridors. The April 2001 survey also included the transmission line corridor. Additional surveys of the transmission line corridor were conducted in October 2001, and the results of all such surveys will be provided to EFSEC upon completion of analysis and reports. The Applicant will continue to coordinate with WSHPO and the interested tribes for fulfilling obligations related to Section 106 consultations.

2.6.1.4 Gas Pipeline Safety Approval

Natural gas pipelines must be inspected for their compliance with the minimum federal standards. The minimum standards (49 CFR 192, incorporated by reference in 480-93-010 WAC) prescribe minimum safety requirements for design, materials, and construction of natural gas pipelines and for their operation and maintenance.

Statement of Compliance

The SPP's gas lateral location, design, and construction plans will be developed so that they comply with the minimum standards. FERC has jurisdiction over the gas lateral and will be the lead agency for this gas project approval.

2.6.1.5 Easement and ROW

The Corps needs to provide easement or ROW for the water pipeline, gas lateral, road access to the generation plant site, and access to the railroad spur. In each case, the Corps has property that will need to be crossed.

Statement of Compliance

The Applicant will coordinate with the Corps and apply for easements and ROW.

2.6.1.6 CAA

The federal CAA Amendments of 1970 authorized EPA to establish ambient concentration limits, NAAQS, for six criteria pollutants. These pollutants are NO_x, CO, SO_2, O_3, PM_{10}, and Pb. All six have been assigned a primary standard that defines the levels of air quality that EPA has determined to be necessary for protecting the public health with an adequate margin of safety. Some pollutants have been assigned a secondary standard that defines a level for the protection of public welfare from any known or anticipated adverse effects of a pollutant. The NAAQS established by EPA are provided in 40 CFR 50.

Statement of Compliance

The Applicant will meet the requirements of the CAA and provide emission control to meet the pollutant standards. The Applicant will meet with EPA, if necessary, to establish air quality protection requirements.

2.6.1.7 Spill Prevention

EPA is authorized to protect navigable waters (including surface waters) from spills originating from petroleum products. Compliance requires preparing an SPCC Plan, updating it on a periodic basis, training employees, and following the SPCC Plan's management practices.

Statement of Compliance

The Applicant will meet the requirements of 40 CFR 112 that relate to spill prevention and control of petroleum products.

2.6.2 State Permit Requirements

The following state permit requirements must be substantially complied with under EFSEC's jurisdiction.

2.6.2.1 SEPA

Compliance with SEPA is required before EFSEC can issue an SCA for construction and operation of a project. EFSEC is the SEPA lead agency. The SEPA process will be generally the same, regardless of the lead agency.

Statement of Compliance

This ASC contains the information necessary for preparation of a joint NEPA/SEPA EIS. As noted, the project will be reviewed under federal environmental laws as well.

2.6.2.2 Prevention of Deterioration Permit

An NOC for a PSD permit will be issued by EFSEC and jointly approved by EFSEC and EPA. The following are the key requirements for NOC approval:

- Employing BACT
- Demonstrating that the source will not cause or contribute to a violation of any ambient air quality standard
- Complying with the PSD program
- Complying with the requirements for new sources of toxic air pollutants

The basic objective of the PSD is to prevent substantial degradation of air quality in areas that are in compliance with NAAQS while maintaining a margin for future industrial growth. Each proposed new or modified air contaminant source must undergo a new source review. Criteria that trigger PSD permitting vary, depending on the type and amount of air contaminant(s) emitted and the type of facility. The Applicant has determined that the SPP must comply with the requirements of a PSD. A PSD permit application must be submitted to EFSEC in the ASC (see Appendix G), and an SCA must be obtained before construction can begin.

A complete PSD permit application requires extensive analysis of potential air quality impacts and must include the following:

- Thorough description of the project, its location and design, the processes that produce air contaminants, control systems, and anticipated operations
- Potential and actual emission estimates for all air pollutants from each emission point
- Anticipated construction schedule
- Demonstration of BACT selection for each subject pollutant at each emission point

- Analysis of present air quality at the proposed source location (may require 12 months of preconstruction monitoring)
- Analysis, using dispersion modeling, of the impact of the proposed source's emissions upon the ambient air quality, including the determination of the magnitude and location of areas of maximum impact
- Demonstration that the proposed emissions will not cause or contribute to violation of any state or NAAQS
- Demonstration that the proposed emissions will not cause or contribute to excursions over the PSD permit increments for particulate matter and sulfur dioxide
- Demonstration that the proposed emissions will not impair visibility in any Class 1 area and a discussion of visibility impacts in other sensitive areas
- Discussion of the proposed project's effects on residential or commercial growth, vehicular traffic, soils, vegetation, acid deposition, and any other values related to air quality

The co-permitting authorities for compliance of PSD permit requirements are EFSEC and EPA. When a complete application (Appendix G) has been submitted, the permitting authorities will prepare a technical analysis document that summarizes its findings and recommendations. A preliminary determination will be issued, and then a public notice will be issued. The public is given 30 days to comment on the application and preliminary determination, and an opportunity for a public hearing may be provided as well. After appropriate response to public comments has been made, a final determination will be made allowing for the PSD permit to be issued.

Statement of Compliance

The Applicant will coordinate with EFSEC, Ecology, and EPA, as appropriate, to comply with the requirements of the state's PSD Program (43.21A RCW, 173-400 WAC, and 463-42-225 WAC as implemented by EFSEC). Coordination will involve participating in preapplication conferences (as necessary) and in preparing and submitting permit application materials consistent with agency requirements.

2.6.2.3 Air Operating Permit

As a new major source, the SPP will comply with the requirements related to a complete air operating permit application within 12 months after beginning operation. The operating permit program will not affect the SPP preconstruction permitting process.

Statement of Compliance

Air operating permits are designed to compile all existing emission limits and other applicable requirements for an emission source into one document. Because the SPP must apply for an operating permit soon after commencing operation, all such requirements are expected to be contained in one document: the NOC Order of Approval and PSD Permit. The Applicant will comply with the requirements of an air operating permit within the required time period.

2.6.2.4 Noise Regulations

173-60 WAC establishes maximum permissible environmental noise levels. The applicable state regulations are summarized in Table 2.6-2.

The following are exemptions to the above limits (per WAC 173-60-050):

- Construction noise between the hours of 7:00 a.m. and 10:00 p.m.
- Motor vehicles when regulated by 173-62 WAC (Motor Vehicle Noise Performance Standards for vehicles operated on public highways)
- Motor vehicles operated off public highways except when such noise affects residential receivers

TABLE 2.6-2
State of Washington Noise Regulations (173-60 WAC)

	Maximum Permissible Environmental Noise Levels (dBA)	
Statistical Descriptor	**Daytime (7:00 a.m. – 10:00 p.m.)**	**Nighttime (10:00 p.m. – 7:00 a.m.)**
L_{eq}	60	50
L_{25}	65	55
$L_{16.7}$	70	60
$L_{2.5}$	75	65

Note: Based on Class A EDNA receiver property (residential or camping facilities) and Class C EDNA source (industrial facilities). Standard applies at the property line of the receiving property.

173-62 WAC, Motor Vehicle Noise Performance Standards, regulates noise generated by vehicles traveling on public roads. The applicable performance standards are summarized in Table 2.6-3.

TABLE 2.6-3
In-Use Motor Vehicle Noise Performance Standards

Vehicle Type	Maximum Sound Level, dBA[a]
Automobiles, light trucks under 10,000 lb GVWR[b]	72 dBA for speeds< 45 mph 82 dBA for speeds > 45 mph
All motor vehicles over 10,000 lb GVWR[b]	86 dBA for speeds < 35 mph 90 dBA for speeds > 35 mph

[a] Measured at a distance of 50 feet from the center of the lane of travel.
[b] GVWR = gross vehicle weight restriction as specified by the manufacturer.

Statement of Compliance

The Applicant will comply with Washington State noise regulations.

2.6.2.5 Water Rights

Ecology regulates water withdrawal from surface and ground sources. The Applicant currently is awaiting Ecology's recommendation on its 300-gpm water right application. If granted, this water right will authorize the proposed onsite well that will serve as the water supply for the generation plant (Elmer, pers. comm.).

Delivering water from the Town of Starbuck's water system via the water pipeline alternative will not require a revision to the town's existing water right (Schlender, Ecology, 2000-2001).

Statement of Compliance

The Applicant will coordinate with Ecology, as appropriate, to comply with the requirements of 90.44 RCW. Coordination will involve participating in preapplication conferences (as necessary) and in preparing and submitting materials consistent with agency requirements.

2.6.2.6 Public Water Supply Approval

The Applicant intends to provide water from the proposed onsite well for human consumption at the generation plant. As a purveyor of public drinking water serving 25 or more nonresidents for 180 or more days per year, the Applicant must comply with Washington State Department of Health Group A noncommunity water system regulations pursuant to 246-290 WAC. Compliance with public water supply regulations includes development of water system plans, engineering reports and plans, and specifications for new public drinking water systems.

Statement of Compliance

The Applicant will coordinate with the Department of Health and the local health department, as appropriate, to ensure compliance with Washington State's public drinking water system requirements. Coordination will involve participation in preapplication conferences, as necessary, and the preparation and submittal of permit application materials consistent with agency requirements.

2.6.2.7 Road Approach Construction Permit

A road approach construction permit is required whenever a new access to a state highway is requested. The SPP will need a road approach permit at the generation plant site and at SR-261 where the railroad spur access road joins the highway.

Statement of Compliance

The Applicant has applied for a road approach permit for access roads to the generation plant site from the WSDOT. The Applicant will comply with the requirements of the road approach permit.

The Union Pacific Railroad will also need to apply for a road approach permit for the railroad spur access road to SR-261.

2.6.2.8 NPDES Stormwater Permits for Construction

Construction Activities

The Applicant must comply with the requirements of EFSEC's regulations related to the NPDES permit program for managing stormwater for construction activities. Projects discharging stormwater solely to the ground, with no surface discharge (as is the case for the SPP) do not need an NPDES stormwater permit.

Statement of Compliance

The Applicant will comply with the requirements of NPDES under 463-38 WAC and coordinate with Ecology, as appropriate. A Stormwater Pollution Prevention Plan for construction activities will be prepared. Coordination will involve participating in preapplication conferences (as necessary) and in preparing and submitting permit application materials consistent with agency requirements. A Notice of Intent (NOI) will be sent to Ecology to verify that a stormwater permit is not required under Ecology's program.

2.6.2.9 NPDES Stormwater Permits for Industrial Activities

The Applicant must comply with the requirements of EFSEC's regulations related to the NPDES permit program for discharge of stormwater for industrial operations. Projects with stormwater infiltration through soils and no surface discharge, as is the case for the SPP, do not need an NPDES stormwater permit.

Statement of Compliance

The Applicant will comply with the requirements of NPDES under 463-38 WAC and coordinate with Ecology, as appropriate. A Stormwater Pollution Prevention Plan for operations will be prepared prior to operating. Coordination will involve participating in preapplication conferences (as necessary) and in preparing and submitting permit application materials consistent with agency requirements. An NOI will be sent to Ecology to verify that a stormwater permit is not required under Ecology's program.

2.6.2.10 State Waste Discharge Permit

The Applicant will comply with the requirements of a state waste discharge permit that will allow wastewater infiltration from the generation plant into the ground. Requirements include information on water supply volumes, water use, wastewater flow, characteristics and disposal methods, planned improvements, stormwater treatment, plant operation, materials and chemicals used, production, and other relevant information.

Statement of Compliance

The SPP is designed to meet applicable water quality criteria for industrial wastewaters that infiltrate to ground. SPP wastewater is primarily housekeeping water. The Applicant has prepared an engineering report and will meet requirements of a state waste discharge permit.

2.6.2.11 Natural Gas Pipeline Construction Approval

FERC regulates the construction, maintenance, and operation of interstate natural gas pipelines. The gas pipeline must meet FERC design standards and construction specifications, as well as requirements for operations, maintenance, emergency procedures, and safety audit reporting.

Statement of Compliance

GTN will design and construct the gas lateral in a manner that complies with applicable FERC regulations, and will obtain FERC approval of its gas pipeline design drawings, construction specifications, and operations, maintenance, and emergency procedures manual.

2.6.2.12 Electrical Construction Permit

The Department of Labor and Industries (DLI) has regulations related to inspection of electrical wires and equipment and requires that electric wires and equipment comply with National Energy Code standards.

Statement of Compliance

As an exempt wholesale generator (EWG), the SPP will be exempt from the National Energy Code standards but will comply with DLI inspection requirements. The SPP will coordinate with EFSEC to ensure that an exemption is obtained and that any necessary DLI inspections and approvals are obtained.

2.6.2.13 Boiler Construction and Certification

DLI regulates boiler construction and certification and health and safety standards for construction workers and employees.

Statement of Compliance

The Applicant will comply with DLI regulations for boilers and employee safety during construction and operations.

2.6.2.14 Surface Mining Permit

Washington DNR administers surface mining reclamation permits that are required when a project "extracts minerals" (including topsoil), resulting in more than 3 acres of disturbed area. The reclamation permit, which is based largely on submittal of a "reclamation plan," focuses on reestablishing the vegetative cover, slope stability, water conditions, and safety conditions suitable to the proposed subsequent use consistent with local land use plans for the surface mine site. SEPA review and local government land use review and approval are cornerstones of the permit process.

Statement of Compliance

This Application provides information on site restoration in Appendix K and the Applicant will provide a Final Site Restoration Plan for EFSEC's review. This Application also provides information on site grading and erosion control in Appendix H.

2.6.3 Local Permits: Columbia County

The following local permit requirements must be substantially complied with under EFSEC's jurisdiction.

2.6.3.1 Conditional Use Permit or Special Use Permit

A conditional use permit or special use permit allows certain land use activities to locate in the same vicinity and zone as permitted uses. The proposed land use approval is granted subject to special conditions intended to minimize conflict with neighboring uses. The

production of non-nuclear energy and its ancillary facilities are identified in the County zoning code as permitted conditional uses in heavy industrial zones. Conditional use permits are subject to a land use hearing under EFSEC.

Statement of Compliance

The Applicant has obtained a Certificate of Land Use Consistency from Columbia County and will continue to coordinate with the county, as appropriate, to comply with the county's Comprehensive Plan and Zoning Ordinance (see Attachment C at the end of this section for a copy of the Certificate of Land Use Consistency from Columbia County).

2.6.3.2 Building Permit

Building permit requirements for buildings at the generation plant site will include detailed final plans for structures, including the electrical plan, plumbing plan, floor layout, sewage facilities, location of wells (if applicable), drainage plan, size and shape of lot and buildings, setback of building from property lines and drain field (if applicable), access, size and shape of foundation walls, beams, air vents, window accesses, and heating or cooling plants (if included in the design).

Statement of Compliance

The Applicant will continue to coordinate with Columbia County, as appropriate, to comply with local zoning requirements and building codes. Coordination will involve participating in preapplication conferences (as necessary) and in preparing and submitting materials consistent with county requirements.

2.6.3.3 Onsite Sewage Disposal System Permit

Businesses and residences that locate outside of areas served by sewer systems that treat and dispose of sewage on the property where it originates through septic tanks and subsurface disposal fields are required to meet the requirements of an onsite sewage disposal system permit. The SPP onsite sewage disposal system has a design flow of less than 3,500 gpd, which places it under the requirements of 246-272 WAC.

Statement of Compliance

The Applicant will coordinate with the Columbia County Health Department, as appropriate, to comply with county requirements for onsite sewage disposal. Coordination will involve participating in preapplication conferences (as necessary) and in preparing and submitting permit application materials consistent with county requirements.

2.6.3.4 Fire Code

The diesel storage tank associated with the secondary diesel engine will be used as a back-up power supply if electric power is lost during a fire-fighting event and the primary electric motor cannot operate. The storage tank will need to meet requirements for construction and operation of tanks in accordance with the Uniform Fire Code (UFC).

Statement of Compliance

The Applicant will coordinate with the county fire marshal to ensure that the SPP complies with these fire code requirements, including all necessary inspections.

2.6.4 Other Permits

2.6.4.1 Railroad Track Crossing/Easement and ROW

If the alternative water pipeline were constructed, then a railroad track crossing/easement would be needed from Union Pacific Railroad because the water pipeline would cross the Union Pacific track on an SR-261 bridge approximately 1 mile south of the site. In addition, a ROW or easement would be needed for the railroad spur and laydown area adjacent to the railroad spur. The railroad spur and laydown area are also located approximately 1 mile south of the site where the abandoned railroad ROW connects to the existing Union Pacific track.

Statement of Compliance

If the alternative water pipeline were constructed, then the Applicant would request that the Union Pacific property manager issue an authorization letter to allow construction and operation of the railroad spur and also to authorize the water pipeline crossing over the railroad track on the SR-261 bridge.

2.7 Coordination and Consultation with Agencies, Native American Tribes, the Public, and Nongovernmental Organizations

The Applicant has made a concerted effort to coordinate and consult with agencies, Native American tribes, the public, and nongovernmental organizations. This consideration of public interest began in the early stages of site feasibility in 1993-1994. A public informational meeting was held in Starbuck, Washington, on March 29, 1993, to describe the proposed SPP and to answer questions. At that time, the proposed project was a peaking facility. After it was determined that the BPA transmission system could handle a base-load generating plant, the SPP was revised to become the larger ASC-led project currently proposed.

There have been additional public meetings where local (Columbia County, Town of Starbuck, City of Dayton), state (agencies and state representatives), and federal (agencies and federal representatives) agencies, tribes, and the public have been invited to learn about the proposed SPP. Public information meetings were held in Dayton on December 5, 2000, and in Starbuck on December 6, 2000. Public scoping meetings will be planned after the ASC is submitted to EFSEC.

A group agency meeting was held on December 6, 2000, and individual agency meetings have also occurred, including the following:

- Ecology (water rights, wastewater disposal, shorelines, stormwater, and air quality issues)
- USFWS and NMFS (plants, wildlife, fish, and endangered species concerns)
- Corps (access easements for road, water pipeline, and gas pipeline; cultural resources; and endangered species concerns)

- Natural Resources Conservation Service (agriculture and land use)
- BPA (transmission and all associated environmental issues, including cultural resources)
- BPA-facilitated intertribal technical work group (cultural resources)
- WSHPO (cultural resources)
- WSDOT (highway ROW and approach permits)

In addition, there have been numerous visits to the Town of Starbuck, visits with Columbia County Commissioners, and visits with other groups interested in the SPP. There has been correspondence with six tribes (Colville, Nez Perce, Spokane, Umatilla, Wanapum, and Yakama; see attached correspondence in Attachment D at the end of this section) on cultural resource issues, cultural resources field work, and the *Cultural Resources Investigation Report* (CH2M HILL, January 2000). Meetings have also been held with tribal technical staff and with tribes individually to discuss tribal issues and concerns about the SPP.

ATTACHMENT A

Performance Data

ATTACHMENT A

Performance Data

Case Description	1 100% Load STIG Hot Day Duct Firing On	2 100% Load Hot Day Duct Firing Off	3 100% Load STIG Avg Ambient Duct Firing On	4 100% Load Avg Ambient Duct Firing On	5 100% Load Avg Ambient Duct Firing Off	6 100% Load Cold Day Duct Firing On	7 100% Load Cold Day Duct Firing Off	8 85% Load Cold Day Duct Firing Off	9 70% Load Cold Day Duct Firing Off	10 85% Load Avg Ambient Duct Firing Off	11 70% Load Avg Ambient Duct Firing Off	12 85% Load Hot Day Duct Firing Off	13 70% Load Hot Day Duct Firing Off
Image File	NPE501FHotDayFireSTIG.img	NPE501FHotDay.img	NPE501FAvgFireSTIG.img	NPE501FAvgFire.img	NPE501FAvgDay.img	NPE501FColdFire.img	NPE501FColdDay.img	NPE501FColdDay85PL.img	NPE501FColdDay70PL.img	NPE501FAvgDay85PL.img	NPE501FAvgDay70PL.img	NPE501FHotDay85PL.img	NPE501FHotDay70PL.img
Run Date	05/23/01pcNT	05/28/01pcNT	05/29/01pcNT	05/29/01pcNT	05/29/01pcNT	05/29/01pcNT	05/29/01pcNT	05/29/01pcNT	05/29/01pcNT	05/29/01pcNT	05/29/01pcNT	05/29/01pcNT	05/29/01pcNT
Ambient Temperature	101 F	101 F	51.1 F	51.1 F	51.1 F	-20 F	-20 F	-20 F	-20 F	51.1 F	51.1 F	101 F	101 F
Number of CTG/HRSG Units Operating	2	2	2	2	2	2	2	2	2	2	2	2	2
CTG Model	SWPC 501F	SWPC 501F	SWPC 501F	SWPC 501F	SWPC 501F	SWPC 501F	SWPC 501F	SWPC 501F	SWPC 501F	SWPC 501F	SWPC 501F	SWPC 501F	SWPC 501F
CTG Fuel	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Load Level (percent of base load)	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	85.00%	70.00%	85.00%	70.00%	85.00%	70.00%
CTG Evaporative Cooler	On	On	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
HRSG Firing	Fired	Unfired	Fired	Fired	Unfired	Fired	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired
HRSG Model	Design: 1815 psia Maximum STG Throttle Pressure	Design: 1815 psia STG Throttle Pressure	Design: 1815 psia STG Throttle Pressure	Design: 1815 psia STG Throttle Pressure	Design: 1815 psia STG Throttle Pressure	Design: 1815 psia STG Throttle Pressure	Design: 1815 psia STG Throttle Pressure	Design: 1815 psia STG Throttle Pressure	Design: 1815 psia STG Throttle Pressure	Design: 1815 psia STG Throttle Pressure	Design: 1815 psia STG Throttle Pressure	Design: 1815 psia STG Throttle Pressure	Design: 1815 psia STG Throttle Pressure
STG Output	193.6 MW	153.3 MW	220.9 MW	242.2 MW	180.8 MW	243.8 MW	184.2 MW	155.6 MW	138.1 MW	152.3 MW	137.9 MW	127.3 MW	119.6 MW
STG Throttle Conditions, psia/F	1909P/1050T	1339P/1050T	1908P/1050T	1907P/1050T	1361P/1050T	1908P/1030T	1359P/1010T	1154P/966T	1040P/971T	1154P/1004T	1054P/1015T	1108P/1027T	1037P/1041T
STG Hot Reheat Conditions, psia/F	339P/1050T	288P/1041T	336P/1050T	392P/1047T	295P/1032T	398P/1013T	301P/992T	260P/951T	232P/956T	254P/987T	229P/999T	240P/1010T	222P/1024T
Condenser Pressure	7 in HgA	6.3 in HgA	2 in HgA	2.3 in HgA	2.3 in HgA	1.75 in HgA	1.75 in HgA	1.75 in HgA	1.75 in HgA	2.19 in HgA	1.98 in HgA	5.09 in HgA	4.48 in HgA
New and Clean Performance per Block													
Number of CTG/HRSG Units Operating	2	2	2	2	2	2	2	2	2	2	2	2	2
Gross CTG Output, kW (each)	189,890	168,850	201,690	181,480	181,480	209,790	209,790	181,430	149,210	154,090	126,660	128,800	105,810
Gross CTG Output, kW (total)	379,780	337,700	403,380	362,960	362,960	419,580	419,580	362,860	298,420	308,180	253,320	257,600	211,620
Gross CTG Heat Rate, Btu/kWh (LHV)	9,003.0	9,350.0	8,888.0	9,205.0	9,205.0	8,935.0	8,935.0	9,109.0	9,500.0	9,460.0	9,931.0	9,901.0	10,604.0

Gross CTG Heat Rate, Btu/kWh (HHV)	9,992.0	10,377.0	9,865.0	10,216.0	10,216.0	9,916.0	9,916.0	10,109.1	10,543.0	10,498.6	11,021.4	10,988.0	11,768.2
CTG Heat Input, MBtu/h (LHV) (each)	1,709.6	1,578.7	1,792.6	1,670.5	1,670.5	1,874.5	1,874.5	1,652.6	1,417.5	1,457.7	1,257.9	1,275.2	1,122.0
CTG Heat Input, MBtu/h (HHV) (each)	1,897.4	1,752.2	1,989.7	1,854.0	1,854.0	2,080.3	2,080.3	1,834.1	1,573.1	1,617.7	1,396.0	1,415.3	1,245.2
CTG Heat Input, MBtu/h (LHV) (total per Block)	3,419.2	3,157.5	3,585.2	3,341.0	3,341.0	3,748.9	3,748.9	3,305.3	2,835.0	2,915.4	2,515.7	2,550.5	2,244.0
CTG Heat Input, MBtu/h (HHV) (total per Block)	3,794.8	3,504.3	3,979.3	3,708.0	3,708.0	4,160.6	4,160.6	3,668.2	3,146.2	3,235.5	2,791.9	2,830.5	2,490.4
Duct Burner Heat Input, MBtu/h (LHV) (each)	217.3	0.0	206.8	248.6	0.0	245.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duct Burner Heat Input, MBtu/h (HHV) (each)	241.1	0.0	229.5	275.9	0.0	272.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duct Burner Heat Input, MBtu/h (LHV) per Block	434.5	0.0	413.6	497.2	0.0	490.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duct Burner Heat Input, MBtu/h (HHV) pre Block	482.2	0.0	459.1	551.8	0.0	544.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gross STG Output, kW (per Block)	193,590	153,250	220,920	242,170	180,760	243,770	184,230	155,640	138,110	152,310	137,880	127,270	119,550
Gross Block Output, kW	573,370	490,950	624,300	605,130	543,720	663,350	603,810	518,500	436,530	460,490	391,200	384,870	331,170
Auxiliary Power/Losses, kW	14,500	12,996	15,493	16,063	14,006	16,315	14,320	13,164	12,351	12,861	12,186	11,845	11,426
Auxiliary Power/Losses, percent of gross	2.53%	2.65%	2.48%	2.65%	2.58%	2.46%	2.37%	2.54%	2.83%	2.79%	3.11%	3.08%	3.45%
Block Heat Input, MBtu/h (LHV)	3,853.7	3,157.5	3,998.9	3,838.2	3,341.0	4,239.9	3,748.9	3,305.3	2,835.0	2,915.4	2,515.7	2,550.5	2,244.0
Block Heat Input, MBtu/h (HHV)	4,277.0	3,504.3	4,438.4	4,259.8	3,708.0	4,705.4	4,160.6	3,668.2	3,146.2	3,235.5	2,791.9	2,830.5	2,490.4
Net Block Output, kW	558,870	477,954	608,807	589,067	529,714	647,035	589,490	505,336	424,179	447,629	379,014	373,025	319,744
Net Block Heat Rate, Btu/kWh (LHV)	6,895	6,606	6,568	6,516	6,307	6,553	6,360	6,541	6,683	6,513	6,638	6,837	7,018
Net Block Heat Rate, Btu/kWh (HHV)	7,653	7,332	7,290	7,231	7,000	7,272	7,058	7,259	7,417	7,228	7,366	7,588	7,789
Net Block Efficiency (LHV)	49.48%	51.65%	51.95%	52.37%	54.10%	52.07%	53.65%	52.17%	51.05%	52.39%	51.40%	49.90%	48.62%
Net Block Efficiency (HHV)	44.58%	46.54%	46.80%	47.18%	48.74%	46.92%	48.34%	47.00%	46.00%	47.21%	46.32%	44.97%	43.81%
Plant Heat Input, MBtu/h (LHV)	7,707.3	6,315.0	7,997.7	7,676.5	6,682.1	8,479.7	7,497.9	6,610.6	5,670.0	5,830.8	5,031.4	5,101.0	4,488.0
Plant Heat Input, MBtu/h (HHV)	8,554.0	7,008.6	8,876.9	8,519.6	7,416.0	9,410.7	8,321.1	7,336.4	6,292.5	6,470.9	5,583.9	5,661.0	4,980.8

Net Plant Output, kW	1,117,740	955,908	1,217,615	1,178,134	1,059,428	1,294,070	1,178,980	1,010,672	848,358	895,258	758,029	746,050	639,489
Net Plant Heat Rate, Btu/kWh (LHV)	6,895	6,606	6,568	6,516	6,307	6,553	6,360	6,541	6,683	6,513	6,638	6,837	7,018
Net Plant Heat Rate, Btu/kWh (HHV)	7,653	7,332	7,290	7,231	7,000	7,272	7,058	7,259	7,417	7,228	7,366	7,588	7,789
Net Plant Efficiency (LHV)	49.48%	51.65%	51.95%	52.37%	54.10%	52.07%	53.65%	52.17%	51.05%	52.39%	51.40%	49.90%	48.62%
Net Plant Efficiency (HHV)	44.58%	46.54%	46.80%	47.18%	48.74%	46.92%	48.34%	47.00%	46.00%	47.21%	46.32%	44.97%	43.81%

Notes:

1. The combustion turbine generator (CTG) performance is based on client supplied CTG performance.
2. The CTG gas was assumed to be natural gas with a lower heating value of 20,890 Btu/lb.
3. Cycle consists of two blocks of 2x1 SWPC 501F combined cycles
4. Cycle makeup water temperature is assumed to be 70 F.
5. HRSG designed unfired to ambient conditions of 39°F, 60 %RH without chilling.
6. No Boiler Feed Pump efficiency curves were used and BFP outlet pressure was assumed to be constant.
7. Steam Turbine Generator maximum throttle pressure assumed to be 5% over design pressure.
8. 1% HRSG blowdown included.
9. This performance is an estimate and can not be guaranteed.

Combustion Turbine Generator (each)														
Ambient Conditions	Pressure, psia	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3
	Temperature, F	101	101	51.1	51.1	51.1	-20	-20	-20	-20	51.1	51.1	101	101
	Relative Humidity	18.00%	18.00%	58.00%	58.00%	58.00%	80.00%	80.00%	80.00%	80.00%	58.00%	58.00%	18.00%	18.00%
Compressor Inlet Conditions	Temperature, F	73.00	73.00	51.10	51.10	51.10	-20	-20	-20	-20	51.10	51.10	101.00	101.00
	Relative Humidity	78.00%	78.00%	58.00%	58.00%	58.00%	80.00%	80.00%	80.00%	80.00%	58.00%	58.00%	18.00%	18.00%
Evaporative Cooler Effectiveness		85.00%	85.00%	0.00%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Steam Injection	Flowrate, lb/h	114570	0	120140	0	0	0	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Injection Fluid	Pressure, psia	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0
Injection Fluid	Temperature, F	550.0	550.0	550.0	550.0	550.0	550.0	550.0	550.0	550.0	550.0	550.0	550.0	550.0
CTG Exhaust	Flowrate, lb/h	3,530,215.	3,409,855.	3,729,530.	3,604,060.	3,604,060.	3,955,835.	3,955,835.	3,707,100.	3,271,185.	3,379,295.	2,989,455.	3,069,530.	2,783,300.
	Temperature, F	1,116.0	1,116.0	1,100.0	1,098.0	1,098.0	1,052.0	1,052.0	996.0	997.0	1,037.0	1,046.0	1,061.0	1,073.0
Generator Gross Output, Kw (each)		189,890	168,850	201,690	181,480	181,480	209,790	209,790	181,430	149,210	154,090	126,660	128,800	105,810

Heat Recovery Steam Generator (per unit)													
HRSG HP Steam	Flowrate, lb/h	584,777.	404,921.	584,306.	584,114.	411,691.	589,783.	418,198.	360,114.	322,777.	354,274.	321,265.	336,698.	312,873.
(after NRV)	Pressure, psia	2,019.0	1,415.5	2,017.5	2,016.9	1,438.8	2,018.0	1,436.8	1,220.5	1,099.5	1,220.2	1,114.4	1,172.1	1,096.8
	Temperature, F	1,056.0	1,054.6	1,056.1	1,056.0	1,054.7	1,036.2	1,014.7	971.0	975.0	1,008.3	1,019.5	1,031.4	1,044.7
	Enthalpy, Btu/lb	1,508.63	1,524.87	1,508.70	1,508.69	1,524.27	1,496.33	1,500.75	1,481.91	1,488.11	1,503.52	1,513.13	1,518.29	1,527.98
HP Evaporator Outlet	Flowrate, lb/h	554,372.	397,906.	563,305.	553,489.	411,503.	571,042.	418,198.	360,114.	322,777.	354,274.	321,265.	336,698.	312,873.
	Pressure, psia	2,087.6	1,455.3	2,087.6	2,085.3	1,480.5	2,089.7	1,479.6	1,254.8	1,129.0	1,253.7	1,143.7	1,203.3	1,125.1
	Temperature, F	641.9	592.2	641.9	641.7	594.5	642.0	594.4	572.9	559.5	572.8	561.2	567.6	559.1
	Enthalpy, Btu/lb	1,131.79	1,172.58	1,131.79	1,131.97	1,171.26	1,131.62	1,171.30	1,182.43	1,187.95	1,182.49	1,187.33	1,184.76	1,188.11
FW to HP ECON 1	Flowrate, lb/h	559,972.	401,927.	568,995.	559,083.	415,659.	576,810.	422,422.	363,752.	326,038.	357,851.	324,510.	340,098.	316,033.
	Pressure, psia	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0
	Temperature, F	304.7	301.7	301.5	309.6	301.2	311.8	304.5	295.5	287.1	293.7	285.5	291.5	284.9
	Enthalpy, Btu/lb	278.75	275.63	275.43	283.69	275.11	285.92	278.55	269.40	260.83	267.48	259.22	265.26	258.61
Duct Burner														
Fuel Mass Flow	Flowrate, lb/h	10400	0	9900	11900	0	11750	0	0	0	0	0	0	0
HRSG Hot Reheat Steam	Flowrate, lb/h	548,592.	468,980.	543,225.	637,784.	480,619.	654,370.	498,001.	436,266.	387,884.	420,349.	377,564.	393,878.	362,886.
	Pressure, psia	352.8	300.0	349.4	408.2	306.4	413.6	312.9	270.2	240.9	263.9	238.2	249.5	231.1
	Temperature, F	1,051.9	1,042.7	1,051.9	1,048.9	1,033.6	1,014.7	994.1	952.6	957.5	989.0	1,000.8	1,012.0	1,025.6
	Enthalpy, Btu/lb	1,552.28	1,548.85	1,552.37	1,549.20	1,543.82	1,530.71	1,522.69	1,502.11	1,505.60	1,521.42	1,528.39	1,533.99	1,541.64
Cold Reheat Steam from STG	Flowrate, lb/h	464,712.	397,377.	458,856.	573,230.	404,019.	578,793.	410,406.	353,404.	316,763.	347,673.	315,279.	330,425.	307,044.
	Pressure, psia	384.2	326.0	380.7	447.8	333.2	454.7	340.9	294.0	261.8	286.8	258.6	270.8	250.6
	Temperature, F	641.9	687.5	640.3	672.9	688.4	659.3	659.8	629.6	632.4	655.7	664.1	672.3	682.3
	Enthalpy, Btu/lb	1,332.40	1,360.86	1,331.76	1,345.59	1,360.93	1,337.48	1,345.07	1,331.76	1,335.43	1,346.20	1,352.35	1,355.94	1,362.33

HRSG IP Steam	Flowrate, lb/h	72,544.	71,604.	79,894.	64,554.	76,600.	75,576.	87,596.	82,862.	71,121.	72,677.	62,285.	63,453.	55,842.
	Pressure, psia	384.2	326.0	380.7	447.8	333.2	454.7	341.0	293.9	261.8	286.8	258.6	270.8	250.7
	Temperature, F	583.4	559.9	584.1	587.5	562.1	590.2	563.8	549.3	538.5	547.5	537.6	542.0	534.2
	Enthalpy, Btu/lb	1,299.04	1,290.48	1,299.74	1,295.97	1,291.11	1,297.03	1,291.43	1,287.39	1,284.31	1,287.04	1,284.06	1,285.39	1,282.94
IP FW to IP ECON	Flowrate, lb/h	73,277.	72,327.	80,701.	65,206.	77,374.	76,340.	88,480.	83,699.	71,839.	73,411.	62,915.	64,094.	56,406.
	Pressure, psia	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
	Temperature, F	301.4	298.4	298.2	306.2	297.9	308.4	301.3	292.4	284.0	290.5	282.4	288.3	281.8
	Enthalpy, Btu/lb	272.22	269.12	268.91	277.14	268.59	279.37	272.03	262.90	254.37	260.99	252.76	258.78	252.15
IP Feedwater to CTG Rotor Air Cooler	Flowrate, lb/h	25,028.	24,960.	23,999.	24,172.	23,992.	24,220.	24,064.	14,731.	12,122.	20,106.	16,591.	21,783.	17,990.
(from IP BFP)	Pressure, psia	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
	Temperature, F	301.4	298.4	298.2	306.2	297.9	308.4	301.3	292.4	284.0	290.5	282.4	288.3	281.8
	Enthalpy, Btu/lb	272.22	269.12	268.91	277.14	268.59	279.37	272.03	262.90	254.37	260.99	252.76	258.78	252.15
IP FW to Fuel Gas Heat Exchanger	Flowrate, lb/h	61,119.	62,296.	66,007.	62,797.	66,140.	61,980.	64,754.	67,402.	61,183.	60,195.	54,896.	53,432.	49,174.
(from IP BFP exit)	Temperature, F	301.4	298.4	298.2	306.2	297.9	308.4	301.3	292.4	284.0	290.5	282.4	288.3	281.8
	Enthalpy, Btu/lb	272.22	269.12	268.91	277.14	268.59	279.37	272.03	262.90	254.37	260.99	252.76	258.78	252.15
IPP BFP Outlet	Flowrate, lb/h	766,536.	568,525.	770,755.	741,883.	583,353.	758,091.	599,722.	529,584.	471,183.	511,562.	458,910.	479,408.	439,604.
(after pipe, before IP CV)	Pressure, psia	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
	Temperature, F	301.4	298.4	298.2	306.2	297.9	308.4	301.3	292.4	284.0	290.5	282.4	288.3	281.8
	Enthalpy, Btu/lb	272.22	269.12	268.91	277.14	268.59	279.37	272.03	262.90	254.37	260.99	252.76	258.78	252.15
LP Steam	Flowrate, lb/h	58,838.	73,165.	48,772.	48,274.	68,896.	54,583.	76,349.	68,383.	58,246.	65,773.	55,070.	66,046.	56,780.
(after NRV)	Pressure, psia	59.1	54.3	57.0	65.2	54.4	66.9	56.6	49.2	43.3	47.9	42.4	46.0	41.8
	Temperature, F	580.4	547.6	587.5	586.5	554.8	590.6	557.2	544.4	533.9	539.8	531.1	529.8	524.1
	Enthalpy, Btu/lb	1,322.71	1,307.01	1,326.33	1,325.26	1,310.53	1,327.16	1,311.51	1,305.86	1,301.20	1,303.69	1,299.92	1,298.98	1,296.57

LP Steam from Rotor Air Cooler	Flowrate, lb/h	25,028.	24,960.	23,999.	24,172.	23,992.	24,220.	24,064.	14,731.	12,122.	20,106.	16,591.	21,783.	17,990.
	Pressure, psia	67.4	64.4	64.2	72.4	64.0	74.8	67.2	58.8	51.6	57.1	50.3	55.2	49.9
	Temperature, F	304.9	302.3	301.8	308.8	301.5	310.7	304.4	293.3	284.6	293.7	285.1	292.5	285.3
	Enthalpy, Btu/lb	1,182.30	1,181.65	1,181.42	1,183.17	1,181.36	1,183.65	1,182.08	1,178.25	1,175.57	1,178.91	1,176.19	1,178.80	1,176.41
LP Evaporator Water Outlet	Flowrate, lb/h	766,536.	568,525.	770,755.	741,883.	583,353.	758,091.	599,722.	529,584.	471,183.	511,562.	458,910.	479,408.	439,604.
	Pressure, psia	67.4	64.4	64.2	72.4	63.9	74.7	67.2	58.8	51.6	57.1	50.3	55.2	49.9
	Temperature, F	300.4	297.4	297.2	305.2	296.9	307.4	300.2	291.4	283.0	289.5	281.4	287.3	280.8
	Enthalpy, Btu/lb	270.19	267.07	266.87	275.12	266.55	277.36	269.99	260.85	252.29	258.93	250.68	256.71	250.07
Condensate to LP Economizer	Flowrate, lb/h	800,686.	617,208.	993,282.	907,234.	735,020.	985,274.	801,285.	718,985.	644,631.	661,488.	609,414.	524,118.	485,529.
	Pressure, psia	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	Temperature, F	153.5	150.2	140.0	140.1	139.9	140.0	140.0	140.0	140.0	140.0	140.0	142.5	140.0
	Enthalpy, Btu/lb	122.04	118.74	108.60	108.64	108.49	108.54	108.54	108.56	108.54	108.56	108.60	111.07	108.63
Condensate from Recirculation	Flowrate, lb/h	0.	0.	197,508.	141,019.	106,313.	196,517.	148,756.	135,216.	126,863.	103,800.	111,638.	0.	6,748.
	Temperature, F	273.1	284.0	254.3	262.9	272.9	264.7	275.8	272.3	264.8	270.2	261.4	277.5	270.5
Condensate from Fuel Gas Heat Exchanger	Flowrate, lb/h	61,119.	62,296.	66,007.	62,797.	66,140.	61,980.	64,754.	67,402.	61,183.	60,195.	54,896.	53,432.	49,174.
	Pressure, psia	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
	Temperature, F	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0
	Enthalpy, Btu/lb	107.97	107.97	107.97	107.97	107.97	107.97	107.97	107.97	107.97	107.97	107.97	107.97	107.97
Condensate to HRSG	Flowrate, lb/h	739,568.	554,913.	729,766.	703,418.	562,568.	726,777.	587,774.	516,367.	456,584.	497,493.	442,881.	470,685.	429,607.
	Pressure, psia	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	Temperature, F	154.6	151.4	108.9	115.3	114.6	106.0	105.3	105.1	105.0	112.6	109.2	142.8	138.1
	Enthalpy, Btu/lb	123.20	119.95	77.54	83.89	83.22	74.62	73.95	73.72	73.68	81.25	77.89	111.42	106.64
Stack Exhaust	Temperature, F	211.1	215.1	195.4	197.1	203.2	199.8	206.3	204.0	198.2	201.3	194.8	207.4	201.0

Steam Turbine Generator													
Main Steam Throttle Conditions	Flowrate, lb/h	1,169,554.	809,842.	1,168,612.	1,168,228.	823,381.	1,179,567.	836,396.	720,228.	645,555.	708,548.	642,529.	673,397.	625,746.
	Pressure, psia	1,909.1	1,338.5	1,907.7	1,907.1	1,360.5	1,908.2	1,358.7	1,154.1	1,039.6	1,153.8	1,053.8	1,108.3	1,037.1
	Temperature, F	1,050.0	1,049.9	1,050.0	1,050.0	1,050.0	1,029.9	1,009.7	966.3	970.6	1,003.7	1,015.3	1,027.2	1,040.7
	Enthalpy, Btu/lb	1,508.04	1,524.27	1,508.11	1,508.10	1,523.68	1,495.74	1,500.16	1,481.33	1,487.53	1,502.93	1,512.54	1,517.70	1,527.39
HPT Exit	Flowrate, lb/h	1,147,764.	794,754.	1,146,838.	1,146,461.	808,038.	1,157,586.	820,812.	706,808.	633,526.	695,346.	630,558.	660,850.	614,088.
	Pressure, psia	425.2	350.7	422.0	484.1	358.2	490.6	365.4	314.5	280.5	307.7	277.9	291.2	269.9
	Temperature, F	647.7	690.8	646.2	677.5	691.8	664.0	663.3	632.7	635.3	658.7	666.9	675.2	685.0
	Enthalpy, Btu/lb	1,332.90	1,361.22	1,332.26	1,345.97	1,361.29	1,337.85	1,345.42	1,332.09	1,335.77	1,346.55	1,352.71	1,356.31	1,362.70
Cold Reheat Steam	Flowrate, lb/h	1,147,764.	794,754.	1,146,838.	1,146,461.	808,038.	1,157,586.	820,812.	706,808.	633,526.	695,346.	630,558.	660,850.	614,088.
	Pressure, psia	425.2	350.7	422.0	484.1	358.2	490.6	365.4	314.5	280.5	307.7	277.9	291.2	269.9
	Temperature, F	647.7	690.8	646.2	677.5	691.8	664.0	663.3	632.7	635.3	658.7	666.9	675.2	685.0
	Enthalpy, Btu/lb	1,332.90	1,361.22	1,332.26	1,345.97	1,361.29	1,337.85	1,345.42	1,332.09	1,335.77	1,346.55	1,352.71	1,356.31	1,362.70
IPT Throttle Steam	Flowrate, lb/h	1,097,184.	937,961.	1,086,450.	1,275,568.	961,239.	1,308,739.	996,003.	872,531.	775,768.	840,699.	755,128.	787,757.	725,772.
	Pressure, psia	339.1	288.3	335.9	392.4	294.5	397.5	300.7	259.6	231.5	253.7	229.0	239.8	222.1
	Temperature, F	1,050.1	1,041.0	1,050.1	1,047.0	1,031.9	1,012.7	992.3	950.8	955.8	987.3	999.1	1,010.4	1,024.0
	Enthalpy, Btu/lb	1,551.69	1,548.26	1,551.78	1,548.61	1,543.23	1,530.12	1,522.10	1,501.52	1,505.01	1,520.83	1,527.80	1,533.40	1,541.05
LP Admission Steam #1	Flowrate, lb/h	117,676.	146,330.	97,544.	96,549.	137,793.	109,167.	152,698.	136,766.	116,492.	131,546.	110,140.	132,093.	113,560.
	Pressure, psia	56.9	50.6	55.4	63.8	51.1	65.2	52.7	45.7	40.4	44.6	39.8	42.5	38.9
	Temperature, F	579.0	545.6	586.2	585.3	553.0	589.3	555.2	542.4	532.0	537.8	529.3	527.7	522.2
	Enthalpy, Btu/lb	1,322.15	1,306.32	1,325.83	1,324.76	1,309.88	1,326.66	1,310.82	1,305.15	1,300.53	1,303.00	1,299.27	1,298.25	1,295.89

Steam Turbine Generator Continued													
LPT1 Inlet	Flowrate, lb/h	1,227,426.	1,091,575.	1,196,647.	1,383,257.	1,106,411.	1,429,008.	1,156,008.	1,015,467.	897,861.	978,479.	870,999.	925,870.	844,989.
	Pressure, psia	55.8	49.6	54.3	62.5	50.1	63.9	51.7	44.8	39.6	43.7	39.0	41.7	38.2
	Temperature, F	591.6	590.3	589.0	583.6	583.5	561.7	559.2	531.5	532.3	554.5	559.8	569.8	576.6
	Enthalpy, Btu/lb	1,328.44	1,328.22	1,327.27	1,324.01	1,324.83	1,313.18	1,312.87	1,299.89	1,300.75	1,311.18	1,314.09	1,318.79	1,322.33
LP Turbine Exhaust	Flowrate, lb/h	1,227,454.	1,091,600.	1,196,674.	1,383,288.	1,106,436.	1,429,041.	1,156,034.	1,015,490.	897,882.	978,502.	871,019.	925,891.	845,008.
	Pressure, psia	3.438	3.094	0.982	1.130	1.130	0.860	0.860	0.860	0.860	1.076	0.972	2.500	2.200
	Pressure, in HgA	7.000	6.299	1.999	2.301	2.301	1.751	1.751	1.751	1.751	2.191	1.979	5.090	4.479
	Temperature, F	188.9	192.0	101.1	105.9	105.9	96.7	96.7	96.7	96.7	104.2	100.8	170.0	166.2
UEEP	Enthalpy, Btu/lb	1,144.12	1,145.68	1,058.42	1,056.58	1,064.13	1,047.31	1,049.33	1,045.30	1,049.65	1,060.66	1,063.07	1,135.86	1,134.30
Generator	Gross Output, kW	193,590.	153,250.	220,920.	242,170.	180,760.	243,770.	184,230.	155,640.	138,110.	152,310.	137,880.	127,270.	119,550.
Condenser Duty	Heat Duty,MBtu/h	1,248.63	1,130.50	1,180.29	1,360.95	1,097.01	1,405.91	1,139.75	997.16	885.68	968.50	867.30	957.65	876.89
Miscellaneous														
LP EVAP Water Outlet	Flowrate, lb/h	766,536.	568,525.	770,755.	741,883.	583,353.	758,091.	599,722.	529,584.	471,183.	511,562.	458,910.	479,408.	439,604.
	Pressure, psia	67.4	64.4	64.2	72.4	63.9	74.7	67.2	58.8	51.6	57.1	50.3	55.2	49.9
	Temperature, F	300.4	297.4	297.2	305.2	296.9	307.4	300.2	291.4	283.0	289.5	281.4	287.3	280.8
	Enthalpy, Btu/lb	270.19	267.07	266.87	275.12	266.55	277.36	269.99	260.85	252.29	258.93	250.68	256.71	250.07
IP BFP Discharge	Flowrate, lb/h	766,536.	568,525.	770,755.	741,883.	583,353.	758,091.	599,722.	529,584.	471,183.	511,562.	458,910.	479,408.	439,604.
	Pressure, psia	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
	Temperature, F	301.4	298.4	298.2	306.2	297.9	308.4	301.3	292.4	284.0	290.5	282.4	288.3	281.8
	Enthalpy, Btu/lb	272.22	269.12	268.91	277.14	268.59	279.37	272.03	262.90	254.37	260.99	252.76	258.78	252.15
HP BFP Discharge	Flowrate, lb/h	590,377.	408,942.	589,996.	589,708.	415,847.	595,551.	422,422.	363,752.	326,038.	357,851.	324,510.	340,098.	316,033.
	Pressure, psia	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0
	Temperature, F	304.7	301.7	301.5	309.6	301.2	311.8	304.5	295.5	287.1	293.7	285.5	291.5	284.9
	Enthalpy, Btu/lb	278.75	275.63	275.43	283.69	275.11	285.92	278.55	269.40	260.83	267.48	259.22	265.26	258.61

HP Evaporator Blowdown (each unit)	Flowrate, lb/h	5,600.	4,019.	5,690.	5,591.	4,157.	5,768.	4,224.	3,638.	3,260.	3,579.	3,245.	3,401.	3,160.
% Blowdown		1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
IP Evaporator Blowdown (each unit)	Flowrate, lb/h	733.	723.	807.	652.	774.	763.	885.	837.	718.	734.	629.	641.	564.
% Blowdown		1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
LP Evaporator Blowdown (each unit)	Flowrate, lb/h	338.	482.	248.	241.	449.	304.	523.	537.	461.	457.	385.	443.	388.
% Blowdown		1%	1%	1%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Cycle Make Up Water (total for all units)	Flowrate, lb/h	242,481.	10,449.	253,769.	12,968.	10,759.	13,670.	11,264.	10,022.	8,880.	9,539.	8,518.	8,969.	8,225.
	Temperature, F	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0

Source: Mike Elmer, Starbuck Power Company, LLC. Forwarded information from Black & Veatch, July 27, 2001.

ATTACHMENT B

Water Pipeline Memorandum

TECHNICAL MEMORANDUM CH2MHILL

Starbuck Power Company Water Pipeline Route Study

PREPARED FOR: Michael Elmer/Starbuck Power Company LLC

PREPARED BY: Travis Pyle/CH2M HILL

REVIEWED BY: Marlena Guhlke/CH2M HILL
Kelly Irving/CH2M HILL
Scott Dethloff/CH2M HILL

DATE: May 2001

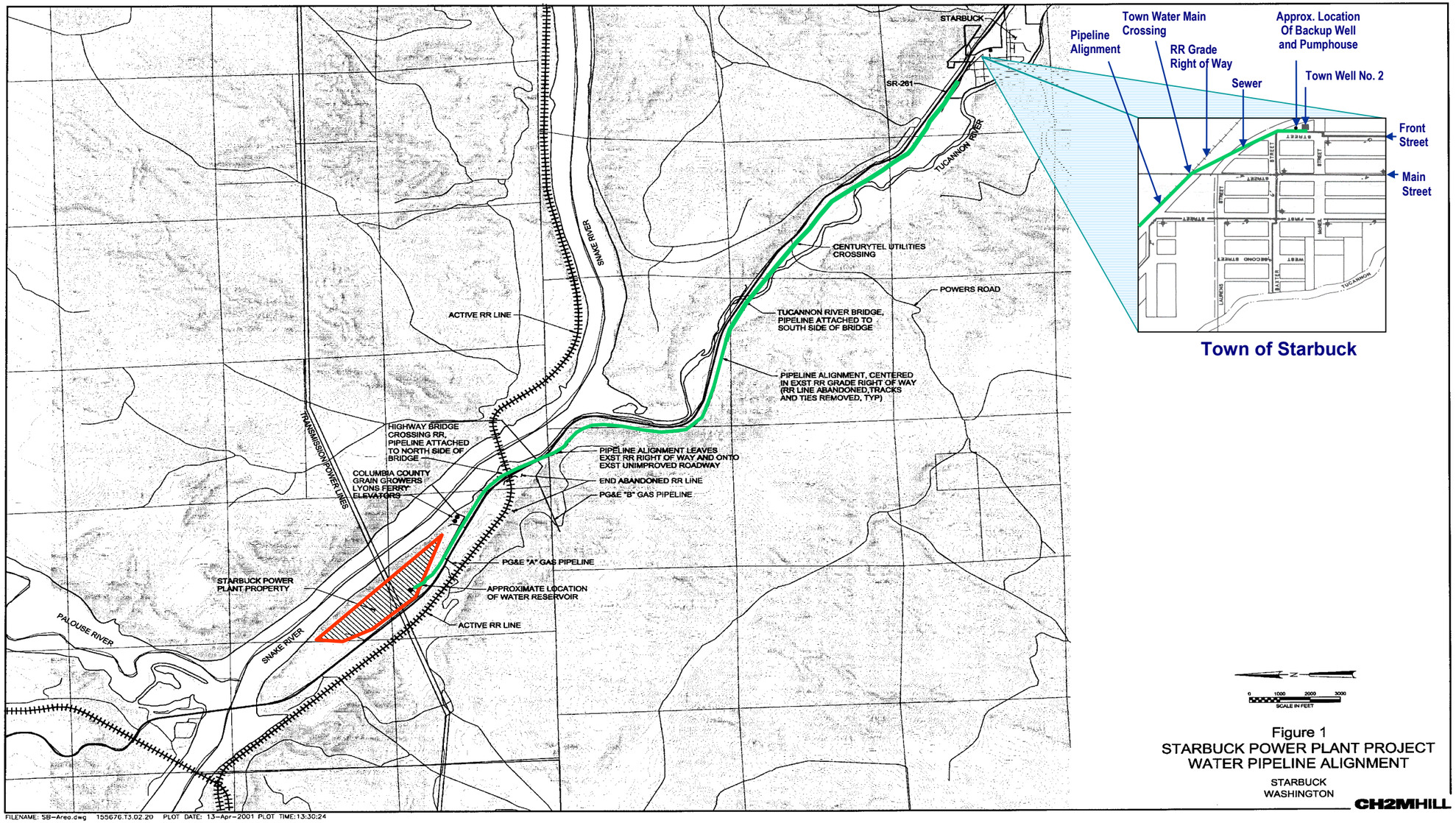
1.0 Introduction

Starbuck Power Company, L.L.C. (SPC) of Bellevue, Washington, is proposing to build a 1200-megawatt (MW), natural gas-fueled, combustion turbine power plant on approximately one-half acre of a 100-acre site located about 5.5 miles northwest of the Town of Starbuck in Columbia County, Washington (Figure 1). State Route 261 (SR-261), a two-lane highway, is adjacent to the southwest side of the property, and a Union Pacific Railroad rail line passes southwest of the highway.

Total water usage for operation of the Starbuck power plant is expected to be up to 300 gallons per minute (gpm), or 432,000 gallons per day (gpd). SPC's preferred alternative is to use groundwater from a new on-site well. SPC has a groundwater right application pending with the Washington State Department of Ecology (Ecology) for 300 gpm. SPC intends to offer water quantity mitigation to offset withdrawals from the on-site well.

Alternatively, SPC has secured an option to purchase up to 100 gpm, or up to 144,000 gpd, of water from the Town of Starbuck under their existing water right. With the lower quantity of available water, the power plant would be able to use foggers (up to 8 hours per day) but would not be able to use steam injectors. Both processes enhance power production potential.

If the Town of Starbuck supplies water to the project, a water pipeline will need to be constructed from Well No. 2 in the Town to the generating facility site. In addition, a back-up well (to Well No. 2) will be installed for system redundancy. This Technical Memorandum conceptually develops the water pipeline that would be required for this option. Note that design and layout of the back-up well is not included in this Technical Memorandum but that order-of-magnitude costs have been provided.



FILENAME: SB-Area.dwg 155676.T3.02.20 PLOT DATE: 13-Apr-2001 PLOT TIME:13:30:24

Figure 1
STARBUCK POWER PLANT PROJECT
WATER PIPELINE ALIGNMENT

STARBUCK
WASHINGTON

CH2MHILL

The following is the scope of study for the water pipeline route.

- Identify two alternative pipeline routes and develop the preferred alternative.
- Provide a hydraulic design overview of the preferred alternative assuming 80 pounds per square inch (psi) of available delivery pressure at the Town's Well No. 2. Provide ownership and right-of-way (ROW) information along the pipeline alignment. (The County Assessor's Office for Columbia County, Washington, was used as an information source for this task.) It is assumed SPC will determine future actions with regard to acquisition and/or negotiation for property along the selected pipeline route.
- Prepare an order-of-magnitude cost estimate for the preferred route.

  The order-of-magnitude cost estimate (minus 30 percent, plus 50 percent accuracy) is in May 2001 dollars and does not include escalation or financing costs. No costs are included for management and disposal of potentially hazardous materials that may be encountered during pipeline excavation. The cost estimate has been prepared for guidance in project evaluation from the information available at the time of preparation, and should be carefully reviewed prior to making specific financial decisions or establishing final project budgets. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule, and other variable factors.

2.0 Conceptual Design of the Water Pipeline

To supply water from the Town of Starbuck to the project site, an approximate 5.5-mile-long water service pipeline is required. The line would be connected to the Town's existing Well No. 2 pump station (located east of Front Street), and to a second well and pump station located within about 200 feet of Well No. 2. The water pipeline would need to be ready to deliver water to the generation plant by at least fall 2004 and possibly sooner, depending on water needs during construction.

2.1.1 Pipeline Alignment

Two alternative pipeline alignments were evaluated:

- SR-261
- Old Union Pacific Railroad Right–of-Way

Field work to evaluate the alignment alternatives was completed on March 13, 2001, and March 22, 2001. In addition, a meeting with the Washington State Department of Transportation (WSDOT) was conducted on March 22 to discuss the proposed alignments, the proximity of the pipeline to SR-261, highway crossings, and pipeline attachments to the highway bridges.

2.1.1 SR-261 Alignment Alternative

In this option, the pipeline alignment would follow the SR-261 ROW from the Town of Starbuck to the project site. Constructing the pipeline along this alignment poses numerous challenges. At several locations there is minimal to no shoulder along SR-261; as a result,

trenching would be required within the road section. This possibility was discussed with WSDOT during the March 22 site visit. The SR-261 alignment was discouraged by WSDOT because it would require special approvals, and also the preferred alternative does not require trenching in the road section. In addition, approximately 1 mile northwest of the Town of Starbuck, about 0.5 mile of SR-261 is built on shallow bedrock and would most likely require blasting for pipeline trenching. The cost of blasting and traffic control along the highway would be high. For these reasons, this route was deemed the least-preferred alternative and was not developed for further consideration.

2.1.2 Old Union Pacific Railroad Right-of-Way (ROW) Alignment Alternative

The preferred alignment is to generally follow the old Union Pacific Railroad ROW from the Town of Starbuck to the project site. The pipeline would begin at the Town's Well No. 2 pump house (and would also connect to the back-up well and pump house, to be constructed), head north along Front Street, cross under the Town's sewer line, through a field, and then onto the old Union Pacific Railroad ROW. From here, the pipeline would follow the Union Pacific Railroad ROW, cross Main Street and a water main, and continue northwest along the ROW to the Tucannon River crossing. At this location, the pipeline would turn north, connect to the underside of the bridge decking (south side), cross the river, and then be routed back south to the Union Pacific Railroad ROW. The pipeline would follow the Union Pacific Railroad ROW to approximately 2,000 feet southeast of the highway bridge that crosses the active Union Pacific Railroad line. The highway bridge is approximately 1 mile southeast of the project site. Here, the pipeline would leave the Union Pacific Railroad ROW toward the highway (north), follow an existing unimproved road, cross SR-261 [also crossing Pacific Gas & Electric's (PG&E's) "B" gas line], and continue paralleling the highway (north side) within the WSDOT ROW to the bridge. The pipeline would be attached to the bridge (north side), similar to the connection at the Tucannon River Bridge.

From the highway bridge crossing the Union Pacific Railroad, the pipeline would follow the shoulder (north side) of SR-261 and then shift farther north, following an existing unimproved road (north of the barbed-wire fence marking WSDOT's ROW). The pipeline would follow the fenceline and shift south inside WSDOT's ROW, just east of the Columbia County Grain Grower's (CCGG's) Lyons Ferry Elevators. Just south of the elevators, the pipeline would parallel the highway and would be routed south of PG&E's "A" gas line. At the exit driveway to the grain elevators, the pipeline would cross this gas line. From here, the pipeline would cross the fenceline to the north side and generally parallel the fence to the project site, where it would connect to the water storage tank.

2.2 Hydraulic Design Overview

2.2.1 General Design Information

Since SPC has secured an option to purchase up to 100 gpm (or 144,000 gpd) of water from the Town of Starbuck, this flow rate was used as the design flow rate. The water would be distributed to the project's water service line by either direct feed from the well pumps (Well No. 2 or the back-up well) or from the Town's interconnected storage reservoirs (200,000-gallon and 50,000-gallon).

The water from the Town would be piped to the project site's water storage tank along the preferred alignment. The connections to the tank and the actual height of the tank are not included in this hydraulic design overview. However, the approximate ground elevation at the tank location and the anticipated tank height were provided by the engineering firm (Black and Veatch) designing the power plant facility. These parameters and other hydraulic design parameters are listed in Table 1.

The elevation gain from the Town of Starbuck to the top of the project's water storage tank is estimated at 110 feet. Based on site visits and discussions with the Town's maintenance manager (Darrel Huwe), Well No. 2 pump can provide a pumping capacity of approximately 260 gpm with a normal operating pressure of about 80 to 90 psi. The Town's two water storage reservoirs operate between 19.5 feet to 24.5 feet of water, and provide service pressure of about 80 psi. Note that evaluation of the Town's existing water distribution system for water availability is not part of this scope. It is assumed that Well No. 2 can provide a maximum, sustained flow rate of 100 gpm and 80 psi of discharge pressure to the SPC facility water service line inlet with either the pump running or direct feed from the Town's distribution system.

Frost maps for the area were not available through Columbia County Planning and Building. According to Mr. Huwe, water mains within the Town of Starbuck are buried between 43 and 46 inches below ground surface (bgs). As such, CH2M HILL recommends that the cover for SPC's service line be 48 inches bgs (minimum) for freezing protection. During follow-on design investigations, the required burial depth may be determined to be less deep.

TABLE 1
Hydraulic Design Overview Parameters

Parameter	Value
Design Maximum Daily Flow Rate	100 gpm (144,000 gpd)
Length of Pipe	29,250 feet
Town of Starbuck Ground Elevation at Well No. 2	645 famsl
Project Site Ground Elevation + Water Storage Tank Height[1]	705 famsl + 50 feet = 755 famsl
Water Pressure Available from Town's Water System[2]	80 psi

[1]Per discussions with the engineering firm (Black and Veatch) designing the power plant facility.
[2]Based on site visits and discussions with the Town's maintenance manager (Darrel Huwe).

Acronyms:
gpm = gallons per minute
gpd = gallons per day
famsl = feet above mean sea level
psi = pounds per square inch

2.2.2 Hydraulic Study

A hydraulic study was performed for the water service pipeline route along the preferred alignment. A 4-inch-diameter (4.07-inch inside diameter), American Water works

Association (AWWA) C900, Class 200 (DR 14) polyvinyl chloride (PVC) was chosen as the most viable pipe. Although a larger pipe (for example, 6-inch diameter) would provide the service, the velocities would be less and would most likely not provide sufficient scouring for self-cleaning.

The approximate total headloss (that is, elevation gain plus 29,250 feet of friction losses in the pipe, and losses from fittings and valves) at a flow rate of 100 gpm is approximately 135 psi. Assuming that the Town's water system could provide 80 psi of discharge pressure, the pressure difference of 55 psi would need to be provided by a booster pump.

It is estimated that a one 5-horsepower booster pump would be required for each water source location (that is, the existing Well No. 2 and the new back-up well). A more powerful, submersible well pump might be installed in the back-up well to provide sufficient discharge pressure and eliminate the need for a booster pump. This will be considered during subsequent design efforts.

Surge Analysis Study

As part of the conceptual-level hydraulic overview, a surge analysis study was conducted to determine the influences of potential water pressure surges on SPC's service line. Surge can be initiated in the system by pump startup, pump shutdown, and rapid valve opening and closing. Each of these conditions can be controlled by pump control valves or by slow valve movement. However, power failure creates an uncontrolled shutdown condition, so it was used as the controlling surge event for this study.

No damaging surge pressures were indicated from the study. Maximum pressures along the pipeline barely exceeded steady-state pressures, and the minimum pressure was estimated at 3.5 pounds per square inch gauge (psig). Although surge protection would not be required, valve closure should be slow (several minutes) to prevent excessive pressures.

Pipeline Installation Overview

It is anticipated that installation of the pipeline would consist of the following activities:

- Retrofitting Town Well No. 2 pump house
- Constructing the well and pump house for the back-up water supply
- Testing the Union Pacific Railroad ROW soils
- Excavating the pipeline trench
- Installing the pipe in the trench
- Backfilling the trench
- Attaching the bridge pipeline
- Installing the air release valve
- Conducting the hydrostatic testing
- Implementing erosion control and soil stabilization

The soils within the Union Pacific Railroad ROW would need to be tested prior to construction to check for any contaminated soils caused by previous Union Pacific Railroad activities. If contamination is found, the excavated soils will need to be removed offsite and disposed of in a permitted facility. Clean backfill may be required to replace excavated soil that is disposed offsite as a result of contamination. Note that the cost estimate in this

Technical Memorandum does not include costs for soil testing or importing of clean soil for backfill, because these components can be unpredictable without initial soil sampling.

Stormwater runoff during water pipeline construction on the Union Pacific Railroad ROW would be controlled to minimize soil erosion. It is anticipated that a narrow 1.5- to 2-foot-wide trench would be excavated for pipeline placement. This would minimize exposed, disturbed areas. Also, short segments of the pipeline would be installed, covering segments as pipe is laid to minimize exposed, disturbed areas. In addition, perimeter silt fences, hay bales, or other sediment control mechanisms would be installed to remove sediment from runoff before discharging from the control area. In sensitive areas, a perimeter silt fence would be installed and would not be removed until stability of the area is achieved. Seeding and mulching would be used where practical, for slope stabilization and site restoration.

The pipeline would need to be encased in a metal jacket and insulated to protect the pipe from freezing at the bridge crossing locations. Air release valves would be required at high points along the alignment, to release air buildup in the crown of the pipe.

A list of major capital equipment is shown in Table 2. (The routing of the pipeline is shown in Figure 1.)

TABLE 2
Major Capital Components

Description	Unit	Quantity
Water Pipeline:		
4-inch PVC Pipe	Feet	29,250
Trench Excavation	Cubic Yard	13,120
Bedding Sand (imported)	Cubic Yard	3,065
Bridge Crossing	Lump Sum	2
Air Release Station	Each	6
Back-up Water Supply Well and Well No.2 Retrofit:		
Well Installation	Feet	425
Submersible Well Pump (40 Hp)	Each	1
Booster Pump	Each	2
Prefabricated Pump Building (15 feet by 15 feet)	Each	1

Hp = horsepower

2.3 Cost Estimate

The following assumptions were used for developing the order-of-magnitude cost estimate:

- Town Well No. 2 will provide sufficient water quantities to supply the facility (100 gpm) and the Town of Starbuck during periods of peak demand.

- The connection components to Town Well No. 2 and the booster pump will be placed in the existing pump house, and a manhole (housing the service line flow meter) will be installed adjacent to the building.
- A second (back-up) well and pump house will be installed within 200 feet of Town Well No. 2 and connected to adjacent utilities.
- The minimum cover for the pipe will be 48 inches. (The Town of Starbuck's water distribution piping is buried between 43 and 46 inches bgs, per the Town's maintenance manager).
- Careful trenching will be required in the Union Pacific Railroad ROW in front of Morton Bishop's property, so as to not injure neighboring trees. It is assumed for this estimate that no trees will need to be replaced.
- Connection of the pipeline to the facility's water storage tank will be part of the facility construction cost. The pipeline will be stubbed-out at the location of the project water storage reservoir for future connection (at the stub-out, the water pressure would be sufficient for delivery of water to the top of the reservoir).
- Ongoing operation and maintenance (O&M) elements are anticipated to include periodic maintenance of pump house equipment (pumps, valves, and meters), bridge connections, air release valves, and the pipeline.
- Maintenance personnel at the SPC facility will be able to include O&M and over-sight duties within their job responsibilities, and there is no need for additional personnel. Also, the Town of Starbuck's maintenance person will contribute to pipeline/well house supervision duties.

The following potential costs are not included in the estimate for pipeline installation:

- Engineering services for design and construction of the back-up well.
- Soil testing along the Union Pacific Railroad ROW, disposal of contaminated soil, and importing clean soil for backfill. These potential cost components are unpredictable without initial soil sampling to determine the extent of contamination, if any.
- The communication link between the booster pump motor controls and the reservoir elevation (pressure transducer mechanism). The site will require telephone connections, and a designated line could be used for this purpose.
- The communication devices needed for the project site elevated storage tank and potential motor control valving. These costs are assumed accounted for as part of the facility construction cost.
- Additional time, trenching requirements, and connections for a local telephone company to use the water pipeline trench for running their conduit from the Town of Starbuck to the project site.
- Blasting through shallow bedrock, if required at any location along the pipeline alignment.

The order-of-magnitude capital cost is estimated at $1,440,000 (see Table 3), which includes:

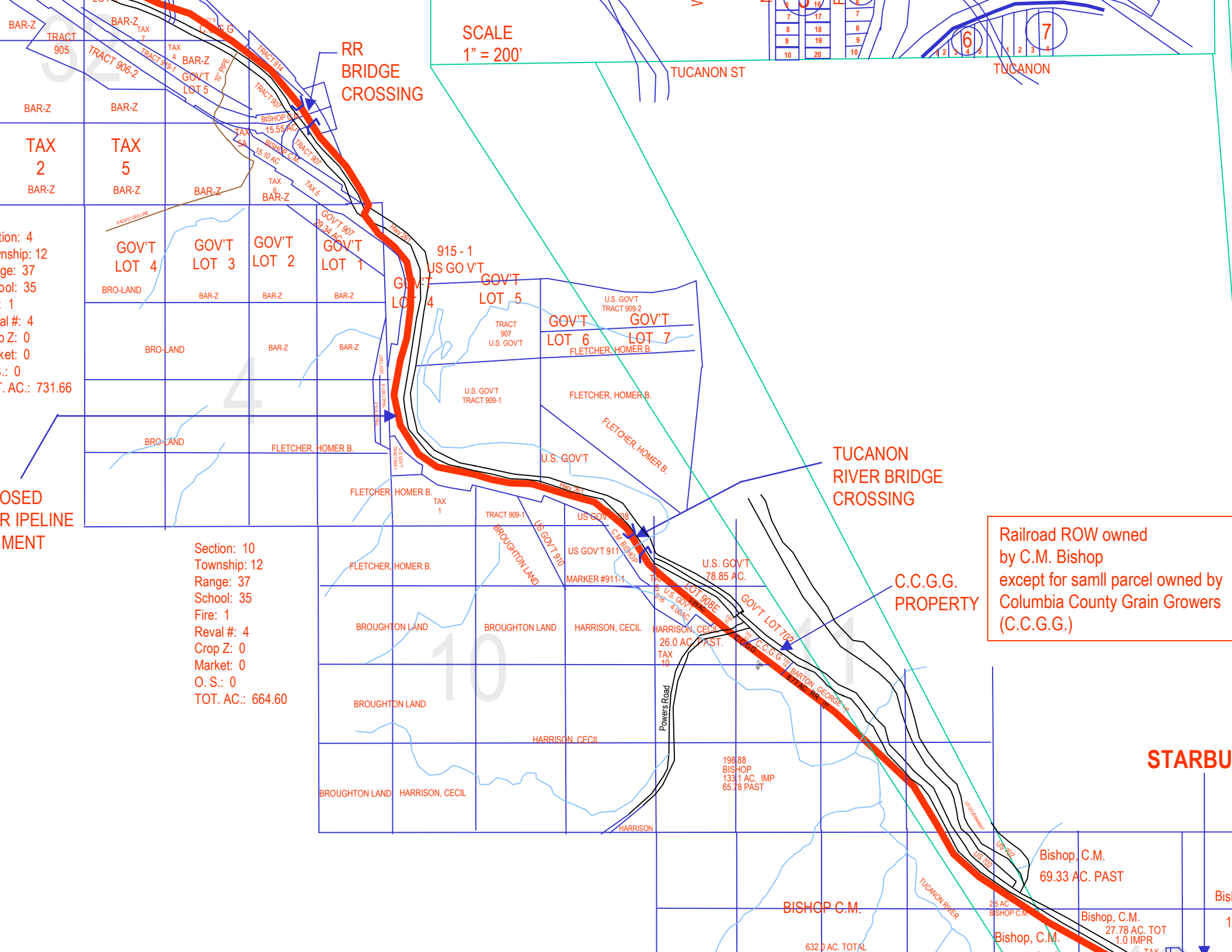
- 10 percent allowance for miscellaneous items
- 30 percent contingency for scope changes that are presently unforeseen
- 10 percent for mobilization
- 8 percent for sales tax on labor and materials
- 15 percent for engineering services (design and technical support)
- 8 percent for engineering construction management

The annual O&M cost is estimated to be $22,000, which includes costs for annual pipeline and pump station inspection, maintenance, and repair.

2.4 Land Ownership Identification and ROW Information

Figure 2 shows the Columbia County assessor maps for property ownership along the pipeline route. From the production wells to the Union Pacific Railroad ROW, the pipeline would be routed along the Town of Starbuck's property and then onto Morton Bishop's plot (Tax Lot 27). From here, the pipeline would be routed along the Union Pacific Railroad ROW, which also is owned by Mr. Bishop. The pipeline would cross a section of the CCGG's property just east of Powers Road and then back onto Mr. Bishop's property along the Union Pacific Railroad ROW. At the Tucannon River crossing, the pipeline would be attached to the south side of the bridge decking. Once across the highway bridge, the pipeline would return to the Bishop property along the Union Pacific Railroad ROW. The pipeline would continue along the Union Pacific Railroad ROW until aligning with the unimproved road. From the unimproved road to the CCGG's Lyons Ferry Elevators, the pipeline would cross PG&E's "B" gas line, through U.S. Government Tracts 907, 900, and 914 (owned and maintained by the U.S. Army Corps of Engineers [Corps]), and would be attached to the north side of the highway bridge. At the Lyons Ferry Elevators, the pipeline would be routed along WSDOT's ROW (north side of the highway), crossing two of CCGG's paved driveways and PG&E's "A" gas line. From here the pipeline would be routed through Government Lot 3 (owned and maintained by the Corps) and then onto Bar-Z Ranch, Inc. property. SPC has an option to purchase the Bar Z property, pending permitting approval.

Consent letters would need to be submitted to the Corps, CCGG, WSDOT, PG&E, the Town of Starbuck, and Morton Bishop for final approval of the preferred pipeline alignment.


SCALE
1" = 200'
RR
BRIDGE
CROSSING
TUCANON ST
TUCANON
TUCANON
RIVER BRIDGE
CROSSING
C.C.G.G.
PROPERTY
Railroad ROW owned
by C.M. Bishop
except for samll parcel owned by
Columbia County Grain Growers
(C.C.G.G.)
OSED
R IPELINE
MENT
Section: 10
Township: 12
Range: 37
School: 35
Fire: 1
Reval #: 4
Crop Z: 0
Market: 0
O. S.: 0
TOT. AC.: 664.60
Powers Road
BISHOP C.M.
Bishop, C.M.
69.33 AC. PAST
Bishop, C.M.
27.78 AC. TOT
1.0 IMPR
Bishop, C.M.
632.0 AC. TOTAL
198.88
BISHOP
1331 AC. IMP
65.78 PAST
26.0 AC. PAST.
78.85 AC.
TRACT
905
TRACT 906-2
TRACT 909-1
TRACT 914
TRACT 907
BISHOP C.M.
15.55 AC.
BISHOP C.M.
15.10 AC.
10" PIPE
PACIFIC GAS LINE
GOV'T 907
29.34 AC.
915 - 1
US GO V'T
GOV'T
LOT 4
GOV'T
LOT 3
GOV'T
LOT 2
GOV'T
LOT 1
GOV'T
LOT 5
GOV'T
LOT 6
GOV'T
LOT 7
TRACT
907
U.S. GOV'T
U.S. GOV'T
TRACT 909-2
U.S. GOV'T
TRACT 909-1
FLETCHER, HOMER B.
BRO-LAND
BAR-Z
TAX
1
TRACT 909-1
US GOV'T 908
US GOV'T 910
US GOV'T 911
MARKER #911-1
BROUGHTON LAND
HARRISON, CECIL
HARRISON, CECIL
26.0 AC. PAST.
TAX
10
U.S. GOV'T
78.85 AC.
LOT 908E
3.81 AC.
U.S. GOV'T
4.00 AC.
GOV'T LOT 702
C.C.G.G.
BARTON, GEORGE
8.77 AC. ISR
C.M. BISHOP
HWY 261
US GOVERNMENT
US-302
US 702
TUCANON RIVER
2.5 AC
BISHOP C.M.
TAX
2
TAX
5
TAX
5A
TAX
6
TAX
7
TAX
4
GOV'T
LOT 5
PACIFIC GAS LINE
ion: 4
nship: 12
ge: 37
ool: 35
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al #: 4
p Z: 0
ket: 0
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T. AC.: 731.66

ATTACHMENT C

Certificate of Land Use Consistency

Columbia County
Certificate of Compliance

NAME OF APPLICANT: STARBUCK POWER COMPANY L.L.C.
ADDRESS: 10500 NE 8th Street, Suite 2026
Bellevue, Washington 98004

PROJECT: STARBUCK POWER PROJECT

PROJECT DESCRIPTION: The Applicant seeks to construct an approximately 1200 megawatt, natural gas-fired, combined-cycle combustion turbine electrical generating facility with associated accessory uses.

CERTIFICATION AND CONDITIONS: Pursuant to RCW 80.50, the Washington State Energy Facility Site Evaluation Counsel ("EFSEC") coordinates all of the evaluation and licensing steps for siting major energy facilities in Washington. Accordingly, a Conditional Use Permit is not necessary for this project.

This Certificate of Compliance certifies that the Starbuck Power Project, as described in the Applicant's Request For Certification of Compliance, is consistent and in compliance with Columbia County land use plans and zoning ordinances and but for EFSEC's exclusive permitting authority would be granted a Conditional Use Permit based upon the following conditions:

1) Construction and operation of the project consistent with the project description contained in the Request for Certification of Compliance dated February 8, 2001, and

2) Continued compliance with applicable provisions of Chapter 80.50 of the Revised Code of Washington and Title 463 of the Washington Administrative Code.

After due deliberation and based upon findings of fact adopted by the Board of Adjustment, this Certificate of Compliance is hereby approved subject only to the conditions stated herein:

Certificate of Compliance: XX approved/certified

_____ denied

APPROVED THIS 5th DAY OF MARCH 2001.
COLUMBIA COUNTY PLANNING DEPARTMENT

Kim E. Lyonnais

Kim E. Lyonnais, Planning Director

ATTACHMENT D

Tribal Letters

October 9, 2000

155676.T1.CR

Ms. Adeline Fredin
Historian
Confederated Tribes of the Colville Reservation
P.O. Box 150
Nespelem, WA 99155

Subject: Starbuck Power Company - Starbuck Generating Plant, Starbuck, Washington

Dear Ms. Fredin:

Starbuck Power Company LLC proposes to construct a gas-fired generating plant to be located just north of the Columbia Grain Growers elevators northwest of Starbuck, Washington (see enclosed report). This project requires compliance with both federal and state cultural resource laws and regulations designed to take into account the effect of proposed projects on significant cultural resources; historic properties that may be listed, or are eligible for inclusion, in either the National Register of Historic Places (NRHP) or the Washington State Register of Historic Places (WSRHP). KVA Corporation (no longer in business) began cultural resource compliance in 1993-1994 and several initial study elements were completed (Scott and Bard 1994 and Moura and Minthorn 1994).

The Confederated Tribes of the Umatilla Indian Reservation in their October 17, 1994 report to CH2M HILL (Moura and Minthorn 1994:6) outlined two broad recommendations if the project were to go forward:

1. *The property be formally submitted for a determination of eligibility to the National Register of Historic Places as a Traditional Cultural Property. This would necessitate:*

   – *Establishing a Government to Government relationship between the CTUIR, the developers, and governmental agencies involved with the proposed action. Only in such a format can KVA, CH2M HILL, the Tribe, Columbia County and the State of Washington discuss such matters as zoning, treaty rights, and private property rights versus cultural resource laws.*

   – *Additional informant interviews.*

   – *Identification and involvement of all other concerned Native American groups.*

2. *More attention be paid to the potential for buried cultural resources. This would necessitate:*

   – *Subsurface archaeological reconnaissance and monitoring of earth disturbing activities during construction. Subsurface archaeological reconnaissance should take the form of systematically placed shovel tests followed by backhoe trenching. Monitoring of construction should include a Tribal monitor in addition to that of a professional archaeologist.*

Northwest Power Enterprises, Inc. of Bellevue, Washington (who took over the project from KVA Corporation in 1999) authorized CH2M HILL to conduct subsurface testing of up to 30 acres to check for the presence/absence of buried archaeological remains. This work was conducted on November 15-18, 1999. Completing the subsurface testing substantially fulfilled a significant portion of the second Tribal recommendation described above (monitoring during construction would be implemented when construction starts). Fifty (50) individual test trench units were excavated on both sides of the BPA power line corridor – all units produced negative findings (no archaeological remains were detected). Two members of the CTUIR served as crewmembers (Mr. Jason Butler and Mr. Toby Patrick). A subsurface testing report (Bard, McClintock, Scott and Sienko 2000) was prepared and is enclosed.

CH2M HILL is assisting Starbuck Power Company LLC (hereafter Starbuck Power) implement the other Tribal recommendations listed above. Because recent changes in cultural resource laws and regulations stipulate proponent (and agency) consultation with affected Tribes; and available guidance from the Advisory Council on Historic Preservation strongly encourages consultation to begin early in the project development stage, Starbuck Power has authorized CH2M HILL to (1) provide copies of the subsurface testing report to the local Tribes for their review and approval and (2) provide Starbuck Power with information on Tribal consultation protocols and procedures.

As explained on page 1 of the enclosed report, this project must obtain EFSEC (Energy Facility Site Evaluation Council) approval. EFSEC will be the lead agency for SEPA (State Environmental Policy Act) compliance. One or more federal permits must be obtained as well. It is our understanding that Bonneville Power Administration will be the lead federal agency and will be responsible for conducting Government-to-Government consultations with the Tribe. Starbuck Power may participate in the Government-to-Government consultations between the Tribe and the lead federal agency as appropriate.

Starbuck Power also hopes to have an opportunity to explain the project to Tribal officials and/or staff (that may be scheduled apart from any formal Government-to-Government consultations) in order to better understand and address any Tribal concerns about the project. Therefore, we would greatly appreciate your cooperation in providing Starbuck Power with information pertinent to properly conducting staff-level consultations between it and appropriate Tribal officials and/or staff. CH2M HILL's cultural resources specialist – Dr. James Bard is authorized by Starbuck Power to collect this information on its behalf:

- What is the proper consultation protocol for the Tribe? How should the Tribe be approached by the Company and who should be approached?
- What are the names, titles, addresses, and phone numbers of the key Tribal officials or staff that should be contacted?
- If Starbuck Power makes a formal presentation to the Tribe, what project presentation materials would be most helpful to Tribal officials/staff (e.g., project description, maps, visual simulations, employment forecasts, anticipated environmental impacts and mitigations)?

- What consultation schedule framework should be anticipated (when and where do the regularly scheduled Tribal Council meetings take place, when and where does the Tribal cultural resources staff meetings take place, etc.)?

Thank you for your cooperation and assistance. The information you wish to provide can be forwarded to Dr. James Bard, CH2M HILL, Inc., 2300 NW Walnut Blvd., Corvallis, OR 97330 (by letter) or jbard@ch2m.com (by e-mail), of by fax to 541-752-0276. Phone calls are welcome if you have any questions – 541-758-0235 extension 3662).

Sincerely,

CH2M HILL

James C. Bard
Cultural Resources Specialist

Cc: Mr. Mike Elmer/Starbuck Power Company LLC

References Cited

Bard, J.C., R. McClintock, S. Scott and A. Sienko. 2000. *Cultural Resources Investigation Report, Starbuck Gas-Fired Electric Generating Plant Project, Columbia County, Washington*. CH2M HILL, Inc., Bellevue, Washington. January 2000.

Moura, G.F. and A. Minthorn. *A Heritage Resource File and Literature Search & Oral History for the Proposed KVA-Starbuck Generation Facility at Lyons Ferry, Washington.* Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon. October 17, 1994.

Scott, S. and J. Bard. *Cultural Resources Investigation Report for the KVA-Starbuck Gas-Fired Electric Generating Plant Project, Columbia County, Washington.* CH2M HILL, Inc., Corvallis, Oregon. May 1994.

Letter of October 9 sent to:

Mr. Brian Flett
Director – Cultural Resources
Spokane Tribe
P.O. Box 100
Wellpinit, WA 99040
(509) 258-4060

Mr. Jeff Van Pelt
Department of Natural and Cultural Resources
Confederated Tribes of the Umatilla Indian Reservation
P.O. Box 638
Pendleton, OR 97801

Mr. Johnson Meninick
Yakama Indian Nation
P.O. Box 151
Toppenish, WA 98948
(509) 865-5121 (ext. 4737)

Mr. J. Herman Reuben
Nez Perce Tribe
P.O. Box 305
Lapwai, ID 83540
(208) 843-2253

Ms. Adeline Fredin
Historian
Confederated Tribes of the Colville Reservation
P.O. Box 150
Nespelem, WA 99155
(509) 634-2692

MEMORANDUM CH2MHILL

Starbuck Power Plant Project - PPL Global

TO: Ms. Vera Sonneck/Cultural Resources
Nez Perce Tribe
c/o Vera Sonneck
RR 1, Box 106
Old Spaulding Mill Road
Spaulding, ID 83540
(208) 843-2009

COPIES: Marlena Guhlke/CH2M HILL - Spokane

FROM: James C. Bard/CH2M HILL - Corvallis

DATE: December 27, 2000

Hello Vera. It was a pleasure speaking with you this morning. As promised, please find enclosed our original letter to the late Mr. Herman Reuben and a copy of the archaeological report we attached to that letter to Mr. Reuben.

As I mentioned, we are having a meeting in Seattle on January 8th and I would most appreciate receiving your written response prior to that time. Because time is of the essence, I'm sending these materials to you via Federal Express and I appreciate your offer to have your tribal archaeologist review the enclosed report.

A letter reply would be most appreciated – providing us with the requested information about the interest the Nez Perce might have in this project and suggested actions we might take to better inform the Tribe about the project (consultation protocols, meetings and presentations, etc.).

I can be reached at CH2M HILL, Inc., 2300 NW Walnut Blvd., Corvallis, OR 97330. Telephone 541-758-0235 (ext. 3662) or fax 541-752-0276 or e-mail jbard@ch2m.com.

Thanks again for your cooperation and assistance.

MEMORANDUM CH2MHILL

Starbuck Power Plant Project - PPL Global

TO: Mr. Johnson Meninick/Program Manager Cultural Resources
Yakama Indian Nation
Heritage Center/Museum
Buster Road
Toppenish, WA 98948
(509) 865-5121 (ext. 4737)

COPIES: Marlena Guhlke/CH2M HILL - Spokane

FROM: James C. Bard/CH2M HILL - Corvallis

DATE: December 28, 2000

Dear Johnson. It was a pleasure speaking with you this morning on the telephone. As promised, please find enclosed our original letter to you on October 9, 2000 and an additional copy of the archaeological report we attached to that letter.

As I mentioned, we are having a meeting in Seattle on January 8th and I would most appreciate receiving your written response prior to that time. As you indicated, you may be away from your office until January 7th and may or may not be able to respond to us in writing by January 8th. Because time is of the essence, I'm sending these materials to you via Federal Express and I appreciate your offer to have a member of your tribal staff review the enclosed report.

Thank you also for confirming that Mr. Bill Yallup is the Chairman of the Cultural Resource Committee and that Mr. Lonnie Selam is the Tribal Chair. As I indicated on the phone, our client PPL Global would be happy to meet any tribal committee or make a presentation to the Tribal Council to provide information about the project and its potential impacts to the cultural environment.

I can be reached at CH2M HILL, Inc., 2300 NW Walnut Blvd., Corvallis, OR 97330. Telephone 541-758-0235 (ext. 3662) or fax 541-752-0276 or e-mail jbard@ch2m.com.

Thanks again for your cooperation and assistance.

KAI
KAUFFMAN AND ASSOCIATES, INCORPORATED

July 30, 2001

Vera Sonneck, Manager
Cultural Resrouces
Nez Perce Tribe
PO Box 305
Lapwai, ID 83540

RE: Starbuck Project

Dear Vera,

Per our email conversations about trying to provide a contract for the Nez Perce Tribe to participate in the archaeological survey and preparation of an oral history report for the Starbuck Project, I wanted to provide you with the latest information and to renew our invitation.

The pedestrian survey for the 16-mile transmission line associated with this project is temporarily on-hold, pending the resolution for access to a certain privately held parcel. The team headed by CH2M Hill and involving cultural resource staff from Umatilla and Yakama tribes completed approximately six to seven miles of the line in April and May. There remains between nine or ten miles yet to complete. In addition, the team still needs to go back to the significant sites identified in the first weeks of this survey to record each site. We anticipate the archaeological work will begin again toward the end of summer or early fall. So there is still time for the Nez Perce Tribe to participate in this team project.

Of most importance I believe, is the invitation extended to the Nez Perce Tribe to conduct an oral history related to the Starbuck Project site. I hope you are still interested in working out some type of arrangement so that this work can be done and included in any subsequent permitting and environmental applications. I would like to make arrangements to meet with you and Josiah at Lapwai to go over the enclosed draft proposal. Are you available anytime between August 13 – 17th? Please let me know when that would be convenient.

I know you and your staff are involved with many projects, but do hope that we can find a way to make sure the Nez Perce Tribe is able to participate in the Starbuck Project.

Sincerely,

Jo Ann Kauffman
Kauffman and Associates, Inc.

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(509) 747-4994 TEL. • (509) 747-5030 FAX

KAI

KAUFFMAN AND ASSOCIATES, INCORPORATED

March 9, 2001

Samuel N. Penney, Chairman
Nez Perce Tribe
PO Box 305
Lapwai, ID 83540

Dear Sam:

On behalf of PPL Global and the Starbuck Power Company, I want to express our appreciation for the opportunity to meet once again with tribal cultural resource representatives in Walla Walla on Wednesday, March 7, 2001 at the BPA office to continue discussions regarding this project. I am enclosing proposed contract language prepared by CH2M HILL that details suggested scope of work language for archaeological studies and oral history work to be undertaken by individual tribes, as we discussed at the meeting. As the draft indicates, it is our hope that the fieldwork described under the scope of work can be done in mid-April, with a report completed by mid-May.

As I indicated in my earlier letter of introduction, Kauffman and Associates (KAI) was hired by PPL Global to assist in facilitating a meaningful and respectful dialogue with the Nez Perce Tribe through the planning, scoping and permitting processes involved in this project. My personal enthusiasm for this project is largely a result of the respect I have for the demonstrated commitment PPL Global has already shown in working with tribal governments in other parts of the country where they do business. Additionally, as a member of a tribe with an interest in the area where the facility is to be located, I am very encouraged by an energy facility proposal that will help take pressure off the Snake River as a source of power production.

I look forward to working with you during this phase of the planning process to see that the concerns of your tribe are recognized and addressed. I am available to assist in moving this contract for cultural resource activities forward. Attached is a sample draft resolution for council action related to this contract for your use if needed. Please feel free to contact me at any time should you have any additional questions or concerns.

Sincerely,

Jo Ann Kauffman,
Kauffman and Associates, Inc.

CC: Vera Sonneck, Cultural Resources Director

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(509) 747-4994 TEL • (509) 747-5030 FAX

KAI
KAUFFMAN AND ASSOCIATES, INCORPORATED

March 9, 2001

Michelle Thompson, Contracting Officer
Confederated Tribes of the Umatilla Indians
C.T.U.I.R.
PO Box 638
Pendleton, OR 978010638

Dear Michelle:

On behalf of PPL Global and the Starbuck Power Company, I want to express our appreciation for the opportunity to meet once again with tribal cultural resource representatives in Walla Walla on Wednesday, March 7, 2001 at the BPA office to continue discussions regarding this project. I am enclosing proposed contract language prepared by CH2M HILL that details suggested scope of work language for archaeological studies and oral history work to be undertaken by individual tribes, as we discussed at the meeting. As the draft indicates, it is our hope that the fieldwork described under the scope of work can be done in mid-April, with a report completed by mid-May.

As I indicated in my earlier letter of introduction, Kauffman and Associates (KAI) was hired by PPL Global to assist in facilitating a meaningful and respectful dialogue with the Confederated Tribes of the Umatilla Indians through the planning, scoping and permitting processes involved in this project. My personal enthusiasm for this project is largely a result of the respect I have for the demonstrated commitment PPL Global has already shown in working with tribal governments in other parts of the country where they do business. Additionally, as a member of a tribe with an interest in the area where the facility is to be located, I am very encouraged by an energy facility proposal that will help take pressure off the Snake River as a source of power production.

I look forward to working with you during this phase of the planning process to see that the concerns of your tribe are recognized and addressed. I am available to assist in moving this contract for cultural resource activities forward. Attached is a sample draft resolution for council action related to this contract for your use if needed. Please feel free to contact me at any time should you have any additional questions or concerns.

Sincerely,

Jo Ann Kauffman,
Kauffman and Associates, Inc.

CC: Jeff Van Pelt, Cultural Resources

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(509) 747-1994 T (509) 747-5020 F

KAI
KAUFFMAN AND ASSOCIATES, INCORPORATED

March 9, 2001

Johnson Meninick, Cultural Resources
Yakama Tribe
PO Box 151
Toppenish, WA 989480151

Dear Johnson:

On behalf of PPL Global and the Starbuck Power Company, I want to express our appreciation for the opportunity to meet once again with tribal cultural resource representatives in Walla Walla on Wednesday, March 7, 2001 at the BPA office to continue discussions regarding this project. I am enclosing proposed contract language prepared by CH2M HILL that details suggested scope of work language for archaeological studies and oral history work to be undertaken by individual tribes, as we discussed at the meeting. As the draft indicates, it is our hope that the fieldwork described under the scope of work can be done in mid-April, with a report completed by mid-May.

As I indicated in my earlier letter of introduction, Kauffman and Associates (KAI) was hired by PPL Global to assist in facilitating a meaningful and respectful dialogue with the Yakama Tribe through the planning, scoping and permitting processes involved in this project. My personal enthusiasm for this project is largely a result of the respect I have for the demonstrated commitment PPL Global has already shown in working with tribal governments in other parts of the country where they do business. Additionally, as a member of a tribe with an interest in the area where the facility is to be located, I am very encouraged by an energy facility proposal that will help take pressure off the Snake River as a source of power production.

I look forward to working with you during this phase of the planning process to see that the concerns of your tribe are recognized and addressed. I am available to assist in moving this contract for cultural resource activities forward. Attached is a sample draft resolution for council action related to this contract for your use if needed. Please feel free to contact me at any time should you have any additional questions or concerns.

Sincerely,

Jo Ann Kauffman,
Kauffman and Associates, Inc.

CC: Gladys Wiltse, Cultural Resources

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(509) 747-4004 Tel • (509) 747-5020 Fax

KAI
KAUFFMAN AND ASSOCIATES, INCORPORATED

March 9, 2001

Lenora Seelatsee, Cultural Resources Dept.
Grant County PUD
Wanapum Tribe
PO Box 878
Ephrata, WA 98823

Dear Lenora:

On behalf of PPL Global and the Starbuck Power Company, I want to express our appreciation for the opportunity to meet once again with tribal cultural resource representatives in Walla Walla on Wednesday, March 7, 2001 at the BPA office to continue discussions regarding this project. I am enclosing proposed contract language prepared by CH2M HILL that details suggested scope of work language for archaeological studies and oral history work to be undertaken by individual tribes, as we discussed at the meeting. As the draft indicates, it is our hope that the fieldwork described under the scope of work can be done in mid-April, with a report completed by mid-May.

As I indicated in my earlier letter of introduction, Kauffman and Associates (KAI) was hired by PPL Global to assist in facilitating a meaningful and respectful dialogue with the Wanapum Tribe through the planning, scoping and permitting processes involved in this project. My personal enthusiasm for this project is largely a result of the respect I have for the demonstrated commitment PPL Global has already shown in working with tribal governments in other parts of the country where they do business. Additionally, as a member of a tribe with an interest in the area where the facility is to be located, I am very encouraged by an energy facility proposal that will help take pressure off the Snake River as a source of power production.

I look forward to working with you during this phase of the planning process to see that the concerns of your tribe are recognized and addressed. I am available to assist in moving this contract for cultural resource activities forward. Attached is a sample draft resolution for council action related to this contract for your use if needed. Please feel free to contact me at any time should you have any additional questions or concerns.

Sincerely,

Jo Ann Kauffman,
Kauffman and Associates, Inc.

CC: Clayton Buck, Cultural Resources
Jim Sharp, CH2M Hill-Hanford

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KAI
KAUFFMAN AND ASSOCIATES, INCORPORATED

March 9, 2001

Adeline Fredlin, Tribal Historic Preservation Office
Colville Tribe
PO Box 150
Nespelem, WA 981550150

Dear Adeline:

On behalf of PPL Global and the Starbuck Power Company, I want to express our appreciation for the opportunity to meet once again with tribal cultural resource representatives in Walla Walla on Wednesday, March 7, 2001 at the BPA office to continue discussions regarding this project. I am enclosing proposed contract language prepared by CH2M HILL that details suggested scope of work language for archaeological studies and oral history work to be undertaken by individual tribes, as we discussed at the meeting. As the draft indicates, it is our hope that the fieldwork described under the scope of work can be done in mid-April, with a report completed by mid-May.

As I indicated in my earlier letter of introduction, Kauffman and Associates (KAI) was hired by PPL Global to assist in facilitating a meaningful and respectful dialogue with the Colville Tribe through the planning, scoping and permitting processes involved in this project. My personal enthusiasm for this project is largely a result of the respect I have for the demonstrated commitment PPL Global has already shown in working with tribal governments in other parts of the country where they do business. Additionally, as a member of a tribe with an interest in the area where the facility is to be located, I am very encouraged by an energy facility proposal that will help take pressure off the Snake River as a source of power production.

I look forward to working with you during this phase of the planning process to see that the concerns of your tribe are recognized and addressed. I am available to assist in moving this contract for cultural resource activities forward. Attached is a sample draft resolution for council action related to this contract for your use if needed. Please feel free to contact me at any time should you have any additional questions or concerns.

Sincerely,

Jo Ann Kauffman,
Kauffman and Associates, Inc.

CC: Colleen Cawston, Chair
Colville Business Council

KAI
KAUFFMAN AND ASSOCIATES, INCORPORATED

February 13, 2001

Honorable Colleen F. Cawston, Chairperson
Colville Business Council
PO Box 150
Nespelem, WA 981550150

Dear Chairman Cawston:

I am pleased to inform you that my firm, Kauffman and Associates, Inc. (KAI), will be working with PPL Global to assist them in undertaking an ongoing dialogue with the Colville Tribe regarding a plan to build a gas-fired energy facility near Starbuck, Washington. This project will provide 1,200 megawatts of generating capacity utilizing state-of-the-art emission controls and air-cooled condensers instead of water, and responds to the desire expressed by tribal leaders to have new energy development that meets rising demand while taking pressure off our river system.

Because of the cultural significance of the area to the Colville Tribe and other tribes, PPL is committed to developing its site in a manner that is respectful of tribal concerns. KAI will also be working closely with the CH2M HILL firm, whose responsibilities include drafting of a proposed environmental impact statement (EIS) for the project. I understand that representatives of CH2M HILL have already had some preliminary discussions with your cultural resource staff regarding the Starbuck project.

I am particularly impressed with the willingness PPL has already shown to be respectful of tribal concerns and the need to be environmentally sensitive in its energy development activities. Having recently acquired a number of energy assets from the Montana Power Company, including a coal-fired energy plant at Colstrip, PPL is working closely with the Northern Cheyenne Tribe to monitor and protect air quality on the reservation. PPL is also working cooperatively with the Penobscot Nation in Maine to protect culturally sensitive sites and to remove debris from the Penobscot River.

PPL was one of the first electric generating companies to join the Coalition of Environmentally Responsible Economies (CERES), a national coalition of progressive companies, environmental groups and investors committed to maintaining high standards in protecting the air, water and land. PPL Corporation received the Environmental Protection Agency's 2000 "Energy Ally of the Year" award for its innovative and creative success, and was recognized by the American Lung Association for installing pollution-cutting equipment at one of its facilities on the Delaware River.

PPL has also received numerous honors for its teaching Environmental Awareness Program that has allowed more than 1,500 teachers to help over 37,000 students become

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more aware about energy, water conservation, recycling, forest protection and other environmental topics.

In retaining KAI, a 100% Indian-owned firm, to assist in developing an ongoing dialogue with respect to tribal concerns in the Snake River area, I believe that PPL reaffirms its commitment to being a good neighbor wherever it has a presence. I will be calling you in the next few days to arrange an opportunity for representatives of PPL Global to visit with you and other interested members of your tribal council and community to discuss this project.

PPL is very interested in seeking tribal comment regarding the Starbuck project, as well as directly hearing any concerns or questions you may have. PPL Global is also prepared to fully respond to any concerns that might be raised through the Bonneville Power Administration's government-to-government consultation that will be undertaken in fulfillment of the federal government's trust responsibilities regarding this project. I look forward to working with you and the Colville Tribe on this effort.

Sincerely,

Jo Ann Kauffman, President
Kauffman and Associates, Inc.

KAI
KAUFFMAN AND ASSOCIATES, INCORPORATED

February 13, 2001

Honorable Antone C. Minthorn, Chairman
Umatilla Board of Trustees
C.T.U.I.R.
PO Box 638
Pendleton, OR 978010638

Dear Chairman Minthorn:

I am pleased to inform you that my firm, Kauffman and Associates, Inc. (KAI), will be working with PPL Global to assist them in undertaking an ongoing dialogue with the Confederated Tribes of the Umatilla Indians regarding a plan to build a gas-fired energy facility near Starbuck, Washington. This project will provide 1,200 megawatts of generating capacity utilizing state-of-the-art emission controls and air-cooled condensers instead of water, and responds to the desire expressed by tribal leaders to have new energy development that meets rising demand while taking pressure off our river system.

Because of the cultural significance of the area to the Confederated Tribes of the Umatilla Indians and other tribes, PPL is committed to developing its site in a manner that is respectful of tribal concerns. KAI will also be working closely with the CH2M HILL firm, whose responsibilities include drafting of a proposed environmental impact statement (EIS) for the project. I understand that representatives of CH2M HILL have already had some preliminary discussions with your cultural resource staff regarding the Starbuck project.

I am particularly impressed with the willingness PPL has already shown to be respectful of tribal concerns and the need to be environmentally sensitive in its energy development activities. Having recently acquired a number of energy assets from the Montana Power Company, including a coal-fired energy plant at Colstrip, PPL is working closely with the Northern Cheyenne Tribe to monitor and protect air quality on the reservation. PPL is also working cooperatively with the Penobscot Nation in Maine to protect culturally sensitive sites and to remove debris from the Penobscot River.

PPL was one of the first electric generating companies to join the Coalition of Environmentally Responsible Economies (CERES), a national coalition of progressive companies, environmental groups and investors committed to maintaining high standards in protecting the air, water and land. PPL Corporation received the Environmental Protection Agency's 2000 "Energy Ally of the Year" award for its innovative and creative success, and was recognized by the American Lung Association for installing pollution-cutting equipment at one of its facilities on the Delaware River.

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In retaining KAI, a 100% Indian-owned firm, to assist in developing an ongoing dialogue with respect to tribal concerns in the Snake River area, I believe that PPL reaffirms its commitment to being a good neighbor wherever it has a presence. I will be calling you in the next few days to arrange an opportunity for representatives of PPL Global to visit with you and other interested members of your tribal council and community to discuss this project.

PPL is very interested in seeking tribal comment regarding the Starbuck project, as well as directly hearing any concerns or questions you may have. PPL Global is also prepared to fully respond to any concerns that might be raised through the Bonneville Power Administration's government-to-government consultation that will be undertaken in fulfillment of the federal government's trust responsibilities regarding this project. I look forward to working with you and the Confederated Tribes of the Umatilla Indians on this effort.

Sincerely,

Jo Ann Kauffman, President
Kauffman and Associates, Inc.

KAI
KAUFFMAN AND ASSOCIATES, INCORPORATED

February 13, 2001

Honorable Samuel N. Penney, Chairman
Nez Perce Tribe
PO Box 305
Lapwai, ID 83540

Dear Chairman Penney:

I am pleased to inform you that my firm, Kauffman and Associates, Inc. (KAI), will be working with PPL Global to assist them in undertaking an ongoing dialogue with the Nez Perce Tribe regarding a plan to build a gas-fired energy facility near Starbuck, Washington. This project will provide 1,200 megawatts of generating capacity utilizing state-of-the-art emission controls and air-cooled condensers instead of water, and responds to the desire expressed by tribal leaders to have new energy development that meets rising demand while taking pressure off our river system.

Because of the cultural significance of the area to the Nez Perce Tribe and other tribes, PPL is committed to developing its site in a manner that is respectful of tribal concerns. KAI will also be working closely with the CH2M HILL firm, whose responsibilities include drafting of a proposed environmental impact statement (EIS) for the project. I understand that representatives of CH2M HILL have already had some preliminary discussions with your cultural resource staff regarding the Starbuck project.

I am particularly impressed with the willingness PPL has already shown to be respectful of tribal concerns and the need to be environmentally sensitive in its energy development activities. Having recently acquired a number of energy assets from the Montana Power Company, including a coal-fired energy plant at Colstrip, PPL is working closely with the Northern Cheyenne Tribe to monitor and protect air quality on the reservation. PPL is also working cooperatively with the Penobscot Nation in Maine to protect culturally sensitive sites and to remove debris from the Penobscot River.

PPL was one of the first electric generating companies to join the Coalition of Environmentally Responsible Economies (CERES), a national coalition of progressive companies, environmental groups and investors committed to maintaining high standards in protecting the air, water and land. PPL Corporation received the Environmental Protection Agency's 2000 "Energy Ally of the Year" award for its innovative and creative success, and was recognized by the American Lung Association for installing pollution-cutting equipment at one of its facilities on the Delaware River.

PPL has also received numerous honors for its teaching Environmental Awareness Program that has allowed more than 1,500 teachers to help over 37,000 students become

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more aware about energy, water conservation, recycling, forest protection and other environmental topics.

In retaining KAI, a 100% Indian-owned firm, to assist in developing an ongoing dialogue with respect to tribal concerns in the Snake River area, I believe that PPL reaffirms its commitment to being a good neighbor wherever it has a presence. I will be calling you in the next few days to arrange an opportunity for representatives of PPL Global to visit with you and other interested members of your tribal council and community to discuss this project.

PPL is very interested in seeking tribal comment regarding the Starbuck project, as well as directly hearing any concerns or questions you may have. PPL Global is also prepared to fully respond to any concerns that might be raised through the Bonneville Power Administration's government-to-government consultation that will be undertaken in fulfillment of the federal government's trust responsibilities regarding this project. I look forward to working with you and the Nez Perce Tribe on this effort.

Sincerely,

Jo Ann Kauffman, President
Kauffman and Associates, Inc.

KAI
KAUFFMAN AND ASSOCIATES, INCORPORATED

February 13, 2001

Honorable Lonnie Selam, Chairman
Yakama Tribal Council
PO Box 151
Toppenish, WA 989480151

Dear Chairman Selam:

I am pleased to inform you that my firm, Kauffman and Associates, Inc. (KAI), will be working with PPL Global to assist them in undertaking an ongoing dialogue with the Yakama Tribe regarding a plan to build a gas-fired energy facility near Starbuck, Washington. This project will provide 1,200 megawatts of generating capacity utilizing state-of-the-art emission controls and air-cooled condensers instead of water, and responds to the desire expressed by tribal leaders to have new energy development that meets rising demand while taking pressure off our river system.

Because of the cultural significance of the area to the Yakama Tribe and other tribes, PPL is committed to developing its site in a manner that is respectful of tribal concerns. KAI will also be working closely with the CH2M HILL firm, whose responsibilities include drafting of a proposed environmental impact statement (EIS) for the project. I understand that representatives of CH2M HILL have already had some preliminary discussions with your cultural resource staff regarding the Starbuck project.

I am particularly impressed with the willingness PPL has already shown to be respectful of tribal concerns and the need to be environmentally sensitive in its energy development activities. Having recently acquired a number of energy assets from the Montana Power Company, including a coal-fired energy plant at Colstrip, PPL is working closely with the Northern Cheyenne Tribe to monitor and protect air quality on the reservation. PPL is also working cooperatively with the Penobscot Nation in Maine to protect culturally sensitive sites and to remove debris from the Penobscot River.

PPL was one of the first electric generating companies to join the Coalition of Environmentally Responsible Economies (CERES), a national coalition of progressive companies, environmental groups and investors committed to maintaining high standards in protecting the air, water and land. PPL Corporation received the Environmental Protection Agency's 2000 "Energy Ally of the Year" award for its innovative and creative success, and was recognized by the American Lung Association for installing pollution-cutting equipment at one of its facilities on the Delaware River.

PPL has also received numerous honors for its teaching Environmental Awareness Program that has allowed more than 1,500 teachers to help over 37,000 students become

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more aware about energy, water conservation, recycling, forest protection and other environmental topics.

In retaining KAI, a 100% Indian-owned firm, to assist in developing an ongoing dialogue with respect to tribal concerns in the Snake River area, I believe that PPL reaffirms its commitment to being a good neighbor wherever it has a presence. I will be calling you in the next few days to arrange an opportunity for representatives of PPL Global to visit with you and other interested members of your tribal council and community to discuss this project.

PPL is very interested in seeking tribal comment regarding the Starbuck project, as well as directly hearing any concerns or questions you may have. PPL Global is also prepared to fully respond to any concerns that might be raised through the Bonneville Power Administration's government-to-government consultation that will be undertaken in fulfillment of the federal government's trust responsibilities regarding this project. I look forward to working with you and the Yakama Tribe on this effort.

Sincerely,

Jo Ann Kauffman, President
Kauffman and Associates, Inc.

KAI
KAUFFMAN AND ASSOCIATES, INCORPORATED

February 13, 2001

Honorable Alfred Peone, Chairman
Spokane Tribe of Indians
PO Box 100
Wellpinit, WA 980400100

Dear Chairman Peone:

I am pleased to inform you that my firm, Kauffman and Associates, Inc. (KAI), will be working with PPL Global to assist them in undertaking an ongoing dialogue with the Spokane Tribe regarding a plan to build a gas-fired energy facility near Starbuck, Washington. This project will provide 1,200 megawatts of generating capacity utilizing state-of-the-art emission controls and air-cooled condensers instead of water, and responds to the desire expressed by tribal leaders to have new energy development that meets rising demand while taking pressure off our river system.

Because of the cultural significance of the area to the Spokane Tribe and other tribes, PPL is committed to developing its site in a manner that is respectful of tribal concerns. KAI will also be working closely with the CH2M HILL firm, whose responsibilities include drafting of a proposed environmental impact statement (EIS) for the project. I understand that representatives of CH2M HILL have already had some preliminary discussions with your cultural resource staff regarding the Starbuck project.

I am particularly impressed with the willingness PPL has already shown to be respectful of tribal concerns and the need to be environmentally sensitive in its energy development activities. Having recently acquired a number of energy assets from the Montana Power Company, including a coal-fired energy plant at Colstrip, PPL is working closely with the Northern Cheyenne Tribe to monitor and protect air quality on the reservation. PPL is also working cooperatively with the Penobscot Nation in Maine to protect culturally sensitive sites and to remove debris from the Penobscot River.

PPL was one of the first electric generating companies to join the Coalition of Environmentally Responsible Economies (CERES), a national coalition of progressive companies, environmental groups and investors committed to maintaining high standards in protecting the air, water and land. PPL Corporation received the Environmental Protection Agency's 2000 "Energy Ally of the Year" award for its innovative and creative success, and was recognized by the American Lung Association for installing pollution-cutting equipment at one of its facilities on the Delaware River.

PPL has also received numerous honors for its teaching Environmental Awareness Program that has allowed more than 1,500 teachers to help over 37,000 students become

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more aware about energy, water conservation, recycling, forest protection and other environmental topics.

In retaining KAI, a 100% Indian-owned firm, to assist in developing an ongoing dialogue with respect to tribal concerns in the Snake River area, I believe that PPL reaffirms its commitment to being a good neighbor wherever it has a presence. I will be calling you in the next few days to arrange an opportunity for representatives of PPL Global to visit with you and other interested members of your tribal council and community to discuss this project.

PPL is very interested in seeking tribal comment regarding the Starbuck project, as well as directly hearing any concerns or questions you may have. PPL Global is also prepared to fully respond to any concerns that might be raised through the Bonneville Power Administration's government-to-government consultation that will be undertaken in fulfillment of the federal government's trust responsibilities regarding this project. I look forward to working with you and the Spokane Tribe on this effort.

Sincerely,

Jo Ann Kauffman, President
Kauffman and Associates, Inc.

KAI
KAUFFMAN AND ASSOCIATES, INCORPORATED

February 13, 2001

Honorable Marvin Cota, Chairman
Duck Valley Shoshone-Paiute Tribe
PO Box 219
Owyhee, NV 89832

Dear Chairman Cota:

I am pleased to inform you that my firm, Kauffman and Associates, Inc. (KAI), will be working with PPL Global to assist them in undertaking an ongoing dialogue with the Duck Valley Shoshone-Paiute Tribe regarding a plan to build a gas-fired energy facility near Starbuck, Washington. This project will provide 1,200 megawatts of generating capacity utilizing state-of-the-art emission controls and air-cooled condensers instead of water, and responds to the desire expressed by tribal leaders to have new energy development that meets rising demand while taking pressure off our river system.

Because of the cultural significance of the area to the Duck Valley Shoshone-Paiute Tribe and other tribes, PPL is committed to developing its site in a manner that is respectful of tribal concerns. KAI will also be working closely with the CH2M HILL firm, whose responsibilities include drafting of a proposed environmental impact statement (EIS) for the project. I understand that representatives of CH2M HILL have already had some preliminary discussions with your cultural resource staff regarding the Starbuck project.

I am particularly impressed with the willingness PPL has already shown to be respectful of tribal concerns and the need to be environmentally sensitive in its energy development activities. Having recently acquired a number of energy assets from the Montana Power Company, including a coal-fired energy plant at Colstrip, PPL is working closely with the Northern Cheyenne Tribe to monitor and protect air quality on the reservation. PPL is also working cooperatively with the Penobscot Nation in Maine to protect culturally sensitive sites and to remove debris from the Penobscot River.

PPL was one of the first electric generating companies to join the Coalition of Environmentally Responsible Economies (CERES), a national coalition of progressive companies, environmental groups and investors committed to maintaining high standards in protecting the air, water and land. PPL Corporation received the Environmental Protection Agency's 2000 "Energy Ally of the Year" award for its innovative and creative success, and was recognized by the American Lung Association for installing pollution-cutting equipment at one of its facilities on the Delaware River.

PPL has also received numerous honors for its teaching Environmental Awareness Program that has allowed more than 1,500 teachers to help over 37,000 students become

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more aware about energy, water conservation, recycling, forest protection and other environmental topics.

In retaining KAI, a 100% Indian-owned firm, to assist in developing an ongoing dialogue with respect to tribal concerns in the Snake River area, I believe that PPL reaffirms its commitment to being a good neighbor wherever it has a presence. I will be calling you in the next few days to arrange an opportunity for representatives of PPL Global to visit with you and other interested members of your tribal council and community to discuss this project.

PPL is very interested in seeking tribal comment regarding the Starbuck project, as well as directly hearing any concerns or questions you may have. PPL Global is also prepared to fully respond to any concerns that might be raised through the Bonneville Power Administration's government-to-government consultation that will be undertaken in fulfillment of the federal government's trust responsibilities regarding this project. I look forward to working with you and the Duck Valley Shoshone-Paiute Tribe on this effort.

Sincerely,

Jo Ann Kauffman, President
Kauffman and Associates, Inc.

KAI
KAUFFMAN AND ASSOCIATES, INCORPORATED

February 13, 2001

Honorable Lionel Q. Boyer, Chairman
Fort Hall Business Council
PO Box 306
Fort Hall, ID 832030305

Dear Chairman Boyer:

I am pleased to inform you that my firm, Kauffman and Associates, Inc. (KAI), will be working with PPL Global to assist them in undertaking an ongoing dialogue with the Shoshone-Bannock Tribe regarding a plan to build a gas-fired energy facility near Starbuck, Washington. This project will provide 1,200 megawatts of generating capacity utilizing state-of-the-art emission controls and air-cooled condensers instead of water, and responds to the desire expressed by tribal leaders to have new energy development that meets rising demand while taking pressure off our river system.

Because of the cultural significance of the area to the Shoshone-Bannock Tribe and other tribes, PPL is committed to developing its site in a manner that is respectful of tribal concerns. KAI will also be working closely with the CH2M HILL firm, whose responsibilities include drafting of a proposed environmental impact statement (EIS) for the project. I understand that representatives of CH2M HILL have already had some preliminary discussions with your cultural resource staff regarding the Starbuck project.

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Sincerely,

Jo Ann Kauffman, President
Kauffman and Associates, Inc.