



STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

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**GRAY HARBOR ENERGY PROJECT
PROPOSED EXPANSION: UNITS 3 & 4**

JULY 14, 2010

AIR QUALITY SUMMARY SHEET

The information below was provided at the request of EFSEC by the Department of Ecology (Ecology) Air Quality Program. Ecology, under contract to EFSEC, provides consulting services and technical support to assist EFSEC in performing its regulatory oversight of the Grays Harbor Energy Project. Information in this summary sheet is for discussion purposes only and does not necessarily reflect the views of EFSEC on matters related to air resources.

Background

On October 30, 2009, the Energy Facility Site Evaluation Council (EFSEC or Council) received a request from Grays Harbor Energy, LLC (GHE) to amend the existing Site Certification Agreement (SCA) for its Grays Harbor Energy Project (Project). (The Grays Harbor Energy Project was formally known as the Satsop Combustion Turbine Project.) The existing Project is a 650 megawatt natural gas-fired turbine power plant, which consists of two combustion turbine generators (Units 1 & 2), a steam turbine generator, and associated power generating equipment. GHE is seeking approval from EFSEC to expand the Project by adding two more combustion turbine generators (Units 3&4), another steam turbine generator, and associated power generating equipment.

This summary sheet addresses air quality issues for the existing and proposed Project.

This summary sheet describes:

1. The anticipated air impacts of the expansion.
2. Mitigation measures proposed to minimize or eliminate the anticipated impacts.

Characteristics of the existing and proposed Projects are described in GHE's summary sheets. Detailed information can be accessed at EFSEC's website listed at the end of this document.

Impacts of the Expansion to Air

1. Air issues during construction

The construction of Units 3 and 4 is not anticipated to result in any additional air pollutants beyond those of a normal large business construction site. Airborne dust from earth moving and construction equipment moving around the site is one of the issues planned for in the project and as part of construction contracts. To control dust during construction, water will be applied as

necessary to dusty areas, and access roads will be graveled or paved to avoid generating airborne dust and to avoid mud track out on to the public roads.

2. The Air Permitting Process

When Units 3 and 4 and their associated processes begin operation, it is important that the plant processes minimize their emissions to the atmosphere. This is accomplished by up front planning before construction, good construction of the equipment, and then followed up by careful operation of the finished plant. Part of the air permitting process is to determine the best way to reduce pollutant emissions from the plant when it operates. Both Federal EPA and Washington State air permitting regulations require that Best Available Control Technology (BACT) be incorporated into the design of Units 3 and 4. BACT requires use of the lowest polluting process equipment and add on controls available while taking into account energy, environmental, and economic impacts.

After pollutant emission rates are determined by the plant design criteria and the BACT process, the emissions are modeled to determine their impact on nearby areas, and on special Class I areas such as Olympic and Mt. Rainer National Parks. These modeled impacts are evaluated to make sure they meet federal requirements for areas outside of Class I areas and do not adversely impact the air quality in Class I areas. The acceptability criteria include:

1. Not allowing pollutant concentrations to exceed their National Ambient Air Quality Standard (NAAQS)
2. Not allowing pollutant concentrations to rise too close to their NAAQS (Increment analysis)
3. Assure that the plant's ambient pollutant concentration, visibility and deposition impacts within Class I areas are acceptable to the National Park Service and US Forest Service.

3. Plant Air Emission Controls

Emission units for the plant include two combustion turbines, one auxiliary boiler, a cooling tower, and diesel engines powering a firewater pump and emergency generator. The combustion turbines are the major emission source. The boiler is small, and used mainly during startup of the combustion turbines. It does not run during normal operations. The firewater pump and emergency generator engines are routinely tested to make sure they are ready to respond to an emergency, but do not run to support normal operations. The cooling tower runs continuously during normal operations. Its emissions are droplets of water called drift that are blown out the top of the tower. A mist eliminator condenses most of these droplets, but some droplets blow through it and into the air.

The BACT process resulted in the following emission controls being proposed in the draft permit:

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 NO _x combustor with SCR	2 ppmvd	Ultra-low NO _x 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	<15 ppm 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% oxygen. A 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

4. Modeled Impacts on Air Quality

The air in Grays Harbor County meets all federal and state air quality standards. The proposed emissions from the project were modeled using EPA Guideline models to estimate the impacts they would have on local air quality. Pollutants modeled are the ones listed in the BACT summary table above.. All modeled impacts of these pollutants were well within air quality standards. The modeled concentrations of the pollutants are below the EPA "level of interest" trigger called a Significant Impact Level (SIL), that requires an evaluation of the proposed project with all other emission sources in the area.

Emissions were also modeled for their long range impacts on Class I Areas. The Class I Areas closest to the project are Olympic and Mt. Rainier National Parks. Visibility degradation and deposition rate of pollutants are the two major impacts modeled. Modeling showed that these

impacts are measurable, but are small enough to be below “level of interest” trigger levels set in regulation, and are acceptable by the Federal Land Managers in charge of these parks.

The emissions of toxic pollutants were also estimated and modeled. Natural gas is the fuel burned by the combustion turbines. It is composed mostly of methane (a very simple organic compound with only one carbon atom) with a small fraction of other more complicated compounds like ethane and propane. When it burns, it does not have the ability to produce the more complicated toxic compounds that diesel oil or coal fuels do. Modeling showed that all toxic emissions were below the Washington State “level of interest” trigger called an Acceptable Source Impact Level.

Mitigation measures:

Along with requiring pollutant emissions to be minimized, EFSEC also requires that several other issues involved with air emissions from the project be mitigated. Two of these are greenhouse gasses, and noise.

1. Greenhouse Gas Emissions Mitigation

Greenhouse gas emissions are required to be mitigated by RCW chapter 80.70. 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 days after the start of commercial operation.

2. Noise Mitigation

The proposed acoustical design of Units 3 and 4 will include silencers placed within the air intake ductwork of the combustion turbines to reduce high-frequency compressor and turbine blade noise levels. In addition, acoustical enclosures will reduce casing radiated noise from the combustion turbines, steam turbines and other auxiliary support equipment. Turbine exhaust noise will be attenuated via the heat recovery steam generators (HRSGs) as well as by absorptive silencers placed either in the HRSG ductwork leading to the stacks or hung within the stacks themselves.

The proposed expansion will take advantage of the existing acoustical barriers along the northern and western property boundaries. If necessary, additional acoustical barriers may be erected along the northern and southern property boundary to control property line noise levels. Specifically, noise level measurements would be collected during performance testing (prior to commercial operation) and used to determine whether acoustical barriers are necessary, and if so, the optimal height, length and placement of any barriers.

Acoustical modeling indicates that based on this design, noise levels from the Grays Harbor Energy Center are expected to fully comply with applicable limits at residential receivers and adjacent industrial properties. The precise details and extent of any noise control measures

needed for the plant will be refined, if necessary, during the detailed engineering phase of Units 3 and 4, at a time when additional noise level data can be obtained from vendors, and when additional design details have been completed.

Additional Information

More specific information about the Project is available on EFSEC's Internet site at: http://www.efsec.wa.gov/Satsop_Amend%205.shtml, or you can call Jim LaSpina, EFSEC Siting Specialist at (360) 956-2047, or email: jim.laspina@commerce.wa.gov.