2.0 PROPOSAL

SECTION 2.1 SITE DESCRIPTION (WAC 463-60-125)

2.1.1 PROJECT SUMMARY

Grays Harbor Energy LLC, (the Certificate Holder) is proposing to add two combustion turbine generators (Units 3 and 4) and a single steam generator to the existing Grays Harbor Energy Center. This will increase the maximum electrical generation capacity by approximately 650 MW, with a total project nominal average capacity of approximately 1,300 MW.

Units 3 and 4 would be constructed entirely within the boundaries of the approximately 22-acre Satsop Combustion Turbine (Grays Harbor Energy Center) project site, for which the State of Washington has already approved an SCA. A 10-acre site immediately east of the project site would be used for construction laydown and access and would become part of the overall site boundary. The fuel will be natural gas only, and will be supplied by an existing pipeline that was constructed as part of the initial site development.

As a part of the construction for the original Grays Harbor Energy Center, transmission lines were installed in the Bonneville Power Administration (BPA) right-of-way from the site to the substation. Power produced by Units 3 and 4 will be transmitted on new lines installed on the existing tower structures that connect to the BPA system at BPA's Satsop substation, approximately 4,000 feet east of the project site.

2.1.2 PROJECT LOCATION

2.1.2.1 Plant Site

The site is located south of the Chehalis River near the town of Elma (Figure 2.1-1). The 1,600-acre Satsop Development Park surrounds the site on all four sides. The site is located approximately 0.5 mile southwest of the river. Fuller Creek is approximately 0.5 mile to the east, and Workman Creek is located approximately 2 miles to the east.

In 1994, Energy Northwest submitted an application to build the Satsop Combustion Turbine Project on this 22-acre site. The 22-acre site was part of the much larger site that had been subject of an SCA issued in 1976 that authorized construction and operation of a nuclear facility. The 22-acre combustion turbine site was thoroughly evaluated by the Energy Facility Site Evaluation Council (EFSEC) and in an environmental impact statement was published by BPA. In 1996, EFSEC amended the SCA to allow a natural-gas fired combustion turbine facility to be constructed on the 22-acre site. The project later changed ownership and was redesigned so that the original facility, now known as the Grays Harbor Energy Center, could be built on only approximately 12 acres of the site, leaving room for future plant additions on the previously studied and permitted site. EFSEC amended the SCA in 2001 to reflect these changes.

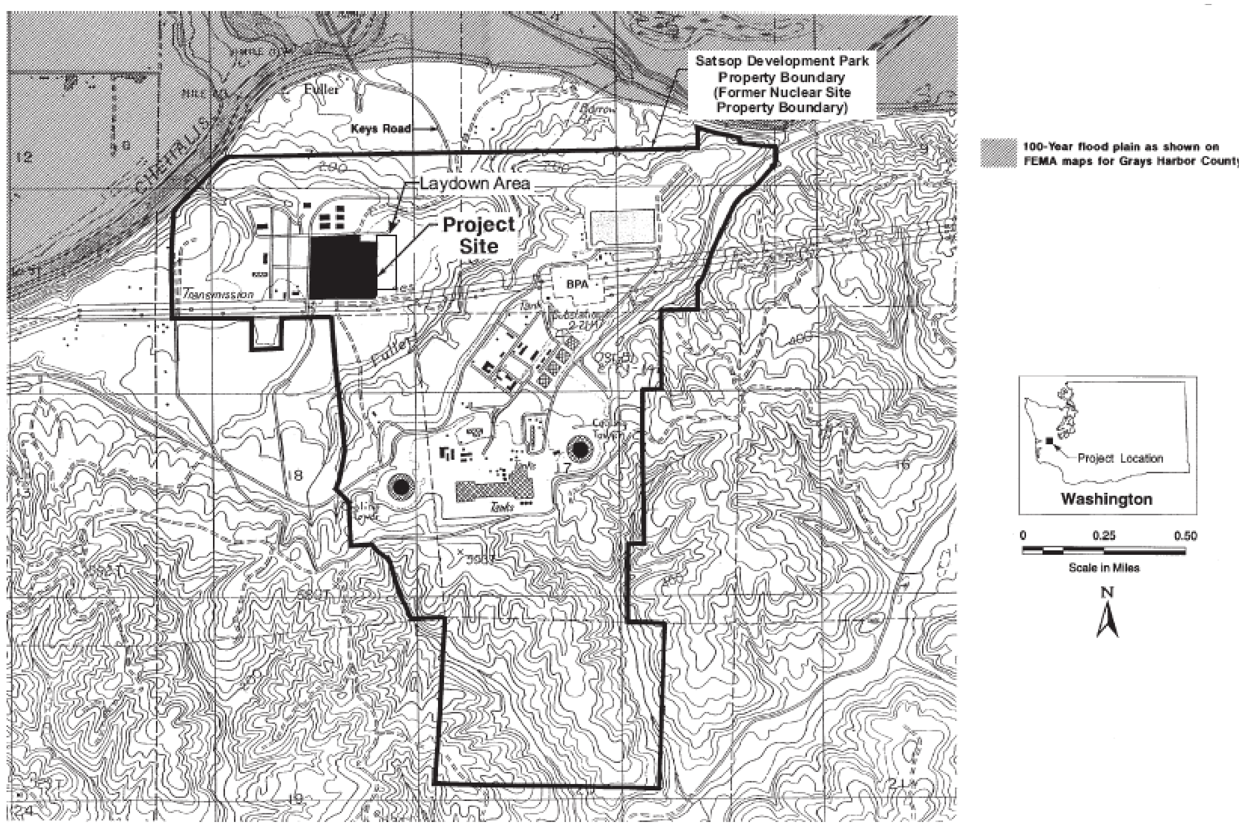


Figure 2.1-1
Project Location

Construction of the Grays Harbor Energy Center was completed in the second quarter of 2008 and commercial operation began April 25, 2008. To the north and northwest of the site are various field offices, storage buildings, and stockpiled building materials. Similar items and facilities are located west of Keys Road. To the south is the BPA transmission line right-of-way. To the east of the site is an approximately 10-acre strip of land that is proposed to be cleared for construction laydown and access. A raw water tank and pump house, owned and operated by the Grays Harbor Public Development Authority (PDA), are located in the northeast corner of the site (Figure 2.1-2). As part of the construction of the Grays Harbor Energy Center, the entire 22-acre site was cleared of structures, discarded construction materials, and unneeded utilities.

The only additional clearing required for construction of Units 3 and 4 would be the approximately 10-acre parcel proposed for construction laydown and access, which is located immediately east of the site. The 10-acre site currently consists of approximately 5 acres of thinned conifers and 5 acres of grassland/agriculture that is mowed every year.

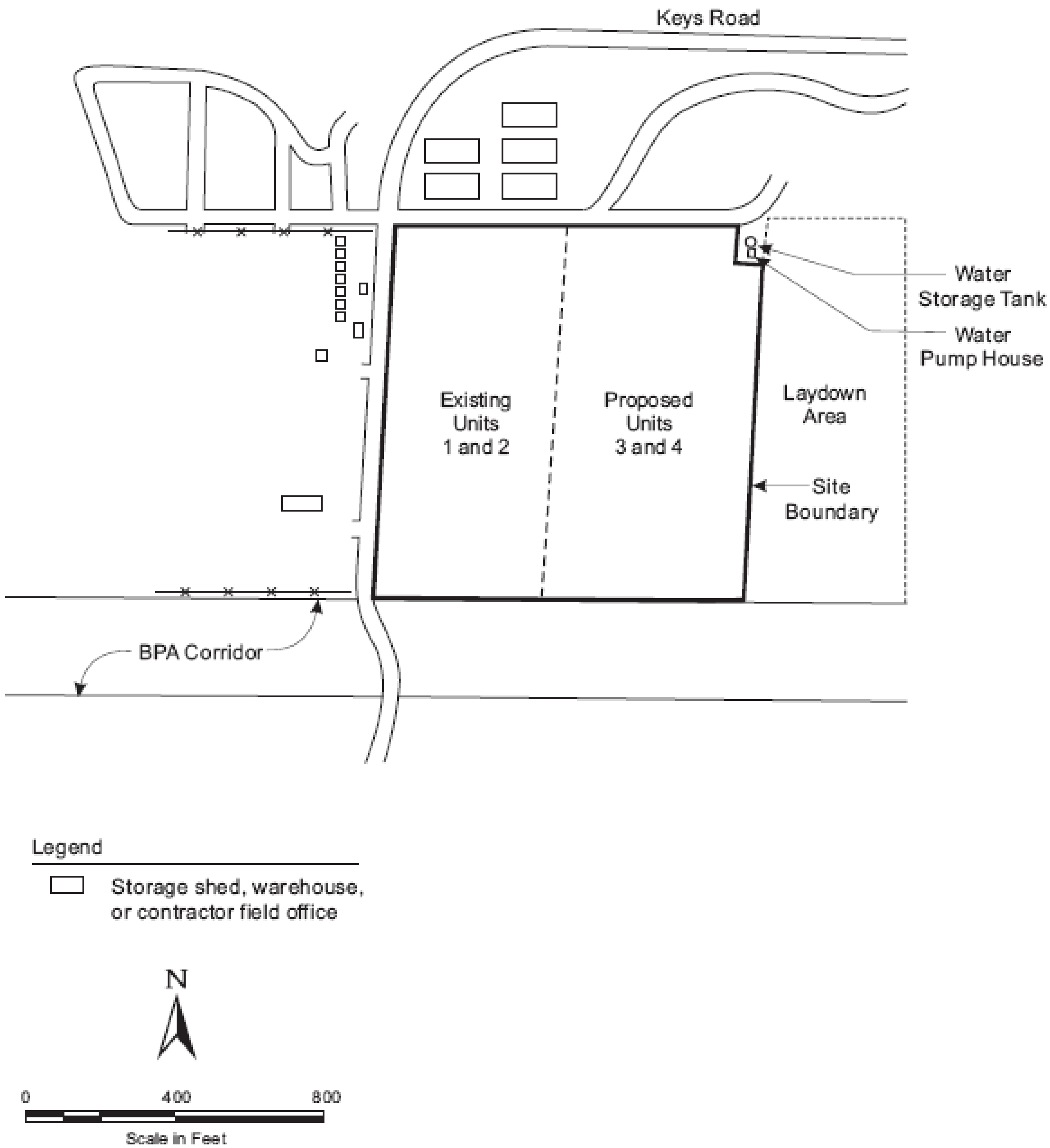


Figure 2.1-2
Project Site

2.1.3 ZONING ORDINANCES

The plant site is located in unincorporated Grays Harbor County near the town of Elma and surrounded by the property boundary of the Satsop Development Park (Figure 2.1-1).

The plant site is located in areas zoned as Industrial District 2, or I-2, under Grays Harbor County Comprehensive Zoning Ordinance No. 241 (Title 17). According to Grays Harbor

Zoning Ordinance 17.52.010), *"The purpose and intent of the industrial district is to provide areas where industrial activities and uses involving the processing, fabrication and storage of products may be located. The district also allows such commercial uses that serve primarily the industrial district."* Uses permitted outright include industrial uses and industrial development facilities as defined by RCW 39.84.020 Part 6. Energy facilities are included within this definition.

In passing the rezone at a Grays Harbor Planning Commission meeting on November 2, 1998, the Planning Commission found that the utilization of the infrastructure originally built for the Satsop Nuclear Plant and the reuse of existing sites for industrial purposes will promote job creation and economic diversification, expressed purposes of the Grays Harbor County Comprehensive Plan.

In connection with the application for the original Grays Harbor Energy Center, EFSEC found that the project was *"consistent with applicable land use laws and regulations"* (EFSEC Order No. 694 *as modified,* April 15, 1996). In 2002, the Council considered an application for an expansion of the Satsop CT Project that was very similar to the current proposal for the additional two units, and EFSEC found that the proposed project *"is consistent and in compliance with Grays Harbor County and regional land use plans and zoning ordinances"* (EFSEC Order No. 766, March 27, 2002).

SECTION 2.2 LEGAL DESCRIPTION AND OWNERSHIP INTERESTS (WAC 463-60-135)

2.2.1 LEGAL DESCRIPTION – PRINCIPAL FACILITIES

Units 3 and 4 will be located within the approximately 22-acre site approved by SCA for the Satsop Combustion Turbine Project (now the Grays Harbor Energy Center). See Attachment I to the existing SCA. In addition, a 10-acre site immediately to the east of the project site would be used for construction laydown and access and would become part of the project site (see Figure 2.2-1). The 10-acre site is not part of the existing SCA, and would constitute an expansion of the area governed by the SCA. The legal description for the 10-acre site is as follows:

> All that certain real property situate in Grays Harbor County, Washington designated as "Option B" on that certain Survey filed September 7,1999 in Book 20 of Surveys, pages 59 through 69, Grays Harbor County, and being described as follows:
>
> That portion of the Southwest One Quarter of the Southeast One Quarter and the Southeast One Quarter of the Southeast One Quarter of Section 7, Township 17 North, Range 6 West, W.M., in Grays Harbor County, Washington, described as follows:
>
> BEGINNING at the South One Quarter Corner of said Section 7, as monumented by an Iron Bar as shown on Record of Survey, Volume 11, Page 132; thence South 88E58'07" East along it's South line, 2479.21 feet to the Southeast corner of said Section 7, as monumented by a Department of Natural Resources concrete monument, as shown on Record of Survey Volume 11, Page 132; thence North 59E45'57" West 1047.69 feet to a

point on the North line of the Bonneville Power Administration Right-of-Way and the True Point of Beginning; thence South 84E18'36" West along said Right-of-Way, 453.55 feet; thence North 03E29'21" East 1010.02 feet to the Southerly margin of an unnamed road; thence South 88E50'40" East along said Southerly margin and said southerly margin extended, 438.66 feet; thence South 02E55'21" West 955.59 feet to the true point of beginning. Together with and subject to easements, restrictions, reservations and covenants of record.

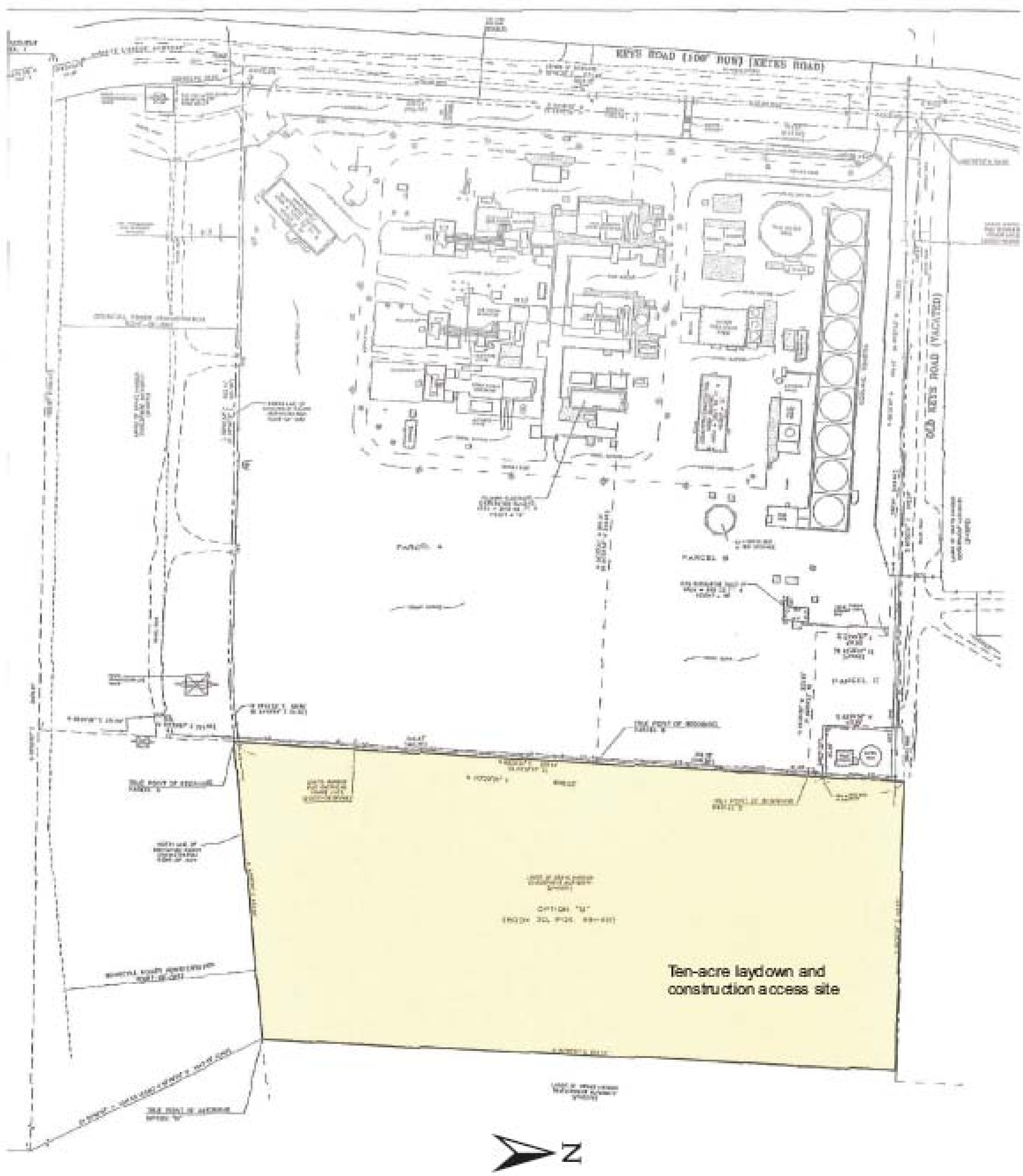


Figure 2.2-1
Ten-Acre Site Survey

SECTION 2.3 CONSTRUCTION ON SITE (WAC 463-60-145)

This section provides information on the proposed project and construction of the project in the following sections:

- Project Summary (Section 2.3.1)
- Power Plant Description (Section 2.3.2)
- Power Plant Construction (Section 2.3.3)

2.3.1 PROJECT SUMMARY

Grays Harbor Energy LLC (the Certificate Holder) is proposing to add two combustion turbine generators (Units 3 and 4) and a single steam generator to the Grays Harbor Energy Center. This will increase the maximum electrical generation capacity by approximately 650 MW, doubling the project's generating capacity. Certain facilities installed for the Grays Harbor Energy Center, such as the operations and control office, warehouse, workshops and stores, gas regulation and treatment, and the water treatment building also will serve Units 3 and 4, and new facilities of this type are not required.

Figures 2.3-1 and 2.3-2 present conceptual isometric diagrams of both the existing Grays Harbor Energy Center and the proposed addition of Units 3 and 4, respectively. Figure 2.3-3 is a plant configuration diagram for the addition, showing the major component systems. Figure 2.3-3 shows the major facilities/systems that will support the turbine trains, including the steam condensing/cooling system and the electrical interconnection system.

To support the expanded facility, additional process water will be obtained from a holder of an existing water right, such as the Grays Harbor PDA or the City of Aberdeen. The intake point would be the existing Ranney collectors and would be delivered via the existing Satsop Development Park water supply line that services the Grays Harbor Energy Center facilities. This water for Units 3 and 4 will be transported through an existing water pipeline that passes adjacent to the site (Figure 2.3-4). The existing outfall structure to the Chehalis River will continue to be used for discharge of the project's process effluent, without requiring any modification.

Potable water will be obtained from the existing Satsop Development Park raw water well. This system includes a supply tank and pump house located contiguous to the northeast corner of the site and will provide high-quality water that will be treated as necessary for potable uses.

Sanitary wastewater will be discharged through an existing on-site septic system and leach field constructed for the plant.

Fuel for Units 3 and 4 will be provided by the existing natural gas pipeline constructed as part of the Grays Harbor Energy Center.

Source: 3DScape

Figure 2.3-1
Existing Gray's Harbor Energy Project Isometric View

Power produced by Units 3 and 4 will be routed through new approximately 4,000-foot transmission lines that connect to the BPA system at the Satsop substation. The lines will be installed on existing structures that were constructed by BPA as part of the Grays Harbor Energy Center.

2.3.2 POWER PLANT DESCRIPTION

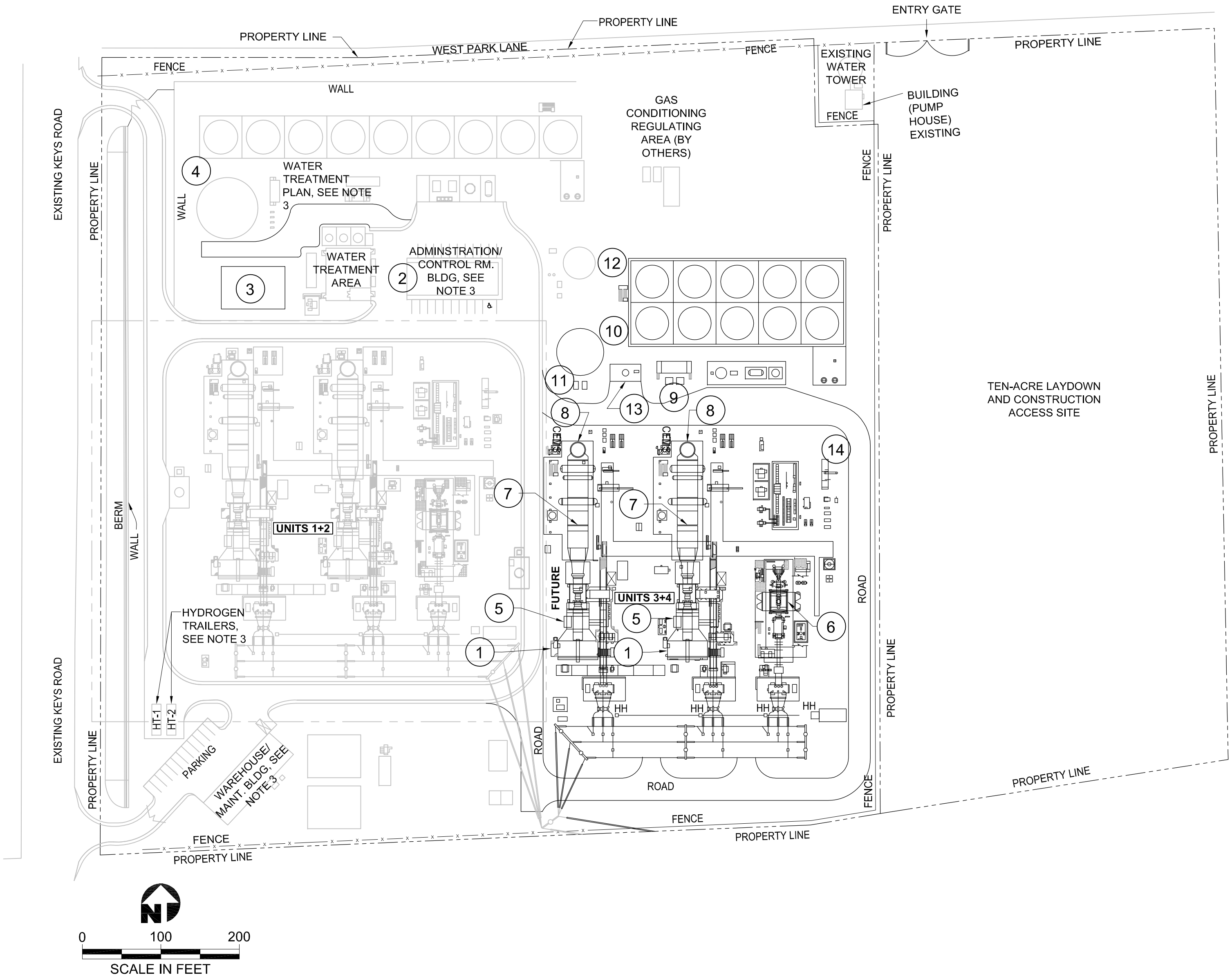
2.3.2.1 Overview

Units 3 and 4 will be combined cycle power generators with a combined nominal average capacity of 650 MW. Units 3 and 4 would be virtually identical to the existing Grays Harbor Energy Center Units 1 and 2. Like the existing units, Units 3 and 4 will be General Electric (GE) Frame 7FA combustion turbines in a 2-x-1 combined cycle configuration with a GE D11 steam turbine. Each GE 7FA combustion turbine generates a nominal gross power capacity of 175 MW, while the steam turbine generates approximately 300 MW gross with maximum duct firing at annual average temperature. The additional units also feature GE 7H2 hydrogen-cooled generators for the combustion turbine and stream turbine.

Source: 3DScape

Figure 2.3-2
Proposed Project with Units 3 and 4 Conceptual Isometric View

Section 2.3.2.2 presents a basic description of the components of Units 3 and 4, and Section 2.6, System of Heat Dissipation, WAC 463-60-175, describes the cooling systems. The basic building structures for the additional two units are shown on Figures 2.3-2 and 2.3-3, and Table 2.3-1 lists approximate heights of the major facility components.



KEY

1. GAS TURBINE HOUSING
2. ADMINISTRATION BUILDING
3. WORKSHOP AND STORES
4. WATER TREATMENT AREA
5. COMBUSTION TURBINE
6. STEAM TURBINE
7. HRSG
8. HRSG STACK
9. CIRCULATING WATER PUMPS
10. COOLING TOWER
11. RAW WATER TANK
12. DEMINERALIZED WATER TANK
13. AMMONIA TANKS
14. AUXILIARY BOILER STACK

NOTES

1. CONSTRUCTION LAYDOWN AND PARKING AREA.
2. ROUGH GRADING AND DRAINAGE IS EXISTING FROM UNITS 1+2.
3. THE FOLLOWING COMMON FACILITIES ARE LOCATED IN EXISTING DEVELOPMENT:
   - ADMINISTRATION/CONTROL ROOM BUILDING
   - WAREHOUSE/MAINTENENCE BUILDING
   - WATER TREATMENT
   - NATURAL GAS METERING YARD
   - HYDROGEN TRAILERS

Figure 2.3-3
Site Plan
Grays Harbor Energy

URS

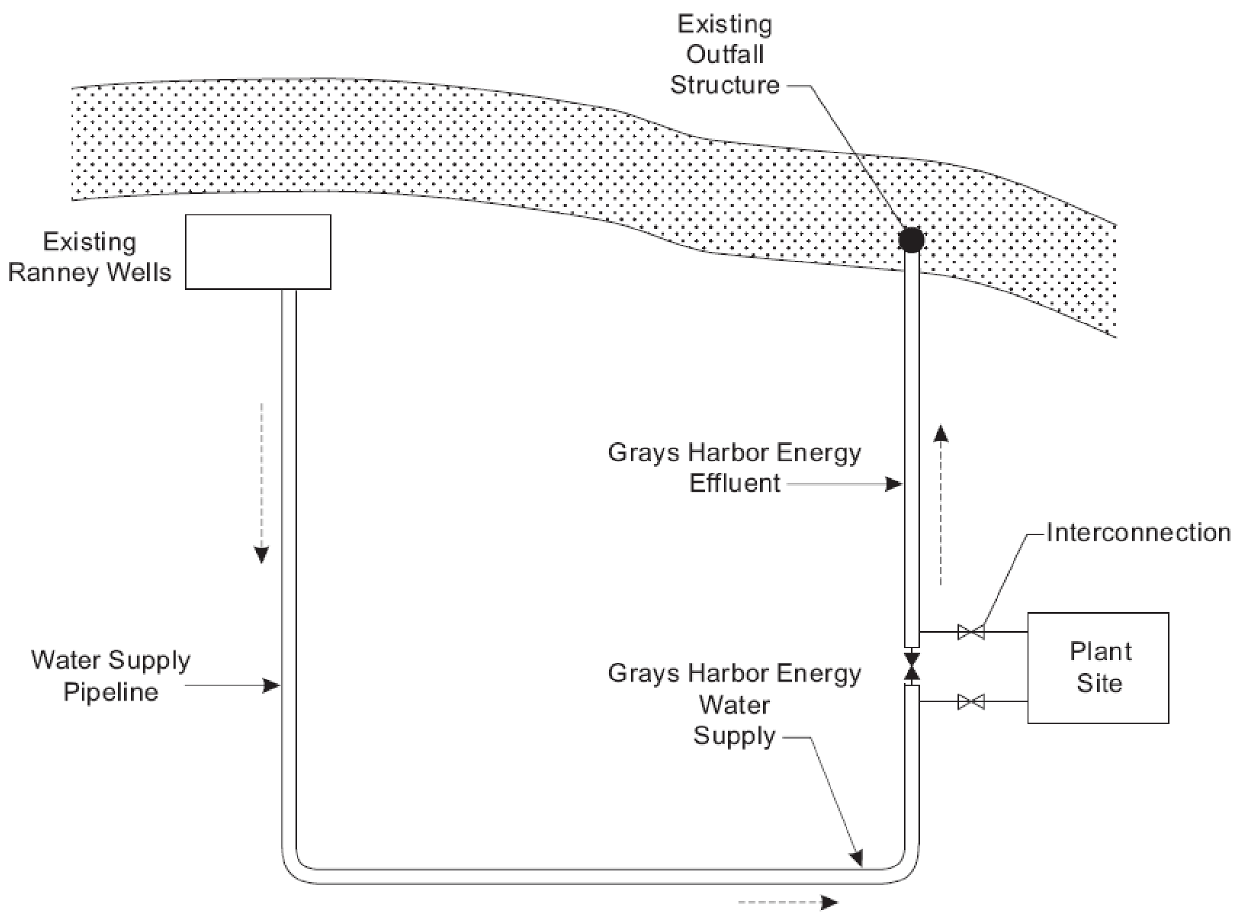


Figure 2.3-4
Process Water Conceptual Flow Diagram

TABLE 2.3-1
APPROXIMATE HEIGHTS OF MAJOR COMPONENTS

Component[a]	Approximate Height Units 1 and 2 (ft)	Approximate Height Units 3 and 4 (ft)
Gas Turbine (1)	57	26
Heat recovery steam generator (7)	85	80
Exhaust Stack (8)	180	180
Exhaust Stack - Auxiliary Boiler	49	49
Exhaust Stack - Diesel Generator	12	35
Firewater Pump	13	40
Cooling Tower (10)	48	52

a. Numbers in parentheses refer to key on Figure 2.3-3, Plot Plan.

2.3.2.2 Plant Components

Figure 2.3-3 shows the equipment configuration of the additional two units plus the existing two units. The project is made up of the following components:

- Combustion turbine generator (CTG) (two)
- Heat recovery steam generator (HRSG) (two)
- Steam turbine generator (STG) (one)
- Fuel supply
- Process water and wastewater treatment
- Cooling system
- Electrical interconnection
- Fire protection

The following is a summary description of the major components of Units 3 and 4.

Combustion Turbine Generator

The configuration incorporates two GE 7FA turbine generators, each with a gross capacity of approximately 175 MW. The GE 7FA is an industrial combustion gas turbine, including dry low-nitrogen (NO_x) burners, that represents the state of the art in combustion turbine technology. This turbine has been specified as the basis for the heat and material balance, fuel use, and emissions calculations.

Heat Recovery Steam Generator

The high temperature exhaust produced by the combustion turbines will flow directly to an HRSG, which will produce output steam at three pressure levels, all of which will supply steam directly to the steam turbine.

Emissions control (air pollution control) equipment is integrated within the HRSG. The selective catalytic reduction (SCR) control equipment for removal of NO_x and the oxidation catalyst for removal of carbon monoxide (CO) and volatile organic compounds (VOCs) are located within the HRSG.

Steam Turbine Generator

Steam from the HRSG will be delivered to the STG, which will have a gross capacity of approximately 300 MW.

An auxiliary boiler will be installed with a low-NO_x burner to produce steam at approximately 25,000 pounds per hour to provide sealing steam to the STG. It also can be used to maintain temperature in the HRSG during long idle time to reduce startup duration.

Fuel Supply

The fuel for the Grays Harbor Energy Center will continue to be natural gas only. The natural gas supply will connect to the metering station on site that has been constructed as part of the Grays Harbor Energy Center.

Process Water and Wastewater Discharge

To support the expanded facility, process water will be obtained from a holder of an existing water right, such as the Grays Harbor PDA or the City of Aberdeen. The water will be obtained through the existing Ranney collectors, located west of the plant site (Figure 2.3-4).

Ranney well water will continue to be delivered to the site via the existing supply water line. Effluent will continue to be sent back to the existing water pipeline via the existing connection downstream of the project intake, from where it will be transported and discharged to the Chehalis River through the existing outfall structure. The discharge will be governed by the facility's the National Pollutant Discharge Elimination System (NPDES) permit.

Cooling System

The proposed cooling system consists of two major components: 1) a circulating water system that will carry cooled water from the cooling tower through the steam turbine condenser and back to the cooling tower, and 2) an auxiliary cooling water system that will be tied into the circulating water system to provide water for cooling major equipment within the combined cycle facility. The evaporative cooling tower will consist of a 10-cell structure approximately 276 feet long, 114 feet wide, and 52 feet high.

Electrical Interconnection

Power generated by the Units 3 and 4 will be delivered to BPA's existing high-voltage transmission system at the Satsop 230 kilovolts (kV) substation. The power will be exported on lines to be installed for Units 3 and 4 on the existing tower structures constructed for Units 1 and 2, from the project site to the BPA Satsop substation, which is located approximately 4,000 feet east of the project site (Figure 2.1-1).

The switchyard containing necessary breakers, switching and transformer equipment will be modified for the additional two units.

Fire Protection

The fire protection system, including the fire water system, fixed suppression systems, detection systems, and portable fire extinguishers will provide the required fire protection for the project. The system for Units 3 and 4 will be similar to the system already installed at the Grays Harbor Energy Center and will consist of the following major components:

- Sprinkler systems
- Yard loop hydrant system

- Pre-action spray/sprinkler system for the steam turbine generator bearings and lube oil equipment
- Independent smoke detection system
- Portable fire extinguishers
- Standpipes and fire hose stations at various locations throughout the buildings
- Instrumentation and control equipment for alarm, indication of equipment status, and actuation of fire protection equipment, monitored in the Grays Harbor Energy control room.
- Combined raw/fire water storage tank
- Fire water pumps

Fire water will be stored in an on-site 1.3-million-gallon storage tank. There is an existing 1.3-million-gallon raw water storage tank for Units 1 and 2, which has a .3-million gallon fire water reserve. A second tank of similar size will be added for Units 3 and 4.

This storage capacity will be sufficient to provide the maximum automatic system demand plus 500 gallons per minute (as recommended by National Fire Protection Association 850) for a 2-hour period.

The fire water pumping system will consist of a primary electric motor-driven pump, a diesel-driven backup pump with independent fuel supply, and a pressure-maintaining jockey pump.

2.3.2.3 Project Layout

Figure 2.3-3 presents the site plan layout for the project. Buildings located on the site are shown on Figure 2.3-2. The locations of key components of each plant are described below.

The combustion turbine and generator, the steam turbine and generator, and their associated support equipment will be located within standard GE enclosures. The HRSGs will be located outside of the generation building.

The CTG-HRSG will be laid out in an in-line design parallel to the STG in a north-south orientation. The combustion turbine and the generator will be located at the south end within the power block and adjacent to the electrical switchyard. The northernmost structures will be the exhaust stacks, with the HRSG (and emission control equipment within the HRSG) located between the stack and the combustion turbine.

The electrical switchyard is located adjacent to the generator ends of the combustion turbines on the southernmost end of the site. Transmission lines extend from the switchyard to the Olympia-Aberdeen transmission line right-of-way that extends along the southern edge of the plant site (labeled “BPA Corridor” on Figure 2.1-2).

The natural gas pipeline enters the northern boundary of the plant site from the east.

2.3.3 POWER PLANT CONSTRUCTION

2.3.3.1 Construction Summary

The 22-acre site was previously graded and a layer of gravel was placed to prepare the site for use as a construction storage area for Units 1 and 2 of the Grays Harbor Energy Center. After excavation, foundations will be installed, as will the drainage system for the construction stage.

Materials to be used during construction are expected to be staged on the approximately 10-acre construction laydown area adjacent to and east of the existing project site (Figure 2.2-1). Access to the laydown area will be via West Park Lane. West Park Lane is an existing unimproved roadway that deadends to the east of the project site. The roadway will be improved with an all-weather driving surface as an early step in the construction. During construction, the plant site will remain fenced to provide site security. The Certificate Holder will purchase electricity needed for construction. Approximately 1.5 megavolt-amps (MVA) of 480-volt, 3-phase temporary power will be installed at a single location within the project site boundary. Startup power will be obtained from the Grays Harbor Energy Center.

Conventional construction equipment, including bulldozers, front-end loaders, trucks, tractor-scrapers, and graders will be used to final grade the site. During construction, dust will be controlled as needed by spraying water on dry, exposed soil. Prior to leaving the site during construction, vehicles will be sprayed with water and required to drive over a gravel pad to remove mud from the tires.

Site clearing and grading was completed during the original Grays Harbor Energy Center construction. Construction erosion control measures for Units 3 and 4 will be used in accordance with the requirements of the Certificate Holder’s existing Erosion and Sedimentation Control Plan, which EFSEC approved on November 1, 2005.

Additional grading will be required to prepare the site for construction of Units 3 and 4. After site preparation is completed, the construction contractors will install the combustion turbine, steam turbine, generators, electrical and other equipment. Once these facilities are in place, the site landscaping will be initiated.

Field toilets and temporary holding tanks will be placed on site for construction personnel use. During construction, potable water from the project's existing water supply system will supply the contractor’s needs. Parking and site access will be provided either on the 10-acre construction laydown area or on the PDA land west of Keys Road that was used for parking and staging during the original construction of the Grays Harbor Energy Center.

2.3.3.2 Site Preparation

There will be approximately 80,000 cubic yards of excavation for foundations, buried pipes (circulating water and fire loop), and the electrical duct banks. This material will be retained in the construction laydown area and later used for backfill.

A Phase I Environmental Site Assessment completed in April 1994 (Dames & Moore 1994) indicated that there is no evidence of contamination with hazardous materials at the site and that the likelihood of such contamination being present in subsurface soils is low. No contamination was identified during the excavation associated with construction of the Grays Harbor Energy Center facility on the site. If contamination is encountered during excavation and grading for Units 3 and 4, the Certificate Holder will notify EFSEC and take the appropriate remedial actions.

During site preparation, the construction contractor will install a storm drainage system. This system will consist of a series of swales that will convey surface water runoff into the existing Satsop Development Park storm drainage control system (Section 2.10, Surface-Water Runoff, WAC 463-60-215). An underground storm sewer and intakes will be installed under the power block area for Units 3 and 4, similar to the existing system used for Units 1 and 2.

A 6-foot high chain link fence was constructed as part of the Grays Harbor Energy Center surrounding the 22-acre plant site to provide security, and will be maintained during construction of Units 3 and 4. Also, a fence will be constructed between the existing facilities and the construction area, and around the construction laydown area to prevent construction activities and personnel from interfering with the operation of Units 1 and 2.

2.3.3.3 Foundations and Roadways

Foundations, including a pedestal for the steam turbine generator and foundations for the gas turbine generator and heat recovery steam generator equipment will be installed. As a part of final design studies, geotechnical investigations will be conducted to determine the appropriate types of foundations for the facilities. Based on currently available data, the Certificate Holder anticipates that foundations will be Category 1 facilities (non-essential facilities) in accordance with American Society of Civil Engineers Document 7-88 ("Minimum Design Loads for Buildings and Other Structures"). Foundations and buildings will be designed for Seismic Zone 3.

Construction of the project foundations will require the use of a number of types of heavy equipment, including excavation equipment, concrete-pumping equipment, and concrete finishing equipment. In addition, light- and medium-duty trucks, air compressors, generators, and other internal combustion engine driven equipment are anticipated.

On-site roadways and parking areas will be constructed with asphaltic concrete over a compacted sub-base.

An on-site concrete batch plant will not be required.

2.3.3.4 Equipment Installation

A number of the component systems of Units 3 and 4 will be fabricated and delivered to the site, including the CTG, HRSG, STG, major pumps, and electrical equipment. Fabrication and delivery of these components will be scheduled to coincide with their requirement in the construction sequence. Heavy and large equipment components will be delivered to the site by truck. Various sized cranes will be required to lift and place many of the pieces of component equipment into the required position.

In sequence with the installation of component equipment, support systems will be installed, including electrical equipment, control equipment, piping instrumentation, wiring cable, and conduits. Typical construction activities on site will include mechanical fastening, welding, preparation, and painting.

Cathodic protection will be provided on all underground gas lines within the site boundary.

2.3.3.5 Startup Testing

At the completion of the construction sequence, the plant system will be energized and operational testing undertaken. This will include testing each of the major component systems in a predetermined sequence and completion of quality assurance (QA) and quality control (QC) checks to ensure that each system is ready for full operation. After the total plant is fully operational, emissions compliance testing will be conducted. At the end of the startup testing phase, each unit will be separately certified for commercial operation. The QA/QC checks are described in detail in Section 2.12, Construction and Operation Activities, WAC 463-60-235.

SECTION 2.4 ENERGY TRANSMISSION SYSTEMS (WAC 463-06-155)

The Grays Harbor Energy Center will continue to be fueled by natural gas supplied by the existing natural gas pipeline. The natural gas pipeline is owned and operated by Williams Pipeline Company and is not subject to this SCA. Power will be transmitted via high voltage transmission lines owned and operated by BPA. The transmission lines also are outside of the scope of this SCA.

As described in Section 2.3, approximately 4,000 feet of new 3-phase transmission line will be added to the existing tower structures to connect Units 3 and 4 to the existing Satsop Substation.

SECTION 2.5 WATER SUPPLY SYSTEM (WAC 463-60-165)

2.5.1 PROCESS WATER SUPPLY

Process water will continue to be supplied from the existing Ranney wells and transported through the existing supply water line (Figure 2.3-4). The Ranney wells are located on the southern bank of the Chehalis River, approximately 4 miles downriver of the plant site near the river's confluence with Elizabeth Creek. The wells penetrate into the alluvial aquifer associated with the Chehalis River to a depth of approximately 120 feet. The Ranney wells obtain approximately 88 percent of their water from the Chehalis River via drawdown, with the remaining 12 percent drawn from groundwater in the surrounding river alluvium. Groundwater availability in river alluvium of the Chehalis River valley from each Ranney well is as high as 40 cubic feet per second (cfs), or 18,000 gallons per minute (gpm). Additional information on water quality and quantity associated with the Ranney wells is presented in Section 3.3, Water, WAC 463-60-322.

Water from the Ranney wells will continue to be transported to the Grays Harbor Energy Center site via the existing supply water line and the existing discharge (blowdown) line. At the Grays Harbor Energy Center site, a pipe connects the blowdown line to transport process supply water to the project. Detailed design, location, and connection information on the Ranney wells and on the existing distribution system used to supply water to the Grays Harbor Energy Center were presented in the Washington Public Power Supply System (WPPSS) application for an SCA, in the SCA issued by EFSEC, in documents subsequently submitted to EFSEC, and in the WPPSS Environmental Report - Operating Licensing Stage (WPPSS 1982) and Final Safety Analysis Report (WPPSS 1984).

The existing SCA allows the Certificate Holder to use up to 9.2 cfs of water to operate the facility, and includes a Water Authorization that allows the Certificate Holder to withdraw up to 9.2 cfs of water from the Ranney Wells, except during low flow periods. During low flow periods, the Certificate Holder may continue operating the facility by obtaining water from another water rights holder, as long as the water is derived from water rights that are not subject to low flow restrictions. As part of this application, the Certificate Holder is requesting an amendment to the existing SCA to allow the Grays Harbor Energy Center to use up to a maximum of 16 cfs of water.

During non-low flow periods, the Certificate Holder would withdraw up to 9.2 cfs pursuant to the existing Water Authorization and obtain additional water from another water right holder or holders. During low flow periods, the Certificate Holder would obtain the entire needed amount from a holder or holders of water rights that are not subject to low flow restrictions. The Certificate Holder is currently in negotiations with both the Grays Harbor PDA and the City of Aberdeen to obtain the needed water. In either case, the water would be withdrawn from the existing Ranney wells. The PDA's water right already authorizes withdraw of its water from the existing Ranney wells. If the Certificate Holder enters into an agreement to lease water from the City of Aberdeen, the agreement would be contingent upon the City obtaining approval from the Department of Ecology to allow the water to be withdrawn from the Ranney Wells.

2.5.2 POTABLE WATER SUPPLY

Water for potable uses will continue to be supplied by the PDA’s potable water system. Anticipated potable and service water demand for the additional staff needed to operate Units 3 and 4 is approximately 50 gpm maximum, and will average less than 20 gpm. Water supplied by the Satsop Development Park is chlorinated, and if needed, additional treatment will be made prior to delivery to the Grays Harbor Energy Center.

SECTION 2.6 SYSTEM OF HEAT DISSIPATION (WAC 463-60-175)

For Units 3 and 4, an additional cooling system will be constructed. The cooling system proposed for Units 3 and 4 is similar to the system used for the existing Units 1 and 2. It consists of two primary components: 1) a circulating cooling water system, and 2) a mechanical draft cooling tower. Steam supplied to the STGs will be exhausted from the steam turbine and condensed in the steam condenser. The circulating cooling water system, operating at a flow of approximately 66,000 gpm, will route cool water to the condenser and auxiliary cooling system.

The auxiliary cooling system will provide cooling for the generator cooling circuit, boiler feed pump, sampling/analysis panel, and lubrication oil cooling circuit. At the condenser and the auxiliary cooling system, heat will be transferred to the circulating water. The warmed water will then be routed to the cooling tower, where the temperature will be reduced before being returned to the cooling system.

The cooling tower will continuously receive the heated cooling water from the plant. The heated water will enter the tower near the top and will be sprayed downward through the tower. A large fan on top of the tower will pull air through openings in the bottom of the tower, moving air counter to the water sprays and cooling the water through evaporation. The temperature of the water will be reduced to approximately 90° F when it reaches the cooling water basin, where it will be collected and returned to the cooling system. This cycle will be repeated until the circulating water needs to be replaced as described below in subsection 2.8.1.1.

SECTION 2.7 CHARACTERISTICS OF AQUATIC DISCHARGE SYSTEMS (WAC 463-60-185)

Units 3 and 4 will use the same blowdown line and outfall that is used by Units 1 and 2, without any modification. The outfall includes a diffuser, which was designed to disperse the effluents as required to comply with the NPDES permit (Permit No. WA-002496-1). Detailed information on the design, location, and construction of the outfall is presented in documents previously submitted to EFSEC.

The existing blowdown line and outfall are owned by the Grays Harbor PDA. The 1999 transfer agreement between Energy Northwest and the Satsop Redevelopment Project guarantees the use of the blowdown line and outfall for Grays Harbor Energy Center discharges.

An existing NPDES permit governs wastewater discharges from the Grays Harbor Energy Center and stormwater discharges from the Satsop Development Park. As described in Section 2.8, Wastewater Treatment, WAC 463-60-195, effluent from Units 3 and 4 would comply with the conditions of the existing NPDES permit.

SECTION 2.8 WASTEWATER TREATMENT (WAC 463-60-195)

This section provides information on the proposed process wastewater discharge streams and alternative systems in the following sections:

- Process Wastewater Streams (Section 2.8.1)
- Wastewater Analyses (Section 2.8.2)
- Regulatory Compliance (Section 2.8.3)
- Bypass and Overflow Facilities (Section 2.8.4)
- Alternative Methods (Section 2.8.5)

2.8.1 PROCESS WASTEWATER STREAMS

The Grays Harbor Energy Center has been designed to minimize wastewater discharges, with only a single process wastewater stream to be discharged from the entire project (including Units 3 and 4). The design for Units 3 and 4, as for the existing Units 1 and 2, includes waste streams that will be treated as necessary and co-mingled prior to discharge. These waste streams consist of cooling tower blowdown and oil/water-separator decant. The co-mingled waste streams from both the existing and proposed units will be discharged to the Satsop Development Park's blowdown line in accordance with the NPDES permit for the Grays Harbor Energy Center (Permit No. WA-002496-1). The outfall discharges to the Chehalis River.

2.8.1.1 Water Treatment System Units and Discharge

Cooling Tower Blowdown

The cooling towers will continuously receive the heated cooling water from Units 3 and 4. Heated water will enter the tower near the top and will be sprayed downward. Evaporation in the cooling towers will result in a loss of cooling water, and the constituents of the cooling water will be concentrated due to evaporation. At high concentrations, some of these constituents could cause scaling in the heat exchanger surfaces. Therefore, after cooling water has repeatedly circulated through the cooling cycle, a small portion will be removed from each cooling tower basin and discharged in accordance with the NPDES permit. (This discharge is termed cooling tower "blowdown.") To replenish the circulating cooling water, additional Ranney well water and the neutralized plant waste streams will be added to the cooling water. The three plant waste streams are the water treatment regeneration discharge, the cooling tower blowdown, and the plant sump discharge as described below.

Since the cooling water will be repeatedly circulated before being discharged, several of the constituents of the cooling water will be concentrated to a point that could result in corrosion. Therefore, an alkaline phosphate treatment is necessary. Chemicals proposed for use in the cooling tower include an acrylic polymer (dispersant), tolytriazole (copper corrosion inhibitor), phosphonocarboxylate (iron corrosion inhibitor), phosphonate (iron corrosion inhibitor), and sulfuric acid (alkalinity control). Because the circulating water is exposed to atmospheric microbiological contaminants, sodium hypochlorite will be used as a biocide to minimize microbiological growth. During treatment with sodium hypochlorite, the blowdown discharge valve will remain closed to prevent the release of chlorine. The majority of chlorine will dissipate from the cooling tower basin while the blowdown valve is closed. The retained wastewater will be sampled and analyzed prior to discharge as blowdown.

The types of chemicals used for treatment are listed in Table 2.8-1. The constituents of these chemicals used for treatment of the cooling tower water system are not on the list of toxic substances regulated under WAC 173-201A-040 (Water Quality Standards for Surface Waters in Washington State). The chemicals used for treatment of the cooling water will either be neutralized or evaporated out of the effluent stream or will be at undetectable concentrations.

TABLE 2.8-1
TYPICAL CHEMICALS USED IN COOLING WATER SYSTEM (PER UNIT)

Chemical	Description and Use	Estimated Usage Rate (pounds per day)
Nalco - Dynacool - 8301D or equivalent (dispersant: acrylate polymer)	Liquid polymeric dispersant used in circulating water treatment system.	58
Nalco - Dynacool - 8308 or equivalent (corrosion inhibitor: phosphonate, phosphonocarboxylate, tolyltriazole)	Liquid phosphate-based corrosion inhibitor used in circulating water treatment system.	116
Sodium hypochlorite	Liquid water treatment chemical for the cooling tower.	111
Sulfuric acid	Liquid water treatment chemical used in demineralizer and in neutralization tank.	335

The cooling tower blowdown water will be co-mingled with the waste stream from the oil-water separator and discharged to the blowdown line to the Chehalis River. The expected flow for Units 3 and 4 will be a maximum of 660 gpm, and a maximum of 1,320 gpm for the combined Units 1 through 4.

The NPDES permit regulates discharges through the blowdown line and outflow structure. The Certificate Holder does not believe the addition of Units 3 and 4 will necessitate any amendment to the NPDES permit. If an amendment were deemed necessary, the NPDES permit could be amended prior to operation of the new units and after the amendments to the existing NPDES permit are completed.

Oil-Water Separator

The oil-water separator will be provided for waste streams that may contain oily water, such as the steam turbine oil purification system and floor and equipment drains. The oil-water separator will receive and separate water and oil mixtures. Water from the separator will be co-mingled with the cooling tower blowdown prior to discharge to the Satsop Development Park's blowdown line, while the oil is retained for eventual removal and disposal. The oil-water separator will be a prefabricated modular fiberglass reinforced plastic, cast-in-place concrete structure, or a packaged steel tank type system. The discharge piping will be designed with a leg extending below the maximum design oil depth, which will allow only oil-free water to be discharged. A reservoir included with the oil/water separator will collect the waste oil for off-site recycling or disposal by a licensed contractor.

Large tanks containing oil will be diked and valved to retain any large oil spills in place for mitigation and cleanup.

Sanitary Wastes

Sanitary wastes are treated at on-site septic tank systems operated in accordance with the applicable state and Grays Harbor County codes. The existing septic system is designed for 34 staff per day. For the operation of all four units, approximately 20 employees would work two

12-hour shifts with a maximum of 31 employees working on site at any one time. The existing septic system will be able to accommodate the additional staff employed for Units 3 and 4.

2.8.1.2 Internal Waste Streams

HRSG Blowdown (Internal Stream)

A small stream (90 gpm) will be drained from the HRSG to remove the constituents of the make-up water that become more concentrated due to evaporative losses during operation (steam production). This “blowdown” from the HRSG will be routed to a blowdown tank before being piped to the cooling tower for use as make-up water. The purpose of the tank is to absorb the “flashing” (the rapid and forceful decrease in temperature and pressure during blowdown release) as blowdown water is released from the HRSG.

Regeneration Waste (Internal Stream)

Approximately 8 gpm of regeneration waste will be discharged from the demineralized water plant to the cooling tower basin.

Plant Sump Discharge (Internal Stream)

Each plant sump will receive minor wastewater streams from the condensate pump pit, the transformer containment structure drains, and the area sump drains. Wastewater in the plant sump will be routed to an oil-water separator.

2.8.2 WASTEWATER ANALYSES

Wastewater analyses were conducted on the Grays Harbor Energy discharge at Outfall 001 to measure concentrations of constituents in the site’s discharge and compare it to the quality of the receiving water (the Chehalis River). Discharge at Outfall 001 was also compared to the water quality criteria specified in WAC 173-201A (Water Quality Standards for Surface Waters of the State of Washington) and the NPDES Permit.

Constituents of the receiving water (Chehalis River), influent process water (concentrations of chemical constituents of Ranney well water), and discharge concentrations (concentrations in process water discharged from Units 1 and 2 at Outfall 001) are presented in Table 2.8-2.

2.8.2.1 Receiving Water

Water quality data for the Chehalis River are collected monthly at station 23A070 located near Porter, Washington as part of the Washington State Department of Ecology (Ecology) Statewide Water Quality Monitoring Network. Station 23A070 is approximately 11 miles upstream from the project site.

TABLE 2.8-2
WATER QUALITY CRITERIA AND ANALYSES

Parameters	WAC 173-201A Criteria[a]		NPDES Permit[b]		Influent Conc. (Ranney Wells) (mg/L)[c]	Chehalis River Water Quality (mg/L)[d]	Discharge Conc. at Diffuser Daily Max. (mg/L)[e]	Discharge Conc. at Diffuser Monthly Average (mg/L)[e]	Mixing Zone Boundary Conc.[f]	
	Acute Criteria (mg/L)	Chronic Criteria (mg/L)	Daily Max. (mg/L)	Monthly Average (mg/L)					Acute Criteria (mg/L)[f]	Chronic Criteria (mg/L)[f]
Temperature (°C)	22	18	16	N/A	NAv	2.8-25.4	6.9-18.6	11.7	11.7[h]	11.7[h]
Ammonia (as N)	pH dependent		321	160	NAv	0.01 - 0.024	0.93	0.37	0.04429	0.00511
Chlorine	19	11	0.5	0.2	NAv	N/A	0.21	0.03	0.01000	0.00115
Chloride	860	230	18	9	3.8	N/A	93.6	52.8	4.45714	0.02449
pH	6.5-8.5	NA	6.5-8.5	NA	7.68	6.77-8.04	6.3-9.3	7.44	7.44[h]	7.44[h]
TSS	NE	NE	100	30	NAv	2-31	20	14.2500	0.95238	0.10989
Arsenic	0.36	0.19	note g	note g	0.00088	0.0002 - 0.0035	0.49	0.0900	0.02333	0.00269
Chromium	0.2	0.065	0.2	0.2	0.00026	<0.0005 - 0.0028	0.05	0.016	0.00238	0.00027
Iron	NE	NE	1	1	0.0735	0.107	9.65	3.0400	0.45952	0.05302
Copper	0.0053	0.0039	note g	note g	0.00039	0.0014 - 0.0072	0.0057	-	0.00027	0.00003
Cadmium	0.0019	0.00041	note g	note g	ND	<0.00001	ND	-	ND	ND
Lead	0.0174	0.00064	note g	note g	0.00044	<0.0001 - 0.00089	ND	-	ND	ND
Mercury	0.0021	1.2E-05	note g	note g	ND	0.0000021- 0.00001	ND	-	ND	ND
Nickel	0.5	0.055	note g	note g	ND	0.0004 - 0.0099	0.0014	-	0.00007	0.00001
Selenium	0.02	0.005	note g	note g	0.00027	<0.002	0.0011	-	0.00005	0.00001
Zinc	0.04	0.037	note g	note g	ND	0.0004 - 0.0018	0.0209	-	0.00100	0.00011

Notes:

NAv=Not Available, N/A=Not Applicable, NE=criterion not established, ND=non detect

a. Metals concentrations are the total fraction. Acute: In general, refers to a 1-hour average concentration not to be exceeded more than once every three years on the average. Chronic: In general, refers to a 4-hour average concentration not to be exceeded more than once every three years on the average. Hardness dependent criteria are calculated with a hardness of 30.5 mg/L.

b. NPDES permit effluent limitations (EFSEC 2008). Note: Chloride concentrations listed in the NPDES permit are incorrect due to a typographical error.

c. Data from Ranney Wells collected 8/5/09. Results shown are the maximum of two samples collected on 8/5/09.

d. Except for iron and selenium, Chehalis River water quality data are from the Ecology water quality monitoring station 23A070 located near Porter, WA, approximately 11 miles upstream from the project site; metals chemistry data was collected in 2002 while conventional parameter data was collected in 2007. Iron and selenium data were collected in 1981 from the intake area (Envirosphere 1982).

e. Data from daily monitoring at Outfall 001 between July 2008 and July 2009 and priority pollutant sampling at Outfall 001 on 8/5/09 and 7/27/09.

f. Using dilution factors stated in the NPDES permit as follows: Chronic Mixing Zone = 182 and Acute Mixing Zone = 21. Dilution factors are applied to the Daily Maximum Discharge Concentration at Diffuser.

g. The NPDES water quality-based limitations must comply with the surface water quality standards (Chapter 173-201A WAC) or the National Toxics Rule (40 CFR 131.36) (EFSEC 2008). There must be no discharge of polychlorinated biphenyls. There must be no detectable amount of priority pollutants (listed in 40 CFR Part 423, Appendix A) and polychlorinated biphenyls in the effluent from chemicals added for cooling system maintenance.

h. Mixing boundary concentrations for temperature and pH were calculated based on the average monthly discharge concentration at the diffuser.

2.8.2.2 Influent Process Water

Water quality data from the Ranney well collector system were assumed to represent influent process water quality. Ranney well water samples were collected by Grays Harbor Energy on August 5, 2009 and the laboratory analyses for each constituent presented in Table 2.8-2 was performed by Dragon Analytical Laboratory. The metals concentrations used for the analysis were the dissolved fraction. Total metal concentrations include the sediment fraction, which would be expected to be insignificant as the Ranney well gravel pack is developed by pumping, and sediment is removed due to settling in the cooling tower basin.

2.8.2.3 Discharge Water Quality

Discharge concentrations in Table 2.8-2 were obtained from two separate sampling events. Temperature, pH, ammonia, chlorine, total suspended solids (TSS), chloride, arsenic, and chromium data were obtained from daily monitoring samples taken at Outfall 001 between July 2008 and July 2009 (May and June of 2009 were not included due to irregular plant operation that lead to non-representative concentrations of the measured constituent). Copper, cadmium, lead, mercury, nickel, selenium, and zinc concentrations were obtained from a sampling effort for determining priority pollutant concentrations at Outfall 001. The results from the priority pollutant sampling are from two samples taken (July 27, 2009 and August 5, 2009) and the results shown in Table 2.8-2 are the maximum concentrations of these two samples. Monthly averages are not provided for copper, cadmium, lead, mercury, nickel, selenium, and zinc because they were only measured from the two priority pollutant samples.

Discharge water quality in Table 2.8-2 is shown as both daily maximum and monthly average concentrations. Daily maximum and monthly average concentrations were included because, due to irregular plant operation, daily maximum concentrations were not considered representative. Units 1 and 2 came into operation in July 2008. Continuous discharge data during this first year was collected during August and September of 2008 and July of 2009. Discharge data for the remaining months is intermittent. During the first year of operation, the facility has been operated at intervals dependant upon energy demand. An inherent issue with a facility that is operated in this manner is that certain constituents may have increased concentrations in the discharge due to a flushing effect when units are placed back into operation after a period of downtime.

The daily maximum concentrations for the constituents presented in Table 2.8-2 (with the exception of temperature and pH) were divided by the acute and chronic dilution factors (21 and 182, respectively) to achieve mixing zone boundary concentrations. The monthly average concentration for temperature and the daily maximum pH values were used instead of the daily maximums because the daily maximum temperature and pH are not considered to be representative of normal plant operation.

2.8.3 REGULATORY COMPLIANCE

When compared to the NPDES permit limits presented in Table 2.8-2, the facility would be compliance at the mixing zone boundary for both acute and chronic concentrations of all the constituents sampled.

2.8.4 BYPASS AND OVERFLOW FACILITIES

No bypass facilities are included in plant design. All tanks would be equipped with overflow drains to prevent catastrophic losses. The discharge from overflow drains from chemical tanks would be directed to a containment basin around each tank, and each containment basin would be designed to hold 110 percent of the contents of the tank. Containment basins would be used to retain the collected fluids until a manual valve in the discharge piping is opened. Discharge from the demineralization plan containment basins would be routed to the neutralization tank for treatment. Administrative procedures require inspection of containment basin content.

2.8.5 ALTERNATIVE METHODS

The infrastructure and permit for discharge into the Chehalis River already exist, are currently used for the Grays Harbor Energy Center, and thus provide the most cost-effective and efficient approach to wastewater treatment for Units 3 and 4.

Zero discharge is another alternative approach. Zero discharge systems recycle and evaporate the water portion of wastewater and concentrate the solids for eventual off-site disposal. In this process, no wastewater is discharged. The zero discharge system was rejected because no water would be returned to the river to supplement flows, there appears (at this time) to be no significant impacts to water quality of the Chehalis River. A zero discharge system is also prohibitively expensive.

The approach selected for Units 3 and 4 minimizes plant wastewater discharges by recycling internal wastewater streams as make-up water for the cooling towers. However, some wastewater (up to 3.0 cfs for the entire Grays Harbor Energy Center) would be discharged to the Chehalis River, returning a portion of the water pumped from the Ranney wells (which obtain 88 percent of their water from the river). This is considered a beneficial condition since the wastewater returned to the river meets both NPDES permit criteria and state water quality standards.

Use of a deep well injection system represents another alternative method of wastewater handling. However, this approach is rarely used in power generation facilities. Deep well injection systems depend on the nature of the site’s underlying aquifer, and are typically very difficult to permit. In addition, the water would not be recharged to the aquifer from which it is extracted. Due to the many risks associated with deep well injection, this alternative was rejected.

SECTION 2.9 SPILLAGE PREVENTION AND CONTROL (WAC 463-60-205)

2.9.1 MATERIALS STORED ON SITE

Chemicals to be used and stored for the additional two units are the same as those used and stored for the existing Grays Harbor Energy Center. They consist of specialty and bulk/commodity chemicals and a minimal amount of fuel oil for small backup generators.

2.9.2 SPILL PREVENTION CONTROL AND COUNTERMEASURES PLAN

The Certificate Holder has an existing Spill Prevention Control and Countermeasures (SPCC) Plan for the Grays Harbor Energy Center that will also be applicable to Units 3 and 4. Revisions of the SPCC Plan were approved by EFSEC on September 15, 2008, and revisions to the Hazardous Waste Management procedure were approved by EFSEC on January 7, 2008. Revisions will be made, if necessary, to respond to changing site organizations or conditions, or changes in regulations.

The existing SPCC Plan describes the oil, fuel, and hazardous material storage facilities; reporting systems; prevention requirements; and spill response procedure. The Hazardous Waste Management procedure establishes a program for the handling, storage, and disposal of wastes from the Grays Harbor Energy Center site.

SECTION 2.10 SURFACE WATER RUNOFF (WAC 463-60-215)

2.10.1 INTRODUCTION

The Certificate Holder has an Erosion and Sedimentation Control Plan and an Environmental Protection Control Plan that were approved by EFSEC on September 19, 2001. These plans provide surface water runoff controls during both construction projects and operational activities and are applicable for construction and operation of Units 3 and 4. The following sections summarize the procedures that the Certificate Holder anticipates using to control erosion and surface water runoff during construction and operation of the proposed project.

2.10.2 EROSION CONTROL DURING CONSTRUCTION

This section presents information on the erosion control practices to be followed during construction and additional information on erosion control during construction at the plant site.

Erosion control measures will be used in accordance with the requirements of the approved Erosion and Sedimentation Control Plan. The Certificate Holder does not anticipate the need to modify this plan. However, the Certificate Holder will do so should conditions of the SCA amendment require modifications.

The Environmental Protection Control Plan establishes a monitoring and control program that documents all site environmental activity, including events or activities that do not comply with environmental commitments. The plan establishes administrative procedures to communicate such events or activities to site management and to bring about corrective action. Stop-work steps are given in the event that an activity is observed to be in violation of permits or environmental regulations.

Erosion and sediment control best management practices (BMPs) consistent with those in the *Stormwater Management Manual for Western Washington* (Ecology 2005) will be employed during construction of Units 3 and 4 and will comply with the requirements of the existing Erosion and Sedimentation Control Plan. BMPs will include limiting certain construction activities and installing temporary control structures such as sediment traps and silt fences.

Generally, erosion control measures will include measures such as silt fences, diversion ditches, hydroseeding, and sediment traps.

Construction activities will be controlled to the extent possible to help limit erosion. Clearing, excavation, and grading will be limited to areas absolutely necessary for construction of the project. Areas outside the construction limits will be identified and clearly marked, and equipment operators will be instructed to avoid these areas.

The area proposed for Units 3 and 4 was previously graded and covered with a layer of gravel for use as an equipment and material laydown area during construction of the existing project. Additional grading will be required to prepare the site for construction of the additional two units.

Runoff from the northern portion of the site will continue to be routed through existing ditches and culverts to the C-1 pond, which is located on Satsop Development Park property to the west. If necessary, surface water runoff from the site can be pumped through a series of ditches and culverts to the existing Equalization Pond on the main Satsop Development Park property. This pond would provide additional storage capacity during construction if surface water runoff is unusually high.

2.10.3 STORMWATER POLLUTION PREVENTION

The existing SCA provides the basis for the stormwater pollution control program. Used in conjunction with the existing Erosion and Sedimentation Control Plan, the existing NPDES permit and EFSEC resolutions will ensure compliance with water quality standards.

2.10.3.1 Construction

The Certificate Holder currently has an approved NPDES permit that covers stormwater discharges, including stormwater discharges from the proposed plant site. In addition, the SCA addresses stormwater management during construction, and includes the following requirements:

- The project must comply with all pertinent industry standards for control of any unforeseen surface water runoff event during construction, and must notify EFSEC of surface water runoff problems
- The project must abide by turbidity criteria for construction-related runoff as established in the State of Washington Water Quality Standards

The existing NPDES permit establishes water quality limits and monitoring schedules for total suspended solids, settleable solids, and pH in collected stormwater runoff. These limits are applicable for material storage runoff and construction runoff within the 100-year, 24-hour rainfall event (5.4 inches per 24 hours).

2.10.3.2 Operation

Runoff from the plant site will be directed toward the perimeter ditches and routed as described in Section 2.10.2. BMPs consistent with those in the *Stormwater Management Manual for*

Western Washington (Ecology 2005) will continue to be employed during operation of the Grays Harbor Energy Center.

At least annually, facility employees will also receive training in the pollution control laws and regulations, and the specific features of the facility which are intended to prevent releases of oil and petroleum products. Employees at the site will be trained in the following spill response measures:

- Identifying areas that may be affected by a spill and potential drainage routes
- Reporting of spills to appropriate individuals
- Employing appropriate material handling and storage procedures
- Implementing spill response procedures

Stormwater catchbasins and detention systems will be inspected at least annually as part of the site preventive maintenance program. Stormwater catchbasins will be cleaned if the collected deposits fill more than one-third of the depth from the basin to the invert of the lowest pipe leading into or out of the basin.

Inspections will be conducted to confirm that non-permitted discharges are not entering the stormwater system. A summary of each inspection will be retained, along with any notifications of noncompliance and reports on incidents such as spills.

SECTION 2.11 EMISSION CONTROL (WAC 463-60-225)

2.11.1 INTRODUCTION

This section identifies emissions of criteria and toxic air pollutants (TAPs) resulting from the proposed addition of Units 3 and 4 to the Grays Harbor Energy Center and describes the emission controls that have been incorporated in the proposed design. Criteria pollutants are air pollutants governed by National and Washington Ambient Air Quality Standards (NAAQS and WAAQS). Toxic air pollutants are certain chemicals that Washington has characterized as toxic in WAC 173-460-150. Greenhouse gas emissions are also quantified and proposed mitigation is identified.

Emissions would be controlled by application of Best Available Control Technology (BACT), and would comply with federal and state emission standards. BACT would be determined by EFSEC as it prepares the Order of Approval and the Prevention of Significant Deterioration (PSD) permits for the project. On-going compliance with the approval conditions established by these permits would be ensured by an air operating permit. The permit application for the operating permit must be filed within a year of startup, and is typically in place within the following year.

Grays Harbor Energy LLC proposes to add two GE Frame 7FA combustion turbines to the existing Grays Harbor Energy Center. Each combustion turbine would have a Heat Recovery Steam Generator (HRSG) and supplemental duct firing. Steam generated by the HRSGs would power a single, shared steam turbine generator.

Additional components include an auxiliary boiler, a cooling tower, a diesel-fueled internal combustion engine driving a firewater pump, and a diesel-fueled generator. Emissions from these new sources are described in the following subsections, along with explanations of the controls that would be applied to specific sources to minimize these emissions. In the discussion that follows, we will refer to the proposed addition of two combustion turbines and HRSGs, a boiler, a cooling tower, and two engines as "Units 3 and 4."

2.11.2 CRITERIA POLLUTANTS

Because the site is partially developed already, grading and excavation associated with construction of the facility (and associated fugitive dust) would be limited to preparing for structure foundations. The construction contractor will take precautions to minimizing fugitive dust.

In addition, welding, painting, paving, and operation of a variety of internal combustion engines would generate gaseous emissions during construction. Because these tend to be relatively small emissions sources that are typically scattered throughout the site, such sources rarely have significant off-site impacts.

2.11.2.1 Best Available Control Technology

EFSEC's determination as to what constitutes BACT at the time of the final permit review would define emission limits from all emission units associated with Units 3 and 4. BACT is addressed for all Units 3 and 4 emission units in the BACT analysis provided as Appendix A-1.

USEPA has established performance standards for a number of air pollution sources in 40 CFR Part 60, including combustion turbines and HRSGs with duct burners, auxiliary boilers, and diesel-fueled internal combustion engines. These "new source performance standards" usually represent a minimum level of control that is required for a new source.

USEPA regulates new stationary gas turbines (and duct burners) in 40CFR60 Subpart KKKK. Subpart KKKK limits NOx emissions to 15 ppm and SO_2 emissions to 0.90 lb/MWhr, or 615 lb/hr for the proposed combustion turbines at maximum operating conditions. As discussed below, NOx and SO_2 emissions from the Units 3 and 4 combustion turbines would be well below these NSPS limits.

All of the recent permits issued in Washington (and most in the United States) have determined that Selective Catalytic Reduction (SCR) constitutes BACT for combustion turbines with HRSGs. SCR is a post-combustion NOx control device that uses a catalyst and ammonia to reduce NOx to nitrogen. Grays Harbor Energy LLC proposes that BACT for NOx emissions from its combustion turbines and HRSGs is SCR with a NOx limit of 2 ppmvd at 15% oxygen, averaged over three hours.

Grays Harbor Energy LLC proposes to include an oxidation catalyst in the HRSG to reduce CO emissions to 2 ppm at 15% oxygen. The oxidation catalyst will also reduce VOCs and certain toxic or hazardous pollutants such as formaldehyde. Consistent with other recently permitted sources, the use of natural gas and proper combustion will provide BACT for volatile organic compounds, sulfur dioxide, toxic air pollutants, and particulate matter.

Subpart Dc applies to steam generating units that commence construction, modification, or reconstruction after June 9, 1989 and have a heat input capacity from fuels combusted in the steam generating unit of less than 100 MMBtu/hr and greater than or equal to 10 MMBtu/hr. Subpart Dc would apply to the auxiliary boiler because it would be rated at 29.3 MMBtu/hr. However, Subpart Dc does not establish any emission limits for boilers fired solely with natural gas.

The diesel engines powering the emergency generator and firewater pump are subject to 40 CFR Part 60 Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines). This standard requires the engine manufacturers to achieve limits on NOx, VOC, and particulate matter emissions.

The proposed BACT for the combustion turbines and other emission units is summarized in Table 2.11-1. See Appendix A-1 for additional detail on BACT. The proposed BACT would also ensure compliance with federal New Source Performance Standards and emissions standards established by Ecology and the Olympic Region Clean Air Agency (ORCAA).

2.11.2.2 Criteria Pollutant Emissions

Table 2.11-2 summarizes maximum hourly pollutant emission rates based on vendor information and proposed BACT limits. Actual emission rates vary with time and averaging period because of variations in turbine firing rate and ambient temperature; proposed short-term emission rates reflect the maximum emission rate when operating at 60 percent load or greater. Calculated annual emissions were based on the assumption that the combustion turbines and cooling towers operate at capacity every hour of the year.

The auxiliary boiler will combust only natural gas and is mainly used to generate steam to assist in the startup of the steam turbine and layup of the HRSGs when offline. Criteria pollutant emissions summarized in Table 2.11-2 are based on the use of ultra-low-NO_x burners to achieve 9 ppm NOx and good combustion control to achieve 50 ppm CO. SO_2 emissions are based on a mass balance calculation (as discussed for the combustion turbines). PM and VOC emissions are based on AP42 Section 1.4.

A diesel-fueled engine powering a firewater pump will be available to provide pressurized water for fire protection. Another diesel-fueled engine will power an emergency generator. Both engines will meet the low emission limits prescribed by USEPA's Tier II emission regulations. Ordinarily, the engine will operate only one half hour per week for testing.

The cooling tower is configured in two parallel sets of five cells. The quantity of water released as droplets to the air (the drift rate) is based on 0.0005 percent of the tower recirculation rate, and reflects the use of very high efficiency drift eliminators. The total dissolved solids (TDS) content of the drift is the maximum value estimated from local water quality measurement data for the makeup water. PM emissions from the cooling tower shown in Table 2.11-2 are based on the assumption that water throughput (gallons per minute) is maximized in all cooling tower cells.

TABLE 2.11-1
BACT SUMMARY

Pollutant	Combustion Turbines		Boiler		Firewater Pump Engine and Emergency Generator Engine		Cooling Tower	
	Best Available Control Technology	Emission Rate	Best Available Control Technology	Emission Rate	Best Available Control Technology	Emission Rate	Best Available Control Technology	Emission Rate
Nitrogen Dioxide (NO_2)	Dry low NOx combustor with SCR	2 ppmvd	Ultra-low NOx burners	9 ppmvd	PC	No limit proposed	NA	NA
Carbon Monoxide (CO)	Turbine design, PC, oxidation catalyst	2 ppmvd	Boiler design, PC	50 ppmvd	PC	No limit proposed	NA	NA
Sulfur Dioxide (SO_2)	Natural gas	1 ppmvd	Natural gas	No limit proposed	0.05% Sulfur fuel	No limit proposed	NA	NA
Particulate Matter (PM_{10})	Natural gas, proper combustion	19 lb/hr/HRSG	Natural gas	No limit proposed	PC	No limit proposed	High efficiency drift eliminators	0.0005% drift rate
Volatile Organic Compounds (VOCs)	Combustion control, oxidation catalyst	1 ppmvd at 100% load, 3 ppmvd at 60% load	Natural gas	No limit proposed	PC	No limit proposed	NA	NA
Ammonia (NH_3)	Proper SCR Operation	5 ppmvd	NA	NA	NA	NA	NA	NA

Note: All proposed concentrations at 15% oxygenA cooling tower would be used to condense steam so that the water can be recycled. These cooling towers release water droplets that contain dissolved solids that occur naturally in the water supply, but are concentrated in the cooling process.
NA = not applicable
PC = proper combustion

TABLE 2.11-2
MAXIMUM HOURLY EMISSIONS (POUNDS)

	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	VOC
Both CTs/HRSGs	40	24.4	28.3	38	9.5	70
Auxiliary boiler	0.32	1.08	0.17	0.15	0.15	0.12
Diesel generator	3.95	3.45	0.0073	0.20	0.17	3.95
Fire water pump engine	1.36	1.18	0.0033	0.18	0.15	1.36
Cooling Tower	NA	NA	NA	0.79	0.8	NA

Maximum Total	45.6	30.1	28.5	39.3	10.8	12.4

Annual emissions (typically expressed as tons per year or tpy) depend on how many hours each unit operates and the unit's operating rate during those periods. Table 2.11-3 presents annual emissions for two scenarios: continuous operation and daily start up and shut down. First, it presents mass emissions assuming the combustion turbines operate every hour of the year in the operating mode with the highest emissions; this is with the combustion turbines operating at 100 percent load with duct burners for all pollutants except VOCs, which are highest at 60 percent load.

TABLE 2.11-3
UNITS 3 AND 4 ANNUAL CRITERIA POLLUTANT EMISSIONS (TONS)

	NO_x	CO	SO_2	$PM_{10}/PM_{2.5}$	VOC
Annual emissions with continuous CT operation					
Maximum Combustion Turbines[a] Scenario	175	107	62.8	166/41.6	51.5
Auxiliary Boiler[b]	0.40	1.4	0.21	0.18.0.046	0.15
Emergency Generator[c]	0.0010	0.021	0.0026	0.000044/ 0.000015	0.0000018
Firewater Pump Engine[c]	0.00034	0.0071	0.00088	0.000020/ 0.0000067	0.00000083
Cooling Tower[d]	--	--	--	3.5/3.5	--
Total Emissions	176	108	63.0	170/45.1	51.7
Annual emissions with worst case startup and/or shutdown schedule					
Combustion Turbines	166	450	43.7	116/29	52.9
Auxiliary Boiler	0.40	1.4	0.21	0.18/0.046	0.15
Emergency Generator	0.0010	0.021	0.0026	0.000044/ 0.000015	0.0000018
Firewater Pump Engine	0.00034	0.0071	0.00088	0.000020/ 0.0000067	0.00000083
Cooling Tower	--	--	--	3.5/3.5	--
Total Emissions	166	451	43.9	120/32.5	53.1

a. Combined emission rates for both combustion turbine units.
b. 2,500 hours of operation per year.
c. Maximum of 12 hours of operation for maintenance and testing.
d. Total for 10 cooling tower cells.

Although conservative, the auxiliary boiler emissions are based on the assumption that the boiler will operate at full load operation for every hour of the year. This assumption is very conservative and is likely to significantly overstate the actual emissions. Annual emissions from the two diesel engines are based on the assumption they are each tested half an hour per week.

Annual PM_{10} emissions from the cooling towers are based on the assumption that the water flow rate is maximized in each cell every hour of the year. In practice, fans may be turned off when cooling requirements are reduced. Without forced airflow through the cell, drift is reduced significantly.

In consideration of the potential operating mode with frequent startups and shutdowns, Table 2.11-3 also presents emissions assuming the CTs start up and shutdown every day. For this evaluation, it is assumed that the combustion turbines operate 16 hours each day at full load with duct burners and are shutdown for the remaining portion of the day that is not devoted to startup and shutdown. Emissions associated with the auxiliary boiler, diesel engines, and the cooling tower are assumed the same as the continuous operation scenario.

Table 2.11-3 indicates that daily startups would substantially increase annual CO emissions and slightly increase VOC emissions, but would reduce NOx, SO_2, and PM emissions. As noted in Section 5.1.3, predicted CO concentrations during startup are still well below the ambient air quality standards under the daily startup scenario. Details regarding the nature of the facility's emission units and the methods and assumptions incorporated in the development of criteria pollutant emission rates for each source category are provided in Section 5.1.2 and Appendix A-2.

2.11.3 TOXIC AIR POLLUTANTS

Units 3 and 4 will emit compounds deemed hazardous air pollutants (HAPs) by EPA and/or deemed toxic air pollutants (TAPs) by Ecology. TAP and HAP emissions would be reduced by the same process features that control criteria pollutant emissions – the use of gaseous fuels, good combustion controls, and post-combustion control by catalytic oxidation. Emissions of TAPs and HAPs were estimated for both CTs and HRSGs; the auxiliary boiler; the diesel generator; and the emergency firewater pump engine. Emission factors were derived from EPA's AP42 emission factor data for virtually all the TAPs and HAPs emitted by the combustion turbines, the boiler, and the diesel engines.

Aqueous ammonia would be used as the reagent for the SCR control system that would be used to limit NO_x emissions from the combustion turbines. In order to maintain the lowest possible NO_x, emissions levels, it would be necessary to supply ammonia reagent at a rate in excess of that needed to participate in the SCR NO_x reduction reactions. The excess ammonia would escape in the exhaust stream out the stack from each turbine/HRSG train. Grays Harbor Energy LLC has proposed to limit such "ammonia slip" emissions at or below 5 ppmvd at 15% O_2

Sulfuric acid mist emissions depend on the amount of sulfur in the fuel and amount of sulfur dioxide converted to sulfur trioxide during fuel combustion. Combustion turbine emissions of this compound were calculated based on the measured sulfur content of natural gas passing through the Huntingdon station in British Columbia (the anticipated source of gas) and conversion of 30 percent of the sulfur to SO_3, with subsequent reaction with moisture in the exhaust to form sulfuric acid.

Table 2.11-4 presents estimated emissions of TAPs and HAPs that may be emitted by the Units 3 and 4 emission units. Those TAPs that are emitted in quantities exceeding the corresponding small quantity emission rate (SQER) must be evaluated using dispersion models to assess compliance with acceptable ambient air criteria; the results of that assessment are summarized in Sections 3.2 and 5.1.3. Additional information on calculating TAP and HAP emissions is presented in Appendix A-2.

TABLE 2.11-4
COMPARISON OF TAP EMISSION INCREASES WITH SQERS

Compound	CAS #	Emission Rate (lb/hr)	Emission Rate (lb/day)	Emission Rate (lb/yr)	SQER Value	SQER Avg Per	Modeling Required?
Acetaldehyde	75-07-0	1.53E-01	3.68E+00	1.33E+03	71	Annual	Yes
Acrolein	107-02-8	2.45E-02	5.87E-01	2.12E+02	0.00789	24-hr	Yes
Ammonia	7664-41-7	3.70E+01	8.87E+02	3.24E+05	9.31	24-hr	Yes
Arsenic	7440-38-2	2.23E-04	5.35E-03	1.92E+00	0.0581	Annual	Yes
Benzene	71-43-2	4.99E-02	1.20E+00	4.18E+02	6.62	Annual	Yes
Benzo(a)anthracene	56-55-3	5.75E-06	1.38E-04	1.73E-02	1.74	Annual	No
Benzo(a)pyrene	50-32-8	8.34E-03	2.00E-01	7.30E+01	0.174	Annual	Yes
Benzo(b)fluoranthene	205-99-2	2.23E-06	5.34E-05	1.73E-02	1.74	Annual	No
Benzo(k)fluoranthene	207-08-9	2.35E-06	5.64E-05	1.73E-02	1.74	Annual	No
Beryllium	7440-41-7	1.34E-05	3.21E-04	1.15E-01	0.08	Annual	Yes
1,3-Butadiene	106-99-0	1.72E-03	4.12E-02	1.43E+01	1.13	Annual	Yes
Cadmium	7440-43-9	1.23E-03	2.94E-02	1.05E+01	0.0457	Annual	Yes
Carbon Monoxide	630-08-0	3.01E+01	7.22E+02	2.16E+05	50.4	1-hr	No
Chromium (hexavalent)	18540-29-9	6.24E-05	1.50E-03	5.37E-01	0.00128	Annual	Yes
Chrysene	218-01-9	2.79E-06	6.70E-05	1.73E-02	17.4	Annual	No
Cobalt	7440-48-4	9.36E-05	2.25E-03	8.05E-01	0.013	24-hr	No
Copper	7440-50-8	9.47E-04	2.27E-02	8.15E+00	0.219	1-hr	No
Dibenzo(a,h)anthracene	53-70-3	2.64E-06	6.32E-05	1.15E-02	0.16	Annual	No
Dichlorobenzene	106-46-7	1.34E-03	3.21E-02	1.15E+01	17.4	Annual	No
Diesel Engine Particulate	DEP	3.78E-01	9.08E+00	4.54E+00	0.639	Annual	Yes
7,12-Dimethylbenz(a)anthracene	57-97-6	1.78E-05	4.28E-04	1.53E-01	0.00271	Annual	Yes
Ethyl benzene	100-41-4	1.21E-01	2.91E+00	1.06E+03	76.8	Annual	Yes
Formaldehyde	50-00-0	4.90E-01	1.18E+01	4.25E+03	32	Annual	Yes
Hexane	110-54-3	2.01E+00	4.82E+01	1.73E+04	92	24-hr	No
Indeno(1,2,3-cd)pyrene	193-39-5	2.84E-06	6.82E-05	1.73E-02	1.74	Annual	No
Manganese	7439-96-5	4.24E-04	1.02E-02	3.64E+00	0.00526	24-hr	Yes
Mercury	7439-97-6	2.90E-04	6.96E-03	2.49E+00	0.0118	24-hr	No
3-Methylchloranthrene	56-49-5	2.01E-06	4.82E-05	1.73E-02	0.0305	Annual	No
Naphthalene	91-20-3	5.79E-03	1.39E-01	4.90E+01	5.64	Annual	Yes
Nitrogen Dioxide	10102-44-0	4.56E+01	1.10E+03	3.51E+05	1.03	1-hr	Yes
Propylene	115-07-1	5.74E-04	1.38E-02	6.89E-03	394	24-hr	No
Propylene Oxide	75-56-9	1.10E-01	2.64E+00	9.62E+02	51.8	Annual	Yes
Selenium	7784-49-2	2.68E-05	6.42E-04	2.30E-01	2.63	24-hr	No
Sulfur Dioxide	7446-09-5	2.85E+01	6.84E+02	1.26E+05	1.45	1-hr	Yes
Sulfuric acid	7664-93-9	1.44E+01	3.47E+02	1.27E+05	0.131	24-hr	Yes
Toluene	108-88-3	4.97E-01	1.19E+01	4.35E+03	657	24-hr	No
Vanadium	7440-62-2	2.56E-03	6.15E-02	2.20E+01	0.0263	24-hr	Yes
Xylenes	1330-20-7	2.43E-01	5.83E+00	2.12E+03	29	24-hr	No

Note: Small Quantity Emission Rates are defined in WAC 173-460-150

2.11.4 GREENHOUSE GAS EMISSIONS

Units 3 and 4 will emit pollutants considered greenhouse gases (GHGs). The principal GHGs are carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), perfluorocarbons (PFCs), chlorofluorocarbons (CFCs), and sulfur hexafluoride (SF_6). The "greenhouse effect" refers to the "trapping" of solar radiation: analogous to a greenhouse, greenhouse gases impede reradiation of solar energy from the earth's surface more efficiently than they impede incoming solar radiation.

The degree to which the various greenhouse gases are believed to contribute to global warming differ significantly. Experts agree that CO_2 released by fossil fuel combustion is the largest single source contributing to GHG, accounting for one-third to more than half of the total.

CO_2 emissions result from many sources, including household activities, transportation, and industrial processes. As indicated in Table 2.11-5, the largest sources of CO_2 emissions in the United States are electrical generation and transportation. Figure 2.11-1 shows the primary sources of CO_2 emissions in Washington.

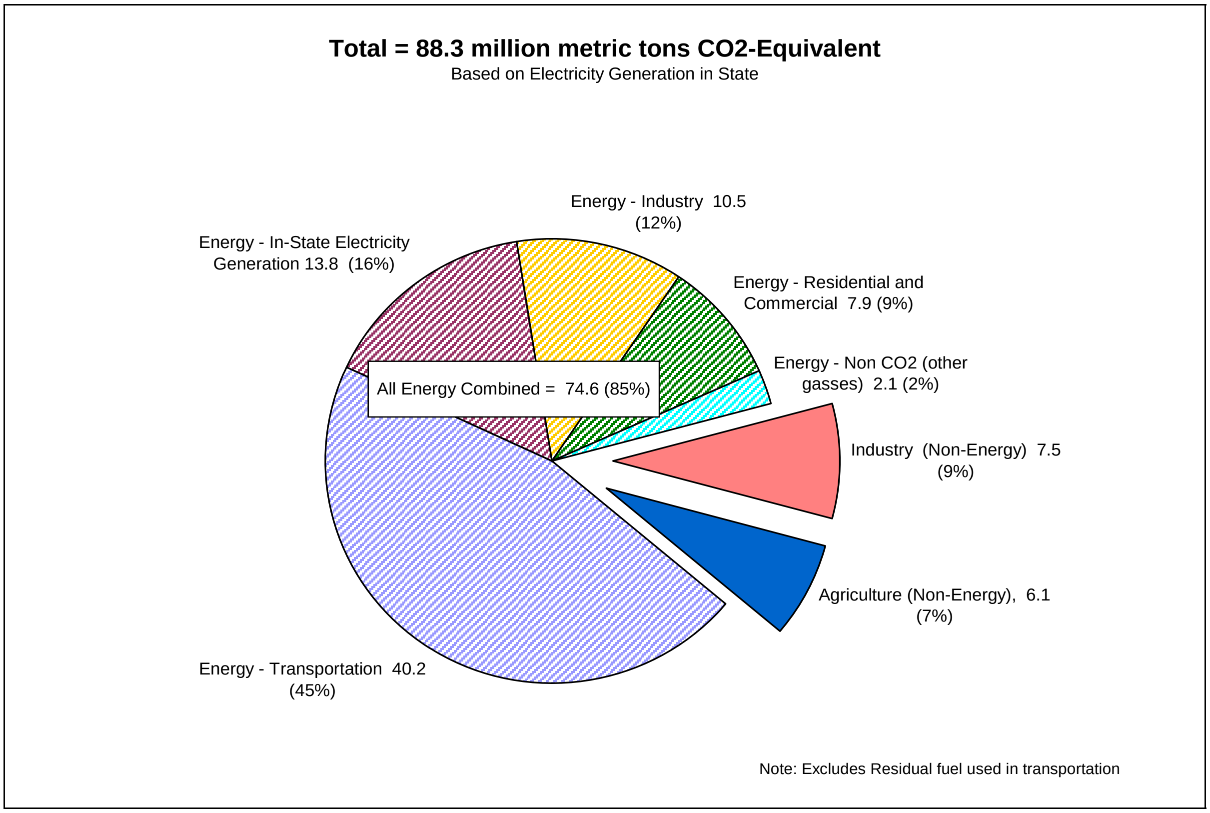
TABLE 2.11-5
CO_2 EMISSIONS FROM FOSSIL FUEL COMBUSTION BY END-USE SECTOR (TG CO_2 EQ.)

End-Use Sector	1990	1995	2000	2005	2007
Transportation	1,487.5	1,601.7	1,803.7	1,886.2	1,892.2
Combustion	1,484.5	1,598.7	1,800.3	1,881.5	1,887.4
Electricity	3.0	3.0	3.4	4.7	4.8
Industrial	1,516.8	1,575.5	1,629.6	1,558.5	1,553.4
Combustion	834.2	862.6	844.6	828.0	845.4
Electricity	682.6	712.9	785.0	730.5	708.0
Residential	927.1	993.3	1,128.2	1,207.2	1,198.0
Combustion	337.7	354.4	370.4	358.0	340.6
Electricity	589.6	638.8	757.9	849.2	857.4
Commercial	749.2	808.5	963.8	1,018.4	1,041.4
Combustion	214.5	224.4	226.9	221.8	214.4
Electricity	534.7	584.1	736.8	796.6	827.1
U.S. Territories	28.3	35.0	36.2	53.2	50.8
Total	**4,708.9**	**5013.9**	**5,561.5**	**5,723.5**	**5,735.8**
Electricity Generation	**1,809.7**	**1.938.9**	**2,283.2**	**2,381.0**	**2,397.2**

Source: USEPA (2009)

Fossil fuel-fired electrical generation is a substantial source of CO_2 emissions both nationwide and in Washington. However, the rate of CO_2 emissions varies considerably with the fuel and technology used. Table 2.11-6 shows the typical rate of CO_2 emitted per kilowatt hour (kWh) of electricity generated from various types of generating facilities. As discussed below, Units 3 and 4 will be substantially more efficient than these typical generating facilities.

The proposed addition of Units 3 and 4 utilizes state of the art technology to improve efficiency and minimize all emissions, including CO_2. Based on the rated fuel energy input capacity of the combustion turbines (and duct burners), the two turbines operating at maximum generating capacity (at 59^{o}F) would emit approximately 233 metric tons (tonnes) of CO_2 per hour.



Source: CTED (2007)

Figure 2.11-1
All Greenhouse Gas Emissions in Washington for 2004 (preliminary estimate)

TABLE 2.11-6
TYPICAL CO_2 EMISSION FACTORS FOR ELECTRICAL GENERATING STATIONS

Generating Station Type	CO_2 Emission Factor (lbs CO_2 per kWh)
Natural gas, combined cycle combustion turbine	0.87
Natural gas, conventional gas-fired boiler	1.32
Fuel oil, conventional oil-fired boiler	1.97
Coal, conventional coal-fired boiler	2.10
Nationwide average for electric utility generating stations (1998)	1.34

Source: EFSEC/BPA (2004)

2.11.5 GHG OFFSET PROPOSAL

The State of Washington has enacted two statutes that address greenhouse gas emissions from proposed generating facilities. The first, chapter 80.70 RCW, imposes carbon dioxide mitigation obligations on new fossil-fueled thermal electric generation facilities. The second, chapter 80.80 RCW, requires that new baseline electric generation facilities comply with an emissions performance standard for greenhouse gases. EFSEC has established regulations that implement the requirements of these statutes: WAC 463-80 and WAC 463-85. The requirements of these two climate change statutes work "in unison" with each other: "The first requirement is the emissions performance standard under WAC 463-85. Once that standard is met, the requirements of chapters 80.70 RCW and 463-80 WAC are applied." The project will comply with the requirements of both climate change statutes and their associated regulations.

2.11.5.1 Compliance with the Performance Standard in WAC 463-85

Because the project may fall within the statute's definition of a "baseload electric generation facility" and the addition of Units 3 and 4 would be an "upgrade" to the facility, the emissions performance standard of chapter 80.80 RCW and WAC 463-85 may apply. The emission performance standard provides that the project's greenhouse gases emissions not exceed 1,100 pounds of greenhouse gases per MW-hour (MWh) as an annual average (WAC 463-85-130[1]).

The Units 3 and 4 combustion turbines and duct burners would emit at most 782 pounds of greenhouse gases per MWh when operating at maximum load. As a result, the facility would comply with the greenhouse gas emissions performance standard under WAC 463-85-130(4)(a) (compliance may be achieved through the "[u]se of fuels and power plant designs that comply with the emissions performance standard without need for greenhouse gases emissions controls").

2.11.5.2 Compliance with the Mitigation Requirements in WAC 463-80

As a proposal to increase the CO2 emissions of the existing Grays Harbor Facility by more than fifteen person, the carbon mitigation requirements of chapter 80.70 RCW and WAC 463-80 apply to the requested amendement. If Units 3 and 4 operated at their full capacity every hour of the year, carbon dioxide emissions would be 2.04 million tonnes per year (see Appendix A-2 for calculation details). The mitigation quantity outlined in the regulation considers 30 years of operation with a capacity factor of 60 percent, or 36.7 million tonnes. WAC 463-80 requires Grays Harbor Energy LLC to mitigate 20 percent of the mitigation quantity, or approximately 7.34 million tonnes.

Grays Harbor Energy LLC has chosen the "monetary path" outlined in RCW 80.70.020(5) for mitigation. At the current rate of $1.60 per metric ton of carbon dioxide, the required payment is approximately $11.75 million. Grays Harbor Energy LLC currently plans to provide EFSEC with proof of payment to a qualifying organization of the total sum, no later than one hundred twenty dats after the start of commercial operation.

SECTION 2.12 CONSTRUCTION AND OPERATION ACTIVITIES (WAC 463-60-235)

2.12.1 POWER PLANT CONSTRUCTION

2.12.1.1 Construction Schedule and Milestones

Final design and construction of the power plant will be accomplished over a 22-month period. The date of initiation of construction will depend on the needs of the Certificate Holder's customers. Depending on the permitting schedule, construction could begin as early as August 2010. Since the date of initiation of on-site construction activities is not known, the information regarding construction schedules presented below is based on duration of activities over the 22 month on-site construction period.

Figure 2.12-1 identifies the major schedule milestones for design and construction of the power plant and associated facilities. The majority of the site preparation work has been completed already as part of the Grays Harbor Energy Center. Following the engineering and design studies, construction activities will begin with the preparation of the site, which will include final grading and road construction. Site preparation is expected to take three months. Construction activities will generally occur five days per week (Monday through Friday), with a 10-hour work day (7 am to 5 pm).

Site preparation will be followed by the installation of underground utilities and foundation work. As soon as possible after the completion of foundation work, the erection of the combustion and steam turbine generator trains and the heat recovery steam generator will begin. The cooling tower, pumps, transformers, mechanical and electrical and other equipment will be installed next.

2.12.1.2 Construction Workforce

The estimated number of construction workers (craft and non-craft) for Units 3 and 4 is shown by month in Figure 2.12-2 and Table 2.12-1.

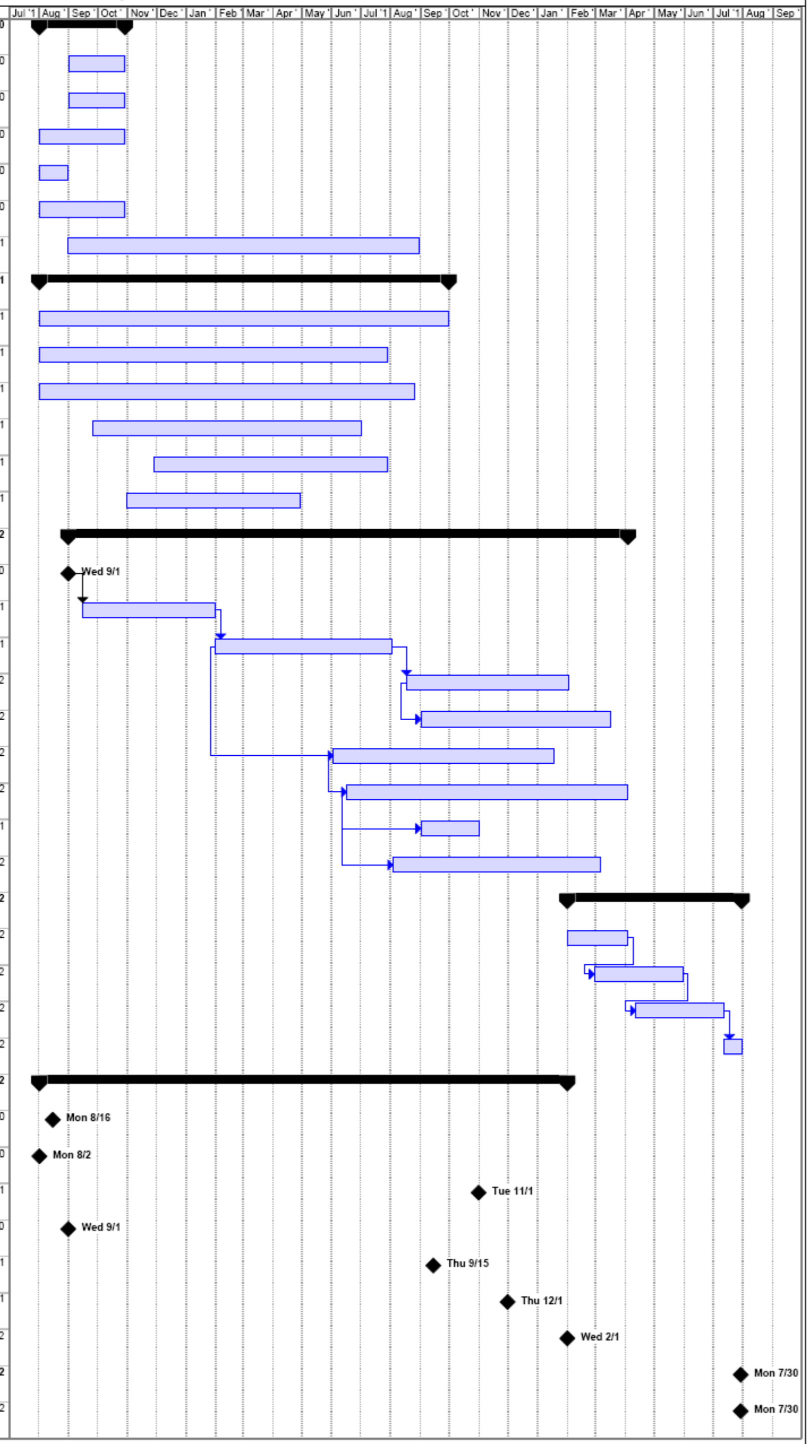
The peak workforce during the 22-month construction period will range from over 400 to over 500 construction personnel from about Month 12 through Month 17 of construction (Figure 2.12-2). During the construction phase there will be craft workers (welders, electricians, etc.) and non-craft workers (engineers, inspectors, etc.).

The types of crafts that will be required for construction include the following: boilermakers, carpenters, cement finishers, electricians, equipment operators and oilers, fire sprinkler installers, laborers, millwrights, painters, pile drivers, pipefitters, plumbers, rodmen, structural steel workers, and welders.

The estimated number of non-craft workers for the construction and start-up phase is based on the sum of project management staff needed by function plus the administrative staff (on-site construction inspectors and project engineers) associated with the anticipated volume of work.

Figure 2.12-1 Construction Schedule

ID	Task Name	Duration	Start	Finish
1	**LNTP ENG & PROC.**	**65 days**	**Mon 8/2/10**	**Fri 10/29/10**
2	High Energy Piping	42 days	Thu 9/2/10	Fri 10/29/10
3	Main Transformer Spec	42 days	Thu 9/2/10	Fri 10/29/10
4	HRSGs	65 days	Mon 8/2/10	Fri 10/29/10
5	STG	22 days	**Mon 8/2/10**	Tue 8/31/10
6	Balance of Equipment Spe	65 days	**Mon 8/2/10**	Fri 10/29/10
7	DETAILED ENGINEERING	260 days	Wed 9/1/10	Tue 8/30/11
8	**PROCUREMENT**	**305 days**	**Mon 8/2/10**	**Fri 9/30/11**
9	CTG's	305 days	Mon 8/2/10	Fri 9/30/11
10	STG	260 days	Mon 8/2/10	Fri 7/29/11
11	HRSG	280 days	Mon 8/2/10	Fri 8/26/11
12	High Energy Piping	200 days	Mon 9/27/10	Fri 7/1/11
13	Main Transformers (52 wk	175 days	Mon 11/29/10	Fri 7/29/11
14	Balance of Equipment	130 days	Mon 11/1/10	Fri 4/29/11
15	**CONSTRUCTION**	**415 days**	**Wed 9/1/10**	**Tue 4/3/12**
16	Mobilize	0 days	Wed 9/1/10	Wed 9/1/10
17	Site prep/ Piling/ Dewaterin	98 days	Thu 9/16/10	Mon 1/31/11
18	Concrete -- U/G	131 days	Tue 2/1/11	Tue 8/2/11
19	CTG	120 days	Thu 8/18/11	Wed 2/1/12
20	STG	141 days	Fri 9/2/11	Fri 3/16/12
21	HRSG	163 days	Fri 6/3/11	Tue 1/17/12
22	Piping	208 days	Fri 6/17/11	Tue 4/3/12
23	Main Transformer	43 days	Fri 9/2/11	Tue 11/1/11
24	Electrical / I&C	153 days	Thu 8/4/11	Mon 3/5/12
25	**COMMISSIONING**	**129 days**	**Wed 2/1/12**	**Mon 7/30/12**
26	HRSG	45 days	Wed 2/1/12	Tue 4/3/12
27	CTG's	66 days	Wed 2/29/12	Wed 5/30/12
28	STG	66 days	Thu 4/12/12	Thu 7/12/12
29	Performance Testing	12 days	Fri 7/13/12	Mon 7/30/12
30	**OWNER RESPONSIBILITIES**	**392 days**	**Mon 8/2/10**	**Wed 2/1/12**
31	Site Access	0 days	Mon 8/16/10	Mon 8/16/10
32	Air Permit	0 days	Mon 8/2/10	Mon 8/2/10
33	Backfeed Power	0 days	Tue 11/1/11	Tue 11/1/11
34	Water (Construction)	0 days	Wed 9/1/10	Wed 9/1/10
35	Water	0 days	Thu 9/15/11	Thu 9/15/11
36	Fuel	0 days	Thu 12/1/11	Thu 12/1/11
37	Power Export Availability/ S	0 days	Wed 2/1/12	Wed 2/1/12
38	**SUBSTANTIAL COMPLETION**	**0 days**	**Mon 7/30/12**	**Mon 7/30/12**
39	(Commercial Operation)	0 days	Mon 7/30/12	Mon 7/30/12



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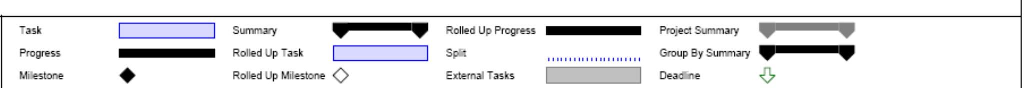

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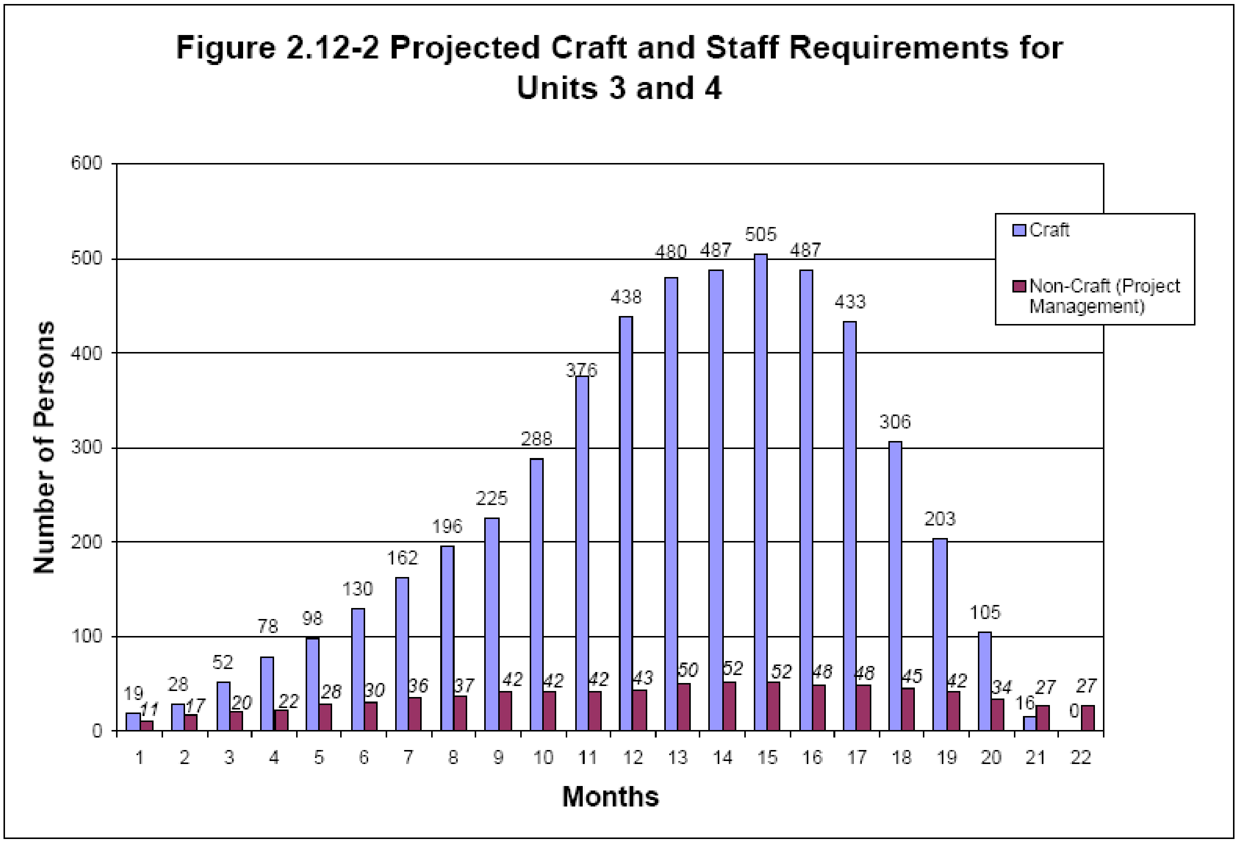
Figure 2.12-1 Construction Schedule



2.12.2 POWER PLANT OPERATION

Operation of Units 3 and 4 would require adding approximately eight employees to the existing staff of 23, for a total of 31 employees. Approximately 20 employees would be working two 12-hour shifts, with a maximum of 31 employees working on site at any time. The operational labor force would include the following positions: plant manager, operations supervisor/engineer, control operators, auxiliary operators, maintenance supervisor, mechanical and electrical technicians, and clerks. Efforts would be made to hire local individuals to staff the project as much as practicable. Major maintenance is expected to take place in Year 6 of operation. During this work, approximately 50 additional people will be on site for 28 days during the day shift.

Initiation of commercial operation for the plant will depend on the needs of the Certificate Holder's customers. If construction is initiated in August of 2010, the earliest anticipated date for the initiation of commercial operation would be approximately mid-2012.

TABLE 2.12-1
POWER PLANT CONSTRUCTION WORKFORCE LOADING

Month	Craft	Non-Craft (Project Management)	Total Staff
1	19	11	30
2	28	17	45
3	52	20	72
4	78	22	100
5	98	28	126
6	130	30	210
7	162	36	198
8	196	37	233
9	225	42	267
10	288	42	330
11	376	42	418
12	438	43	481
13	480	50	530
14	487	52	539
15	505	52	557
16	487	48	535
17	433	48	481
18	306	45	351
19	203	42	245
20	105	34	139
21	16	27	43
22	0	27	27

SECTION 2.13 CONSTRUCTION MANAGEMENT (WAC 463-60-245)

2.13.1 CONSTRUCTION MANAGEMENT—ORGANIZATION

Grays Harbor Energy LLC will contract for the turnkey engineering, procurement and construction (EPC) of Units 3 and 4 with an EPC contractor. Grays Harbor Energy LLC will assemble and maintain a staff of professional engineering and construction personnel to monitor the EPC contractor’s performance and to ensure adherence to all contract specifications and requirements throughout the execution of the work.

Organization charts depicting the Certificate Holder’s expected oversight organization and the EPC contractor’s engineering and construction organization are shown on Figures 2.13-1 and 2.13-2, respectively.

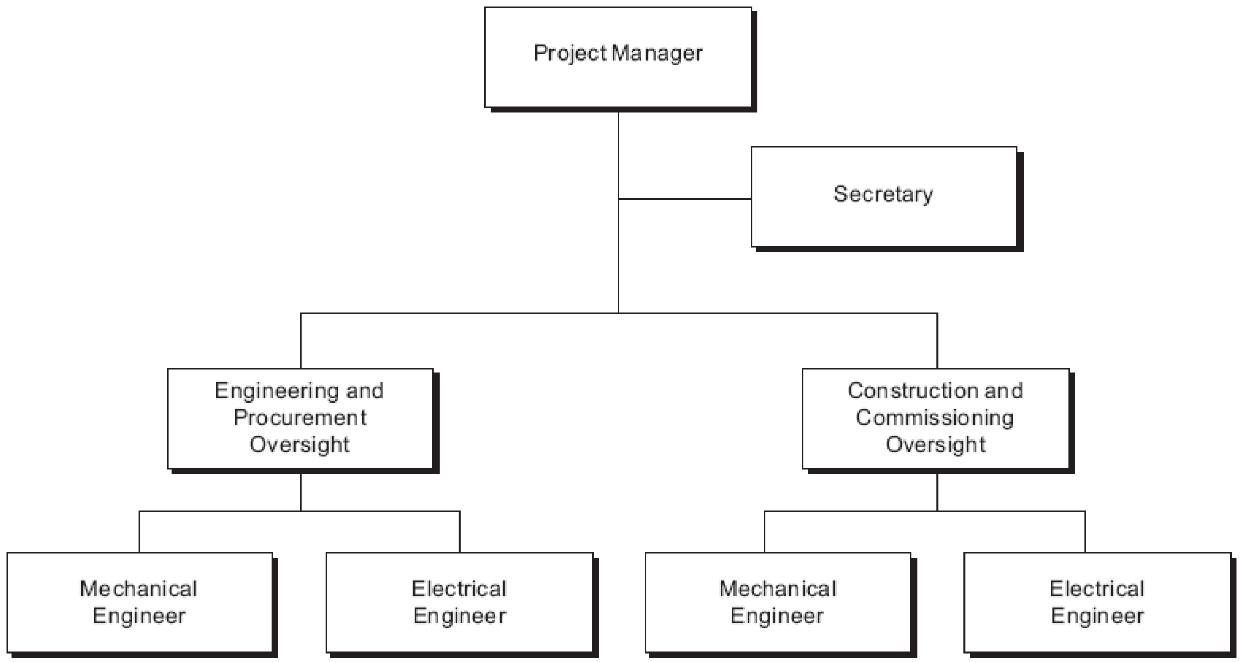


Figure 2.13-1
Grays Harbor Energy LLC Construction Organization Chart

2.13.2 QUALITY ASSURANCE AND QUALITY CONTROL

Grays Harbor Energy LLC will implement QA/QC procedures similar to those implemented during construction of the existing Grays Harbor Energy Center. Grays Harbor Energy LLC will update the existing Project Procedures Manual that describes project activities from the initiation of final design activities through startup of the plant. This document includes a project QA/QC Plan to be used during all phases of the work. The QA/QC Plan will address key aspects, such as vendor shop and field work activities, and the methods each contractor will use to ensure and document that work accomplished for the construction of Units 3 and 4 is of acceptable quality.

Grays Harbor Energy LLC's engineering and construction personnel will periodically audit the EPC contractor, including reviews of documentation and surveillances of field activities to ensure compliance with the project specifications and with the requirements of the QA/QC Plan. For the installation and alignment of major equipment, the acceptance of Grays Harbor Energy LLC's field inspectors will be required prior to final sign-off of Units 3 and 4.

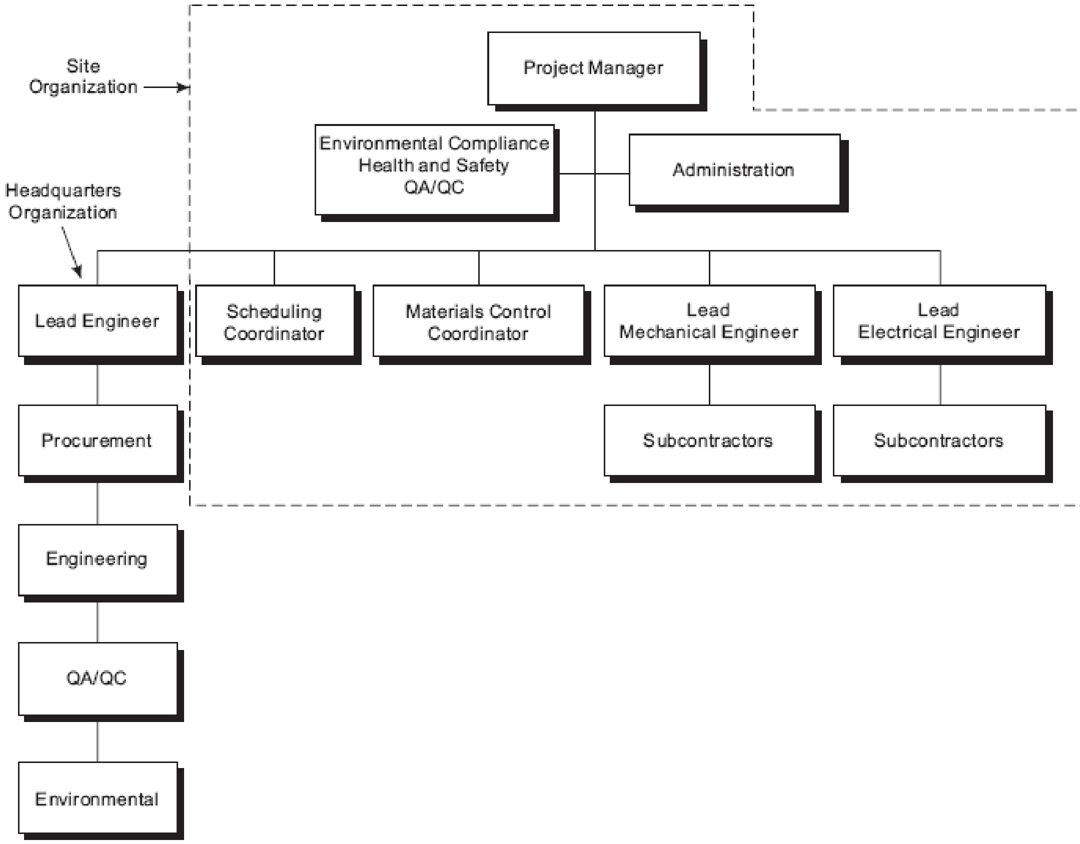


Figure 2.13-2
EPC Contractor Anticipated Organization Chart

2.13.2.1 Environmental Compliance

The Certificate Holder has an active Environmental Protection Control Plan for the Grays Harbor Energy Center that was approved by EFSEC on November 1, 2005. Where appropriate, this plan will be revised to include environmental protection procedures specific to Units 3 and 4.

The Environmental Protection Control Plan covers all construction activities. The Project Manager or the Project Manager's designee will be responsible for complying with the requirements of the Environmental Protection Control Plan. The Certificate Holder will audit the construction of Units 3 and 4 for environmental compliance, including periodic reviews of documentation and surveillance of field activities, as follows:

- Review erosion control plan
- Review spill prevention plan
- Witness construction implementation
- Witness erosion control performance
- Observe spills and cleanup

- Review spill reports

SECTION 2.14 CONSTRUCTION METHODOLOGY (WAC 463-60-255)

WAC 463-60-255 addresses the construction procedures to be used within watercourses, wetlands, and other sensitive areas. There are no watercourses, wetlands, or other sensitive areas on or adjacent to the project site. Therefore, no construction methodology descriptions are required. Construction procedures related to activity in terrestrial areas are addressed in Section 2.3, Construction on Site, WAC 463-60-145.

SECTION 2.15 PROTECTION FROM NATURAL HAZARDS (WAC 463-60-265)

EFSEC has considered the natural hazards associated with the 22-acre project site and has issued an SCA authorizing development of a gas-fired combustion turbine facility on the site. Units 3 and 4 would be constructed on the same site, with an adjacent 10 acres used for temporary construction laydown and access. No additional natural hazards are anticipated.

SECTION 2.16 SECURITY CONCERNS (WAC 463-60-275)

The Grays Harbor Energy Center site is enclosed by a 6-foot-high chain link fence with locking gates that provide ingress and egress; 24-hour security is provided. A fence will be constructed between the existing Grays Harbor Energy Center and the area to be used for Units 3 and 4 for the construction period. The construction fence also will enclose the proposed 10-acre construction laydown and access area.

The Emergency Plan, which was approved by EFSEC on November 1, 2005, applies to all project personnel and provides the guidelines necessary to ensure timely notification and rapid response in the event of emergencies occurring on the property.

SECTION 2.17 STUDY SCHEDULES (WAC 463-60-285)

The Certificate Holder does not plan to perform any additional environmental studies.

SECTION 2.18 POTENTIAL FOR FUTURE ACTIVITIES AT SITE (WAC 463-60-295)

Other than the proposed addition of two units that is the subject of this SCA amendment, the Certificate Holder has no plans for future additions, expansions, or other activities on or adjacent to the project site.

The Satsop Development Park, which is owned by the Grays Harbor PDA, encompasses over 1,600 acres. Because of its size, and the many advantages that the location offers for power production, it is conceivable that other industrial or energy projects will be investigated and proposed for the Satsop Development Park property.

SECTION 2.19 ANALYSIS OF ALTERNATIVES (WAC 463-60-645)

Grays Harbor LLC is proposing to add two units to the existing Grays Harbor Energy Center using the same technology. No alternate sites or technology were considered due to development advantages and minimization of environmental impacts.

SECTION 2.20 PERTINENT FEDERAL, STATE, AND LOCAL REQUIREMENTS (WAC 463-60-685)

Federal, state, and local permits and requirements applicable to the construction and operation of Units 3 and 4 are listed in Table 2.20-1. This table also summarizes the regulatory compliance plans for the project. State and local permits listed are those that would apply to the additional units if the project were not under EFSEC jurisdiction.

TABLE 2.20-1
PERTINENT FEDERAL, STATE, AND LOCAL REQUIREMENTS

Permit or Requirement	Agency/Regulation	Compliance Plan
State Environmental Policy Act	**Grays Harbor County:** RCW 43.21C, 173-802 WAC; project development.	EFSEC performs SEPA compliance as a part of its review of the Certificate Holder's request for an amendment to their SCA.
Air Quality (PSD Permit)	**Ecology:** RCW 70.94, 173-400, 401 WAC; 40 CFR § 52.21Control Requirements for Air Pollutants.	This request for an amendment to the SCA includes a PSD Permit Amendment Application for EFSEC review and approval.
Wastewater Disposal (NPDES)	**Ecology:** Clean Water Act, RCW 90.48, 173-220 WAC, 173-201 WAC, 173-240 WAC; cooling water discharge.	The existing NPDES permit does not place any limit on the quantity of water discharged from the project. The discharge from Units 3 and 4 will comply with the conditions of the existing NPDES permit. It is not anticipated that an amendment to the existing NPDES permit will be required.
Stormwater Discharge (NPDES)	**Ecology:** Clean Water Act, RCW 90.48, 90.50, 90.52, 173-220 WAC; stormwater discharge associated with construction and industrial activities.	The existing NPDES permit authorizes the discharge of stormwater during construction and operations. A SWPPP has been developed as required by the permit. The SWPPP will be modified, if necessary, to include the area used for Units 3 and 4.
Spill Prevention Control and Countermeasures Plan	**Ecology:** 40 CFR 112, RCW 80.50; plan to prevent, control and contain accidental petroleum discharges into surface waters.	The SPCC plan for the Satsop Combustion Turbine/ Grays Harbor Energy Center was approved by EFSEC on November 1, 2005, and applies to Units 3 and 4.
Notification of Dangerous Waste Activities	**Ecology:** 173-303 WAC, RCW 80.50; identification of dangerous waste activities.	An active state identification number has been issued for the Grays Harbor Energy Center. This request for an amendment to the SCA provides EFSEC with information on 1) waste streams, compositions, and volumes, and 2) hazardous waste activities. Stipulations on methods of handling dangerous wastes are expected to be included in the amended SCA issued by EFSEC and are expected to be similar to those included in the existing SCA.
Building Approval	**Grays Harbor County:** County Code 15.4; RCW 80.50; to comply with County Building Code.	Building plans will comply with the Grays Harbor County Building Code. Following current EFSEC requirements, drawings and specifications related to public health and safety will be submitted to Grays Harbor County for review and approval.
Land Use and Zoning Compliance	**Grays Harbor County:** Ordinance 241, County Title 17, RCW 80.50; demonstration of compliance with county land use and zoning ordinances.	As part of the SCA amendment for the Grays Harbor Energy Center, the location of energy facilities at the Grays Harbor Energy site was found to be consistent with the Grays Harbor County Zoning Code. The site was rezoned to I-2 expressly to permit energy facilities.
County Road Permit	Grays Harbor County: County Ordinance	If needed, county road permits will be obtained from Grays Harbor County for hauling of materials to the site. Road access and work in county road right-of-way permits also will be obtained if needed.

CFR Code of Federal Regulations
EFSEC Energy Facility Site Evaluation Council
NPDES National Pollutant Discharge Elimination System
PSD Prevention of Significant Deterioration
RCW Revised Code of Washington
SCA Site Certification Agreement
SEPA State Environmental Policy Act
SPCC Spill Prevention, Control and Countermeasure
SWPPP Stormwater Pollution Prevention Plan
WAC Washington Administrative Code