2.1

WAC 463-60-125 Proposal—Site description.

The application shall contain a description of the proposed site indicating its location, prominent geographic features, typical geological and climatological characteristics, and other information necessary to provide a general understanding of all sites involved, including county or regional land use plans and zoning ordinances.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, recodified as § 463-60-125, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-125, filed 10/8/81. Formerly WAC 463-42-180.]

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

2.1.1 LOCATION OF PMEC

The proposed Pacific Mountain Energy Center (PMEC) would be constructed within the North Port Marine Industrial Park at the Port of Kalama. The Port of Kalama is zoned for heavy industrial and is located north of the City of Kalama, within Cowlitz County, Washington. The site is located on the east bank of the Columbia River and both the Burlington Northern Santa Fe (BNSF) Railway and Interstate 5 (I-5) lie immediately to the east. The site can be accessed from I-5 via Exit 32. See Figure 2.1-1 for a general vicinity map and Figure 2.1-2 for a site vicinity map.

The approximately 95-acre site has access to a 1,600-foot dock on the deep draft Columbia River. The Kalama River is approximately 2500 feet to the south and is separated from the site by the Steelscape, Steel Coil Facility. Wetlands associated with the Kalama River are located on both the proposed PMEC site and other property owned by the Port of Kalama which is not part of the PMEC site.

The PMEC would include a 600 Megawatt (MW) Integrated Gasification Combined Cycle (IGCC) generation facility, rail spur and loop track, and natural gas pipeline. (See Section 2.3, Construction On Site, for a description.) The loop and siding track will consist of about 11,300 lineal feet for the loop (turnout on mainline, around the site, to loop closure) and about 4,500 feet of sidings for non-feed stock shipping and receiving, resulting in a total of about 15,800 lineal feet of new railroad track. It would connect to the Burlington Northern Santa Fe (BNSF) mainline railway, and would be adjacent to the mainline system for about 400-feet. The gas pipeline would be located mostly under Hendrickson Drive, within existing pipeline right-of-way, and would cross the Kalama River at the location of the existing vehicular bridge either by being hung on the underneath side of the bridge, or drilled beneath the river. The pipeline would be approximately 5 miles in length and would extend from the plant site near Exit 32 south to Exit 27 on the west side of I-5 (see Figure 2.1-2).

The Cowlitz County Public Utility District (PUD) would construct high voltage transmission lines, utilizing an existing corridor of approximately 12 miles. The PMEC would use the Port of Kalama-owned dock, providing access to the Columbia River. The Port of Kalama has received a permit to extend the existing 600-foot dock to a length of approximately 1,600 feet. Both the transmission line and dock are outside the scope of this project.

2.1.2 PROMINENT GEOGRAPHIC FEATURES

There are no prominent geographic features on the site. The site is fairly level with patches of brush, grass, sand, and soil piles. See Figure 2.1-3 for existing site conditions.

The site is located along the east bank of the Columbia River. The proposed gas pipeline crosses one major river, the Kalama River. The rail spur would require the filling of approximately 4 acres of wetlands. (See Section 3.5 for a discussion of wetland impacts.)

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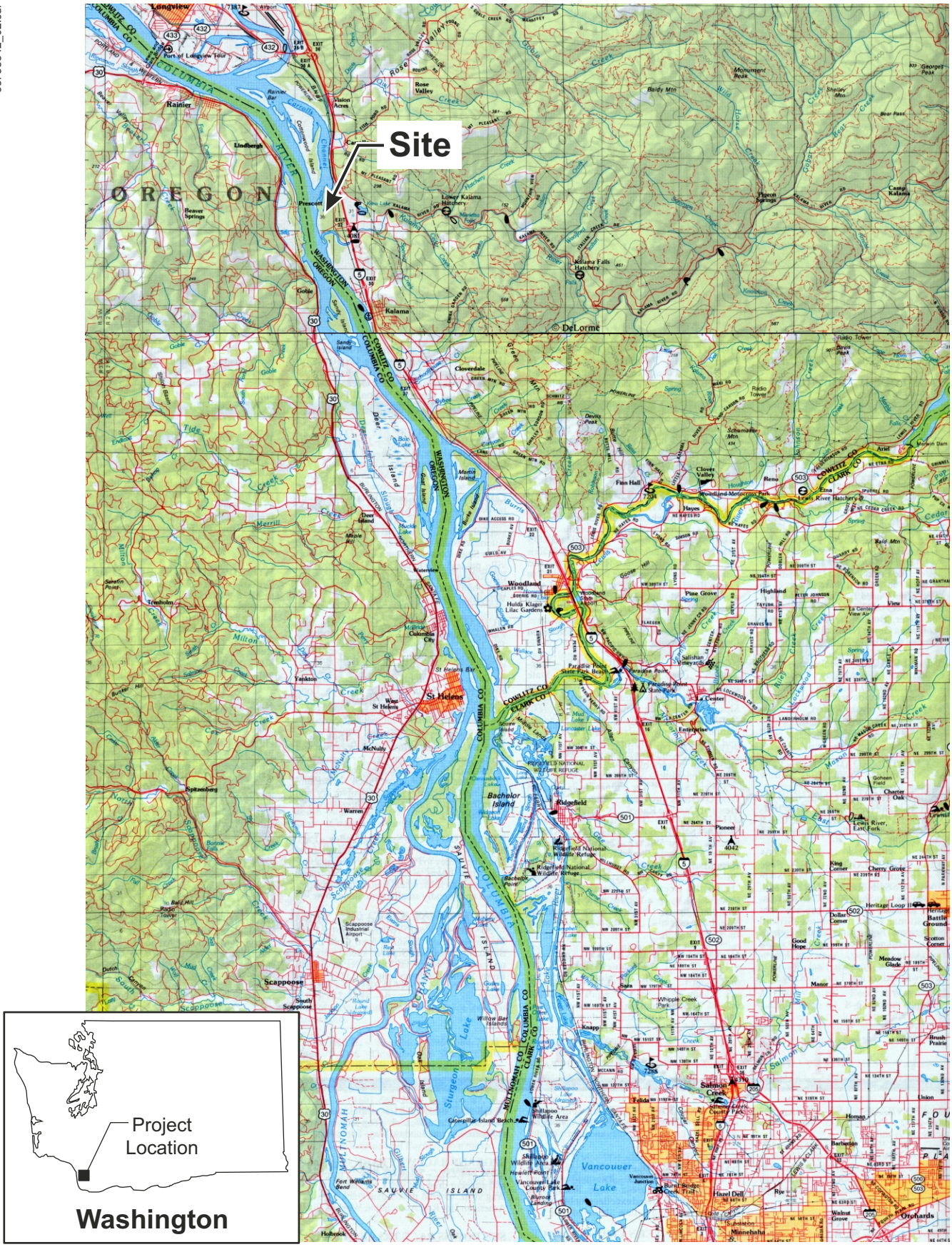

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Figure 2.1-1
General Vicinity

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Figure 2.1-2
Site Vicinity Map

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Legend

- Water test well
- Fence
- Subject property

Job No. 33758342

Figure 2.1-3

Existing Site Conditions

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2.1.3 TYPICAL GEOLOGICAL AND CLIMATOLOGICAL CHARACTERISTICS

The following summarizes the geological and climatological characteristics of the site. For a more complete discussion of site geology, please see Section 3.1 Earth.

2.1.3.1 Geology

Prior to 1979, the proposed plant site was owned by the BNSF Railroad and was undeveloped range land used primarily for cattle grazing. The Port of Kalama acquired the site in April 1979. Following the eruption of Mount Saint Helens in 1980, the United States Army Corps of Engineers (USACE) conducted emergency dredging of the Columbia River, and the spoils from this activity were deposited at the site as fill. Since 1980, the site continued to receive spoils from regular maintenance dredging of the Columbia River for safe navigation (Hart Crowser, 1995a). As of 1995, dredge spoils constituted a layer of fill ranging from approximately 6 to 16 feet thick draped across the site (Parametrix, 1995 and Hart Crowser, 1995b).

The dredge spoils consist principally of fine- to coarse-grained sand with varying amounts of silt and entrained pumice. The placement of this material was estimated to have raised the site ground surface by upwards of 10 feet or more in certain areas. The topography at the site has remained relatively flat over the course of the dredging operations. Site elevations range from a high of approximately 24 feet above mean sea level (ft-MSL) to as low as 18 ft-MSL near the bank of the Columbia River (Parametrix, 1995), and are approximately 22 ft-MSL across the site. Beneath the dredged fill are Quaternary alluvial deposits composed principally of silt with some clay and lentincular, sand-dominated interbeds containing gravel, organic matter, and volcanic ash. These alluvial deposits may be greater than 300 feet thick near the mouth of the Kalama River and are underlain by basalt bedrock of the Columbia River Group at depth (Evarts, 2002 and Parametrix, 1995). The alluvium is bounded by Tertiary sedimentary and volcanic/volcaniclastic rocks that form relatively steep walls on both sides of the Columbia River (Evarts, 2002).

The shallow hydrogeology of the site vicinity is relatively simple. Precipitation is infiltrated into the groundwater system by percolation or else runs off as surface discharge (Myers, 1970). Groundwater has been encountered beneath the site at depths ranging from 8 to 20 feet below ground surface (bgs) (Hart Crowser, 1995a/1995b). Groundwater table elevations are likely influenced by the stage of the Columbia and Kalama rivers, given the site's proximity to the rivers and associated tidal flats. Groundwater flow is also influenced by the rivers, and is therefore inferred to be westerly beneath the site, parallel to the drainage of the Kalama River into the Columbia.

2.1.3.2 Climate

Cowlitz County has a predominately temperate climate characterized by cool, but rarely freezing winters and moderately warm summers. Precipitation is common throughout the year, with the exception of summer when rainfall is light and infrequent. The climate is tempered by wind from the Pacific Ocean.

Temperature and precipitation data was recorded at Longview, Washington from 1951 to 1981. The average winter temperature is 41 degrees Fahrenheit (°F) with an average daily minimum of 34 °F. The average temperature is 63 °F in the summer with an average daily maximum of 75 °F.

The total annual precipitation is 46 inches at Longview, of which 25 percent falls between April and September. The average seasonal snowfall is 6 inches at Longview. The number of days on average with at least 1 inch of snow on the ground is 3; however, this varies greatly from year to year. In most winters, one or two storms bring strong winds. These storms can be accompanied by heavy rains which result in substantial flooding.

Precipitation values based on 1971 – 2000 Kalama Falls Hatchery, Washington data from Western Regional Climate Center Internet Site www.wrcc.dri.edu, indicate much higher precipitation levels for Kalama. Based on Portland and Kalama historical meteorological records, Table 3.2-4 in Section 3.2, Air, presents the average relative humidity in the morning and afternoon, average monthly precipitation, and the average number of days with heavy fog per month. The site has an annual average total of 68 inches of precipitation. Most of the precipitation falls as rain during the winter months.

Prevailing winds are from the south-southwest, with the highest average wind speed in the spring. Please refer to Section 3.2 for additional meteorological information.

2.1.4 LAND USE PLANS AND ZONING ORDINANCES

A full description of the applicable comprehensive plans, zoning, and development regulations and other land use programs relevant to the PMEC is included in Section 4.2.1, Land and Shoreline Use.

The site, proposed rail spur and loop, and gas pipeline are within Cowlitz County with the exception of a small portion of the gas pipeline which would be located within the boundaries of the City of Kalama. The site, including the land for the rail spur, is zoned heavy industrial. The use is allowed within the industrial zoning district subject to compliance with the Cowlitz County Critical Areas Ordinance, Shoreline Master Program, and Floodplain Management Program. The industrial zone is governed by and consistent with industrial land use policies outlined in the Cowlitz County Comprehensive Plan. The Cowlitz County Comprehensive Plan, goals and policies are discussed in Section 4.2.1.

The natural gas pipeline would be located on unzoned lands within Cowlitz County and land zoned industrial within the City of Kalama. The applicable City of Kalama Comprehensive Plan, goals and policies are discussed in Section 4.2.1.

2.2

WAC 463-60-135 Proposal—Legal descriptions and ownership interests.

(1) Principal facility. The application shall contain a legal description of the site to be certified and shall identify the applicants and all nonprivate ownership interests in such land.

(2) Associated and transmission facilities. For those facilities described in RCW 80.50.020 (6) and (7) the application shall contain the legal metes and bounds description of the preferred centerline of the corridor necessary to construct and operate the facility contained therein, the width of the corridor, or variations in width between survey stations if appropriate, and shall identify the applicant's and others' ownership interests in lands over which the preferred centerline is described and of those lands lying equidistant for 1/4 mile either side of such center line.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-135, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1). 83-01-128 (Order 82-6), § 463-42-135, filed 12/22/82. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-135, filed 10/8/81. Formerly WAC 463-42-190.]

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

2.2.1 INTRODUCTION

The Pacific Mountain Energy Center (PMEC) is an Integrated Gasification Combined Cycle (IGCC) power generating facility to be constructed at the Port of Kalama in Washington State. PMEC would consist of a solid fuel gasification complex providing synthesis gas to two independently dispatched 300 MW combined cycle combustion turbine power plants. Energy Northwest, a municipal corporation and joint operating agency operating in the State of Washington, is developing PMEC and will own 50% of the gasification complex and one of two 300 MW combined cycle combustion turbine power plants. Pacific Mountain Energy Group, LLC (PMEG, LLC), a Washington State, Limited Liability Corporation, will own the other 50% of the gasification complex and one of the combined cycle combustion turbine power plants.

The PMEC would be constructed on an approximately 95-acre site within a portion of the Southwest Quarter and Northwest Quarter of Section 31, Township 7 North, Range 1 West and in the Southeast Quarter and Northeast Quarter of Section 36, Township 7 North, Range 2 West, Willamette Meridian, Cowlitz County, Washington. The site is owned by the Port of Kalama. Energy Northwest entered into a lease for the property in 2005 and has the option to continue the lease for fifty years, with an option to extend for an additional term of thirty years.
Ancillary facilities (RCW 80.50.020 [7]) include a natural gas pipeline and railroad spurs, both of which are part of this Application. The operation of the natural gas pipeline would be under the jurisdiction of the Washington Utilities and Transportation Commission (WUTC). The railroad spurs would connect the PMEC's rail line loop to the BNSF main line tracks.

2.2.2 LEGAL DESCRIPTION OF PROPERTY AND EASEMENTS

2.2.2.1 PMEC Site Legal Description (including Rail Spur and Loop Line)

A parcel of land located in a portion of the Southwest Quarter and Northwest Quarter of Section 31, Township 7 North, Range 1 West and in the Southeast Quarter and Northeast Quarter of Section 36, Township 7 North, Range 2 West, Willamette Meridian, Cowlitz County, Washington;
Beginning at the Southwest corner of said Southwest Quarter of Section 31;

Thence North 01°27'37" East, along the East line of said Section 36, for a distance of 1609.05 feet to the **TRUE POINT OF BEGINNING**;

> Thence South 88°26'23" East, for a distance of 286.01 feet;
>
> Thence North 01°33'37" East, for a distance of 785.94 feet;
>
> Thence, along the arc of a 623.80 foot radius non-tangent curve to the left for an arc distance of 450.32 feet, through a central angle of 41°21'42", the radius of which bears North 05°04'55" West, the long chord of which bears North 64°14'14" East for a chord distance of 440.60 feet;

Thence South 84°02’35” East, for a distance of 170.26 feet;

Thence North 00°53’42” West, for a distance of 385.34 feet;

Thence North 15°32’40” East, for a distance of 208.69 feet;

Thence North 00°36’20” East, for a distance of 99.04 feet;

Thence North 86°14’46” West, for a distance of 385.32 feet;

Thence North 84°10’25” West, for a distance of 275.74 feet;

Thence North 86°02’16” West, for a distance of 277.84 feet;

Thence North 81°32’34” West, for a distance of 1552.94 feet

Thence South 37°15’00” West, for a distance of 375.00 feet;

Thence South 13°55’47” West, for a distance of 538.37 feet;

Thence South 01°38’52” West, for a distance of 401.98 feet;

Thence South 40°05’46” East, for a distance of 462.77 feet;

Thence South 83°478’11” East, for a distance of 500.40 feet;

Thence South 01°33’35” West, for a distance of 276.40 feet;

Thence South 88°26’23” East, for a distance of 1128.19 feet
To the **TRUE POINT OF BEGINNING;**

Containing 92.73 acres, more or less.

Together with and subject to easements, reservations, covenants and restrictions apparent or of record.

See Figure 2.2-1 for survey drawing of the site.

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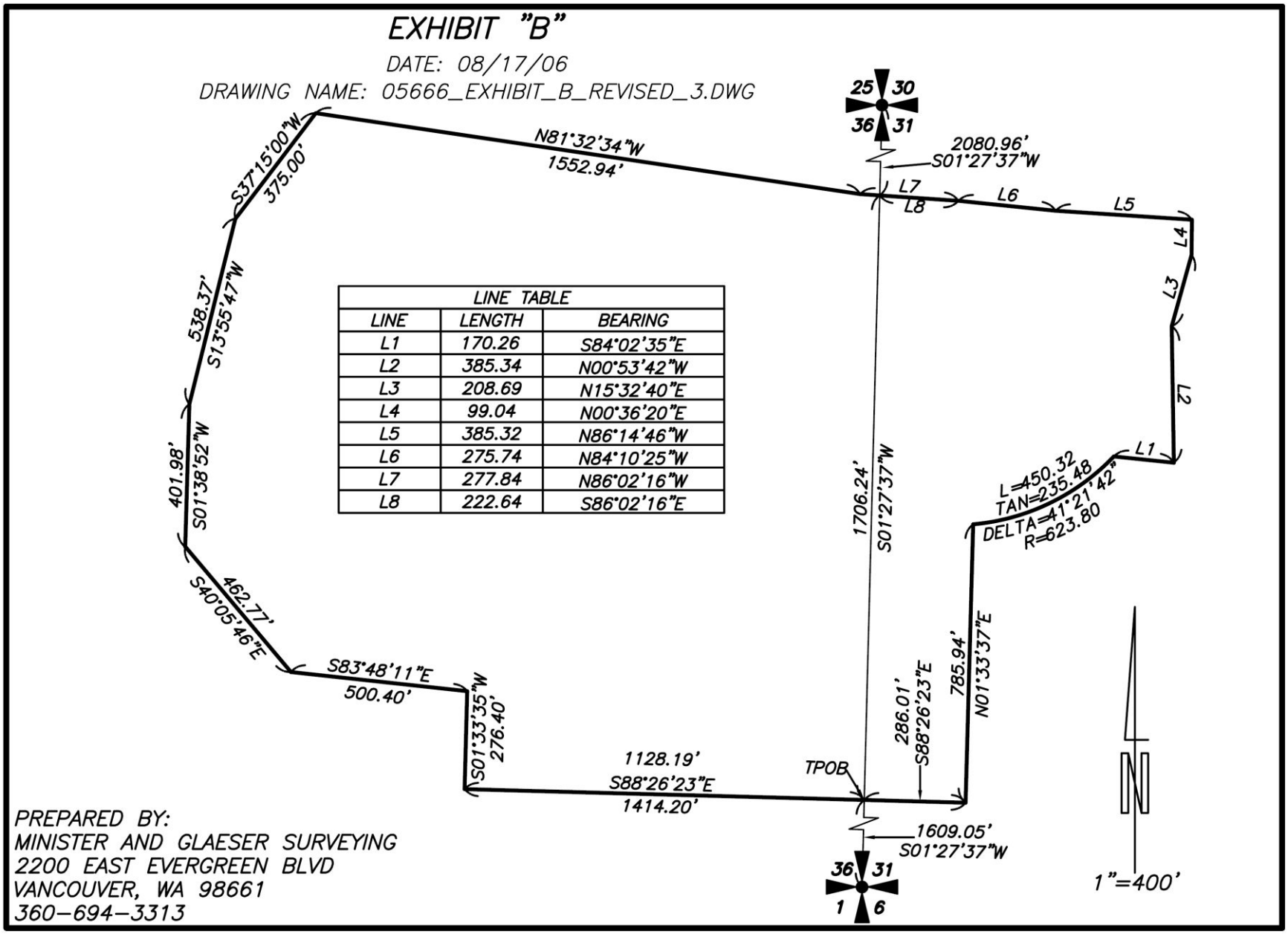

LINE TABLE		
LINE	LENGTH	BEARING
L1	170.26	S84°02'35"E
L2	385.34	N00°53'42"W
L3	208.69	N15°32'40"E
L4	99.04	N00°36'20"E
L5	385.32	N86°14'46"W
L6	275.74	N84°10'25"W
L7	277.84	N86°02'16"W
L8	222.64	S86°02'16"E

Figure 2.2-1
Survey Drawing

Job No. 33758342

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Kalama, Washington

2.2.3 NATURAL GAS PIPELINE

The pipeline would be primarily located within the paved area of Hendrickson Drive, located through Section 31, Township 7 North, Range 1 West, Willamette Meridian, Cowlitz County, Washington, and through Sections 6, 7, 17, 18, 20 and 29, Township 6 North, Rage 1 West, Willamette Meridian, Cowlitz County, Washington.

The exact location of the pipeline has not been completed. A surveyed drawing and legal description of the preferred centerline of the natural gas pipeline will be provided to the Washington State Energy Facility Site Evaluation Council (EFSEC) after final engineering has been completed for the pipeline and no later than six months prior to the anticipated beginning of construction.

2.2.4 PROOF OF LEASE

See Appendix A for a copy of the lease between Energy Northwest and the Port of Kalama.

2.3

WAC 463-60-145 Proposal—Construction on site.

The applicant shall describe the characteristics of the construction to occur at the proposed site including the type, size, and cost of the facility; description of major components and such information as will acquaint the council with the significant features of the proposed project.

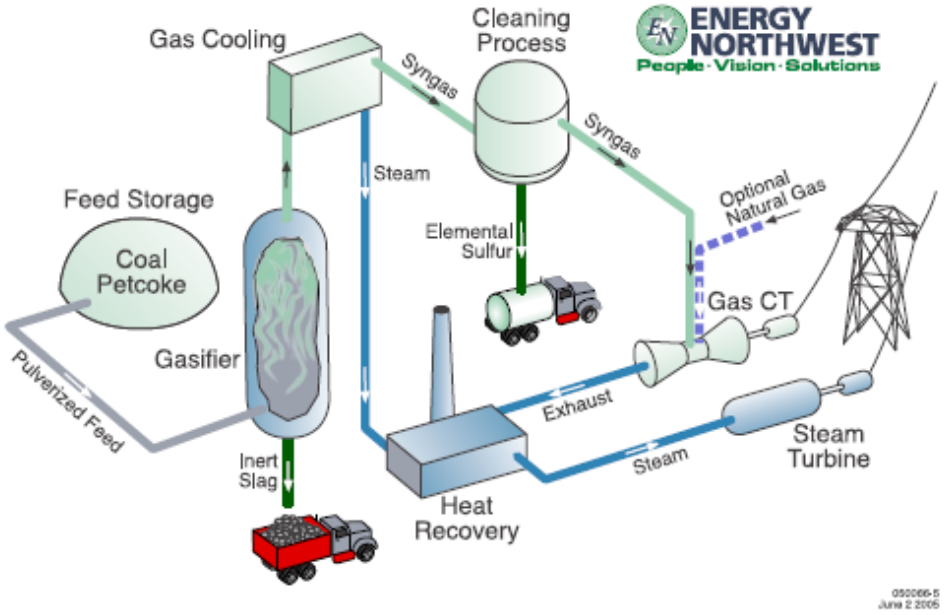
[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, recodified as § 463-60-145, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-145, filed 10/8/81. Formerly WAC 463-42-210.]

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

2.3.1 PACIFIC MOUNTAIN ENERGY CENTER SUMMARY

BEnergy Northwest is proposing to construct and operate the Pacific Mountain Energy Center (PMEC), an Integrated Gasification Combined Cycle (IGCC) development, which would gasify petroleum coke or coal to power two 300 MW combined cycle combustion turbine electric power generating plants.

In the gasification process, petroleum coke, coal, or blends of petroleum coke and coal are pulverized and transported into a pressurized vessel (the gasifier) along with sub-stoichiometric amounts of purified oxygen. In the gasifier, controlled reactions take place, thermally converting feed stock materials into a low British Thermal Unit (BTU) gaseous fuel known as synthesis gas or syngas. The syngas is cooled, cleaned of contaminants, and then combusted in a combustion turbine, which is directly connected to an electric generator. A simplified view of the process is shown below.



IGCC
Gasification Process

The electric power generating plants would have two sources of power generation – a combustion turbine-generator (CTG) and a steam turbine generator (STG). The expansion of hot combustion gases inside the combustion turbine creates rotational energy that spins the generator and produces electricity. The hot exhaust gases exiting the CTG pass through a heat recovery steam generator (HRSG), a type of boiler where steam is produced. The resulting steam is piped to a steam turbine that is connected to an electric generator. The expansion of steam inside the steam turbine spins the generator to produce an additional source of electricity.

The gasification process is integrated with the combined cycle electric power generating plant to improve efficiencies and optimize performance. The combined process is known as IGCC, an inherently lower polluting technology application to produce electricity from solid feed stocks. Additionally, the PMEC would have the capability of using natural gas as a back up fuel for the electric power generating plants.

The total estimated cost of the PMEC at the completion of construction would be over $1 billion, which includes the gasifiers, power plants, and associated equipment; the natural gas pipeline; and the railroad spur and loop track. Energy Northwest estimates that the annual operating and maintenance costs would be approximately $38 million, including the following:

- Wages and salaries of operation, maintenance, and administrative personnel,
- Procurement of goods and services,
- Insurance, and
- Sales and other state and local taxes.

Process water would be supplied from the Port of Kalama, and would be treated as necessary to meet plant specifications. Process effluent would be discharged through the Port of Kalama's discharge line and outfall, which would be upgraded to accommodate the additional from the PMEC. Potable water would be supplied by the City of Kalama in lines that have already been installed for the site. Sanitary wastewater would be discharged to the Port of Kalama's wastewater treatment plant located to the southeast of the PMEC.

The fuel primarily would be petroleum coke, coal, or combinations of the two, with natural gas as a back up. Petroleum coke and coal would be supplied either by rail or ship. Natural gas would be supplied by a pipeline, which would connect with Williams Northwest Pipeline Corporation's line at or near the Deer Island meter station located on the south end of the Port of Kalama.

- From a visual perspective, the dominant structures on site include the following:
- Combustion Turbine Generators (approximately 100 ft. by 30 ft. by 20 ft. high),
- Steam Turbine Generators (approximately 100 ft. by 30 ft. by 40 ft. high),
- Air Separation Unit Building (approximately 300 ft. by 250 ft. by 30 ft. high),
- Heat Recovery Steam Generators (approximately 150 ft. by 40 ft. by 80 ft. high),
- Feed Stock Feed Bins (approximately 40 ft. by 40 ft. by 80 ft. high),
- Cooling Towers (approximately 400 feet by 120 feet by 40 feet high),
- Gasification Block (approximately 120 feet by 240 feet by 200 feet high)
- Exhaust Stacks (approximately 120 feet high by 12 feet in diameter),
- Feed Stock Storage Buildings(approximately 500 feet in diameter x 80 feet tall, and
- Flare Enclosure (approximately 35 feet in diameter by 80 feet high).

Actual dimensions of these structures would not be determined until engineering is completed.

Various numeric values are provided throughout this description. These values are used to indicate relative magnitudes or sizes. In all cases, they are rounded and therefore not the exact values. Exact values would be available only after detailed design of the PMEC is completed.

2.3.2 SITE ARRANGEMENT

The PMEC would be located on an approximately 95-acre site in Cowlitz County, Washington, and along the Columbia River. The conceptual plot plan identifying important equipment and processes is presented in Figure 2.3-1. The development would be constructed within the North Port Marine Industrial Park at the Port of Kalama. The development site is located on the east bank of the Columbia River and both the BNSF and Union Pacific (UP) joint railway and Interstate 5 (I-5) lie immediately to the east. The property to the south is leased from the Port of Kalama by Steelscape, Inc. a steel coil facility. To the north is a backwater channel of the Columbia River.

2.3.3 MAJOR EQUIPMENT LIST

Following are the major pieces of equipment or systems for the PMEC:

- Feed Stock Feed Bins,
- Feed Stock Storage Buildings,
- Gasifiers,
- COS Hydrolysis Unit ,
- Acid Gas Removal System (AGR),
- Selexol™ System,
- Mercury Removal System,
- Sulfur Recovery Unit (SRU),
- Air Separation Unit (ASU),
- Tank Vent Collection and Boiler System,
- Sour Water Treatment,
- Auxiliary Boiler,
- Combustion Turbine Generators (CTG),
- Steam Turbine Generators (STG),
- Heat Recovery Steam Generators (HRSG),
- Cooling Towers,
- Flare Enclosure, and
- Emergency Diesel Engines.

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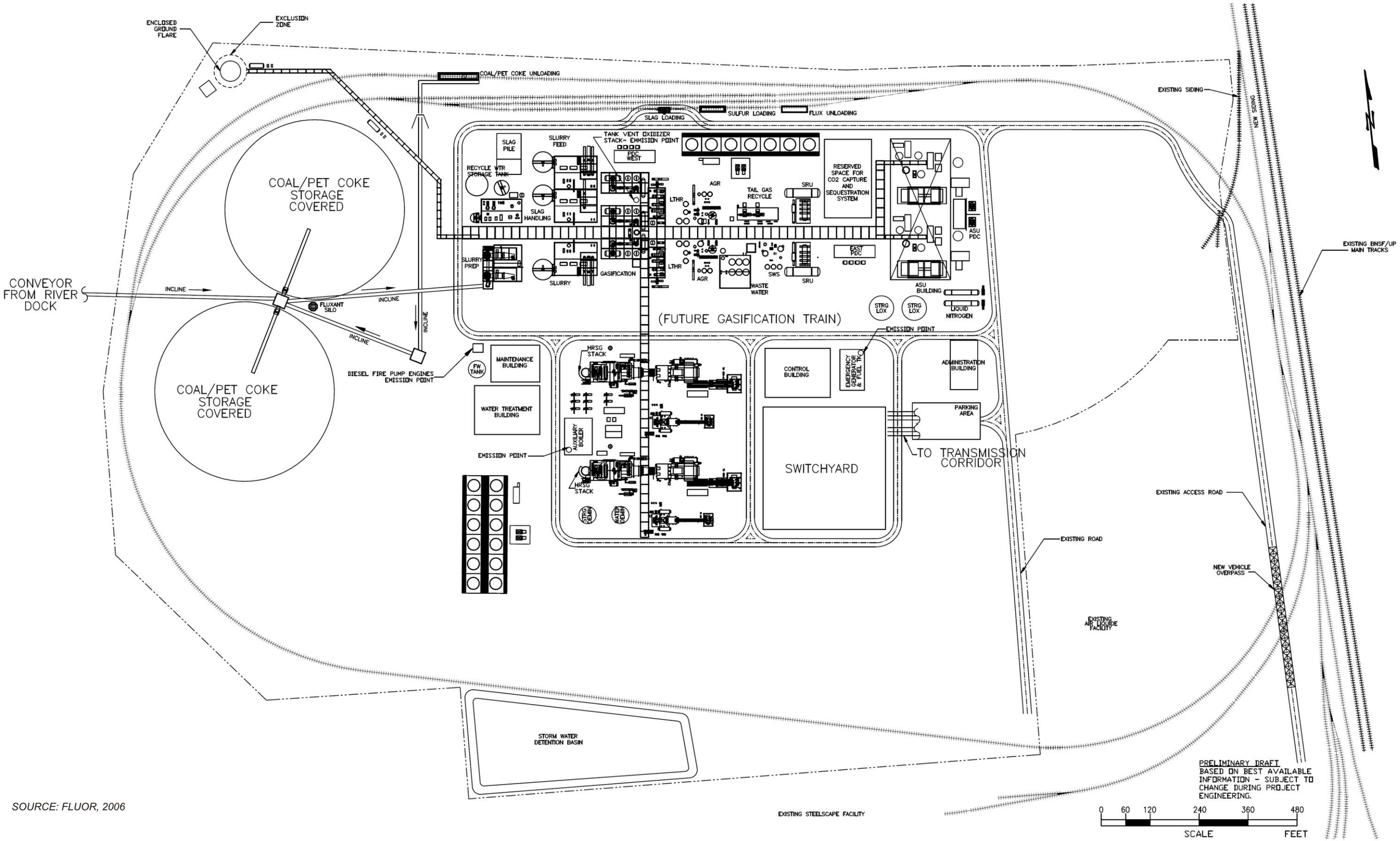

SOURCE: FLUOR, 2006

Job No. 33758342

Figure 2.3-1
Conceptual Plot Plan

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Kalama, Washington

2.3.4 PMEC RENDERING

Figure 2.3-2 presents a computer simulation of the proposed PMEC showing the major components. This illustration includes the major facilities/systems, including the gasifiers, water pretreatment/office, fuel storage, conveyors, rail loop, cooling tower, ASU, feed stock preparation area, wastewater treatment facility, switchyard, gas cleaning area, inert slag storage, CTG, STG and HRSG. The Port of Kalama's North Port pier is also shown on this simulation; however its actual location is to the south of the PMEC.

2.3.5 PMEC CONFIGURATION AND PERFORMANCE

Energy Northwest is presently in discussion with major vendors of the IGCC technology for engineering, procurement, and construction of the PMEC. The gasification process that Energy Northwest has used for analysis purposes in this application is based upon the 262 MWe (net) Wabash River Coal Gasification Repowering PMEC ("Wabash River") in Terre Haute, Indiana. The Wabash River plant was built under the United States Department of Energy's (USDOE) Clean Coal Technology Program (predecessor to the Clean Coal Power Initiative,[CCPI]) and has been in operation since 1995. Following its construction, the USDOE funded studies of potential performance and technological upgrades, and nearly 1,600 design and operational lessons learned from Wabash River have been identified. Based in part on the DOE studies and the lessons learned from the Wabash River facility, the PMEC would integrate numerous design improvements that represent a substantial advance in the original Wabash River technology, design, and systems integration. The PMEC would incorporate the following features and technologies in its improved IGCC process:

- Improved Environmental Performance – The PMEC would improve upon Wabash River's results by deploying processes and technologies that would make it among the cleanest coal-based power generating plants in the world. Emission levels for criteria pollutants (sulfur dioxide [SO_2], nitrogen oxides [NOx], carbon monoxide [CO], volatile organic compounds [VOCs], particulate matter [PM], and mercury [Hg]) are expected to be equal to or below those now considered to represent the lowest emission rates for utility-scale, solid fuel-based generation fueled by similar feed stocks. In addition, carbon dioxide (CO_2) emissions are expected to be significantly lower than the current average for U.S. coal-based power plants when fueled by similar feed stocks, due to the higher efficiency of the IGCC process.
- Increased Capacity – By more than doubling the generating capacity of Wabash River with a two-train design, the PMEC would demonstrate the economies of scale attainable at larger commercial operations.
- Improved Efficiency – The PMEC would incorporate advances to improve efficiency, including optimization of the fuel inputs into each stage of the gasifier. Two gasifiers would be operated simultaneously to supply two CTGs and two STGs, each coupled directly to its own generator.

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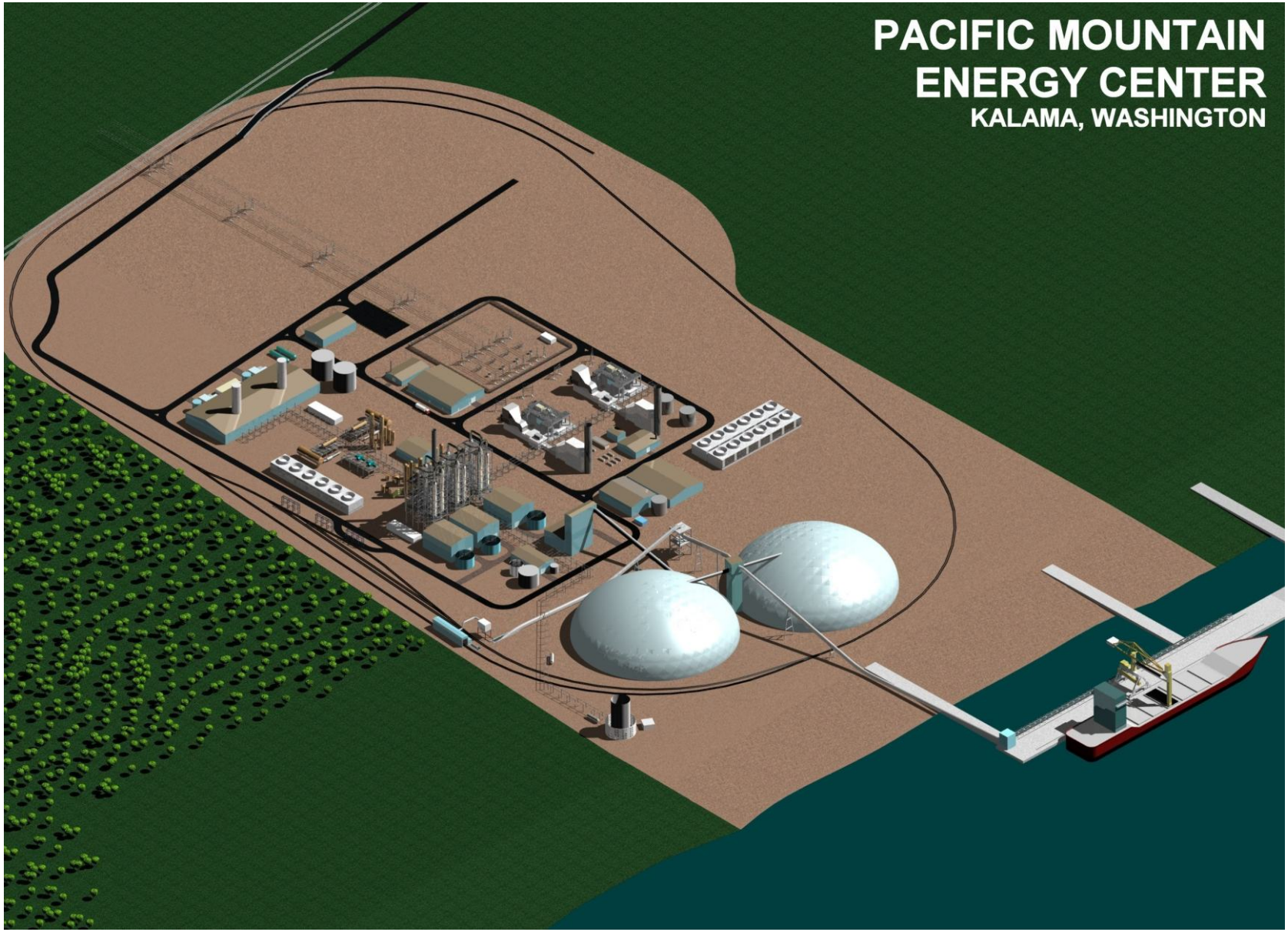

Figure 2.3-2

Model of the Pacific Mountain Energy Center

Job No. 33758342

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Pacific Mountain Energy Center
Kalama, Washington

- Integrated ASU – The PMEC would extract bleed air from the CTG's air compressor to reduce the parasitic load of the main air compressor in the ASU, increasing net plant output and reducing capital cost. Nitrogen extracted from air entering the ASU would be recycled for injection into the CTG to reduce formation of NOx by reducing the flame temperature of the combustor and the time that combustion gases remain at elevated temperatures. The injection of recycled nitrogen into the CTG would also increase power output.
- Fuel Flexibility – The PMEC would demonstrate greater feed stock flexibility with the capability of gasifying petroleum coke, a high Btu refinery waste product created during the processing of crude oil into gasoline, jet fuel, and other useful products, bituminous coal (such as Illinois No. 6), sub-bituminous coal (such as Powder River Basin [PRB]), and other blend combinations of these feed stocks.
- Improved Availability – The PMEC, with a spare gasification train, would achieve significantly improved availability over Wabash River, and have the ability to operate during extended gasification vessel maintenance periods resulting in the same availability as other base load plants.

2.3.6 GASIFICATION PROCESS DESCRIPTION

2.3.6.1 Fuel Preparation

Solid fuel at the PMEC would be placed on a weigh belt feeder and directed to a rod mill where it would be ground and fed into the gasifier or mixed with treated recycled water and slag fines that are recycled from other areas of the gasification plant and fed into the gasifier. Tanks, drums and other areas of potential atmospheric exposure of the fuel would be covered and vented into the tank vent collection system for emission control. The entire feed stock grinding and preparation facility would be paved and curbed to contain spills, leaks, wash down, and storm water runoff. A trench system would carry this water to a sump where it would be pumped into the recycle water storage tank. Figure 2.3-3 presents a schematic of the proposed fuel preparation process.

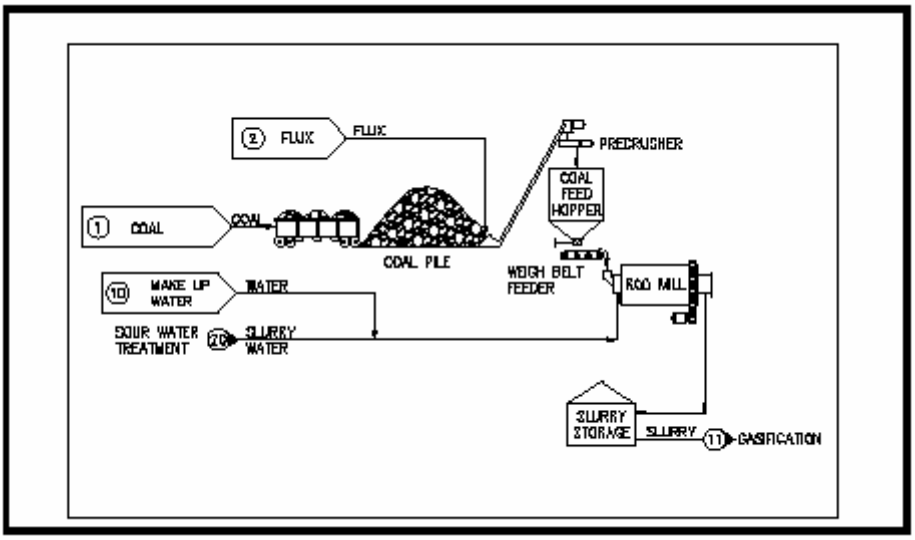


Figure 2.3-3
Feed stock Grinding and Slurry Preparation

Pacific Mountain Energy Center
Kalama, Washington

2.3.6.2 Gasification

Feed stocks at the PMEC would be exposed to sub-stoichiometric quantities of oxygen at an elevated temperature and pressure. Oxygen and preheated slurry would be fed to the gasifier. Oxygen feed rate to the nozzles would be carefully controlled to maintain the gasification temperature above the ash fusion point to allow good slag removal and high carbon conversion. The feed stock would be almost totally gasified in this environment to form syngas consisting principally of hydrogen (H), CO, carbon dioxide (CO_2), and water.

Sulfur in the fuel would be converted to primarily hydrogen sulfide (H_2S), with a small portion converted to carbonyl sulfide (COS). With the processing provided downstream, over 99% of the sulfur would be removed from high sulfur feed stocks; over 97% of the sulfur would be removed from low-sulfur, feed stocks. This 97% removal rate from low sulfur fuel results in approximately equal sulfur emissions rates as the higher removal rate from higher sulfur fuel. In other words, the final SO_2 emission rate achieved is independent of the starting sulfur concentration in the feed stock. Therefore the percentage of SO_2 removed from a higher sulfur fuel that exhibits the same SO_2 emission rate as a lower sulfur fuel, would show a higher percentage removal rate.

Mineral matter in the feed stock and any added flux would form a molten slag. The characteristics of the slag produced in the gasifier would vary with the mineral matter content of the feed stock. Solidified slag would be removed and crushed, and then would flow as a slag/water slurry that is directed to a dewatering and handling area. Raw syngas would be generated in the first stage and flow up to the second stage.

Typically, the ash content of petroleum coke is expected to average about 0.6% as received, and the ash content of coal is expected in the range of 5-11% as received. Slag production at full load would vary from about 465 tons per day up to a maximum of about 774 tpd per gasifier. The slag would be conveyed from the slag dewatering unit to the slag storage pile using covered conveyors. The storage area would be provided with dust suppression systems. The slag from the storage area would then be conveyed to rail cars or trucks for transport to market or storage.

Certain metals present in the feed stocks in trace quantities and volatile at the temperatures typical of the gasifier may be carried out in their gaseous state as components of the syngas, and removed in the cleanup stage.

The slag/water slurry would flow continuously into a dewatering bin. The bulk of the slag would settle out in the bin while water overflows into a basin in which the remaining slag fines would settle. The clear water from the settler would pass through heat exchangers where it would be cooled as the final step before being returned to the gasifier quench section. Dewatered slag would be transferred to the slag storage area to be loaded into trucks or rail cars for transport to market or storage. The slurry of fine slag particles from the bottom of the settler would be recycled to the slurry preparation area to be fed back into the gasifier, ensuring maximum carbon utilization.

2.3.6.3 Syngas Cleanup and Desulfurization

The next two steps in the proposed process would be to cool the syngas and then remove the PM for recycle to the gasifier. The hot raw syngas (with entrained PM) exiting the gasifier system would be cooled in the syngas cooler, converting a significant portion of the heat from the gasifier to high pressure steam for use in power generation.

Particulate Matter Removal

After cooling, the syngas would be directed to the PM removal system. The gas would flow first through a hot gas cyclone for removal of relatively large particulate matter and then pass to the particulate matter filter. The filter vessel would contain numerous porous filter elements to remove particulate matter. The cleaned syngas would exit the unit as a particle free syngas. PM removal efficiency is expected to be better than 99.9%. Removed PM from both the hot gas cyclone and the dry filter vessel would be recycled to the first stage of the gasifier to improve carbon conversion efficiency. With the PM being recycled to the gasifier from both devices, near complete gasification of the carbon content of the feed stock is obtained. The particle free syngas would proceed to the low temperature heat recovery system.

Syngas Scrubbing, COS Hydrolysis and Low Temperature Heat Recovery

With PM removed from the syngas, additional gas cleanup and cooling steps can more easily be performed. The syngas would be scrubbed with recycled sour water (water with dissolved sulfur compounds and other contaminants condensed from the syngas) to remove chlorides and trace metals and reduce the potential of equipment corrosion and formation of undesirable products in the Selexol^{R} or equivalent AGR system.

A COS hydrolysis unit would be provided to achieve a high level of sulfur removal. The purpose of the COS hydrolysis step is to convert the small amount of COS in the syngas to H_2S, which can then be efficiently removed in the Selexol^R or equivalent system. After hydrolysis, the syngas would be cooled in process heat exchangers to efficiently utilize the available relatively low-temperature heat. Most of the ammonia (NH_3) and a small portion of the CO_2 and H_2S present in the syngas would be absorbed in the water condensed by this cooling step. Additionally, some of the trace metals that remained in their gaseous state during the particulate matter removal process would condense. The water would then be collected and sent to the sour water treatment unit. The cooled sour syngas would be fed to the Selexol^R or equivalent system where the sulfur compounds are removed to produce a low sulfur product syngas.

Acid Gas Removal System

The typical AGR system contacts the cool sour syngas with an aqueous solution of methyl-diethanolamine (MDEA), an amine absorbent that removes the H_2S to produce a clean product syngas. MDEA chemically bonds with H_2S, with a bond that can be easily broken with low level heat in order to regenerate the absorbent. H_2S is absorbed from the syngas by contacting the gas with MDEA solution within the H_2S absorber column. A portion of the CO_2 is also absorbed as well. The H_2S-rich MDEA from the bottom of the absorber flows to a cross heat exchanger to recover heat from the hot lean MDEA coming from the stripper. The heated-rich MDEA is then directed to the H_2S stripper where the H_2S and CO_2 are removed at near atmospheric pressure. A concentrated stream of H_2S and CO_2 exits the top of the H_2S stripper and flows either to the carbon-capture system or directly to the SRU. The lean MDEA is pumped from the bottom of the stripper to the heat exchanger. The lean MDEA is further cooled before being stored and then recirculated to the absorber. This unit would be a totally enclosed process with no discharges to the atmosphere.

Potential Carbon Capture Retrofit

The PMEC would be designed to be carbon capture ready. This carbon capture ready design would be accomplished by upgrading the amine AGR system to a Selexol^R or equivalent process that removes additional sulfur and enables bulk CO_2 removal. The Selexol^R or equivalent system has a potential to provide a 14% reduction in CO_2 by removing CO_2 from syngas. CO_2 captured with the Selexol^R or equivalent system could be sold as a commodity for use in carbonated beverages or as dry ice. The PMEC facility design concept includes the appropriate connection points, piping and vessel sizing and equipment location areas as well as production capacity for the later addition of equipment needed to capture and compress essentially all of the pre-combustion CO_2 produced by PMEC. This additional equipment would be required to support a future CO_2 treatment and transport system that would be needed to complement a carbon sequestration program. This capture would come at a decrease in capacity and an increase in heat rate.

Energy Northwest is a member of the Big Sky Regional Carbon Sequestration Partnership, (one of seven regional partnerships funded by the USDOE's National Energy Technology Laboratory Regional Carbon Sequestration Partnership Program), led by Montana State University. The Partnership's primary geologic effort is to demonstrate mineralization processes and carbon

storage in mafic/basalt rock formations, a geology not yet well characterized but with significant long-term storage potential in the region. (See Section 2.11 for additional information.

Mercury Removal and Moisturization

After removing the sulfur, the syngas would pass through fixed beds of activated carbon that are specially impregnated to remove Hg. Multiple beds would be used to obtain optimized adsorption. The lower temperature and lower moisture content of the syngas after the Selexol^R or equivalent would allow the carbon beds to operate at higher efficiencies. The activated carbon capacity for Hg ranges up to 20% by weight of the carbon. The Hg removal system would guarantee to remove enough mercury from the syngas so that the Hg content of the syngas fuel would be no more than 10% of the mercury contained in the solid IGCC feed stock. After Hg removal, the product syngas would be moisturized, heated, and diluted with nitrogen for control of NOx before being used as fuel for power generation in the CTGs.

Sulfur Recovery Unit

The H_2S carried along in the acid-gas from the Selexol^R or equivalent system would be converted to elemental sulfur in the SRU. This technology is based on the industry-standard Claus process involving the conversion of the H_2S to gaseous elemental sulfur and steam. The sulfur is selectively condensed and collected in molten form.

The acid gas stream from the Selexol^R or equivalent system and the CO_2 / H_2S stripped from the sour water, would be fed to the SRU. One-third of the H_2S would be combusted with oxygen to produce the proper ratio of H_2S and SO_2, which would then react together to produce elemental sulfur gas in a reaction furnace. A waste heat boiler would be used to recover heat before the furnace off-gas is cooled to condense the first increment of sulfur. Gas exiting the first sulfur condenser would be fed to a series of heaters, catalytic reaction stages and sulfur condensers where the H_2S would be incrementally converted to elemental sulfur. The sulfur would be recovered and stored in molten form and may be sold as a by-product raw material for fertilizer and other beneficial uses. The tail gas from the SRU would be composed mostly of CO_2 and nitrogen with trace amounts of H_2S and SO_2 as it exits the last condenser. This SRU tail gas would be catalytically hydrogenated to convert the remaining sulfur species to H_2S and then recycled to the gasifier. Recycling the SRU tail gas would allow for a very high overall sulfur removal in the IGCC process and eliminate the need for a conventional tail gas treating unit and the associated SO_2 and NO_x emissions from the atmosphere. The sulfur production rate would be dependent upon the sulfur content of the feed stock, and would vary from about 30 tpd up to about 162 tpd per process train. The sulfur storage tanks would be located in the SRU.

Condensed sulfur from the SRU would be collected in the sulfur pit. The liquid sulfur would drain into the pit which contains a pump well and sulfur pumps. Sweep nitrogen would be introduced into the pit to prevent the accumulation of an otherwise potentially explosive mixture of H_2S and air, and to control fugitive emissions. The sweep nitrogen outlet would be collected and fed to the tank vent gas incinerator. Nitrogen would be used instead of air as it is readily available and it is undesirable to send air back to the gasifier second stage.

The liquid sulfur would be pumped from the sulfur pit to a sulfur degassing unit. The sulfur degassing unit strips dissolved H_2S out of the liquid sulfur. The degassed sulfur would be pumped from the degassing unit to the sulfur storage tank. The stripped H_2S stream would then be routed from the tail gas recycle stream to the gasifier.

Sulfur loading involves pumping liquid sulfur from the sulfur storage to trucks or rail cars. The sulfur loading arms have vapor recovery systems to control fugitive emissions by returning displaced vapors to the storage tank.
The SRU would be a totally enclosed process with no discharges to the atmosphere.

2.3.6.4 Air Separation Unit

The ASU provides oxygen for the gasification process and nitrogen for CTG NO_x control and for purging. The ASU would contain an air compression system, an air separation cryogenic distillation system ("cold box"), an oxygen pump system and a nitrogen compression system. Two ASU equipment trains would be provided for the PMEC.

A multi-stage, electric motor-driven centrifugal compressor compresses filtered atmospheric air that may be combined with additional compressed air extracted from the gas turbines in the power block. The combined air stream would be cooled and directed to the molecular sieve absorbers where moisture, carbon dioxide and atmospheric contaminants are removed to prevent them from freezing in the colder sections of the plant. The dry carbon dioxide-free air would be separated into oxygen and nitrogen in the cryogenic distillation system. A stream containing mostly oxygen would discharge from the cold box as a liquid and be stored in an intermediate oxygen storage tank, from which it is fed to the gasifier.

The remaining portion of the air is mainly nitrogen and would leave the ASU in three separate nitrogen streams. A small portion of the nitrogen would be high purity and be used in the gasification plant for purging and inert blanketing of vessels and tanks. The largest, but less pure, portion of the nitrogen would be compressed and sent to the combustion turbines for NO_x emission control. A waste/excess nitrogen stream would vent to the atmosphere. No regulated air pollutants would be emitted from the ASU.

Equipment associated with air separation unit includes:

- ASU (2,507 tpd/train, based on PRB-1 coal operation),
- N2 Booster Compressor for CGT Injection, and
- Liquid Oxygen and Liquid Nitrogen Storage

2.3.6.5 Slag Handling, Storage, and Loading

The slag/water slurry from the gasifier would flow continuously into a dewatering bin. The bulk of the slag would settle in the bin while water would overflow into a settler in which the remaining slag fines are settled and concentrated. The clear water from the settler would pass through heat exchangers where it would be cooled as the final step before being returned to the gasifier quench section.

Dewatered slag would be transferred by in-plant trucks to the slag storage area to be loaded into on-road trucks or rail cars for transport to market or storage. The dewatered slag is inert. Because it is still very moist, it would not be a source of fugitive emissions. The slag is typically used in road beds, utility trenches, and landfill covers.

2.3.7 UTILITY SYSTEMS

2.3.7.1 Tank Vent Collection and Boiler System

A tank vent incineration system would be used to convert each off-gas component in the tank vents to oxidized form (SO_2, NO_x, H_2O, and CO_2) before venting them to the atmosphere. The tank vent streams are composed primarily of air purged through various in-process storage tanks, and are routed to the tank vent incinerator. This tank purge gas may contain very small amounts of sulfur-bearing components. The high temperature produced in the tank vent incinerator would thermally convert any H_2S present in the tank vents to SO_2. Heat recovery in the form of steam generation would be provided for the hot exhaust gas from the tank vent incinerator before it is directed to a stack.

The slag handling dewatering system off-gas contains H_2S which would be a source of relatively significant SO_2 emissions if vented to the tank vent system. In this part of the process, H_2S would be released from slag water as the pressure is reduced from approximately 400 pounds per square gauge (psig) to atmospheric conditions. Rather than vent this "flashed" gas to the tank vent incinerator, a blower would be provided to combine it with either the tail gas from the SRU for recycle to the gasifier or the SRU feed gas from the Selexol^R or equivalent system, thus eliminating this potential SO_2 emission source.

2.3.7.2 Sour Water Treatment

Process water containing dissolved contaminant gases produced within the gasification process would need to be treated to remove these dissolved gases before being recycled to the cooling tower. The dissolved gases are driven from the water using steam-stripping. The steam provides heat and a sweeping medium to expel the gases from the water, resulting in a purification level sufficient for reuse within the plant and/or for blowdown to the cooling tower.

Water condensed during cooling of the sour syngas contains small amounts of dissolved gases (CO_2, NH_3, H_2S and other trace contaminants). The gases would be stripped from the sour water in a two-step process. First, the CO_2 and most of the H_2S would be removed in the CO_2 stripper column by steam stripping and directed to the SRU. The water exiting the bottom of this column, would be cooled, and a major portion would be recycled to feed stock grinding and slurry preparation. The remainder would be treated in an ammonia stripper column to remove the ammonia and remaining trace components. A portion of the ammonia stripped water would be blown down to the cooling tower, with the rest being reused within the plant. Reuse of the water within the gasification plant minimizes water consumption and discharge. This unit would be a totally enclosed process with no discharges to the atmosphere.

2.3.7.3 Auxiliary Boiler

The auxiliary boiler would provide steam for pre-startup equipment warmup and for other miscellaneous purposes when steam from the gasifiers or HRSGs is not available. This boiler would provide steam in addition to, or in lieu of, the steam that can be generated from the tank vent incinerators. The boiler would produce a maximum of about 100,000 pounds per hour (lb/hr) of steam and would be fueled by only pipeline natural gas. Annual operation of the boiler would be equivalent to or less than 25% of the year at maximum capacity. The boiler would be equipped with a low NOx burner to minimize emissions.

2.3.7.4 Flare

The gasification island elevated flare would be utilized to burn partially combusted natural gas and scrubbed/desulfurized off-specification syngas during unit startup or on-specification syngas during short-term combustion turbine outages. Syngas sent to the flare during normal planned flaring events would be filtered, water-scrubbed and further treated in the Selexol™ system or equivalent system and Hg removal systems to remove regulated contaminants prior to flaring. Flaring of untreated syngas or other streams within the plant would only occur as an emergency safety measure during unplanned plant upsets or equipment failures. The flame would be enclosed in a refractory-lined combustion chamber, effectively eliminating any visible flame. No thermal radiation would be emitted. Use of an enclosed system significantly reduces noise levels.

2.3.7.5 Emergency Diesel Engine

One two-MW emergency diesel generator would be used for the gasification island and a 350-kW emergency diesel generator would be used for two power plants. One nominal 300-horsepower (hp) diesel-driven firewater pump would be provided for each power plant. These engines would burn very low sulfur distillate oil. Other than during plant emergency situations, the engines would be operated less than five hours per month per engine for routine testing, maintenance, and inspection purposes. The emergency diesel generator fuel will be stored in a 1,000-gallon above- ground double-walled tank

2.3.7.6 Combined Cycle Power Block

The power generation portion of the PMEC would similar to a conventional natural gas combined cycle plant. The PMEC would include two electric generating power plants, each with one CTG configured to utilize syngas, one HRSG, one STG, condenser with 100 percent steam bypass capability, flash drums, condensate pumps and boiler feed water pumps. Major differences for the IGCC application compared to conventional combined cycle plants include larger CTGs to accommodate the increased gas turbine output on syngas, larger STGs to accommodate the additional steam flows from the gasification island, and modified HRSGs to better integrate with the gasification island.

2.3.8 CATHODIC AND FREEZE PROTECTION SYSTEMS

The need for cathodic protection and freeze protection would be determined by the Engineering, Procurement, and Construction (EPC) contractor. Based upon current knowledge of the site, it is not believed that cathodic protection would be required.

2.3.9 COMBUSTION TURBINE GENERATORS

A standard CTG used for natural gas operation would be modified to accept preheated syngas as the primary fuel with natural gas as the back up fuel. Preheated syngas from the gasification section and compressed air would be supplied to the combustor of the CTG and mixed through diffusion. Diluent nitrogen added to the syngas fuel would reduce the flame temperature in the combustor and thereby reduce production of NOx. The hot exhaust gas exiting the combustor would flow to the expander turbine, which drives the generator to produce electricity and also turns the air compressor section of the combustion turbine. Hot exhaust gas from the expander would be ducted through the HRSG to generate high-energy steam used to produce additional electricity in the STG. Following heat recovery, the cooled CTG exhaust gas would be discharged to the atmosphere through the HRSG stacks.

2.3.10 HEAT RECOVERY

The HRSG would generate three pressure levels of steam as well as heating boiler feed water for the syngas cooler in the gasification section. The HRSG also would provide additional energy for superheating steam from the gasification section and cold reheat steam from the STG. Emission control (air pollution control) equipment would be integrated within the HRSG. Selective Catalytic Reduction (SCR) control equipment for removal of NO_x would be located within the HRSG. The HRSG stacks would be provided with emission monitoring instruments, as required, to verify compliance with applicable emission standards and permit conditions.

2.3.11 STEAM TURBINE GENERATORS

The STGs would be comprised of high pressure (HP), intermediate pressure (IP), and low pressure (LP) turbine sections, coupled directly to a hydrogen-cooled generator. The LP turbine section would exhaust to the surface condenser. Process heat from the gasification plant would be used to preheat the condensate from the steam turbine condenser before it is returned to the HRSG to produce steam. Exhaust steam would be condensed in the surface condenser by indirect cooling with circulating cooling water from the cooling tower. The resulting steam condensate would be recycled to the HRSG and other heat recovery equipment to once again produce steam for the STG. The STGs would be sized to accommodate the additional steam flow from the gasification island.

2.3.12 COOLING SYSTEM

The proposed cooling system of each plant would consist of a circulating water system that would carry cold water from the cooling tower through the STG and back to the cooling tower. The evaporative cooling towers for each plant would consist of six cells in a combined structure

approximately 400 feet long, 120 feet wide, and 40 feet high. A seven-cell recirculating mechanical draft cooling tower would be used for the ASU.

2.3.13 WATER SUPPLY AND DISCHARGE SYSTEMS

2.3.13.1 Water Supply

Process water would be supplied from the Port of Kalama, and would be treated as necessary to meet plant specifications. The Port of Kalama is constructing a Ranney well to the west of the PMEC to meet the water supply requirements of PMEC. The well construction is part of their overall development plan and the requirement to supply PMEC with the water is a condition of the lease between Energy Northwest and the Port (see Appendix A, page 30).

Potable water would be supplied by the City of Kalama in distribution lines that have already been installed to the site.

2.3.13.2 Discharge Systems

The PMEC's sanitary sewage would be disposed of through the Port of Kalama's wastewater system, which includes a wastewater treatment plant. Spent process waters would be treated on-site prior to entering the Port of Kalama's wastewater discharge system. Both sanitary wastes treated at the Port of Kalama's treatment facility and spent process waters would be discharged to the Columbia River from the Port of Kalama's outfall located on the North Port pier.

2.3.14 FUEL SUPPLY

Energy Northwest expects that fuel selection throughout the lifetime of the PMEC would be made pursuant to a competitive solicitation process, with selection based upon the terms offered by various suppliers and transportation rate considerations. The primary feed stocks would be petroleum coke and coal. Natural gas would be the back up source.

2.3.14.1 Feed Stock Supply Source

Feed stock supply would be flexible from 100% petroleum coke (likely from the west coast of the United States or Alberta, Canada) to 100% PRB coal from areas of Wyoming and Montana. Heating value would vary from 14,000 British thermal units per pound (Btu/lb) to 8,600 Btu/lb. Chemical compositions would be 88%, 69% carbon; 4%, 4% hydrogen; 6%, 0.5% sulfur; 6%, 24% moisture; and .5%, 7% ash for petroleum coke and PRB coal, respectively. These two fuels represent the extremes in heat value, moisture and sulfur content expected.

2.3.14.2 Black Start Fuel Requirements and Capability

The PMEC does not expect to use dual fueled or internal combustion engines for planned black starts. Start up power would be provided by Cowlitz County PUD.

2.3.14.3 Fuel Delivery and Storage

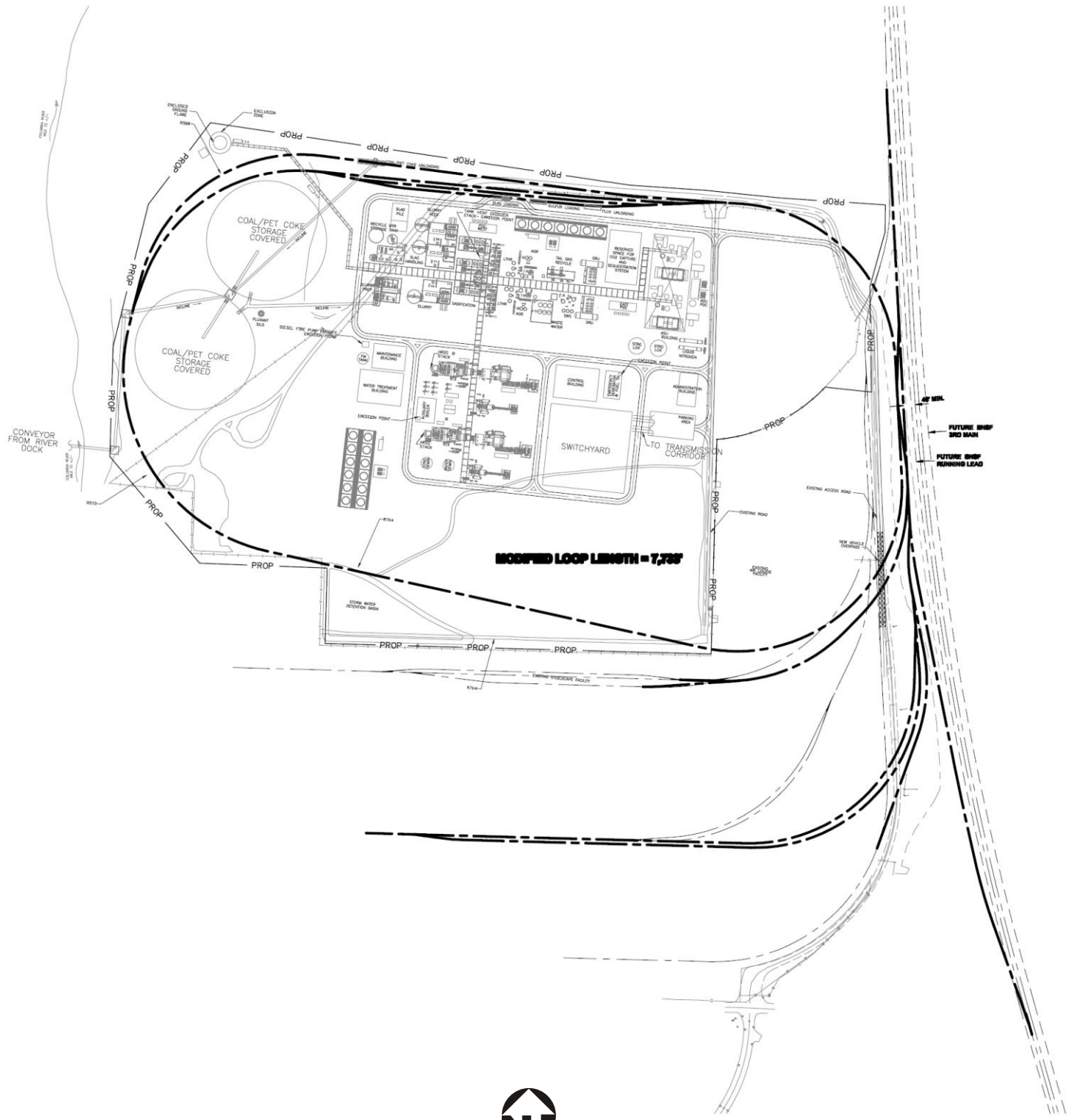
Petroleum coke and coal feed stocks would normally be received by rail in dedicated unit trains or via ship or barge that would dock at the Port of Kalama's North Port pier. Natural gas would be the startup and back up fuel, delivered via a pipeline constructed for the PMEC.

The feed stock handling system would include facilities necessary to unload solid feed stock materials, convey them to storage areas, store them until required, reclaim them from storage, blend them as necessary, and convey the blended materials to the fuel preparation system.

Rail access into the PMEC is from existing BNSF and UP joint railway tracks. A rail loop would be designed to accommodate unit trains up to 135 cars in length with up to four motive power units within the PMEC site boundary. This would result in overall lengths of trains up to about 7,430 feet. Spurs would be constructed from the main line track to allow the unit trains to deliver fuel to the PMEC. Figure 2.3-4 presents the proposed location of the rail spurs and rail loop. The receiving system incorporates the use of high-capacity aluminum-steel railcar bottom dumping to an under-rail pit-hopper system. The hopper doors of the car would be opened and closed by means of an on-board air-actuated system with control initiated by 24-volt direct current (DC) electrical signals from a way-side third rail system. A minimum of 50 feet between the dumper facility and tangent point on the loop curve would allow sufficient distance for inclined conveyors between the car dumper and the top of the fuel storage units. Above-grade areas would be enclosed for housing of supporting facilities for dumping operations and for control of fugitive dust emissions, noise generation, and visual shielding.

PMEC would be furnished with dock and ship unloading equipment for receipt and unloading of petroleum coke and coal feed stocks. Deliveries can be made in ungeared Panamax class bulk vessels to 70,000 long-tons deadweight. The existing Port of Kalama North Port pier would be extended by the Port to accommodate vessels delivering feed stock for PMEC. Regional petroleum coke would be delivered by barge. The rails for the ship unloader would be recessed into the dock structure (i.e., top of rails flush with top of dock) to facilitate the movement of vehicles (e.g., trucks, rubber-tired container cranes, etc.) over essentially the entire dock area except for gantry leg portions of the ship unloader in its "parked" location. The rail runway system of the existing dock would be extended to accommodate rail-mounted, cargo-handling cranes over the entire dock.

33758342_48.CDR



Not to Scale

SOURCE: Wiser Rail Engineering, 2006

Job No. 33758342

Figure 2.3-4

Conceptual Railroad Track Plan

URS

Pacific Mountain Energy Center
Kalama, Washington

Unloading of the ocean vessels would be accomplished by means of a rail-mounted, continuous bucket (i.e., vertical leg type) ship unloader. The ship unloader would be designed for operations over about 452 feet of travel along the crane runway system. The crane system would be further extended as required to provide a machine parking space with storm tie-down provisions at the north end of the dock. The ship unloader would discharge feed stock onto a conveyor that would be located along the east side of the dock. This conveyor would be elevated, allowing unrestricted clearance for trucking/cartage movements under the conveyor supporting truss structures, and would run the length of the runway travel of the ship unloader unit. The ship unloader would be configured to transfer feed stocks onto the dock conveyor at any point along the working limits of the machine.

The dock conveyor would be approximately 660 feet in length, would be flat lying at an elevation of about 27 feet above the top of the dock, and would be uncovered (i.e., open-topped with windscreens) for receipt of feed stocks from the ship unloader. The conveyor would terminate in a fully enclosed transfer structure where flows would be fed onto an inclined conveyor leading to the top areas of the transfer tower between the domes. The transfer point would be provided with a dry-dust collection system for control of fugitive dusts.

Two aluminum dome structures would be provided for feed stock storage to ensure maximum control of fugitive dusts and noise emissions, and an enhanced visual appearance. The basis for fuel storage would be a minimum of about 30 days. Each of the domes would be furnished with two or more large overhead type doors for equipment access as well as two or more pass doors for personnel access. The upper dome areas would be furnished with low-speed fan-powered ventilator units for control and exhaust of heat buildup. The ventilation units would be equipped with power-operated shut-off dampers and would be operated only after the air-borne dusts generated during operations settle out. The opened overhead doors would allow entry of fresh air to replace exhausted air.

Each of the domes would be provided with a center pylon mounted conveyor capable of 360 degrees of slewing motion and furnished with a hydraulically-actuated luffing motion.

Each of the domes would also be furnished with a rail-mounted, portal-type reclaimer unit feeding to a center area hopper. The hopper would collect reclaimed feed stock from any location of the machine and forward of the feed stock from the storage unit. Each of the domes would be fed from, and feed back to, a central transfer tower structure located between the storage areas. The top of this transfer structure would be the receipt point of independent inclined conveyor systems running from the railcar unloading facility and the ship unloading facility.

The internal arrangement of the upper area of the transfer structure would incorporate separate surge hoppers and feeder units to allow simultaneous and independent unloading of railcars and ships. Diverter gates in the feed system would allow flows from either unloading operation to be forwarded to storage in either dome. Reclaiming from each dome would be by means of a conveyor feeding to a common surge hopper area in the base of the transfer tower. This hopper would transfer feed stock to one or two inclined conveyors forwarding feed stock to downstream processing facilities.

Each of the domes would be furnished with translucent roof panels to provide natural daytime lighting with nighttime lighting provided by portable mast-type lighting units positioned near the working faces of pile areas and lighting fixtures mounted on the stacker and reclaimer equipment. Floor areas within the structure would be surfaced with compacted crushed rock underdrain with an impermeable membrane liner and collection piping for the capture and subsequent treatment of any pile leachate. The transfer tower structure would be fully enclosed for mitigation of noise and furnished with dry-type, baghouse collection systems for control of fugitive dusts. The tower would be furnished with a stair tower and elevator for vertical movements of personnel as well as a hoist-way space for transfer of major equipment.

Natural gas would be supplied by a pipeline constructed as part of PMEC. The pipeline would be approximately five miles in length and would connect with Williams Northwest Pipeline at or near the Deer Island meter station.

2.3.14.4 Fuel Gas System

Primary fuel would be a manufactured syngas that comes to the CTGs from the gasifier island at 450 psig. Natural gas would come to the CTGs at 400 psig from the pipeline. No compressors would be required.

2.3.15 RAILROAD SPUR AND RAIL LOOP

One or more rail sidings or spurs would be needed to connect the PMEC rail loop to the BNSF and UP joint rail line. These spurs would likely be at 16 to 20 foot track centers and would be constructed within the present rail right-of-way, requiring modifications to the existing rail spurs servicing the Steelscape plant. Initial discussions with Steelscape Operations Management have not uncovered any major concerns. The loop track and siding would consist of about 11,300 lineal feet for the loop (turnout on mainline, around the site, to loop closure) and about 4,500 feet of sidings for non-feed stock shipping and receiving, resulting in a total of about 15,800 lineal feet of new railroad track.

2.3.16 NATURAL GAS SYSTEM

2.3.16.1 Interconnection

The backup fuel would be natural gas that would be supplied by a pipeline constructed by Energy Northwest. The line would be approximately five miles in length and would connect with Williams Northwest Pipeline Corporation's line at or near the Deer Island meter station. The new pipeline would be 16 inches in diameter.

2.3.16.2 Pipeline Location

The pipeline would be located primarily within the paved roadway of Hendrickson Drive.

2.3.17 INSTRUMENT AIR/SERVICE AIR SYSTEMS

2.3.17.1 Plant Service and Instrument Air Systems

The plant service and instrument air systems would be supplied by 1 to 100% capacity compressor.

2.3.17.2 FIRE PROTECTION

The Fire Protection System, including the fire water system, fixed suppression systems, detection systems, and portable fire extinguishers, would provide the required fire protection for the PMEC and would consist of the following major components:

- Dry pipe sprinkler system,
- Wet pipe sprinkler system,
- Yard loop hydrant system,
- Preaction spray/sprinkler system for turbine generator bearings, lube oil equipment, gasifiers, ASU buildings, and fuel storage/transfer buildings and conveyors,
- High pressure CO2 system for the control room,
- 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,
- Fire water storage tank,
- Fire water pumps, and
- Preaction spray/sprinkler system for combustion turbine enclosure and electrical package.

Fire water would be stored on-site, sufficient to provide maximum automatic sprinkler demand plus 500 gallons per minute (gpm) for a two-hour period. The fire water pumping system would consist of a primary motor-driven pump, a diesel-driven backup pump with independent fuel supply, and a pressure-maintaining jockey pump. CO_2 and other suppression systems would be provided in areas where water systems could cause damage to plant equipment.

2.3.18 ELECTRICAL SYSTEM

2.3.18.1 Electrical Interconnection

The facility would be interconnected to the BPA Longview substation and Cowlitz County PUD transmission system through a new switchyard located at the site and a new approximately 12 mile

long 230 kV transmission line constructed and owned by Cowlitz County PUD in their existing right-of-way. The transmission line is not part of this Application.

2.3.18.2 On-Site Electrical Equipment

The PMEC 230 kV switchyard would contain two 13.8/230 kV step up transformers, one for each of the turbine driven generators, to step up generated voltage to transmission voltage. The transformers would connect to the 230 kV switchyard. The 230 kV switchyard would be arranged in a ring bus configuration complete with power circuit breakers, disconnect switches, instrument transformers, surge arresters, insulators, control building, protective relaying, and metering. The switchyard would utilize rigid, tubular aluminum buswork complete with aeolian vibration damping cable, expansion joints, and fittings set on 20-foot phase-to-phase spacing.

Equipment, buswork, and structures would be designed to withstand the large forces created by the available fault current conditions. All equipment and buswork would be designed and installed to limit the effects of corona by including corona shields and rings as needed.

The dead-end towers, rigid bus supports, and equipment supports would be steel type. The 230 kV switchyard structures would be arranged to include adequate space for maintenance and replacement of large equipment such as transformers and power circuit breakers.

Direct stroke lighting protection would be provided by the use of overhead shield wires and lighting masts connected to the switchyard ground grid. Overhead shield wires would be high strength steel wires arranged to provide shield zones of protection.

The switchyard control building would be sized to accommodate the relay and control panels, communication equipment, metering panels, DC battery systems, low voltage alternating current (AC) systems, and cableways. Protective relaying would be provided as required by the Cowlitz County PUD to protect all equipment and 230 kV transmission lines terminating in the switchyard. The protective relaying along with the circuit breakers would detect and then isolate faulted equipment so as to minimize outages and damage.

2.3.18.3 Auxiliary AC Power Loads

An auxiliary transformer in the switchyard would provide startup and backup power from Cowlitz County PUD. The connected auxiliary power loads would be approximately 18 MW. A diesel generator would supply critical AC loads during emergency situations.

2.3.18.4 125 Volt DC System

A 125-volt DC battery distribution system would be provided to supply critical equipment and protective devices, such as the turbine generator bearing and shaft seal oil generator pumps, protective relaying schemes, breaker controls, the vital AC inverter, annunciation, and various other control circuits, for a minimum of 8 hours following a complete loss of normal AC power.

2.3.18.5 Uninterruptible Power Supplies (UPS)

Uninterruptible power supplies (UPS) would be provided for loads for which the loss of supply power would immediately affect unit operations. The UPS system would consist of a 125-volt-DC to 120-volt-AC inverter supplied from the station battery, a make-before-break static transfer switch (with manual bypass) connected to the inverter output and the instrument AC distribution panel, and a vital AC distribution panel.

The inverter output would be the normal source to the vital AC loads. Upon inverter malfunction or manual initiation, the loads would be automatically transferred to the instrument AC source and would require manual retransfer. The inverter would be equipped so as to be synchronous with the phase-lock to the AC bypass source.

2.3.18.6 Substations

A switchyard containing necessary control, switching and transformer equipment would be constructed for each electric power generating plant, and would be adjacent to the generator end of each CTG and STG.

2.3.19 CAPITAL COSTS

The total estimated cost of the PMEC at the completion of construction would be over $1 billion, which includes the gasifiers, power plants, and associated equipment; the natural gas pipeline; and the railroad spur and loop track.

2.4

WAC 463-60-155 Proposal—Energy transmission systems.

The application shall identify the federal, state, and industry criteria used in the conceptual design, route selection, and construction for all facilities identified in RCW 80.50.020 (6) and (7), and shall indicate how such criteria are met.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-155, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1). 83-01-128 (Order 82-6), § 463-42-155, filed 12/22/82. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-155, filed 10/8/81. Formerly WAC 463-42-240.]

SECTION 2.4 ENERGY TRANSMISSION SYSTEMS (WAC 463-60-155)

Energy transmission will be provided from the site by Cowlitz County PUD. Cowlitz County PUD will construct approximately 12 miles of high voltage transmission lines within the PUD's existing transmission line right-of-way. These transmission lines are outside the scope of this Application. No transmission facilities will be constructed by Energy Northwest.

2.5

WAC 463-60-165 Proposal—Water supply.

(1) Water intake and conveyance facilities. The application shall describe the location and type of water intakes, water lines, pipelines and water conveyance systems, and other associated facilities required for providing water to the energy facility for which certification is being requested.

(2) Water supply and usage alternatives.

(3) Water rights and authorizations. An applicant proposing to use surface or ground water for the facility shall describe the source and the amount of water required during construction and operation of the energy facility.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-165, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1). 92-09-013, § 463-42-165, filed 4/2/92, effective 5/3/92. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-165, filed 10/8/81. Formerly WAC 463-42-400.]

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

2.5.1 WATER INTAKE AND CONVEYANCE FACILITIES

The Port of Kalama would supply process water to the Pacific Mountain Energy Center (PMEC) through a Ranney collector well. The Port's well location is immediately to the west of the PMEC site (See Figure 2.5-1). The Ranney collector well has the ability to supply 15 million gpd. A water conveyance pipeline would be installed from the well location, under the rail loop track, to various PMEC facilities (e.g., storage tanks and water treatment plant).

Potable water would be supplied by the City of Kalama in distribution lines that have already been installed for the site.

2.5.2 WATER SUPPLY AND USAGE ALTERNATIVES

2.5.2.1 Water Supply Alternatives

Because of the ready supply of water from the Port of Kalama, Energy Northwest did not seriously consider other process water supply alternatives (i.e., reclaimed water or other water reuse projects). The City of Kalama is another supplier in the area; however, the City's water system capacity is insufficient to provide process water to the PMEC.

2.5.2.2 Air Cooling

An air cooling system uses large quantities of fin tubes for the heat transfer surface. Large fans are used to transfer the heat from the finned tubes (cooling water inside the tubes) to the atmosphere. Compared to a water cooling system, the efficiency of an air cooling system can be reduced by temperature extremes, and an air cooling system has higher auxiliary power consumption than a water cooling system. An air cooling system also has a higher fan noise. Air cooling systems require significantly higher capital investment and more maintenance than water cooling systems. Given the availability of water from the Port of Kalama, increased costs, higher electrical demand for the fans (thereby reducing the amount of power available for export), the enlarged footprint needed, and increased maintenance for an air cooling system, Energy Northwest is not pursuing the air cooling option.

2.5.2.3 Water Conservation Methods

The water balance presented in Section 5.2 expresses the anticipated use of water by the various processes at the PMEC facility. These quantities are reasonable estimates based on the technologies selected. Much of the water conservation for PMEC is inherent in the Integrated Gasification Combined Cycle (IGCC) process where water is recycled in the slag and slurry systems and in numerous heat exchangers. According the United States Environmental Protection Agency (USEPA), the IGCC process creates 33% less wastewater and 35% less plant make-up water when compared to a typical pulverized coal plant.

33758342_62.CDR

Legend

- Water test well
- Fence
- Subject property
- Port of Kalama Collector Well

Job No. 33758342

Figure 2.5-1
Well Locations

URS

Pacific Mountain Energy Center
Kalama, Washington

With the exception of a purge stream from the gasification island, the wastewater from PMEC is similar to that from a natural gas combined cycle plant. Energy Northwest considered the feasibility of recycling the wastewater from the site and the Port of Kalama. Alternate technologies (e.g. air cooling discussed above) or additional recycling, could result in lower water usage. However, given the availability of water from the Port of Kalama, and increased capital costs and higher electrical demand associated with alternate technologies or additional recycling, Energy Northwest has decided not to include air cooling or additional recycling to reduce water demand.

2.5.3 WATER RIGHTS AND AUTHORIZATIONS

Energy Northwest is not requesting any new water rights or authorizations. Process water would be acquired from the Port of Kalama and potable water would be supplied by the City of Kalama. Exhibit E to the lease between Energy Northwest and the Port of Kalama obligates the Port to provide the PMEC with a reliable and continuous delivery of 5,556 gallons per minute of water. (The lease is referenced in Appendix A and a complete copy is on file with EFSEC). Energy Northwest has discussed its potable water needs with the City of Kalama, and has received verbal assurances that the City will meet the PMEC's potable water supply needs. A Certificate of Water Availability will be acquired from the City and provided to EFSEC after final design of the PMEC, prior to construction.

2.5.3.1 Process Water

The PMEC would have an estimated peak instantaneous water demand of 5,826 gpm. The annual water usage by PMEC would vary based on the feed stock used and the ambient air temperature, with higher water usage at higher ambient temperatures. The total annual average demand used for design is 9,397 acre-feet per year (af/yr) or 5,826 gpm. For design planning purposes, the average demand was assumed to be the peak demand.

Process water would be supplied from the Port of Kalama from an off-site industrial source for which valid water rights are held. The Port of Kalama has been awarded water rights by the Washington State Department of Ecology (Ecology). The two separate groundwater permits allow the Port a water usage of 3,472 gpm. In late 2005, the Port applied to Ecology for a permit for another 10 million gpd of water. Ecology has completed the review of senior water rights and has discovered no conflicts or issues. It is anticipated that this additional water right will be granted to the Port in late summer or early fall 2006, allowing the Port to supply PMEC enough water to operate during all ambient conditions.

2.5.4 POTABLE WATER

Potable water would be supplied by the City of Kalama. The City of Kalama provides water service to over 1,300 accounts (approximately 3,000 people) inside and outside the city limits of Kalama. The source of water is a Ranney well adjacent to the Kalama River. The water rights associated with this source total 2,284 af/yr on an annual withdrawal basis, and 2,225 gpm on an instantaneous basis. As the well is a groundwater under the influence of surface water (GWI) source, the City of Kalama has constructed a water filtration plant, which also includes

chlorination, fluoridation, and pH adjustment. The City of Kalama is currently using its well field (along with thirteen water storage reservoirs) to satisfy all of the water demands of its system. The present municipal water supply is anticipated to be sufficient to address growth through the year 2016, at which point the water treatment plant and associated water rights would need to be expanded.

2.5.4.1 Mitigation Measures

The Port does not anticipate that any mitigation measures would be required for the granting of the additional water right that will serve PMEC.

2.6

WAC 463-60-175 Proposal—System of heat dissipation.

The application shall describe both the proposed and alternative systems for heat dissipation from the proposed facilities.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-175, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-175, filed 10/8/81. Formerly WAC 463-42-430.]

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

2.6.1 INTRODUCTION

The thermal efficiency of the combined cycle plant is over 50%. More than 50% of the energy in the fuel is converted to useful electricity. An additional three to five percent of the energy in the fuel is consumed internally by operations. The remaining 40-plus% of the energy would need to be dissipated from the Pacific Mountain Energy Center (PMEC) to the environment. The energy to be dissipated would be in the form of waste heat at temperatures too low to be utilized.

The two major sources of heat dissipation from the PMEC to the environment would be: 1) the HRSG exhaust stacks discharging CGT exhaust that has been cooled to 176º F; and 2) the heat released by condensing the steam turbine exhaust steam in the wet and dry condensers. Hot machinery and piping would also dissipate some heat to the environment even though the machinery and piping are well insulated. The machinery and piping heat dissipation, however, would be minuscule compared to the two major sources of heat dissipation and is considered further in this evaluation.

The exhaust gases leaving the HRSG would be cooled as far as technology and economics allow. No other viable options are available to further cool the gas. Therefore, this section presents the heat dissipation options considered for condensing the steam turbine exhaust steam.

2.6.2 SYSTEM OF HEAT DISSIPATION

Heat must be rejected from the Integrated Gasification Combined Cycle (IGCC) power station's condenser in order to maintain proper steam cycle characteristics. Large volumes of water are required for this purpose (a typical 600 MW pulverized coal-fueled power plant would require about 300,000 gallons of water per minute for a once-through cooling system). The IGCC power station would use cooling towers, instead of a on-through cooling system, to reduce the amount of water required to be withdrawn from the water resources.

The proposed cooling system would consist of a circulating cooling water system and a mechanical draft cooling tower. Steam supplied to the steam turbine generators would be exhausted from the steam turbine and condensed in the steam condenser. The circulating water system would route cool water to the condenser.

The cooling tower would continuously receive heated water from the plant. The heated water would enter the tower near the top and would be sprayed downward through the tower. Large fans on top of the tower would pull air through openings in the sides of the tower, moving air across the water sprays and cooling the water through evaporation. The temperature of the water would be reduced when it reaches the cooling tower basin, where it would be collected and returned to the cooling system. This cycle would be repeated until the circulating water requires replacement.

In the cooling tower, warmed, cooling water from the power station's condenser would be cooled by the evaporation of a portion of the water as it passes through the cooling tower. In addition to evaporation, a very small amount of entrained water, called drift (i.e., water droplets that are entrained in the exhaust air stream carrying heat away from the towers), would also be emitted into the atmosphere. As evaporation continues, salts dissolved in the remaining cooling liquid would become more concentrated. When the concentrations of dissolved salts near their solubility limit, scale formation may occur on the condenser tubes and hinder heat transfer. Although addition of certain chemicals can inhibit scale formation, a portion of the cooling water, called blowdown, must be removed from the system and discharged.

Because almost all of the wastewater discharged from the IGCC power station operations is due to the need to remove a portion of the condenser cooling water for control of dissolved solids in the blowdown, the constituents in the blowdown discharge would essentially be identical to the constituents in the water supply, although slightly more concentrated. Based on the IGCC power station equipment operating requirements and water supply quality, the plant cooling towers are expected to be limited to approximately twelve cycles. Therefore, the constituents in the cooling water blowdown could be concentrated, due to evaporation in the cooling tower, by about three to eight times the concentration in the water supply.

In general, the amount of cooling tower blowdown requiring discharge to receiving waters is calculated as follows:

$$\text{Blowdown} = \frac{\text{Evaporation}}{\text{Cycles} - 1} - \text{Drift}$$

The cooling tower blowdown would be removed from the cooling tower basin and discharged with other power plant wastewater in accordance with the National Pollutant Discharge Elimination System (NPDES) permit. To replenish the circulating cooling water, additional water, sour water from the gasification process, and the neutralized plant waste streams would be added to the cooling water. Wastewater discharged under the NPDES permit would include the cooling tower blowdown from the power blocks and gasification/ASU units, HRSG blowdown, demineralizer rinse, and gasification island wastewater as described in Sections 2.7 and 2.8.

2.6.3 ALTERNATIVE FORMS OF HEAT DISSIPATION

The efficiency of present day thermal power generation technology requires that heat be dissipated from the cycle. Current technology limits heat dissipation to water or the atmosphere. Heat can be dissipated to water by drawing in large quantities of water from a large body of water, heating it slightly and then returning to the large body of water. Due to NPDES restrictions and potential temperature impacts on aquatic species, heat dissipation to water would not be possible for the PMEC. Heat dissipation to the atmosphere is the only viable option.

Four heat dissipation technologies to the atmosphere are available and were evaluated by Energy Northwest in the Application. The four technologies are: 1) natural draft cooling tower, 2) dry cooling tower, 3) wet forced draft (mechanical) cooling tower, and 4) wet/dry hybrid tower. The technologies are discussed below and summarized in Table 2.6-1.

TABLE 2.6-1
COMPARISON OF ALTERNATIVE FORMS OF HEAT DISSIPATION

Option	Visual (Size)	Water Use	Power Requirement	Costs	Plume	Unit Performance Impact
Natural Draft Cooling Towers	High	High	Low	High	High	Low
Dry Cooling Tower	Med	Low	Med	High	Low	High
Wet Forced Draft Cooling Tower	Low	High	Med	Low	Med	Low
Wet/Dry Hybrid Tower	Med	Med	High	Med	Low	Med

Natural draft cooling towers operate as a chimney to induce air flow to enter the bottom of the tower, causing cooling of the water as the water falls through it, and with the air exiting at the top. The towers are large hyperbolic structures. The negative aspects of using a natural draft cooling tower include the high cost of such large structures, relatively high water use, and a high visible vapor plume when atmospheric conditions make the plume visible. The positive aspects are that the cooling tower has a low adverse affect on the power plant performance and low power requirements for cooling tower performance. The visual size impact and high cost make the natural draft cooling tower the least desirable technology option for the PMEC.

Dry cooling towers were developed for use in arid areas without water supplies. The system is entirely closed. Hot water leaves the condenser and flows through banks of finned coils that dissipate heat to the atmosphere. The cooling water can only approach the temperature of the air flowing across the outside of the tubes. Dry cooling towers are expensive because of the large number of tubes required. Their benefits are that water use is very low and there are no visible plumes. Their use is normally limited to arid areas because they have a very high impact on power plant performance. The cooling water temperature exceeds 75º F whenever the air temperature approaches 75º F. As cooling water temperature increases over 75º F, condenser back pressure begins to increase. Increased back pressure is very detrimental to steam turbine performance and therefore, detrimental to the power plant's performance and efficiency of fuel use. This multiplies the impacts of extracting, refining, transporting, and consuming fuel. Therefore, dry towers are used only where there is no other option. The dry tower technology was not selected for PMEC because of the availability of water and the impact a dry tower would have on costs and on plant performance.

The wet forced draft or mechanical cooling tower uses fans to force air movement through the cooling tower. The thermodynamic benefits of a natural draft cooling tower are obtained while the negative aspects of large size and high cost are eliminated by the use of fans. The negative aspect, the power used by the fans, is offset by the fans allowing the tower to be optimized in terms of performance, cost and size. Because air and water are mixed, the tower uses approximately the same amount of water as the natural draft tower. Wet cooling systems require substantial amounts of water, but require less fuel to operate, are more energy efficient, and are less expensive to purchase, operate and maintain. Based on the available water supply, and the achieved efficiencies, this system has been selected for the PMEC.

The wet/dry hybrid tower combines the features of the dry and wet towers. The resulting hybrid tower costs more, uses more power, is physically bigger and impacts power plant performance more than the forced draft cooling tower. However, use of a hydrid tower would require

approximately 30 percent of the water supply necessary for an all-wet cooling system. The wet/dry hybrid tower technology was not selected for PMEC because of the availability of water and the impact a hybrid tower would have on costs and plant performance.

2.7

WAC 463-60-185 Proposal—Characteristics of aquatic discharge systems.

(1) Where discharges into a watercourse are involved, the applicant shall identify outfall configurations.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-185, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-185, filed 10/8/81. Formerly WAC 463-42-440.]

SECTION 2.7 CHARACTERISTICS OF AQUATIC DISCHARGE SYSTEMS (WAC 463-42-185)

2.7.1 INTRODUCTION

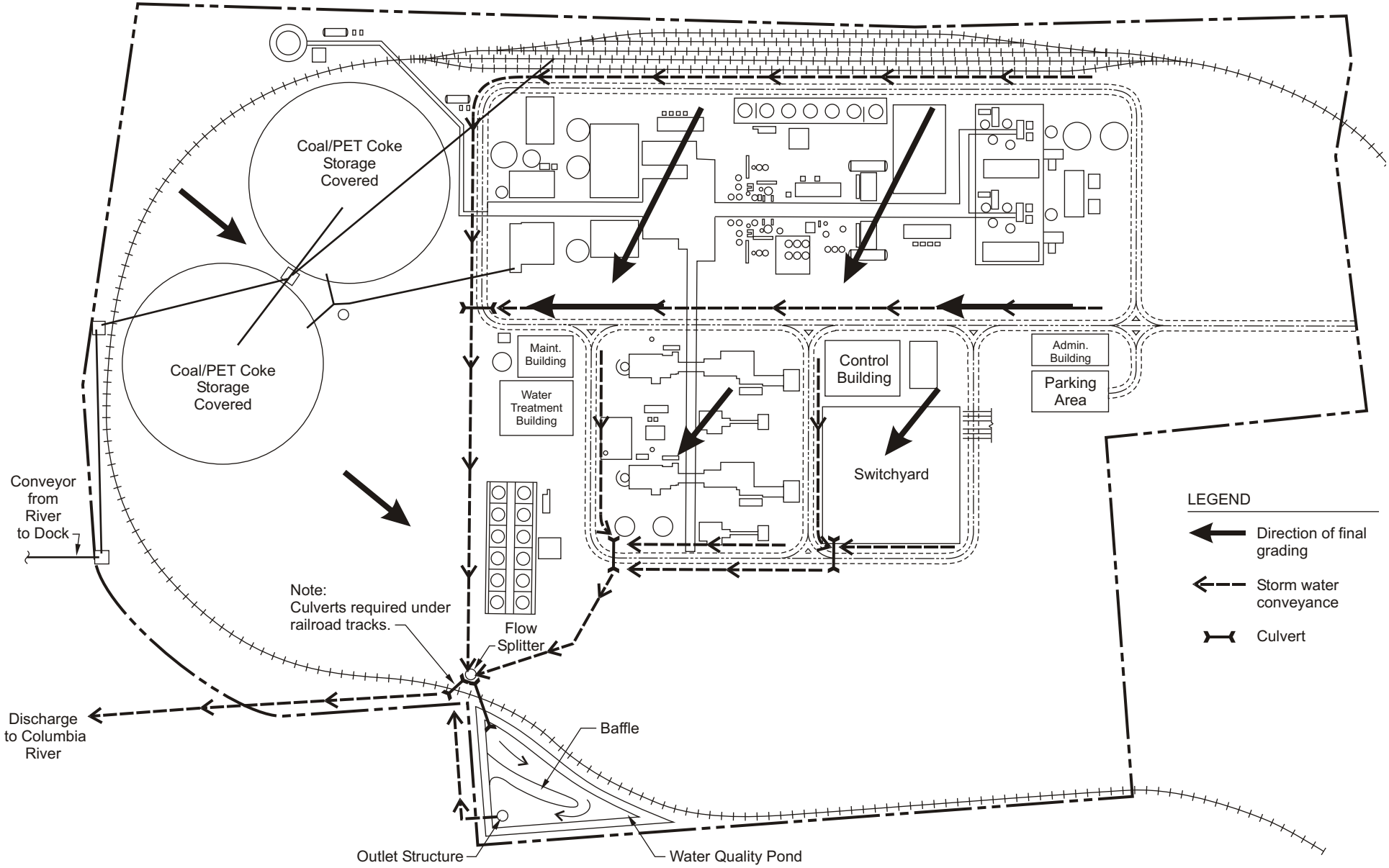
After collection, stormwater runoff would be discharged via proposed ditches to a water quality treatment pond (i.e., wet pond) and then to the Columbia River (Figure 2.7-1). Best Management Practices (BMPs) and water quality treatment facilities (i.e., wet pond) would be designed to conform to Ecology's Stormwater Management Manual for Western Washington February 2005 (SWMMWW) or latest edition. (Ecology, 2005) Detention/flow control would not be required for site stormwater runoff because the Columbia River is exempt from flow control requirements per the SWMMWW, Volume I, Appendix E. (Ecology, 2005).

Other waters leaving the site, to be discharged to the Columbia River, include the spent process waters as described in Section 2.8 and the Pacific Mountain Energy Center's (PMEC) sanitary sewage. The PMEC's sanitary sewage would be disposed of through the Port of Kalama's wastewater system, which includes a domestic wastewater treatment plant that discharges from the Port of Kalama's outfall located on the North Port pier (Figure 2.7-2). Spent process waters may require on-site pre-treatment prior to discharge to the Port of Kalama's discharge lines and Domestic and Industrial Wastewater Mixing Vault which ultimately discharge to the Columbia River via the Port's outfall located on the North Port pier (Figure 2.7-3). The existing outfall discharges treated sanitary wastewater from the Port of Kalama's wastewater treatment plant (Figure 2.7-3) and process wastewater from the Steelscape, Inc. plant, located to the south of the PMEC, to the Columbia River. Sections 2.7.2.2 and 2.8 present further information regarding potential wastewater treatment requirements and discharge locations

The projected process waterwater discharges of cooling tower blowdown (for power block and gasification/ASU), HRSG blowdown, demineralizer rinse, and gasification island wastewater comprise approximately 17 percent of the total water supplied to the facility. These wastewater streams would be discharged to the Port of Kalama's discharge system at a maximum rate of 890 gpm, or approximately 1.28 million gpd (for design planning, the average rate was assumed to be the maximum rate). Sanitary waste discharge is expected to be approximately 1,200 gpd.

Existing vegetation, which consists mostly of a thin layer of grasses, would be converted to various impervious surfaces at the plant site, thereby increasing runoff and reducing the potential for natural percolation of precipitation to the soil. Stormwater runoff would be treated onsite according to permanent BMPs for low impact industrial sites as described in Section 2.10, Surface Water Runoff. Although an amount of on-site stormwater would infiltrate at the site through proposed grassy channels and/or wet ponds for stormwater treatment, an increase in annual runoff is predicted. The BMP-treated stormwater would be discharged to the Columbia River.

33758342_18.cdr



SOURCE: Fluor, Conceptual Plot Plan, June 16, 2006

Job No. 33758342

0 300 600

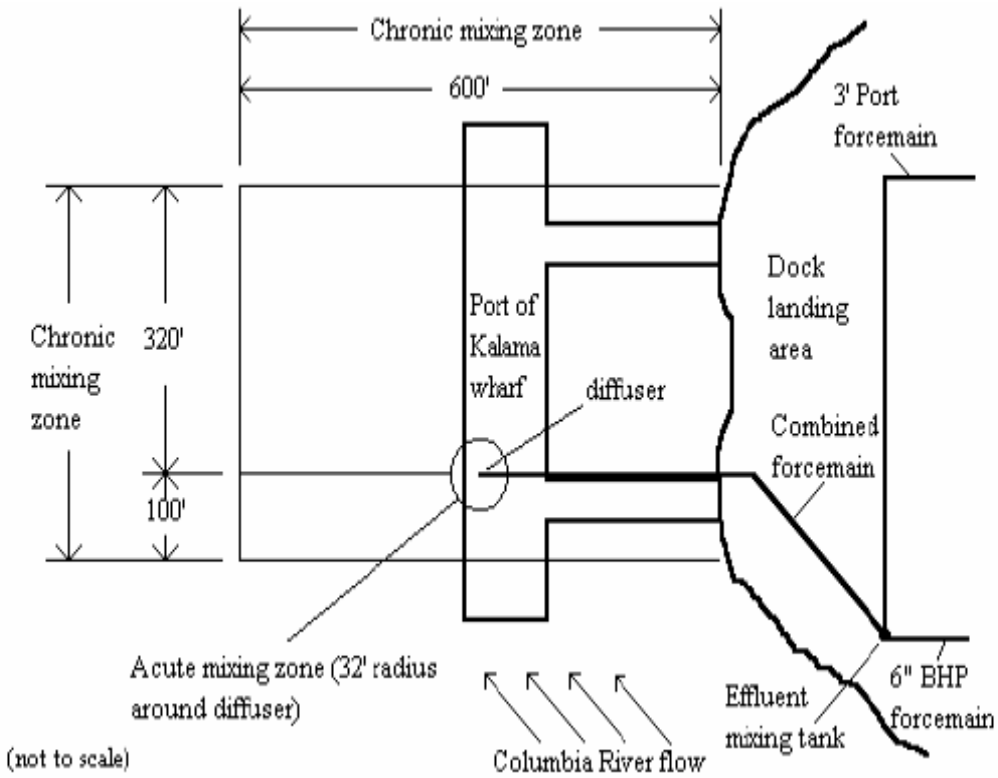
Scale in Feet

Figure 2.7-1

Conceptual Drainage Plan

URS

Pacific Mountain Energy Center
Kalama, Washington

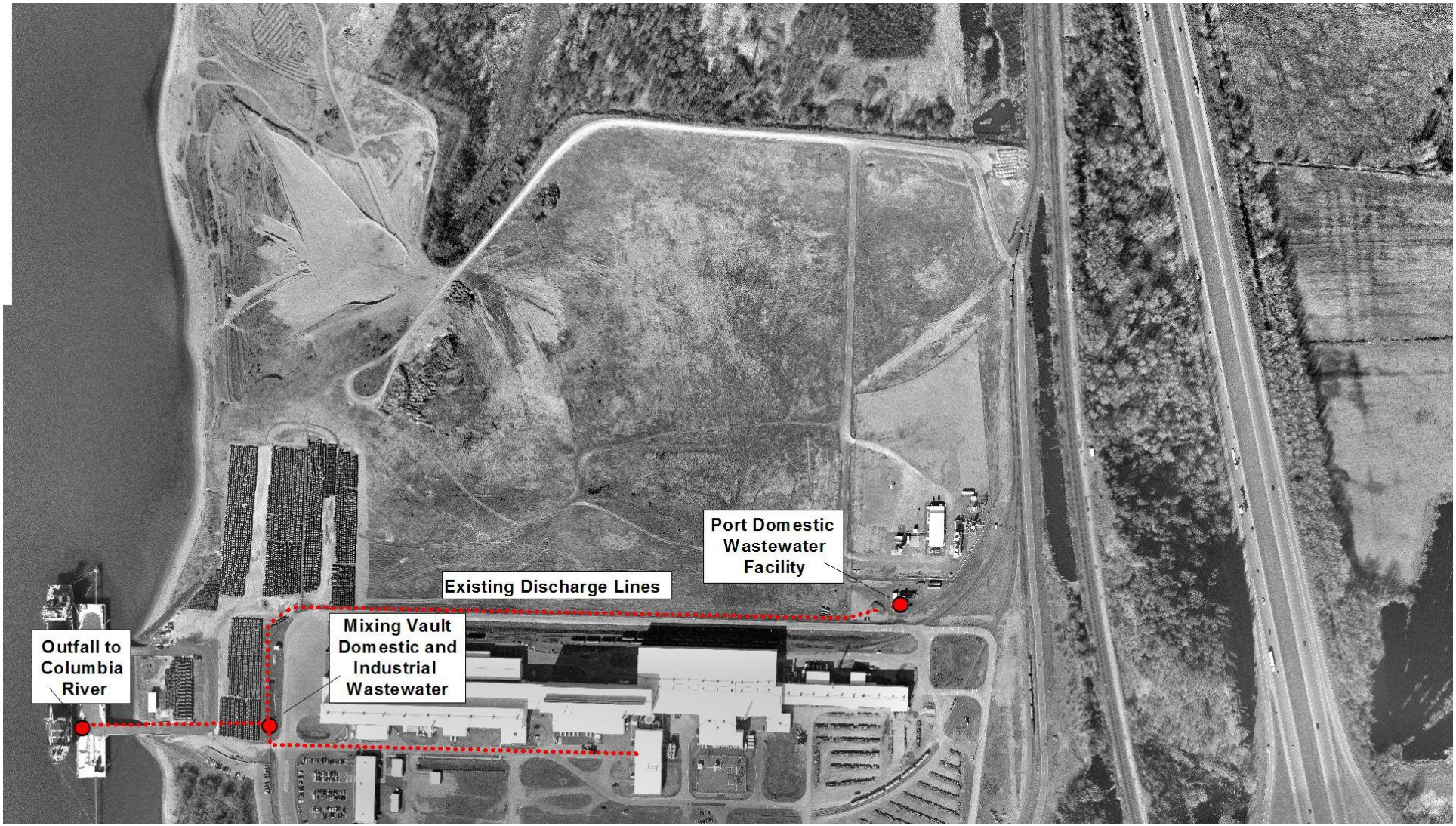


Source: National Pollutant Discharge Elimination System Permit No. WA0040843

Figure 2.7-2

Existing Port of Kalama Discharges to Columbia River

Pacific Mountain Energy Center
Kalama, Washington



SOURCE: Port of Kalama, August 11, 2006

Job No. 33758342

Figure 2.7-3

Existing Port of Kalama Wastewater Infrastructure

URS

Pacific Mountain Energy Center
Kalama, Washington

The total site area is approximately 95 acres. Of the 95 acres, 50 acres would be used for facilities associated with the PMEC and would require stormwater quality treatment (i.e., wet pond). The site currently consists of thin grasses on sandy soil (Hydrologic Soil Group C, CN=86 used to compute pre- and post-development runoff quantities). In the post-developed condition, 50 acres would be developed, of which 35 would be pervious (Hydrologic Soil Group C, CN=86), and 15 acres would be impervious surface (CN=98). The remaining 45 acres of the site not part of the developed area need not be considered in stormwater management facility sizing computations.

The SWMM guides the design of stormwater improvements. The design storm for water quality treatment BMPs is a 6-month, 24-hour storm (72% of the 2-year, 24-hour rainfall event). The 6-month, 24-hour rainfall event as defined by the SWMMWW is 1.72 inches. A water quality peak runoff rate of 6.5 cubic feet per second (cfs) and total volume of 3.6 acre-feet were calculated, assuming 15 acres of impervious surface requiring runoff treatment.

Because stormwater would be discharged to the Columbia River, stormwater runoff would subject to only the basic treatment requirements of the SWMMWW. Basic treatment could be provided by wet ponds, as described in the SWMMWW. This pond must be sized to hold the runoff from the water quality design storm (i.e., wet pond). Based on the Santa Barbara Urban Hydrograph (SBUH) results, the volume of the wet pond would need to be 3.6 acre-feet. At a design depth of 6.5 feet, this would require a pond surface area of 0.55 acres or about 24,000 square feet (ft^2). This area can be accommodated at the location of the water quality treatment pond (i.e., wet pond) shown in Figure 2.7-1. Discharge from the pond, as well as flows in excess of the design treatment volume bypassed around the pond by a flow-splitter, would flow through a ditch or culvert to the Columbia River.

2.7.2 DISCHARGE LOCATION

2.7.2.1 Stormwater

Stormwater discharge from the site would be collected in a system of inlets, pipes and ditches and routed to the water quality treatment facility (i.e., wet pond) located tentatively in the south-central portion of the site. Stormwater discharged from the pond and from the bypass ditch around the pond would be discharged to the Columbia River. (Figure 2.7-1).

2.7.2.2 Wastewater

The PMEC's wastewater would consist of sanitary sewage and process water. The PMEC's sanitary sewage would be discharged through the Port of Kalama's wastewater system for treatment at the wastewater treatment facility located to the southeast of the PMEC. The Port of Kalama's treatment plant is a 20,000 gpd package plant that was designed to treat sanitary wastes for tenants occupying the North Port area. The treatment plant has more than enough capacity remaining to handle the PMEC's sanitary wastewater discharge. The Port discharges treated sanitary wastewater to the Columbia River as permitted by National Pollutant Discharge Elimination System Permit No. WA0040843. (Ecology, 2000)

As presented in Section 2.8.3, an on-site wastewater treatment facility may be needed to treat spent process wastewater prior to discharge to the Port of Kalama's Mixing Vault for Domestic and Industrial Wastewater. The on-site treatment facility may be needed to ensure that water quality standards are met when the spent process wastewater is discharged to the Columbia River. The spent process wastewater would be discharged through the Port of Kalama's discharge line and outfall, located on the North Port pier. The Port would be adding diffuser ports to the outfall to accommodate the PMEC's discharge and may need to increase the pipe size to handle the increased flow. The pipe sizing, diffuser ports, and requirements associated with on-site wastewater treatment would be addressed in the final PMEC design.

2.8

WAC 463-60-195 Proposal—Wastewater treatment.

(1) The application shall describe each wastewater source associated with the facility and for each source, the applicability of all known, available, and reasonable methods of wastewater control and treatment to ensure it meets current waste discharge and water quality regulations.

(2) Where wastewater control involves collection and retention for recycling and/or resource recovery, the applicant shall show in detail the methods selected.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-195, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1). 92-09-013, § 463-42-195, filed 4/2/92, effective 5/3/92. Statutory Authority: RCW 80.50.040(1) and chapter 8030 RCW. 81-21-006 (Order 81-5), § 463-42-195, filed 10/8/81. Formerly WAC 463-42-470.]

SECTION 2.8 WASTEWATER TREATMENT (WAC 463-42-195)

2.8.1 INTRODUCTION

Wastewater sources from the Pacific Mountain Energy Center (PMEC) include cooling tower blowdown from the power blocks and gasification/ASU units, HRSG blowdown, demineralizer rinse, gasification island wastewater, and office/plant employee domestic waste. Some wastewater from the gasification process would be reused within the gasifier. No other recycling or retention of wastewater for reuse is proposed.

2.8.2 PROCESS WASTEWATER SOURCES

The largest wastewater discharge from the facility would be cooling tower blowdown with minor contributions of wastewater from the HRSGs, demineralizers, and gasification island wastewater. The major wastewater sources and their average quantities (gpm) based on fuel type are provided in Table 2.8-1 below. The quantities of each wastewater stream would fluctuate depending upon plant operations, ambient air conditions, and cooling water quality. The average total wastewater discharge, excluding employee waste, would be approximately 17 percent of the total water supplied to the facility.

TABLE 2.8-1
MAJOR WASTEWATER SOURCES
WATER COOLED SYSTEM

Wastewater Stream	Average Steady State PMEC Flows (gpm)	Maximum Steady State PMEC Flows (gpm)
Cooling Tower Blowdown		
Power Block	611	611
Gasification/ASU	209	209
HRSG Blowdown	11	11
Demineralizer Rinse	31	31
Gasification Island Wastewater	28	28
TOTAL WASTEWATER	**890**	**890**

The average flows were considered equal to the maximum flows, based on the design basis document and as described in Section 3.3.

Hot HSRG blowdown and process drains from equipment and area floor drains would be collected for reuse as a portion of cooling tower makeup. The process drains would first be filtered to remove grits and oils that may accidentally enter the system. The high temperatures of these streams would be reduced through mixing and dilution with other cooling waters in the cooling tower basin.

The approximate constituent concentrations in the wastewater are shown in Table 2.8-2. These levels are based on raw water quality from Port of Kalama supply wells (3 samples collected in January 2006) or, where indicated, Columbia River data, concentrated by a factor of 12, per the design basis document. Where raw water data was not available, wastewater values for a similar facility (Wabash River IGCC) are provided. The far right columns of Table 2.8-2 presents the

Washington State Water Quality Standards for aquatic life criteria for each constituent (based on standards applicable to the Columbia River, Chapter 173-201A WAC, 2003 version).

TABLE 2.8-2
CHEMICAL MAKEUP OF PACIFIC MOUNTAIN ENERGY CENTER PROCESS WATER DISCHARGE

Chemical	Concentration	Unit	Water Quality Standard mg/L	
			Acute	Chronic
pH	**6.3**	Standard	6.5-8.5	6.5-8.5
Hardness (as CaCO3)	1920	mg/L	NA	NA
Biochemical Oxygen Demand (BOD-5)	*<12*	mg/L	NA	NA
Bicarbonate (HCO3)*	720	mg/L	NA	NA
Carbonate (CO3)*	2.4	mg/L	NA	NA
Chemical Oxygen Demand (COD)	*160-260*	mg/L	NA	NA
Total Organic Carbon (TOC)	*60-110*	mg/L	NA	NA
Phenols, Total	*<0.02*	mg/L	NA	NA
Oil and grease	*<30*	mg/L	NA	NA
Surfactants	*<0.3*	mg/L	NA	NA
Phosphorus (as P)	*<13*	mg/L	NA	NA
Potassium*	1	mg/L	NA	NA
Total Dissolved Solids	2400	mg/L	NA	NA
Total Suspended Solids (TSS)	*<40*	mg/L	NA	NA
Ammonia (as N)	*<10*	mg/L	0.24 ***	0.04
Total Organic Nitrogen	*<8.0*	mg/L	NA	NA
Cyanide	*<0.5*	mg/L	0.022	0.0052
Nitrate (as N)**	3.6	mg/L	NA	NA
Thiocyanates	*<3.0*	mg/L	NA	NA
Formates	*<150*	mg/L	NA	NA
Sulfate**	30	mg/L	NA	NA
Sulfide	*<0.7*	mg/L	NA	NA
Sulfite	*<3.5*	mg/L	NA	NA
Thiosulfate (S_2O_3)	*<5.0*	mg/L	NA	NA
Bromide	*<6.0*	mg/L	NA	NA
Chloride**	30	mg/L	860	230
Fluoride**	3.6	mg/L	NA	NA
Chlorine, Total Residual	*<0.1*	mg/L	0.019	0.011
Aluminum	*<1.0*	mg/L	NA	NA
Antimony	*<1.2*	mg/L	NA	NA
Arsenic	0.06	mg/L	0.360	0.190
Barium	*<0.6*	mg/L	NA	NA
Beryllium	*<0.03*	mg/L	NA	NA
Boron	*35-70*	mg/L	NA	NA
Cadmium	*<0.035*	mg/L	0.002	0.0007
Calcium	492	mg/L	NA	NA
Chromium	*<0.06*	mg/L	0.357	0.116
Cobalt	*<0.15*	mg/L	NA	NA
Copper	*<0.15*	mg/L	0.010	0.0072
Iron	156	mg/L	NA	NA
Lead**	**0.012**	mg/L	0.025	0.001
Magnesium	*<130*	mg/L	NA	NA
Manganese	24	mg/L	NA	NA

TABLE 2.8-2 (Continued)
CHEMICAL MAKEUP OF PACIFIC MOUNTAIN ENERGY CENTER PROCESS WATER DISCHARGE

Chemical	Concentration	Unit	Water Quality Standard mg/L	
			Acute	Chronic
Mercury**	**0.006**	mg/L	0.0021	0.000012
Molybdenum	*<0.2*	mg/L	NA	NA
Nickel	*<0.2*	mg/L	0.908	0.100
Selenium**	**0.12**	mg/L	0.020	0.005
Silica (as SiO2)*	132	mg/L	NA	NA
Silver**	**0.012**	mg/L	0.0014	NA
Sodium	108	mg/L	NA	NA
Thallium	*<0.9*	mg/L	NA	NA
Tin	*<3.0*	mg/L	NA	NA
Titanium	*<1.5*	mg/L	NA	NA
Vanadium	*<0.01*	mg/L	NA	NA
Zinc	0.072	mg/L	0.073	0.067

Notes
[1] **Bold** shows values in exceedance or outside the range of state water quality standards
[2] Italics refer to Wabash River IGCC plant data
[3] * Based on USGS measured Columbia River samples taken at Beaver Army Terminal, Oregon, 1990-2004
[4] ** Parameter was not detected; value based on one-half of detection limit
[5] *** Ammonia standard is based on receiving water temperature and pH. Calculated standard shown is based on maximum measured temperature in receiving water (22.1 C in Columbia River at Vancouver, Washington measured by the Department of Ecology, July 2003 data) and the pH for that sample (7.86).
[6] Standards for Cadmium, Chromium, Copper, Lead, Nickel, and Zinc are based on hardness of receiving water. Value of hardness used in computing standards for these metals was 58.9 mg/L, an average of twelve monthly samples taken by Ecology from the Columbia River at Vancouver, Washington.
[7] NA = No state standard promulgated

2.8.3 EVALUATION AND SELECTION OF WASTEWATER TREATMENT ALTERNATIVES

Based on the available data and the assumed concentration factor of 12**,** at least four metals (i.e., lead, mercury, selenium and silver) may occur in wastewater in concentrations that may exceed the applicable Washington State water quality standards. Treatment processes appropriate for the removal of these metals would probably be required prior to discharge to the Port of Kalama wastewater outfall.

2.8.4 WASTE DISCHARGE/WATER QUALITY STANDARDS

The total PMEC sanitary wastewater discharges to the Port of Kalama plant would comprise less than approximately six percent of the total domestic wastewater flows that could be treated at that Port's facility. Figure 2.7-3 presents the existing Port of Kalama wastewater infrastructure. The Port's domestic wastewater treatment receives domestic wastewater from other industries located in the North Port area. The Port discharges treated sanitary wastewater to the Columbia River under conditions contained in National Pollutant Discharge Elimination System Permit No. WA0040843.

All process wastewater would be discharged to an on-site treatment plant, if one is required to comply with Washington State water quality standards for discharge to the Columbia River as discussed in Section 2.8.3. This discharge, with or without pre-treatment on-site, would be

subject to an NPDES permit issued by the Ecology. An NPDES permit application is included in Section 5.2 of this Application as required by WAC 463-60-537. Discharge from the PMEC would be sampled and tested before joining other discharges at the Port of Kalama's discharge system at the Mixing Vault for Domestic and Industrial Wastewater as shown on Figure 2.7-3. As described above, the annual average steady state flow of process wastewater from the PMEC would be approximately 890 gpm, with a maximum steady state flow of 890 gpm. The final design of the PMEC would address storage capacity, duration, and bypass (overflow) requirements.

2.9

WAC 463-60-205 Proposal—Spillage prevention and control.

The application shall describe all spillage prevention and control measures to be employed regarding accidental and/or unauthorized discharges or emissions, relating such information to specific facilities, including but not limited to locations, amounts, storage duration, mode of handling, and transport. The application shall describe in general detail the content of a Construction Phase and an Operational Phase Spill Prevention, Control and Countermeasure Plan (chapter 40 CFR Part 112 and Hazardous Waste Management Plan) that will be required prior to commencement of construction.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-205, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-205, filed 10/8/81. Formerly WAC 463-42-420.]

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

2.9.1 PURPOSE AND SCOPE

This section describes the general requirements for spillage prevention and control measures during construction activities at the Pacific Mountain Energy Center (PMEC), an integrated gasification combined cycle (IGCC) development site proposed by Energy Northwest, as required by the State of Washington Site Certification Agreement, National Pollutant Discharge Elimination System Permit, and state and federal requirements. A revised procedure will be issued as the PMEC moves to plant operations, or if new requirements or organizational changes require revision. The procedure will be reviewed annually, at a minimum, and updates made as needed.

2.9.2 REFERENCES

The following references will be used in developing spill prevention, control, and countermeasure (SPCC) plan.

2.9.2.1 40 Code of Federal Regulation (CFR) Part 302, Designation, Reportable Quantities, and Notification Requirements for Hazardous Substances.

2.9.2.2 40 CFR Part 112, Oil Pollution Prevention.

2.9.2.3 Chapter 173-303 WAC, Dangerous Waste Regulations.

2.9.2.4 Chapter 173-350 WAC, Solid Waste Handling.

2.9.2.5 Washington State Department of Ecology, Stormwater Management Manual for Western Washington (SWMMWW), February 2005.

2.9.2.6 Chapter 173-340 WAC, Model Toxics Control Act (MTCA)

2.9.2.7 Washington State Department of Ecology, Toxic Clean Up Program Policies, "Policy 300, Site Discovery -- Reporting Releases"

2.9.3 DEFINITIONS

The following definitions will be used in developing the SPCC plan:

- **Oil Spill** - Any spill of unrefined or refined petroleum products. Spill is any discharge that will cause a film or sheen upon, or discoloration of water, or cause a sludge or emulsion to be deposited beneath the surface of water.

- **Hazardous Material** - Any chemical or substance which could be hazardous to the environment. Many hazardous materials have reportable spill quantities established. See 40 CFR Part 302 for the list of hazardous substances and their reportable quantities. (Reference 2.9.2.1).

- **Discharge -** Discharge means the accidental or intentional release of petroleum and/or hazardous substances, including wastes and waste constituents, such that the substance may enter or be emitted into the environment.

- **Release** - Release includes, but is not limited to, the actions of spilling, leaking, pumping, pouring, emitting, dumping, emptying, depositing, placing, or injecting.

2.9.4 RESPONSIBILITIES

Responsibilities will be established for the construction period, in which the construction contractors will have primary responsibility for overseeing compliance with state and federal environmental regulations and compliance with environmental commitments made to the EFSEC. Construction contractor personnel will oversee field activities;, coordinate resolution of deviations from BMPs, commitments and regulations; and identify any process changes that could require revision to the environmental procedures.

During the construction period, Energy Northwest shall have the overall responsibility for ensuring compliance with state and federal environmental regulations and compliance with environmental commitments made to the EFSEC. After the PMEC has reached commercial operation, Energy Northwest and its operator(s) will assume all responsibilities for spill prevention, control, and countermeasures.

2.9.5 PROCEDURE REQUIREMENTS

2.9.5.1 References to Federal Requirements of 40 CFR 112.7

In accordance with 40 CFR 112.7, a cross-reference to the requirements listed in that part will be made when the procedure is finalized prior to initiating construction. Following is a listing of the requirements which will be addressed in the procedure.

- Part 112.7 (a) Conformance, Facility Layout, Contacts
- Part 112.7 (b) Prediction of Oil Discharges for Major
- Part 112.7 (c) Containment and Diversionary Structures
- Part 112.7 (d) Spill Control Procedures
- Part 112.7 (e) Inspections, Tests and Records
- Part 112.7 (f) Personnel, Training and Discharge Prevention Procedures
- Part 112.7 (g) Security
- Part 112.7 (h) Facility Loading/ Unloading

- Part 112.7 (i) Repair of Field Constructed ASTs
- Part 112.7 (j) State Rules and Guidelines

2.9.5.2 Prevention Requirements

The following are summaries of the guidelines and requirements necessary for control and prevention of oil, fuel, and hazardous material spills. The SWMMWW (Reference 2.9.2.5) will be reviewed to ensure that prevention BMPs are described in the plan. Current BMPs are C153: Material Delivery, Storage and Containment, Mobile Fueling of Vehicles and Heavy Equipment, Maintenance and Repair of Vehicles and Equipment, Loading and Unloading Areas for Liquid or Solid Material, Liquid Storage in Permanent Above-ground Tanks, and Storage of Liquid, Food Waste, or Dangerous Waste Containers.

2.9.5.2.1 Users of oil, fuels, and hazardous materials must have a supply of oil absorbent materials on site for cleaning up minor spills. A supply of materials (i.e., socks, pads, booms, rolls, etc.) and spill cleanup kits for emergency use by site personnel will be located throughout the PMEC. Absorbent material used to clean spills shall be handled in accordance with Reference 2.9.2.3 and 2.9.2.4.

2.9.5.2.2 Table 2.9-1 below lists categories of materials that may be stored on site. Material Safety Data Sheets (MSDSs) are required for all oils, fuels and hazardous materials. A current listing of MSDSs will be located in the PMEC office. Prior to bringing a material on-site, the user must forward a copy of the MSDS to the PMEC office. Containers of oils, fuels and hazardous chemicals shall be labeled, tagged, or marked with the identity (trade name) of the material and appropriate health hazard warnings (e.g., caustic).

TABLE 2.9-1
OILS, FUELS AND HAZARDOUS MATERIALS

STORED AT PMEC

Fuel (e.g., diesel, kerosene)
Gasoline
Oil (e.g., transformer, lubricating)
Solvents and thinners
Paints
Antifreeze
Coatings and sealants
Water treatment chemicals
Ammonia
Corrosion inhibitors
Pesticides (herbicides, rodenticides, insecticides, etc.)
Batteries

2.9.5.2.3 Permanent bulk storage tanks and containers with oil, fuel, and/or hazardous materials in quantities greater than five gallons will be contained within curbed storage pads or on level storage areas surrounded by a berm or dike sized to contain a containment volume able to contain precipitation from a 25-year, 24-hour storm event (if outside) and the volume of either 10 percent of the total enclosed tank volume or 110 percent of the volume contained in the largest tank, whichever is greater, or if a single tank, 110 percent of the volume of that tank. A tank overfill protection system will be used to minimize the risk of spillage during filling. Portable tanks and barrels will be stored using prefabricated storage containers, or surrounded by a berm or dike sized to contain the containment volume able to contain precipitation from a 25-year, 24-hour storm event (if outside) and the volume of either 10 percent of the total enclosed container volume, or 110 percent of the volume contained in the largest container, whichever is greater, or if a single container, 110 percent of the volume of that container. Dikes containing hazardous waste materials shall have roofed coverings to prevent accumulation of stormwater. All secondary containment facilities shall be impervious to the materials stored within for a minimum contact time of 72 hours. All materials shall be stored in accordance with the Uniform Fire Code (UFC). The person in direct charge of the bulk storage area will regularly sweep and clean the storage area, check for leaks and spills, and have repairs made as needed. All spills made within dikes will be cleaned up as soon as practicable.

2.9.5.2.4 Where berms or dikes are used, they will be designed in such a way as to permit stormwater to be drained from the area inside the berm or dike without discharging any oil, fuel or hazardous material with the water. Where a valve is used, the valve shall be left in the normally closed position. Where sump pumps are used, the pump shall normally be left disconnected. The person in direct charge shall look for evidence of contamination before opening a containment dike valve or operating a sump pump to allow discharge of stormwater, and shall document that the inspection was made. Evidence of contamination can include the presence of visible sheen, color, or turbidity in the runoff. Simple pH measurements with litmus or pH paper can be used for areas subject to acid or alkaline contamination.

2.9.5.2.5 No barrels or tanks will be allowed to sit in accumulated liquids. Barrels or tanks will be covered and stored so that water cannot accumulate on top. All tanks and barrels will be stored in a manner to prevent rusting and damage to the containers. If containers must be stored outside, they shall be stored at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion, or a domed plastic cover shall be snapped onto the top of the container, preventing water from collecting. Drip pans will be placed beneath all mounted container taps and at all potential drip and spill locations during filling and unloading of containers. Sufficient separation shall be provided between stored containers to allow for spill clean up and emergency response access. The person in direct charge will check containers and storage areas for leaks and spills.

2.9.5.2.6 Drums stored in an area where unauthorized persons may gain access must be secured in a manner that prevents accidental spillage, pilferage or any unauthorized use.

2.9.5.2.7 Containers of five gallons or less shall be stored in designated storage areas, generally within buildings, storage containers, and/or flammable storage lockers where spills can be contained. When the material is in use on site, small containment pans shall be used to store the material.

2.9.5.2.8 Traveling equipment, compressors and generators will be maintained properly to minimize oil, grease, and hydraulic fluid leakage. Incoming vehicles, parts, and equipment used and stored outside will be checked for leaks. Service and fuel trucks must carry spill clean up material that are readily available for use.

2.9.5.2.9 Use of well maintained equipment and fixtures for fueling and maintenance operations will be encouraged. Use of items such as quick couple nozzles with automatic shut-off and absorbent materials for fueling, suction pumps to drain oil, drip pans when changing oil filters and fueling, and locating waste receptacles for oil and filters on service trucks will also be encouraged. Fuel lines will not be extended across a trafficable lane. The fill nozzle will be removed and filling stopped when the automatic shut-off valve engages; there will be no "topping off" of the fuel receiving equipment. Adequate lighting shall be maintained at all filling points.

2.9.5.2.10 Equipment maintenance must be conducted in assigned areas except for approved light field servicing. All equipment working in the vicinity of ditches, storm drains, or the Columbia River must move to an area where any release can be contained and prohibited from entering the drainage system, and/or the Columbia River during servicing and fueling operations. The area should be at least 25 feet away from the nearest storm drain or inside an impervious containment with a volumetric holding capacity equal to or greater than 110 percent of the fueling tank volume. As an alternative, the storm drain may be covered to ensure no inflow of spilled or leaked oil, fuel, or grease.

2.9.5.2.11 When oils, fuels, and/or hazardous materials will be loaded or unloaded, an employee trained in spill containment shall be present. To the extent practicable, unloading or loading of solids and liquids shall be conducted in a building, under a roof, under a lean-to, or other appropriate cover, consistent with the UFC. Drip pans or other appropriate temporary containment devices shall be placed at hose connections, hose reels, filler nozzles, and other appropriate locations to capture any potential leak or spill. For permanent loading/unloading areas, the area shall be bermed, diked, or sloped to prevent spills from leaving the area, and to prevent stormwater from entering the area. The area shall drain to a dead-end sump, spill containment sump, a spill control oil/water separator, or other spill control device. For permanent loading/unloading areas, the area on which the transfer takes place shall be paved with a material compatible with the material being

transferred (e.g., an area for transfer of gasoline would be paved with Portland cement concrete, not with asphalt).

2.9.5.2.12 Liquid waste and materials contaminated with oil or hazardous materials must be collected for salvage or disposal off-site in accordance with Reference 2.9.2.3 and 2.9.2.4.

2.9.5.2.13 Contractors working at the PMEC site are responsible for storage of materials in accordance with References 2.9.2.3 and 2.9.2.5. The Contractor will coordinate with Energy Northwest on the transport and delivery of all wastes to salvage firms for reprocessing or to properly approved, permitted facilities or sites for disposal. All hazardous waste material generated on behalf of Energy Northwest will be transported off-site and disposed of under Energy Northwest's generator identification number.

2.9.5.2.14 Contractors will provide Energy Northwest with an estimate of quantities of oils, fuels, hazardous materials and wastes stored or generated on a monthly basis, the on-site storage location, waste disposal frequency off-site, location of disposal facility, name of company transporting wastes, information on whether wastes are recycled, reclaimed or reused, and copies of all bills of lading or manifests.

2.9.5.2.15 Oil, fuel and hazardous substances shall not be introduced into plant sumps or drains or into the storm water drainage system.

2.9.5.2.16 Training of site personnel involved in handling, storage and disposal of oil and hazardous materials shall be performed and documented in accordance with 40 CFR 112 and WAC 173-303-330 (References 2.9.2.1 and 2.9.2.3). Training shall include review of procedures, definitions and regulations. All new employees will receive this training as part of their orientation. Employees will be required to participate in annual refresher training. Staff shall periodically test the procedure by either performing a table top drill or where practicable a field drill. If necessary, as a result of the drill(s), the procedure shall be revised to take advantage of lessons learned.

2.9.5.3 Inspection Procedure

Inspection procedures will be developed that include the following:

- Inventory of bulk (greater than five gallon containers) storage of oil, fuel, and hazardous materials on-site, including storage locations, dike type and capacity, and quantities of materials;
- Reviews of use, storage, and handling of oil, fuel, and hazardous material;

- Inspection of facilities and site for compliance with environmental commitments and regulations, which include:

  (a) Condition of storage areas for oil, fuel, and hazardous materials and wastes. The condition of containers within storage areas.

  (b) Wastes and contaminated materials collected for salvage or disposal off-site in accordance with References 2.9.2.3 and 2.9.2.4.

  (c) Measures taken to prevent entry of oil, fuel, and/or hazardous materials to the storm drainage system and the Columbia River, including fueling and maintenance away from storm drainage and the Columbia River.

  (d) Review of servicing and refueling operations.

  (e) Spill kits and absorbent materials available on site, including materials on servicing and fueling trucks.

2.9.5.4 Spill Procedures

Procedures for responding to spill events shall be developed. These procedures will include actions needed to contain the material in accordance with training received.

- Absorbent booms will be placed around area of spill if it is believed that the spill could travel outside immediate area. Drains and catch basins in the immediate area will be covered so that no material can enter. For spills to the ground, if appropriate for the material spilled, turn soil and use absorbent materials to collect additional spilled material. If not appropriate, collect contaminated soil for disposal in accordance with References 2.9.2.3 and 2.9.2.4. Contaminated absorbent materials shall be collected and disposed of in accordance with References 2.9.2.3 and 2.9.2.4.
- If the spill is large enough to require cleanup company's assistance, or cleanup requires training beyond level provided to site personnel, a contractor for cleanup services at responsible party's expense will be contacted.
- Spills will be reported as required by References 2.9.2.1, 2.9.2.5, 2.9.2.6, and 2.9.2.7.
- All spills will be reported to EFSEC and Ecology as required by Reference 2.9.2.6, using the guidance provided in Reference 2.9.2.7.
- Oil and fuel spills, regardless of size, which have entered or have the potential to enter the Columbia River and/or the Kalama River will be reported to the National Response Center, EFSEC, and Ecology (Reference 2.9.2.1 and 2.9.2.5).
- Hazardous material spills in quantities greater than the reportable quantity will be reported to EFSEC, the National Response Center, the local Emergency Planning Committee, and Ecology (Reference 2.9.2.1).

2.9.5.5 Record Retention

All records pertaining to the SPCC Plan shall be retained on site for a minimum of five years.

2.10

WAC 463-60-215 Proposal—Surface-water runoff.

The application shall describe how surface-water runoff and erosion are to be controlled during construction and operation to assure compliance with state water quality standards. The application shall describe in general detail the content of the construction and operational storm water pollution prevention plans that will be prepared prior to commencement of construction and/or operation of the facility.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-215, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-215, filed 10/8/81. Formerly WAC 463-42-330.]

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

Surface water runoff without regulated controls can cause the erosion of topsoil, increase sediment load of surface water bodies, increase temperature and deteriorate water quality of receiving creeks and streams. These impacts would be mitigated by the requirements of stormwater control programs.

The discharge of stormwater runoff from the Pacific Mountain Energy Center (PMEC) is regulated by EFSEC based upon the Ecology's stormwater pollution control program. Ecology is delegated to implement the federal NPDES program in the State of Washington. The stormwater program is based on federal regulations adopted to implement Section 402(p) of the Federal Clean Water Act and Chapter 90.48 RCW, the State of Washington's Water Pollution Control Act. The goal of the stormwater program is to reduce or eliminate stormwater pollution from municipal and industrial point sources, by requiring the implementation of technology based Stormwater Pollution Prevention Plans (SWPPP) and to eliminate surface water quality standards violations caused by stormwater. The PMEC would be required to obtain coverage under either an individual NPDES permit or seek coverage under a general permit for stormwater discharges (Stormwater General Permits).

The PMEC would be required to seek coverage under Ecology's Construction Stormwater General Permit because the construction activities would disturb more than one acre of land. Energy Northwest anticipates filing a notice of intent (NOI) to obtain coverage under the Construction Stormwater General Permit (CSGP) and the Industrial Stormwater General Permit (ISGP) unless it is instructed by EFSEC or Ecology that it is not necessary to do so. Even if coverage under this general permit is not required, the Applicant proposes to design and implement the same BMPs to prevent and minimize the discharge of pollutants in its stormwater runoff, and to prepare SWPPPs for the construction and operation of the PMEC in substantially the same form and content.

The final design would address the 6-month, 24-hour storm, the 10-year, 24-hour storm, and the 100-year, 24-hour storm as required, and would conform to the Washington State Department of Ecology's Stormwater Management Manual for Western Washington (SWMMWW) in effect at the time.

The NOI for coverage under the CSGP would be filed with EFSEC (or Ecology, if designated by EFSEC as the responsible agency for this permit) at least 38 days prior to the start of construction. A SWPPP meeting the conditions of the CSGP must also be prepared and implemented prior to the start of construction activities. The contents of the SWPPP for construction activities is presented in Section 2.10.1.

The NOI for coverage under the ISGP would be filed with EFSEC (or Ecology, if designated by EFSEC as the responsible agency for this permit) at least 38 days prior to the start of commercial operations at the PMEC IGCC. A SWPPP meeting the conditions of the ISGP must also be prepared and implemented prior to the start of operations. The content of the SWPPP for industrial activities is addressed in Section 2.10.2.

2.10.1 STORMWATER EROSION CONTROL DURING CONSTRUCTION

This section presents specific procedures and requirements, which would be implemented at the construction site to reduce the discharge of contaminated stormwater runoff. It includes information on the erosion control practices to be followed during construction at the site (Section 2.10.1.1), and along the off-site utility routes (Section 2.10.1.2). Site-specific erosion control plans would be submitted to EFSEC prior to construction.

The main categories of information to be included in the SWPPP are construction BMPs, operating BMPs, construction-phase enforcement, and establishment of the PMEC Stormwater Pollution Prevention Team.

The SWPPP is most appropriately prepared when design-level topographic surveying and mapping is available, and the final configuration of proposed improvements is overlaid on the existing topo. The civil site design engineer would be establish the locations and types of construction BMPs to be required of the construction contractor, and would be include these on an overall map of the site. A narrative section of the SWPPP would describe the intended installation sequence and function of the selected BMPs, and present the sizing calculations. The report would also identify the selected minimum standard to which each of the BMPs are to be constructed or installed. When prepared at this level of detail, the document meets the requirements of the Stormwater Construction Activity NPDES permit system, and also accurately describes, to the construction contractor, the improvements and actions to be required during construction. When complete and submitted to EFSEC implementation of the construction BMPs is carried out by the site work contractor, with enforcement supervised by the Owner's resident inspector.

2.10.1.1 Site Construction

Site-specific BMPs for temporary erosion and sedimentation control during construction would be identified on the construction plans submitted to EFSEC. BMPs would be selected from the SWMMWW, as appropriate for the site slopes, the construction activities, weather conditions, and vegetative buffers.

The sequence and methods of construction activities would be controlled to limit erosion. Clearing, excavation, and grading would be limited to the minimum areas necessary for construction of the project, and would not be done far in advance of facility construction. Slopes would be graded to no steeper than 3 feet horizontal (H) to 1 foot vertical (V). Ground surface restoration shall be completed within fourteen days of the area's final disturbance. Interim surface protection measures, such as erosion control blankets or straw matting, may also be required prior to final disturbance and restoration if warranted by the potential for erosion.

Sediment control measures used during construction would be based on a 10-year design storm. Water quality measures (other than sediment removal) would be based on the 6-month, 24-hour design storm.

All construction practices would emphasize erosion control over sediment control through such non-quantitative activities as:

- Straw mulching and vegetating disturbed surfaces,
- Retaining original vegetation wherever possible,
- Timing grading operations to dry seasons,
- Directing surface runoff away from denuded areas,
- Keeping runoff velocities low through minimization of slope steepness and length, and
- Providing and maintaining stabilized construction entrances.

Slope steepness of pre-loading surcharge piles, if necessary, would not be a significant issue, since flow velocities at the base of the piles can be dramatically slowed to acceptable levels as runoff proceeds toward the water quality facility. Slope steepness of surcharge piles would be determined by the angle of repose and shear stability of the pre-load material.

To effectively drain the work area during filling and construction, the predominantly level site would require construction of temporary swales or ditches, to direct flow toward the proposed drainage channels. Temporary erosion and sedimentation control measures must be implemented to reduce sediment loss from the site. A combination of the measures listed below would be used.

It is assumed that the pre-loading surcharge piles would be largely impervious due to the degree of compaction achieved during placement. It is thus proposed that the drainage channels be constructed first, to provide sedimentation functions for the surcharge construction phase as well as the permanent operation of the plant site. At the conclusion of construction, sediment accumulated during construction would be removed from the drainage channels to restore design capacity for permanent operations.

Sediment Traps

Sediment traps are temporary or permanent basins used to intercept stormwater runoff and allow sediment to settle, thereby minimizing the amount of sediment flowing offsite. Sizing criteria for the traps include inflow and sediment load. Sediment traps would be sized for the specific disturbed area, for bare soil conditions, and typically for 75 percent sediment removal efficiency. It is proposed to construct and use the permanent drainage channels as construction phase sediment traps. The drainage channels would be cleaned for permanent operation upon completion of site construction.

Silt Fences

Slopes less than 3H:1V would be protected with silt fencing as appropriate. Silt fences would be installed in locations where they would trap silt eroded from slopes during construction and prior to reestablishing vegetation. The maximum flow path to each silt fence would be approximately 100 feet. No concentrated flows greater than 1 cubic feet per second (cfs) would be directed toward any fence for the 25-year storm. Silt fences would be maintained throughout the construction period, and beyond until disturbed surfaces have been stabilized with vegetation.

Silt fence construction specifications including fabric-equivalent open-size, support spacing, and total length would be determined by local construction conditions during final design of the facilities.

Grade Control Structures and Slope Ditches

Grade control structures, such as rock check dams, hay bale check dams, dikes, and swales, would be used where appropriate to reduce runoff velocity as well as to direct surface runoff around and away from cut-and-fill slopes. The perimeter slopes of the filled pad may require the protection of rock check dams and swales at the base to reduce impacts of re-directed offsite runoff trying to migrate across the property. Swales and dikes would also be used to direct surface water on top of the filled pad toward sediment traps and away from flowing over-bank, which may contribute to sheet and rill erosion.

Matting and Erosion Control Blankets

Depending upon weather conditions during the construction period, straw or jute matting or other suitable erosion control blankets would be used on the pad slopes and the drainage channel slopes if direct rainfall on the slopes would result in erosion prior to stabilization.

Quarry Spall Construction Entrances

Quarry spall construction entrances would be used to reduce migration of construction dirt to adjacent public streets. Placing the construction entrances is one of the first activities required at the site, but the rock bed must also be periodically replenished as it becomes dirty or migrates into the subgrade. All construction traffic would be directed to use the construction entrances.

In addition to erosion and sedimentation control on the site, the reduction of potential for chemicals to enter surface waters during construction is important. Since source control is the most effective method of preventing chemical water pollution, careful control would be exercised over potentially polluting chemicals used onsite during construction. A Stormwater Pollution Prevention Team established by the construction contractors and including Energy Northwest members would be responsible for planning, implementing, and maintaining BMPs for:

- Neat and orderly storage of construction chemicals and spent containers in lined, bermed areas,
- Prompt clean up of construction phase spills,
- Regular disposal of construction garbage and debris, and
- Regular sweeping of streets leading from the construction site.
- Off-site Utility Route Construction

Similar temporary erosion and sedimentation control measures would also be applied along the construction routes of offsite utilities, including the natural gas pipeline and railroad spur.

The proposed river crossing by the gas pipeline would be constructed by means of horizontal directional drill (HDD) or by hanging the pipeline off the existing bridge. If HDD is selected, drill pit construction setback distances and burial depths would be determined during Final Design. If the elevation of the pipe construction trench on either side of the Kalama River is lower than the ordinary high water elevation of the river, bentonite clay collars would be poured in the trench backfill to prevent the migration of river water through the pipeline trench. The clay collars would be placed near the face of the drill pits to ease the installation, and to minimize any potential for bentonite migration to the river. Use of clay collars is a routine construction practice and presents insignificant risks to river water quality.

In addition to the silt fences, straw bale and rock check dams described in Section 2.10.1.1 above, utility route construction BMPs would also include:

- Weather protection of stockpiled bedding and backfill materials and topsoil,
- Careful placement of trench excavation spoils so as to minimize impact to drainage, courses,
- Routine street sweeping,
- Quarry spall construction entrances to materials storage sites and field offices, and
- Surface restoration that immediately follows trench backfill.

2.10.2 PERMANENT STORMWATER MANAGEMENT

Existing land cover is sandy gravels with short (6-8”) herbaceous vegetation. There are also some small areas of Scot’s broom and other similar shrubs. No wetland vegetation appears to be present in depressions, indicating that stormwater is presently draining or infiltrating quickly. The total PMEC would be approximately 95 acres, and the developed land is assumed to be approximately50 acres with approximately 15 acres of impervious surface.

Permanent stormwater management requires construction of appropriate stormwater hydraulic and treatment facilities, routine maintenance thereof, and prevention of chemical pollution through source control. Energy Northwest would identify a Stormwater Pollution Prevention Team prior to commercial operation, which would be responsible for developing, implementing, maintaining, and modifying the SWPPP.

It is proposed that a pair of geomembrane-lined stormwater channels be constructed, one on either side of the berm separating the gasification area from the combined-cycle area. These channels would be suitably sloped so as to direct site stormwater towards a stormwater water quality treatment facility, proposed to be a wet-pond, which would be located in the south central portion of the site. All site stormwater, from the bermed areas and from the balance of the site, would be directed to this wet-pond, and then would flow to the Columbia River for discharge.

Treated, detained runoff from PMEC would have dissolved oxygen (DO) levels comparable to runoff from the pre-developed condition, so no change in dissolved oxygen has been assumed. Runoff from the PMEC stormwater wet pond or bioswale could be slightly warmer than pre-developed runoff if the water is exposed to strong sunlight for any length of time. A very intense

morning rainfall would have to be followed by a day of strong sunlight for these conditions to occur.

The edges of the finished filled site would have slopes of 3H:1V. Several methods are available for providing permanent slope stability. The sides of the filled site may be covered with topsoil, biodegradable jute matting, and seeding with tall-growing grass species intended to be un-mowed. Another option for side slopes of 3H:1V or shallower includes topsoil, jute matting and rye-fescue seed mixtures suitable for mowing. An angular, quarry rock covering of the slopes is suitable for erosion control, but would be unattractive and difficult to maintain when weedy. For all methods, silt fencing would remain in place at the toe of the fill site slopes until vegetation is established. Site-specific slope stabilization measures would be developed for the final design.

The SWPPP would contain pre-design level of detail for the permanent stormwater treatment and water quality BMPs (i.e. wet pond), and would establish the permanent operations Stormwater Pollution Prevention Team from appropriate employee categories. Final designs for the permanent BMPs would be incorporated into the final construction plans and specifications prepared by the civil site design engineer. An operations manual for the permanent BMPs would be prepared by the civil site design engineer and the Stormwater Pollution Prevention Team members.

The constructed permanent stormwater BMPs would include:

- An onsite stormwater collection system of inlets, catch basins and pipes;
- Two geomembrane-lined drainage channels to direct site stormwater from within the two bermed areas to a stormwater treatment structure, located at the west end of the bermed areas;
- The water quality treatment structure would be a stormwater wet pond which would discharge to the Columbia River;
- Passive oil-water separators in some catch basins; and
- Permanent erosion and sedimentation control through site landscaping, grass and other vegetative cover.

Because the site stormwater management system would discharge to the Columbia River, no detention storage is required, per SWMMWW.

Runoff treatment BMPs and wet ponds would be designed to conform to SWMMWW.

Constructed source control BMPs would also be consistent with the SWMMWW. Secondary containment areas consisting of pavement curbs and berms, non-porous pavement, sumps, and outlet valves, would be employed as necessary in the design of fueling stations, loading and unloading areas for chemicals, aboveground chemical storage tank systems, container storage facilities, outside storage areas and outside maintenance areas. Oil or hazardous substances collected within these containment areas would be isolated for proper cleanup and disposal according to local, state, and federal regulations, and would not be automatically directed to the stormwater system or the Columbia River (See Section 2.9).

Operational BMPs would be adopted as part of the SWPPP to implement good housekeeping, preventive, and corrective maintenance procedures, steps for spill prevention and emergency cleanup, employee training programs, and inspection and record keeping practices as necessary to prevent stormwater pollution.

Examples of good operational housekeeping practices, which would be employed by Energy Northwest, include:

- Neat and orderly storage of chemicals,
- Prompt cleanup and removal of spillage,
- Regular pickup and disposal of garbage and rubbish,
- Regular sweeping of floors and parking lots,
- Proper storage of containers, and
- Prevention of accumulations of liquid or solid chemicals on the ground or the floor.

During periods of heavy rainfall and after primary storage tanks have been filled or emptied, secondary containment areas would be inspected for accumulations of water that may contain chemical pollution. If chemical pollution is not detected, the rainwater may be drained to the stormwater system. If pollution is detected, the contaminated water must be isolated and removed, either with absorbents or by pumping by a contractor that can handle the waste water in a treatment facility. These operational issues would be identified in the SPCC Plan as identified in Section 2.9.

At least annually, facility operators would receive spill response training, training in the applicable pollution control laws and regulations, and training in the specific features of the PMEC, which are intended to prevent releases of oil, petroleum products, or other chemicals. Additional support staff would also be trained in the following spill response procedures:

- Recognizing 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, and
- Implementing spill response procedures.

Stormwater catch basins would be inspected at least annually as part of the site preventive maintenance program. Stormwater catch basins would be cleaned if the collected deposits fill more than one-third of the sump volume below the lowest pipe invert. The stormwater wet pond sediments would be removed annually, to restore the necessary design settling and storage volumes of the pond. Material removed from catch basins and the pond must be disposed of in accordance with local, state and federal regulations. If disposed of at any location other than the grit and sludge handling facilities of a Publicly Owned Treatment Works (POTW), the sediments from the catch basins and pond should first be analyzed to demonstrate the absence of toxic compounds.

PMEC operators would be required to periodically review the SWPPP against actual practice and confirm that the controls identified in the plan are adequate, and employees are following them. In addition, tests and observations would be performed to confirm that non-permitted discharges to the stormwater system are not occurring. A summary of these in-house compliance inspections would be kept with the SWPPP, along with any notifications of non-compliance and reports on incidents such as spills. If the SWPPP has been followed but still proved inadequate to prevent stormwater pollution, the Stormwater Pollution Prevention Team would amend the SWPPP and seek EFSEC concurrence with the improvements.

2.10.3 PERMANENT WATERWAYS

The proposed drainage channels would provide a permanent stormwater flow path leading toward the Columbia River. Collector channels are proposed for four locations: north of the gasification bermed area, within the south edge of the gasification bermed area, within the north edge of the combined-cycle bermed area, and south of the combined-cycle bermed area. These channels would collect stormwater runoff and direct it eastward either to a stormwater wet pond, or to a bioswale. Discharge from the pond would be conveyed through a pipe or openditch to the Columbia River.

2.11

WAC 463-60-225 Proposal—Emission control.

(1) The application shall describe and quantify all construction and operational air emissions subject to regulation by local, state or federal agencies.

(2) The application shall identify all construction and operational air emissions that are exempt from local, state and federal regulation, and the regulatory basis for the exemption.

(3) The applicant shall demonstrate that the highest and best practicable treatment for control of emissions will be utilized in facility construction and operation.

(4) The application shall identify all state and federal air emission permits that would be required after approval of the site certification agreement by the governor, and the timeline for submittal of the appropriate applications for such permits.

(5) In the case of fossil-fuel fired energy plants, the application shall describe and quantify all emissions of greenhouse gases.

(6) In the case of a nuclear-fueled plant, the applicant shall address optional plant designs as these may relate to gaseous emissions.

[Statutory Authority: RCW .80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-225, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80,50.040(1). 92-09-013, § 463-42-225, filed 4/2/92, effective 5/3/92. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-225, filed 10/8/81. Formerly WAC 463-42-520.]

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 Pacific Mountain Energy Center (PMEC) and describes the emission controls that have been incorporated in the proposed PMEC design. Criteria pollutants are air pollutants governed by National and Washington Ambient Air Quality Standards (NAAQS and WAAQS). TAPs emissions from the operational PMEC facility have also been estimated based on source tests at other IGCC plants and EPA emission factors in the AP-42 compendium. Although it is not a regulated pollutant, emissions of carbon dioxide (CO_2) are also quantified in this section as required by WAC 173-60-225 since increases in atmospheric CO_2 concentrations are potential greenhouse gas linked to potential global warming.

Emissions would be controlled by application of Best Available Control Technology (BACT) and would comply with federal and state emission standards. In addition to BACT limits, the United State Environmental Protection Agency (USEPA) and Washington Department of Ecology (Ecology) air quality regulations contain provisions for applicants to propose Innovative Control Technologies (ICTs) that have not yet been demonstrated in practice at comparable facilities, but which may have the potential to improve upon current BACT limits. Energy Northwest proposes that additional syngas fuel cleaning steps and the application of Selective Catalytic Reduction (SCR) controls on the combustion turbines represents ICT. The Selexol® or equivalent process would provide an additional 80 percent removal of sulfur from the syngas compared with the amine systems considered BACT at other Integrated Gasification Combined cycle (IGCC) facilities. The lower sulfur syngas would then potentially allow the use of SCR to decrease turbine emissions of nitrogen oxides (NO_x) by 80 percent compared with levels achieved at other IGCC projects. As explained in Section 3.2, emissions attributable to PMEC would not result in significant air quality impacts.

Energy Northwest proposes to operate two combustion turbines, each of which would have a combustion turbine-generator (CTG) and a steam turbine generator. Although the equipment vendor has not been selected for the PMEC, for purposes of analysis, the following equipment configuration was used: two Siemens SGT6-5000F turbines with a Heat Recovery Steam Generator (HRSG), without supplemental duct firing. Steam generated by the HRSGs would supply the steam turbine generator.

Additional PMEC components include materials handling equipment related to the receipt, handling and storage of feedstock fuels (coal and petroleum coke, i.e., petcoke); three gasifiers for the production of syngas; a tank vent oxidizer; a gasification island flare; an auxiliary boiler; cooling towers; and internal combustion engine drivers for an emergency generator and two firewater pumps. Quantitative emissions estimates for all project sources are described in the following subsections along with explanations of the controls that would be applied to minimize these emissions for specific sources throughout the proposed power plant.

2.11.2 CRITERIA POLLUTANTS

2.11.2.1 Best Available Control Technology

Energy Facility Site Evaluation Council's (EFSEC's) determination as to what constitutes BACT at the time of the final permit review would define PMEC emission limits. Because the combustion turbines would be the most significant sources of air pollutant emissions associated with the PMEC, this section focuses on the combustion turbine emissions and control options. However, for all PMEC sources of emissions BACT is addressed in the BACT analysis provided as Appendix B-1.

This project would be the first IGCC facility in Washington, so it is necessary to look nationwide for emission limits for comparable facilities. Table 2.11-1 compares BACT determinations that have been made for other IGCC power plants that have been permitted in the United States with the proposed emission limits for the PMEC project. The emission rates listed in this table have been estimated based on permit documents and converted to the units of pounds per million Btu (lbs/MMBtu) of gasifier feedstock, for the purposes of general comparison. The actual permitted levels and/or BACT determination in many cases are expressed in different units.

The conclusion to be drawn from this comparison is that proposed emission limits for the PMEC are substantially more stringent than those that have been accepted in other recent IGCC permits throughout the United States. This is primarily due to Energy Northwest's proposal to implement control technologies that have been used in other industries and in natural gas fueled combined cycle power projects, but never thus far for IGCC power plants.

TABLE 2.11 -1
PERMITTED EMISSION RATES FOR IGCC UNITS

In lbs/MMBtu gasifier fuel energy input (approximate)

Location	Year Permitted	MMBtu/hr as coal to gasifier or Plant MW (estimated)	CO	NOx	SO_2	PM	VOC
Wabash River (Indiana)	Operational since 1995	2,356	0.036	0.087	0.126	0.005	0.001
Polk Power Station (Florida)	Operational since 1995	2,191	0.045	0.101	0.170	0.008	0.001
Kentucky Pioneer	Permitted in 2001, but not constructed	4,413	0.026	0.059	0.026	0.009	0.004
Lima Energy (Ohio)	Permitted in 2002, but not constructed	4,413	0.035	0.067	0.022	0.008	0.007
We Energies (Wisconsin)	Permitted in 2004, but not constructed	5,424	0.024	0.059	0.023	0.008	0.003
Steelhead Energy Center (Illinois)		544 MW	0.04	0.059	0.033	0.0092	0.0029
Taylorville Energy Center (Illinois))		677 MW	0.036	0.058	0.045	0.007	0.008
PMEC Proposed IGCC (Washington)	Proposed	600	0.036	0.012 (3, hr, ICT)	0.016 (3-hr, ICT)	0.0010	0.003

The ICT proposed for the PMEC includes enhanced syngas cleanup using the Selexol® or equivalent process to reduce sulfur in the syngas and the use of SCR to control NO_x emissions from the combustion turbines. The additional level of syngas cleanup (the Selexol® or equivalent process) is critical to prevent the fouling of the catalyst and plugging of the heat recovery steam generators that would otherwise occur. Energy Northwest proposed this ICT despite the fact that neither Selexol® or equivalent nor SCR has been deemed feasible as BACT for any other proposed and permitted IGCC plant in the US. Only by making a sizeable investment in more complete syngas desulfurization, beyond that normally deemed to be BACT for sulfur dioxide (SO_2) emission limits can the PMEC project reasonably attempt to utilize SCR for NO_x control, thus potentially reducing emissions of that pollutant by a further 80% compared with IGCC plants using only diluent injection for NOx control.

As described above, there is no commercial operating experience with SCR on ICGC plants utilizing petcoke or coal-derived syngas. However, Energy Northwest believes that there is a substantial likelihood that the proposed control technology package can achieve reduced NO_x emissions from combustion of syngas. Additional costs associated with the use of SCR, which are substantial, include system reliability, potential performance loss, reduced catalyst service life, and elevated maintenance, all of which have been recognized in USEPAs BACT analysis.
Additional information on the ICT regulatory program and its application to the PMEC project is presented in the BACT analysis (Appendix B-1).

Generally accepted BACT and LAER for NOx emissions from IGCC combustion turbines is diluent injection, and Energy Northwest proposes that diluent injection be identified as BACT for PMEC as well. The proposed BACT limits with diluent injection are 15 ppmvd NO_x at 15% O_2 for syngas firing, and 25 ppmvd NO_x at 15% O_2 for natural gas firing. The BACT selection of diluent injection to the NO_x levels described above is strongly supported by recent precedents for similar IGCC projects.

Add-on controls such as SCR and Selexol® or equivalent are subject to significant technical feasibility concerns with regard to their application to IGCC units, and are not commercially demonstrated for such an application. The PMEC facility has proposed installation of SCR as part of an ICT package and would accept alternate NO_x emission limits based on this technology of 3 ppmv NOx at 15% O_2 for syngas firing, and 5 ppmv NOx at 15% O_2 for natural gas firing.

Energy Northwest intends to work with EFSEC to establish milestones and a timetable for ICT implementation. It is anticipated that the ICT criteria in the PSD permit could be based on observed system performance during initial operations. If there is evidence after a sufficient test period that the use of Selexol® or equivalent and SCR would not be capable of reliably achieving the ICT limits described above, then some relaxation of the proposed limits would be warranted.
Energy Northwest also proposes to implement BACT for the other emission sources of the PMEC, including the following:

- Railcar Solid Feedstock Unloading and Transfer Points
- Ship Solid Feedstock Unloading and Transfer Points
- Solid Feedstock Storage Dome Vents

- Gasification Island Flare
- Tank Vent Collection and Boiler System
- Auxiliary Boiler (One Unit)
- Cooling Towers (two 6-cell units and a 7 cell unit)
- Emergency Diesel Engines (Generator and Fire Water Pump)

Table 2.11-2 summarizes Energy Northwest's proposed BACT controls and anticipated emission rates for all PMEC sources. Detailed evaluations of control options for PMEC emission units are provided in Appendix B-1.

During periods of firing natural gas as the start-up fuel, the combustion turbine would achieve 25 ppmvd NO_x, without the benefit of proposed ICT add-on control. This emission rate is higher than with syngas due to the higher heating value of natural gas and differences in diffusion flame speed for natural gas versus syngas in a turbine optimized for syngas. Energy Northwest proposes to use natural gas for less than 50 hours/year for turbine startups plus an estimated 440 hours per year of full-load operation during transition to syngas firing. For non-startup hours of operation on natural gas, Energy Northwest has set a goal of reducing NO_x emissions with SCR to 3-5 ppmvd at 15% O_2. Since SCR is considered an ICT for IGCC technology, Energy Northwest has requested that actual plant performance determine the emissions limit for NOx (see Appendix B-1 for additional discussion). The annual emissions estimates for the combustion turbine in this Application assume the use of natural gas for 490 hours per year (total of start up periods and full-load natural gas firing). Table 2.11-3 presents the projected annual emissions of criteria pollutants from the combustion turbines and the other sources within the proposed IGCC facility.

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 5.1.2.3 and Appendix B-3.

2.11.3 TOXIC AIR POLLUTANTS

The PMEC has the potential to emit hazardous air pollutants (HAPs) regulated at the federal level by the Clean Air Act (CAA) Section 112 and TAPs regulated by Ecology under Chapter 173-460 WAC.

TAP and HAP emissions at the PMEC would be reduced by the inherently lower polluting IGCC technology and many of the same process features that control criteria pollutant emissions. A large percentage of the metals and other toxic constituents of the feedstock would be immobilized in the non-hazardous vitreous slag by-product of gasification, and thereby prevented from causing adverse environmental effects. Gaseous and particle-bound TAPs and HAPs that may be contained in the raw syngas exiting the gasifiers would be totally or partially removed from the turbine fuel stream by the syngas particulate matter removal system, water scrubber, and acid gas removal systems. In addition, carbon absorption beds used for mercury removal would ensure that mercury emissions from the PMEC would remain at 10 percent or less of the mercury present in the feedstock as received.

Emissions of TAPs were estimated for all PMEC sources, including the turbines, tank vent oxidizer, flare, auxiliary boiler, cooling towers, emergency engines, and fugitive sources. Emission factors for IGCC plant equipment expressed in pounds of pollutant per 10^{12} Btu of feedstock fuels were obtained from a number of sources, primarily the National Energy Technology Laboratory, United States Deptartment of Energy (USDOE) publication, *Major Environmental Aspects of Gasification-based Power Generation Technologies, Final Report* (December, 2002) and results of source tests conducted at the Wabash River IGCC plant in Indiana. Table 2.11-4 identifies the federal- and state-regulated TAPs and HAPs that may be emitted by the PMEC combustion turbines, along with the corresponding estimated emission quantities. The turbines are responsible for about 76% of the calculated plant-wide emissions of HAPs and approximately 98% of the TAPs. Detailed information on the nature of toxic air pollutant emissions from all sources within the PMEC and the development of estimated short-term and long-term emission quantities of individual compounds is presented in Appendix B-3.

TABLE 2.11-2
PROPOSED BACT CONTROLS AND ANTICIPATED EMISSIONS

Pollutant	Control	Emissions Limits
IGCC Combustion Turbines (Emissions shown per combustion turbine excluding Start up / Shutdown conditions). All values in lb/MMBtu are based on fuel energy input of feedstock to the gasifiers.		
NO_x	Diluent Injection (BACT Limit)	15 ppm NOx @ 15% O_2 on syngas gas fuel, 3-hour average
		25 ppm NOx @ 15% O_2 on natural gas fuel, 3-hour average
	Selective Catalytic Reduction (ICT Limit)	3 ppm NOx @ 15% O_2 on syngas gas fuel, 3-hour average
		5 ppm NOx @ 15% O_2 on natural gas fuel, 3-hour average
CO	Good Combustion Practices (GCP)	15 ppm @ 15% O_2 (above 50% load) 3-hour average
PM/PM_{10}	GCP, gas cleanup, Gaseous Fuels only	0.009 lb/MMBtu heat input to gasifier
SO_2	Gas cleanup (BACT Limit)	50 ppmvd H_2S in undiluted, unsaturated syngas, rolling 30-day average
	Selexol® Gas Cleanup (ICT limit)	10 ppmvd H_2S in undiluted, unsaturated syngas, rolling 30-day average,
VOC	GCP	0.003 lb/MMBtu heat input to gasifier
NH_3	Molar ratio control on Injection Sys.	5 ppmvd @ 15% O_2 (ammonia slip), 20 lb/hr (ICT-based Limit)
H_2SO_4	Gas cleanup/ Limit on reduced sulfur in syngas	3.2 lb/hr, 13.83 tpy (10 ppm S)
Mercury	Syngas Cleanup Process	0.0033 lb/hr
Railcar Unloading Building and Transfer to Storage Domes (3,186 tons feedstock per hour)		
PM/PM_{10}	Baghouse, 99% efficiency	0.171 lb/hr
Ship Unloading Facility and Transfer to Storage Domes (1,900 tons feedstock per hour)		
PM/PM_{10}	Baghouse, 99% efficiency	0.436 lb/hr
Storage Domes Ventilation (3,186 maximum tons feedstock per hour)		
PM/PM_{10}	Baghouse, 99% efficiency	0.085 lb/hr
Gasification Island Enclosed Flare (capacity of 3,730 MMBtu/hr as syngas) - Assumes worst-case upset (85% of max syngas capacity for gasifiers).		
NO_x	GCP	Exit velocity > 60 meters/second

TABLE 2.11-2 (CONTINUED)
PROPOSED BACT CONTROLS AND ANTICIPATED EMISSIONS

Pollutant	Control	Emissions Limits
CO	GCP	
PM/PM_{10}	GCP, gaseous fuel only	
SO_2	GCP, Gas cleanup/Limit on reduced sulfur in syngas	Natural gas purge Steam or air assisted flare design
VOC	GCP	
Tank Vent Collection System and Vapor Processing Unit		
NO_x	GCP, low-NOx burner	0.3 lb/MMBtu fired, 3-hr average
CO	GCP	0.09 lb/MMBtu fired, 3-hr average
PM/PM_{10}	GCP, gaseous material only	0.01 lb/MMBtu fired, 3-hr average
SO_2	Gas cleanup/Limit on reduced sulfur in syngas	5.8 lb/hr SO_2 (1-hour average) 4.2 llb/hour SO_2 (24-hour average)
VOC	GCP	0.004 lb/MMBtu fired, 3-hr average
Auxiliary Boiler (Natural Gas-Fired, 130 MMBtu/hr heat input)		
NO_x	GCP, low-NOx burner	0.036 lb/MMBtu fired, HHV, 3-hr average
CO	GCP	0.074 lb/MMBtu fired, HHV, 3-hr average
PM/PM_{10}	GCP, natural gas fuel only	0.005 lb/MMBtu fired, HHV, 3-hr average
SO_2	GCP, natural gas fuel only	0.00286 lb/MMBtu fired, HHV 3-hr average
VOC	GCP, natural gas fuel only	0.004 lb/MMBtu fired, HHV, 3-hr average
Cooling Towers (2, 6-cell, Mechanical Draft Type)		
PM/PM_{10}	High Efficiency Mist Eliminators, TDS limit in circulating water	0.0010% draft as percent of circulating water
Emergency Diesel Engines (1, 300 hp firewater pump; 1, 2-MW, 2682 hp generator) - assumes 100 hours per year normal maintenance operation per engine.		
NO_x	Combustion controls, restricted operating hours	Operatons limited to < 100 hours/year Use of low-sulfur (0.05 weight percent) diesel fuel.
CO	Combustion controls, restricted operating hours	
PM/PM_{10}	Combustion controls, restricted operating hours, low-sulfur diesel fuel	
SO2	Low-sulfur diesel fuel, restricted operating hours	
VOC	Combustion controls, low-sulfur diesel fuel, restricted operating hours	

TABLE 2.11-3
ESTIMATED ANNUAL CRITERIA POLLUTANT EMISSIONS

Emission Source	Maximum Annual Operational Emissions (ton/yr)				
	SO_2	NO_x	CO	PM_{10}	VOC
Combustion Turbine Generator 1	64.5	147.0	561.3	105.1	52.1
Combustion Turbine Generator 2	64.5	147.0	561.3	105.1	52.1
Tank Vent Oxidizer	15.86	26.40	7.92	0.88	0.35
Auxiliary Boiler	0.41	5.12	10.53	0.71	0.57
Flare	1.43	14.64	312.45	1.67	1.25
Emergency Diesel Generator	0.05	1.84	0.24	0.05	0.09
Emergency Diesel Fire Pump	0.01	0.20	0.05	0.01	0.01
Power Block Cooling Towers				12.19	
Gasification/ASU Cooling Towers				7.11	
Fugitive PM10 - transfer point to storage dome				0.03	
Fugitive PM10 - ship unloading				0.22	
Fugitive PM10 - dome ventilation fans				0.03	
Fugitive Equipment Leaks					2.6
Total	**146.8**	**342.3**	**1453.9**	**233.15**	**109.11**

TABLE 2.11-4
ESTIMATED TOXIC AIR POLLUTANT EMISSIONS FROM COMBUSTION TURBINES
(Data are for both turbines)

CAS # or MPCA #	Compound	Emission Factor ($lb/10^{12}$ Btu coal)	Short-term Emission (lb/hr)	Annual Emission (ton/yr)
75-07-0	Acetaldehyde	1.8	0.010	0.044
7440-36-0	Antimony (1)	1.1	0.0061	0.027
7440-38-2	Arsenic (1)	2.4	0.0132	0.058
56-55-3	Benz[a]anthracene	0.0023	0.000013	5.6E-05
71-43-2	Benzene	2.4	0.013	0.058
7440-41-7	Beryllium (1)	0.26	0.0014	0.006
7440-43-9	Cadmium (1)	9.6	0.05	0.232
75-15-0	Carbon disulfide	46	0.25	1.112
0-00-5	Chromium, total (1)	0.51	0.0028	0.012
18540-29-9	Chromium, (hexavalent)	0.15	0.00084	0.004
7440-48-4	Cobalt (1)	0.26	0.0014	0.006
57-12-5	Cyanide (Cyanide ion, Inorganic cyanides, Isocyanide)	5.7	0.031	0.138
50-00-0	Formaldehyde	17	0.09	0.411
7647-01-0	Hydrochloric acid	13	0.072	0.314
7664-39-3	Hydrogen fluoride (Hydrofluoric acid) (3)	50	0.28	1.209
7439-92-1	Lead (1)	0.56	0.0031	0.014
7439-96-5	Manganese (1)	1.0	0.0057	0.025
7439-97-6	Mercury (1)	1.2	0.0066	0.029
74-83-9	Methyl bromide (Bromomethane)	47.7	0.26	1.153
75-09-2	Methylene chloride (Dichloromethane)	2.2	0.012	0.053
91-20-3	Naphthalene	2.5	0.014	0.060
7440-02-0	Nickel (1)	0.39	0.0022	0.009
108-95-2	Phenol	36.8	0.20	0.890
7784-49-2	Selenium (1)	0.56	0.0031	0.014
7664-93-9 14808-79-8	Sulfuric acid and sulfates	572	3.2	13.830
108-88-3	Toluene	0.033	0.00018	0.001
7664-41-7	Ammonia (5)	7141	39.42	172.66

(1) Wabash factors for HAP metals and HCl are adjusted assumed worst-case PMEC feed composition.

(2) Mercury factor based on 90% overall removal for PRB coal feed. Worst-case mercury feed (PRB) = 0.14 ppmvd Hg and approx 12,000 Btu/lb HHV, dry: Hg = 0.14 $lb/10^6$ lb x 1 lb/12,000 Btu x 0.1 x 10^{12}.

(3) Hydrofluoric acid is estimated using fraction of total feed fluorine measured in the Louisiana Gasification Technology, Inc (LGTI) combustion turbine stacks, as reported in Reference 1, and the highest expected concentration of fluorine in the PMEC feed steams.

(4) Sulfuric acid calculated assuming 7% of SO_x in HRSG exhaust converts to SO_3 which reacts with water to form H_2SO_4. Assuming 10 ppmvd total sulfur in fuel, 240 Btu/ft^3 HHV, and 0.76 coal energy conversion to syngas, Sulfuric acid = 0.07 x $10/10^6$ x 1 ft^3/240 Btu x 98 lb/380 ft^3 x 0.76 x 10^{12} = 572$lb/10^{12}$ Btu coal.

(5) Ammonia slip from the SCR (5 ppmvd @ 15% O2)

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 slightly 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. Energy Northwest has committed to a goal limiting such "ammonia slip" emissions at or below 5 ppmvd at 15% O_2, which corresponds to the most stringent limit required for any power plant utilizing SCR in the western United States. Since SCR is considered an ICT for IGCC technology, Energy Northwest has requested that actual plant performance determine the emissions limit for NOx.

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 assumptions of 10 ppmvd total sulfur in the syngas fuel to the CTGs and 7% conversion of SO_2 in the turbine/HRSG exhaust to SO_3, with subsequent reaction with moisture in the exhaust to form sulfuric acid.

Since mercury occurs naturally in coal, the PMEC syngas clean up process includes a system to control mercury that may remain in the syngas. Downstream of the acid gas removal (AGR) system, the syngas passes through fixed beds of activated carbon that are specially impregnated to remove mercury. The mercury removal system would remove enough mercury from the syngas so that the mercury content of the syngas fuel is no more than 10% of the mercury contained in the solid feedstock. For Powder River Basin (PRB) coal, for example, this results in a maximum emission rate of 0.0033 lb/hr per turbine. The maximum annual mercury emission rate was estimated to be 58 pounds per year for both of the PMEC combustion turbines.

2.11.4 GREENHOUSE GAS (GHG) EMISSIONS

In accordance with WAC 463-60-225, this section presents information related to potential greenhouse gas (GHGs) associated with the proposed PMEC. The principal GHGs are 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. Studies show that the gases impede re-radiation of solar energy from the earth's surface more efficiently than they impede incoming solar radiation. Because these gases are distributed throughout the atmosphere, it is believed that the net result is analogous to that of a global greenhouse.

The degrees to which the various greenhouse gases are believed to contribute to global warming differ significantly. The relative contribution of CO_2 to global warming is estimated to be roughly equal to that of all other GHG combined. 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.

2.11.5 CO_2 EMISSIONS FROM PMEC

CO_2 emissions result from many sources, including household activities, transportation, and industrial processes. Since CO_2 is not currently a regulated pollutant, emission data on current sources is incomplete.

PMEC is a thermal power generation complex that 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 the estimated constituent analyses for syngas and natural gas, each of the two turbines operating at base load would emit between approximately 226 and 246 tons of total CO_2 equivalent emissions per hour, or between 4 and 4.3 million tons per year for the two power generation trains combined. Other project sources would be small by comparison, and the entire IGCC facility would emit 4.1 to 4.4 million tons of total CO_2 equivalent emissions annually (3.7 to 4 million metric tons), including both turbines, tank vent oxidizer, auxiliary boiler, gasification island flare, and emergency engines operating at their respective projected annual capacity factors. (See Appendix B-3)

2.11.6 GHG OFFSET

The selection of combustion turbine combined cycle generating units represents the most efficient technology of all power systems and, with efficient operation, is the highest and best practical control of GHG emissions from electric power generation based on fossil fuels. Natural gas contains less carbon than any other fossil fuel and natural gas-fired plants burn cleaner and is more efficient than oil or coal. Syngas has even lower carbon content than natural gas, but because of its lower Btu content, results in somewhat higher GHG emissions for a given level of electric power production.

Of all the GHGs emitted to the atmosphere, only CO_2 can be readily removed from fuels or exhaust gases. The term "GHG offsets" refers to specific, individual projects that remove carbon from the atmosphere, usually through "carbon sequestration" processes which fix carbon in living biomass or store it in secure underground or undersea geological formations. Over the earth as a whole, the areas of high CO_2 fixation are relatively small. Tropical forests are prime examples of highly productive natural ecosystems suitable for offset projects.

By contrast, "GHG management," as used in the literature, refers to a broad-spectrum of programs which may include such actions as directly avoiding emissions, removing carbon from the air, or indirect social, economic, or technological changes which make carbon emissions less likely to occur or carbon-emitting processes more efficient.

2.11.7 TYPES OF GHG OFFSET PROJECTS

GHG offset projects fall within the following broad categories: energy efficiency and conservation projects (e.g., avoiding emissions); forestry; aquatic options (such as deep sea burial); desert farming; building up soil organic carbon; industrial usage; stack gas scrubbing; carbon sequestration, and technology transfer to developing countries.

- Forestry options include preservation and conservation, reforestation, sustainable forest management practices.
- Desert farming includes growing halophytes for biomass energy generation or plowing biomass into desert soils[1] (judged economic and effective by the Electric Power Research Institute (EPRI), but impacts on desert ecosystems are not addressed).
- Energy options include efficiency and conservation in all sectors, cogeneration, and fossil fuel displacement by renewable sources.
- Aquatic options include nutrient supplementation to stimulate increased primary productivity by phytoplankton, seaweed farming (judged uneconomic by EPRI2), and biomass burial in deep ocean sediments (experimental).
- Soil organic carbon options include fallowing, erosion control, adding organic waste, "green manuring" or cover cropping, and agroforestry to reduce soil surface temperatures.
- Industrial usage of carbon in processes such as dry ice formation, carbonation of beverages, gas bottling or other industrial uses.
- Carbon scrubbing from stack gases entails stripping CO_2 from flue gas bubbled through a solution of either monoethanolamine (MEA) or algae that grow rapidly in high concentrations of the gas.[3, 4]
- Carbon sequestration by injection of gas streams containing CO_2 into subsea or subterranean formations, such as basalt formations, salt domes or depleted oil or natural gas fields to avoid their release to the atmosphere in the exhaust of fossil fuel combustion processes.
- Assistance in technology transfer to developing countries is an option that can enable them to reduce carbon emissions by more efficient operation.

2.11.8 PMEC GHG OFFSET PROPOSAL

Washington has adopted new rules, Chapter 80.70 RCW, to mitigate CO_2 emissions. These rules apply to new fossil-fueled thermal electric generation facilities in Washington with station-

[1]EPRI, 1992.

[2]EPRI, 1992.

[3]This option is considered too costly at this stage of development (Electric Light and Power August 1992, Crane et al. 1991, Dudek and LeBlanc 1990).

[4] Steinberg and Albanese (1980) report a doubling in power generation cost and a reduction in efficiency from 34% to 25% at 50% CO_2 removal efficiency.

generating capability of three hundred fifty thousand (350) kilowatts (kW) or more. The site certification agreement for such a facility must include an approved CO_2 mitigation plan, which must include one or a combination of the following CO_2 mitigation options as part of its mitigation plan:

- • Payment to a third party to provide mitigation,
- • Direct purchase of permanent carbon credits, or
- • Investment in applicant-controlled CO_2 mitigation projects, including combined heat and power (cogeneration).

Energy Northwest is committed to the environment and is evaluating all options to mitigate CO_2 emissions. The following sets forth Energy Northwest's plan for operating actions at PMEC that would provide CO_2 reductions and acquisition of carbon offsets through participation in applicant-controlled greenhouse gas mitigation projects.

IGCC technology is inherently an efficient energy conversion technology. In fact, IGCC is one of the most efficient methods available to convert solid fuels into electricity. For example a typical IGCC power plant emits 8% less CO_2 than new efficient supercritical coal plants and 10% less CO_2 than new pulverized coal plants. The main reason for this is a lower heat rate and therefore better efficiency for the IGCC power plant. PMEC is being designed as the most efficient power plant possible, but this improved technology plant would cost significantly more than other solid fuel plants. These additional costs, estimated at $200 million over the conventional plants being developed throughout the United States, should be considered when determining the steps taken to mitigate CO_2 emissions.

In addition to spending significant amounts of additional capital for efficiency, PMEC would be designed with operational flexibly and be able operate on a wide range of fuels including: petcoke, coal and mixtures of both feedstocks. Energy Northwest is proposing to design and build PMEC to operate with a blend of petcoke and coal as a fuel feedstock in order to increase plant efficiency and ensure the PMEC would gasify a lower carbon emitting fuel.

A benefit of petcoke as a fuel source for PMEC is the avoided CO_2 emissions on an international basis. The majority of west coast petcoke production is exported overseas to Asia, where it is burned as a feedstock in boiler systems for cement and other industries. Unlike coal, petcoke needs to be disposed of once it is produced. The refinery waste product has moved from a commodity to a waste disposal problem. The Asian boilers that currently burn it produce more CO_2/ton than if it is gasified at PMEC. Boilers are far less efficient in converting the energy from petcoke when compared to an IGCC. Therefore, the use of petcoke for PMEC would significantly save on overall CO_2 emissions on an international basis.

In order to extend potential future CO_2 mitigation beyond what is required by law, the PMEC would be designed to be carbon capture ready. This would be accomplished by upgrading the amine AGR system to a Selexol® or equivalent process that removes additional sulfur and enables bulk CO_2 removal. The Selexol® or equivalent system has a potential to provide approximately 20-25% of CO_2 reduction. The PMEC facility design concept includes the appropriate connection points, piping and vessel sizing and equipment location areas as well as

production capacity for the later addition of equipment needed to capture and compress essentially all of the pre-combustion CO_2 produced by PMEC. This additional equipment would be required to support a future CO_2 treatment and transport system that would be needed to complement a carbon sequestration program. The estimated cost of this design is $35-$50 million.

CO_2 captured with the Selexol® or equivalent system could be used for use in carbonated beverage and dry ice production. PMEC has identified a potential industrial user and is pursuing this opportunity. Another future opportunity to reduce CO_2 is to reform a portion of the syngas for the production of methanol for the chemical or racing fuel industries. The use of PMEC CO_2 streams for industrial purposes would effectively displace CO_2 that would have been released from less efficient sources. While the potential amount of CO_2 used for carbonated beverages or dry ice production may be small, the production of methanol from the synthesis gas could provide a major byproduct stream.

Energy Northwest is a member of the Big Sky Regional Carbon Sequestration Partnership (Partnership), one of seven regional partnerships funded by the United State Department of Energy's (USDOE) National Energy Technology Laboratory Regional Carbon Sequestration Partnership Program, led by Montana State University. The region includes Idaho, Montana, South Dakota, Wyoming, and eastern parts of Oregon and Washington.

In the validation phase, the Partnership would focus on geologic and terrestrial field validation tests that assess the relative efficiency of alternative sequestration options, prove the environmental efficacy and sustainability of sequestration, verify regional CO_2 sequestration capacities, and satisfy permitting and regulatory requirements. The Partnership has proposed two geologic and three terrestrial field tests. The Partnership's primary geologic effort is to demonstrate mineralization processes and carbon storage in mafic/basalt rock formations, a geology not yet well characterized but with significant long-term storage potential in the region. Its terrestrial efforts would focus on cropland, rangeland, and forestland sequestration and demonstrate the marketability of an emerging pilot carbon market. For additional information about the Partnership please refer to the website at www.bigskyco2.org.

A field test in eastern Washington would demonstrate carbon storage in a mafic/basalt rock formation, which extends to western Washington. The tests would assess the mineralogical, geochemical, and hydrologic impact of injected CO_2 within the reservoir and incorporate site monitoring and verification activities such as downhole vertical seismic profiling, wireline logging, downhole geochemical sampling, stable isotopic, noble gas, and introduced tracers, and atmospheric monitoring.

The Partnership, in cooperation with Energy Northwest, would evaluate the potential for large-scale carbon sequestration in basalt, saline caverns and other major geologic formations proximal to Kalama, Washington. The sequestration potential would be quantified within the limitations of the available data and would include sequestration volume (depth, temperature, permeability, etc), mineralization potential, and cap rock information. The resulting data would be included in the Partnership's regional GIS and Mafic rock atlas. The collaboration between the Partnership and Energy Northwest would produce a summary of the scientific, engineering,

and technical information that supports integrated advanced production and sequestration technologies.
Energy Northwest proposes implementation of an individual mitigation plan, which includes use of the efficient IGCC technology, use of petcoke, investment in equipment needed for carbon capture readiness, reduction in CO_2 emissions by installation of Selexol® or equivalent system, and participation in the Partnership.

Because converting to a more efficient process has been accepted as a viable CO_2 mitigation strategy for other projects, Energy Northwest believes that the difference in the amount of CO_2 that could be emitted by a less efficient technology versus what PMEC would emit, should be subtracted from the total CO_2 emissions for which mitigation would otherwise need to be provided.

Energy Northwest believes that installation of Selexol® or equivalent system would satisfy the CO_2 mitigation requirements as required in Chapter 80.70 RCW, by investment in an applicant-controlled project that would reduce CO_2 emissions over what would otherwise be produced in an IGCC plant with a standard AGR. Energy Northwest proposes that the total cost of the mitigation otherwise required should be reduced by the incremental cost to install the Selexol® or equivalent system above the cost of standard equipment and by the cost to make the facility carbon-capture ready.

In the permitting for PMEC, Energy Northwest has assumed the use of 100% PRB coal. However, because of the environmental and efficiency gains of using petcoke, Energy Northwest has a goal to design and build PMEC to operate on 100% petcoke as a feedstock, which would increase plant efficiency. Operating with 100% petcoke would yield a CO_2 rate of approximately 5 million metric tons/year providing an approximate 20% decrease in CO_2 emissions. Energy Northwest believes that the amount of CO_2 not generated by use of petcoke should be subtracted from the amount of CO_2 that would be produced if PMEC were operated solely on coal.

Although the actual amount of CO_2 reduction by use of the Selexol® or equivalent system cannot be determined until PMEC design is completed and contracts are established for use of the captured CO_2, Energy Northwest is proposing that PMEC receive credit for this CO_2 reduction. The amount of CO_2 used as a commodity would be subtracted from the total CO_2 emissions for which PMEC would otherwise need to mitigate.

As a member of the Partnership, Energy Northwest has and would continue to expend funds to support carbon sequestration research and development. As 20% of the total funds expended for mitigation are allowed for the selection, monitoring, and evaluation of mitigation projects, Energy Northwest proposes that Energy Northwest funds expended for this research and development be considered as partly satisfying the CO_2 mitigation requirement, up to 20% of the total mitigation funds that would be due if a third party were to provide mitigation, with the amount to be verified by the Partnership and EFSEC.

Energy Northwest proposes that an initial calculation be based on the use of 100% PRB coal. The amount of CO_2 emitted over the 30-year life of the PMEC would be based on the manufacturer's or designer's guaranteed total net station generating capacity, new equipment

heat rate, and an assumed sixty percent capacity factor. This amount would be multiplied by 20 percent, to determine the CO_2 emissions for which PMEC would need to mitigate. From this amount, reductions would be made for using the more efficient IGCC technology and any reductions as a result of commodity.

The amount of payment needed would then be determined by multiplying the calculated emissions by one dollar and sixty cents ($1.60) per metric ton. From this total, the incremental cost of using IGCC technology and to install the Selexol® or equivalent system above the cost of standard equipment; costs of equipment to make the facility carbon-capture ready; and funds (up to 20 percent of the total) provided to the Partnership would be subtracted.

Energy Northwest believes that the proposed PMEC efficient design, the preference of petcoke as a fuel feedstock, the installation of Selexol® or equivalent equipment, and efforts undertaken as part of the Partnership, as a combined package, would more than satisfy the CO_2 mitigation requirements as required in Chapter 80.70 RCW.

2.12

WAC 463-60-235 Proposal—Construction and operation activities.

The application shall: Provide the proposed construction schedule, identify the major milestones, and describe activity levels versus time in terms of craft and noncraft employment; and describe the proposed operational employment levels.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-235, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-235, filed 10/8/81.]

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

Energy Northwest will construct the Pacific Mountain Energy Center (PMEC).

2.12.1 CONSTRUCTION SCHEDULE AND MILESTONES

Figure 2.12-1 identifies the major schedule milestones, engineering and procurement, construction and start-up. Assuming the Governor's approval of the Site Certification agreement in November 2007, Energy Northwest anticipates beginning design & site preparation by the middle of 2008. The construction schedule will be revised according to the actual approval of the Site Certification Agreement, and a copy provided to EFSEC at least sixty (60) days prior to the start of construction. Initial site work will consist of clearing, surcharge fill placement, drainage and runoff control. After approximately 9 months of design and site work, construction mobilization and foundation activities would commence. Specific tasks and construction schedule will be determined in the EPC contract.

As individual mechanical and electrical sub-systems are completed they will be turned over to the start-up crew which will supervise final quality and functional checks. The sub-systems will be completed in an orderly manner to permit a logical system check-out and start-up process. Initial firing of the first gasification train is scheduled for late 2011, with commercial operation for both gasification trains occurring in the first half of 2012. Due to the exploding world wide resource development, the PMEC schedule will be impacted by the EPC contractor's ability to coordinate with other major projects, skilled labor availability, equipment lead times, and increasing demand for construction commodities. Expeditious permitting will facilitate getting PMEC into the EPC contractor's construction queue earlier and avoid excessive delays.

2.12.2 CONSTRUCTION WORKFORCE

2.12.2.1 Power Plant

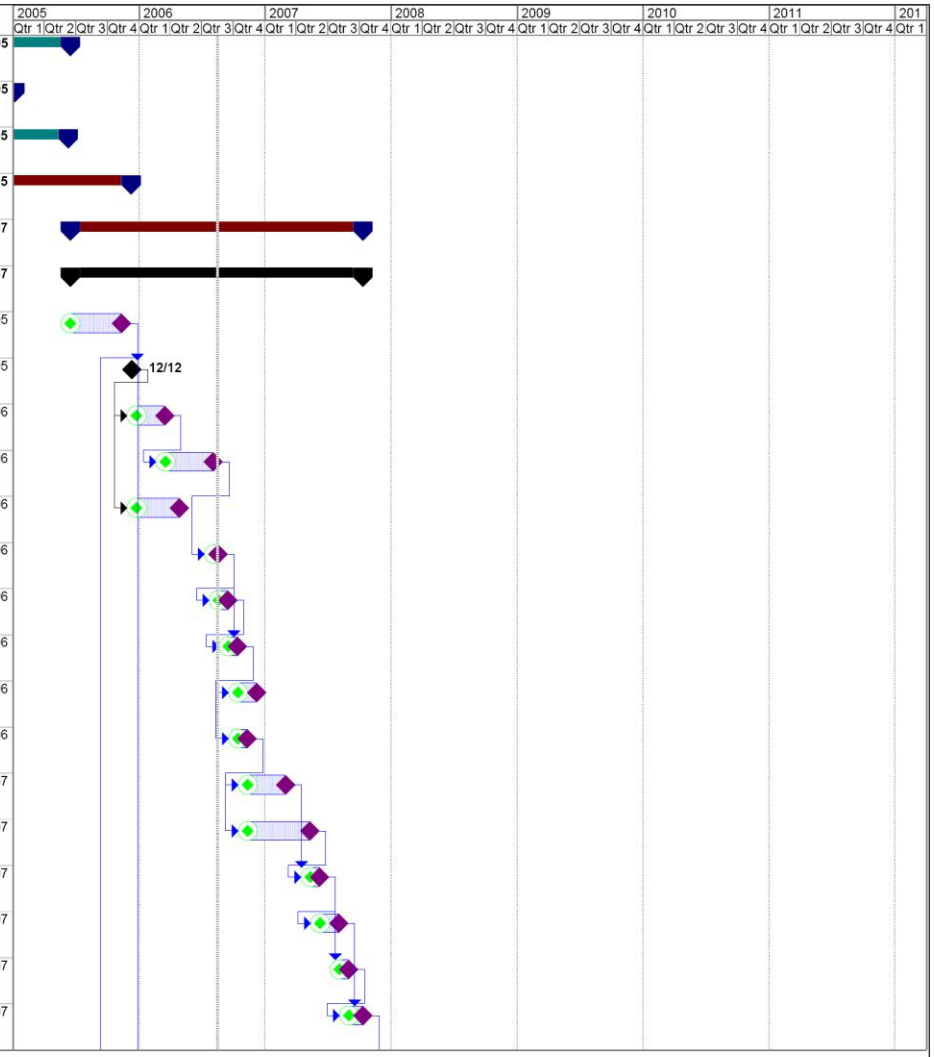
The typical average workforce headcount and construction skills required for the construction of the PMEC is:

Civil	80
Electrical	80
Mechanical	200
Operators	20
Structural	20

In addition, there will be approximately 3 management, including non-craft, personnel at the site during construction.

During construction, the construction workforce would peak at approximately 1,400 workers over the construction period and average 400 workers over the 14 quarters. Table 2.12-1 presents the expected average composition of the construction work force.

ID	Task Name	Duration	Start	Finish
1	**PRELIMINARY DEVELOPMENT**	**185 days**	**Fri 10/1/04**	**Thu 6/16/05**
10	**PRELIMINARY IGCC TECHNOLOGY EVALUATION**	**79 days**	**Mon 9/20/04**	**Thu 1/6/05**
18	**PRELIMINARY PROCESS DESIGN**	**155 days**	**Mon 11/8/04**	**Fri 6/10/05**
23	**SITE PRE-DEVELOPMENT**	**323 days**	**Wed 9/15/04**	**Fri 12/9/05**
31	**PROJECT DEVELOPMENT**	**606 days**	**Fri 6/17/05**	**Fri 10/12/07**
32	**Permitting**	**606 days**	**Fri 6/17/05**	**Fri 10/12/07**
33	Permitting Preparation & RFP for Consultant Firm	106 days	Fri 6/17/05	Fri 11/11/05
34	Award Environmental Consulting Contract	10 days	Mon 12/12/05	Fri 12/23/05
35	Survey Property & Supplemental Engineering	60 days	Mon 12/26/05	Fri 3/17/06
36	Prepare Permit Application to EFSEC	100 days	Mon 3/20/06	Fri 8/4/06
37	Develop Emissions Points & Model	90 days	Mon 12/26/05	Fri 4/28/06
38	Scoping Summary	10 days	Mon 8/7/06	Fri 8/18/06
39	Determination of Significance & Scoping Notice	20 days	Mon 8/21/06	Fri 9/15/06
40	Notice of Adjudification & Opportunity to File for Int	20 days	Mon 9/18/06	Fri 10/13/06
41	Public Informational Meeting & Land Use Hearings	40 days	Mon 10/16/06	Fri 12/8/06
42	Land Use Consistency Order	20 days	Mon 10/16/06	Fri 11/10/06
43	Hearings of NOC/PSD Water& Air Permits	80 days	Mon 11/13/06	Fri 3/2/07
44	Draft EIS	130 days	Mon 11/13/06	Fri 5/11/07
45	Adjudification Proceedings	20 days	Mon 5/14/07	Fri 6/8/07
46	Draft Site Certification Agreement	40 days	Mon 6/11/07	Fri 8/3/07
47	Final EIS	20 days	Mon 8/6/07	Fri 8/31/07
48	Governor's Approval	30 days	Mon 9/3/07	Fri 10/12/07



Project: Project Schedule for EFSEC A
Date: Tue 8/15/06

Task | Critical Task | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Critical Task | Rolled Up Milestone | Rolled Up Progress | Split | External Tasks | Project Summary | Group By Summary | Deadline

Page 1

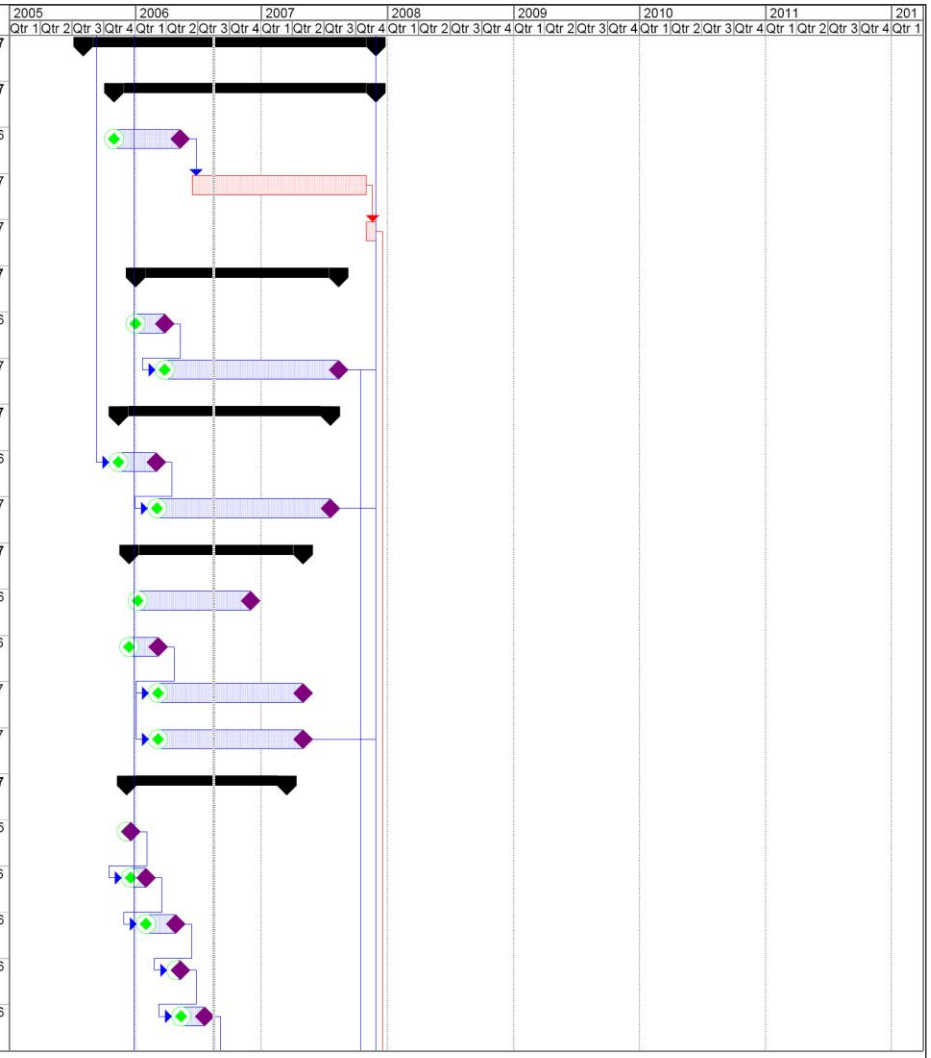
Job No. 33758342

Figure 2.12-1a
Project Milestones

URS

Pacific Mountain Energy Center
Kalama, Washington

ID	Task Name	Duration	Start	Finish
49	**PROJECT AGREEMENTS**	**606 days**	**Thu 8/4/05**	**Thu 11/29/07**
50	**Power Purchase Agreements**	**543 days**	**Tue 11/1/05**	**Thu 11/29/07**
51	Project Promotion & Expressions of Interest	138 days	Tue 11/1/05	Thu 5/11/06
52	PPA & Governance Development & Negotiations	360 days	Fri 6/16/06	Thu 11/1/07
53	Finalize PPAs & IOU Contracts	20 days	Fri 11/2/07	Thu 11/29/07
54	**Coal Supply Agreements**	**420 days**	**Tue 1/3/06**	**Mon 8/13/07**
55	Coal Studies & Strategy	60 days	Tue 1/3/06	Mon 3/27/06
56	Coal Supply Negotiations & Contracts	360 days	Tue 3/28/06	Mon 8/13/07
57	**Petroleum Coke Supply Agreements**	**440 days**	**Mon 11/14/05**	**Fri 7/20/07**
58	Petcoke Market Study & Strategy	80 days	Mon 11/14/05	Fri 3/3/06
59	Petcoke Supply Negotiations& Contacts	360 days	Mon 3/6/06	Fri 7/20/07
60	**Natural Gas Supply Agreements**	**360 days**	**Thu 12/15/05**	**Wed 5/2/07**
61	Northwest Pipeline Agreement	235 days	Mon 1/9/06	Fri 12/1/06
62	Interconnect Application Submittal Feasibility Study	60 days	Thu 12/15/05	Wed 3/8/06
63	Negotiate Pipeline Agreement	300 days	Thu 3/9/06	Wed 5/2/07
64	Negotiate Gas Supply Agreement	300 days	Thu 3/9/06	Wed 5/2/07
65	**BPA Interconnect Agreement**	**332 days**	**Thu 12/8/05**	**Fri 3/16/07**
66	TBL Application	8 days	Thu 12/8/05	Mon 12/19/05
67	Scoping Meeting & Point of Interconnection	32 days	Tue 12/20/05	Wed 2/1/06
68	Feasibility Study	62 days	Thu 2/2/06	Fri 4/28/06
69	System Impact Agreement	10 days	Mon 5/1/06	Fri 5/12/06
70	System Impact Study	50 days	Mon 5/15/06	Fri 7/21/06



Project: Project Schedule for EFSEC A
Date: Tue 8/15/06

Task	Summary	Rolled Up Progress	Group By Summary
Critical Task	Rolled Up Task	Split	Deadline
Progress	Rolled Up Critical Task	External Tasks	
Milestone	Rolled Up Milestone	Project Summary	

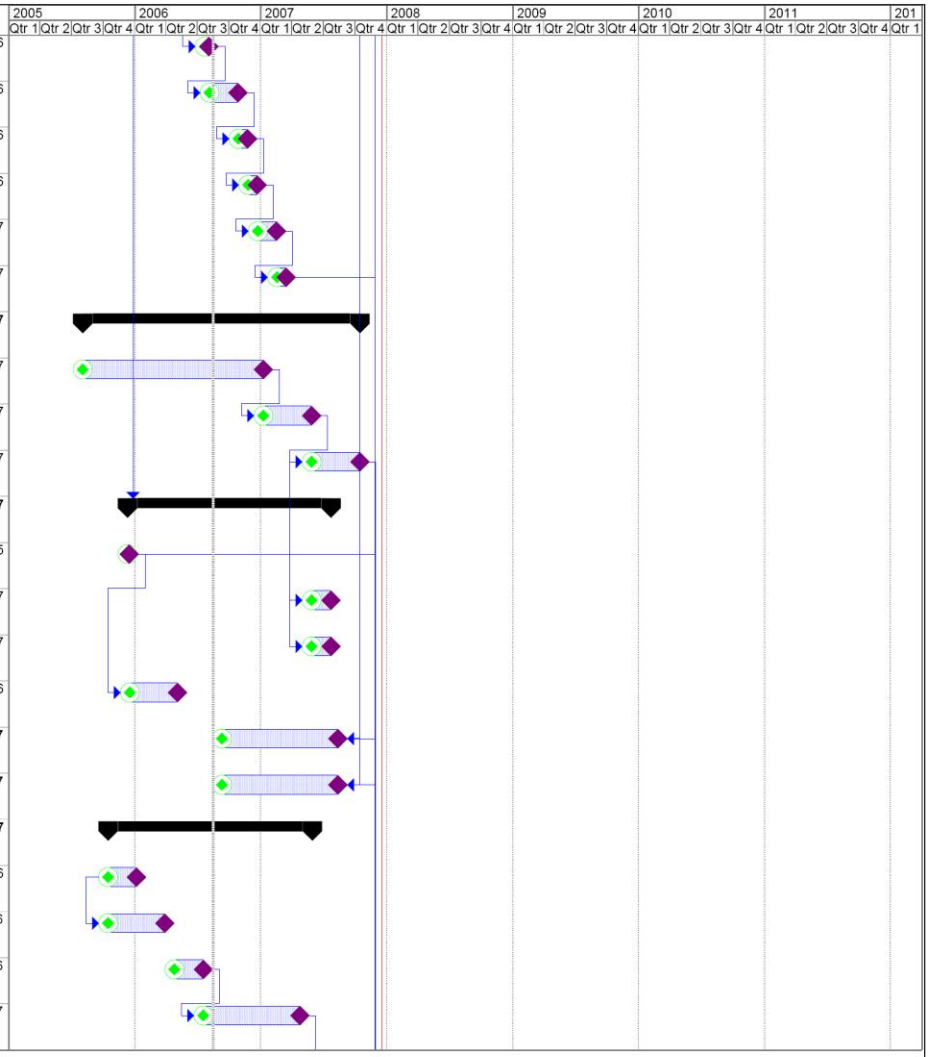
Job No. 33758342

Figure 2.12-1b
Project Milestones

URS

Pacific Mountain Energy Center
Kalama, Washington

ID	Task Name	Duration	Start	Finish
71	Facilities Study Agreement	10 days	Mon 7/24/06	Fri 8/4/06
72	Facility Study	60 days	Mon 8/7/06	Fri 10/27/06
73	Facility Agreement	20 days	Mon 10/30/06	Fri 11/24/06
74	Draft Generator Agreement	20 days	Mon 11/27/06	Fri 12/22/06
75	NEPA Record Of Decision	40 days	Mon 12/25/06	Fri 2/16/07
76	Large Gen Interconnect Agreement Complete	20 days	Mon 2/19/07	Fri 3/16/07
77	**Cowlitz Transmission Agreement**	**574 days**	**Thu 8/4/05**	**Tue 10/16/07**
78	Preliminary Discussions & Conceptual Design	374 days	Thu 8/4/05	Tue 1/9/07
79	Transmission MOU /Agreement	100 days	Wed 1/10/07	Tue 5/29/07
80	Transmission Cost Estimates & Preliminary Design	100 days	Wed 5/30/07	Tue 10/16/07
81	**Utility Supply Agreements**	**422 days**	**Mon 12/12/05**	**Tue 7/24/07**
82	Water -In Lease Agreement	5 days	Mon 12/12/05	Fri 12/16/05
83	Employee Sewer	40 days	Wed 5/30/07	Tue 7/24/07
84	Potable Water	40 days	Wed 5/30/07	Tue 7/24/07
85	Utility Easements	100 days	Mon 12/19/05	Fri 5/5/06
86	**Sulfur Sales Agreement**	**240 days**	**Tue 9/12/06**	**Mon 8/13/07**
87	**Slag Offtake Agreement**	**240 days**	**Tue 9/12/06**	**Mon 8/13/07**
88	**EPC Bid Process**	**424 days**	**Mon 10/17/05**	**Thu 5/31/07**
89	Alternative Public Works Qualification	60 days	Mon 10/17/05	Fri 1/6/06
90	Establish Contracting Plan & Advertise RFP	118 days	Mon 10/17/05	Wed 3/29/06
91	Conduct RFP Contactors Meeting & Evaluate Prop	60 days	Thu 4/27/06	Wed 7/19/06
92	Negotiate with Final Contractors on EPC Contract	200 days	Thu 7/20/06	Wed 4/25/07



Project: Project Schedule for EFSEC A
Date: Tue 8/15/06

Task	Summary	Rolled Up Progress	Group By Summary
Critical Task	Rolled Up Task	Split	Deadline
Progress	Rolled Up Critical Task	External Tasks	
Milestone	Rolled Up Milestone	Project Summary	

Page 3

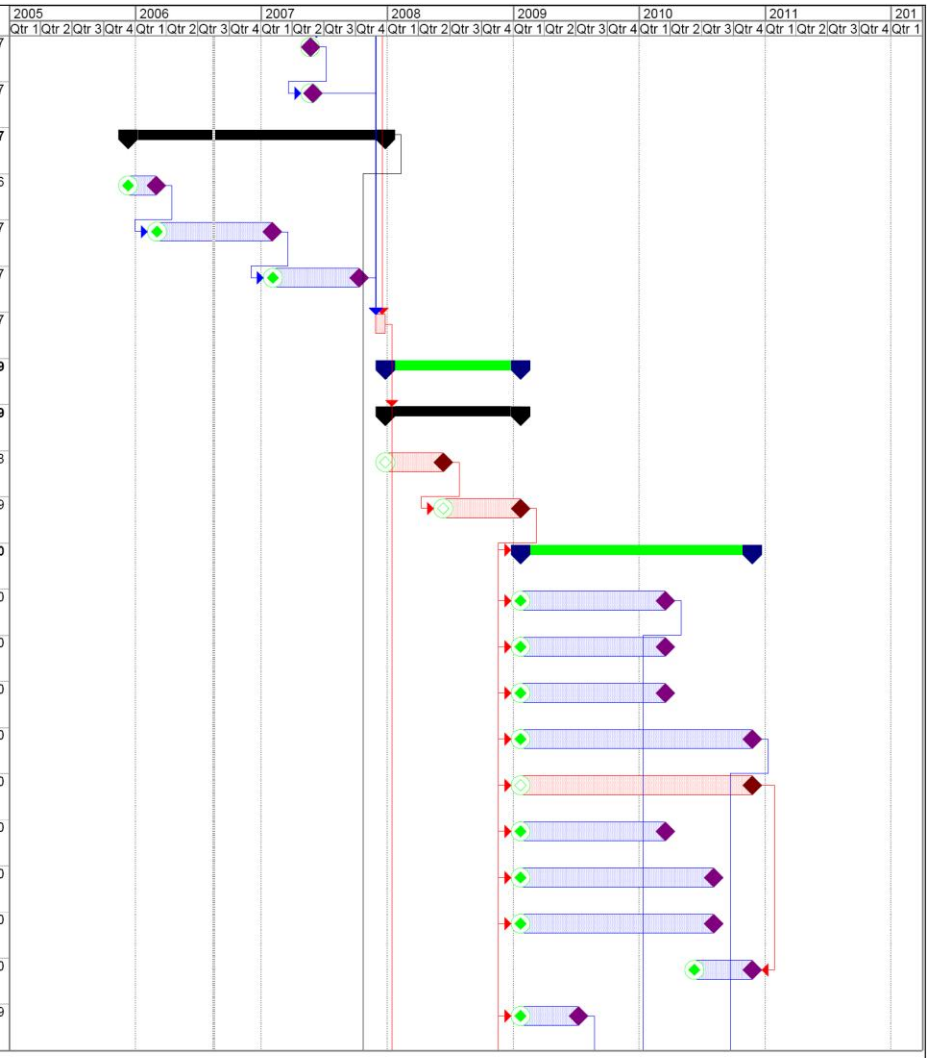
Figure 2.12-1c
Project Milestones

Job No. 33758342

URS

Pacific Mountain Energy Center
Kalama, Washington

ID	Task Name	Duration	Start	Finish
93	Board Approval	1 day	Thu 5/24/07	Thu 5/24/07
94	EPC Award	5 days	Fri 5/25/07	Thu 5/31/07
95	**PROJECT FINANCE PROCESS**	**534 days**	**Mon 12/12/05**	**Thu 12/27/07**
96	Preliminary Structuring & Governance	60 days	Mon 12/12/05	Fri 3/3/06
97	Utility Due Diligence and Input	240 days	Mon 3/6/06	Fri 2/2/07
98	Investor Bank Structuring	180 days	Mon 2/5/07	Fri 10/12/07
99	Financial Closing	20 days	Fri 11/30/07	Thu 12/27/07
100	**ENGINEERING & DESIGN**	**280 days**	**Fri 12/28/07**	**Thu 1/22/09**
101	**Feed Package**	**280 days**	**Fri 12/28/07**	**Thu 1/22/09**
102	Gasification Process Design Package	120 days	Fri 12/28/07	Thu 6/12/08
103	Detailed IGCC Design Package	160 days	Fri 6/13/08	Thu 1/22/09
104	**PROCUREMENT & FABRICATION**	**480 days**	**Fri 1/23/09**	**Thu 11/25/10**
105	Combustion Turbine	300 days	Fri 1/23/09	Thu 3/18/10
106	Steam Turbine	300 days	Fri 1/23/09	Thu 3/18/10
107	HRSG	300 days	Fri 1/23/09	Thu 3/18/10
108	Air Separation Unit- ASU Turn Key	480 days	Fri 1/23/09	Thu 11/25/10
109	Gasifier	480 days	Fri 1/23/09	Thu 11/25/10
110	High Temp Heat Recovery Unit	300 days	Fri 1/23/09	Thu 3/18/10
111	Aux Gasification Equipment	400 days	Fri 1/23/09	Thu 8/5/10
112	Aux Combined Cycle Equipment	400 days	Fri 1/23/09	Thu 8/5/10
113	Substation Transformers & Equipment	120 days	Fri 6/11/10	Thu 11/25/10
114	Fuel Storage Domes & Handling	120 days	Fri 1/23/09	Thu 7/9/09



Project: Project Schedule for EFSEC A
Date: Tue 8/15/06

Task | Critical Task | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Critical Task | Rolled Up Milestone | Rolled Up Progress | Split | External Tasks | Project Summary | Group By Summary | Deadline

Page 4

Figure 2.12-1d

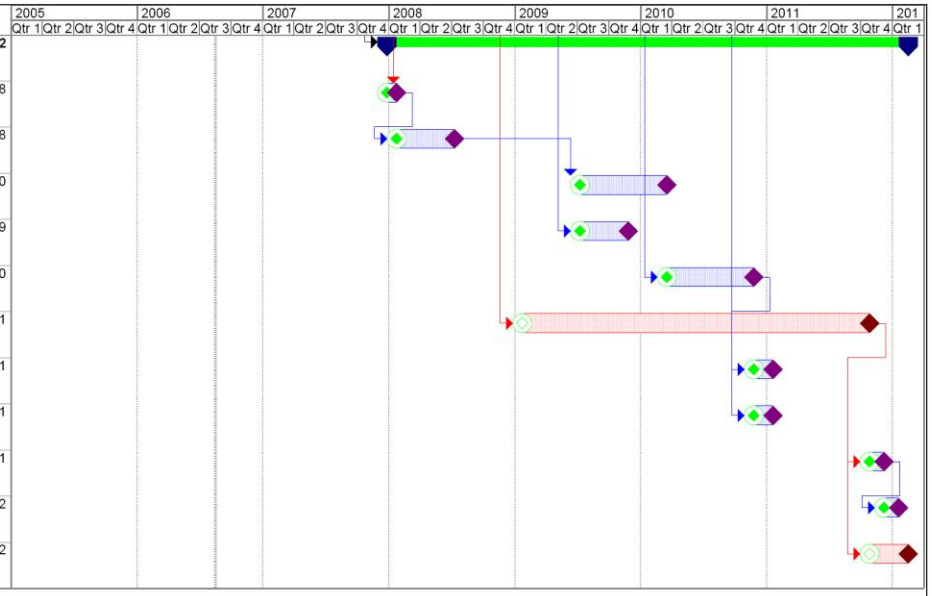
Project Milestones

Job No. 33758342

URS

Pacific Mountain Energy Center
Kalama, Washington

ID	Task Name	Duration	Start	Finish
115	**CONSTRUCTION**	**1080 days**	**Fri 12/28/07**	**Thu 2/16/12**
116	Mobilization	20 days	Fri 12/28/07	Thu 1/24/08
117	Site Development	120 days	Fri 1/25/08	Thu 7/10/08
118	Natural Gas Pipeline	180 days	Fri 7/10/09	Thu 3/18/10
119	Storage & Rail Facilities	100 days	Fri 7/10/09	Thu 11/26/09
120	Combined Cycle Island	180 days	Fri 3/19/10	Thu 11/25/10
121	Gasification Island	720 days	Fri 1/23/09	Thu 10/27/11
122	Combined Cycle Start Up	40 days	Fri 11/26/10	Thu 1/20/11
123	ASU Start Up	40 days	Fri 11/26/10	Thu 1/20/11
124	Gasification Train 1 Start Up	30 days	Fri 10/28/11	Thu 12/8/11
125	Gasification Train 2 Start Up	30 days	Fri 12/9/11	Thu 1/19/12
126	Integrated Operations & Commissioning	80 days	Fri 10/28/11	Thu 2/16/12



Project: Project Schedule for EFSEC A
Date: Tue 8/15/06

Task	Summary	Rolled Up Progress	Group By Summary
Critical Task	Rolled Up Task	Split	Deadline
Progress	Rolled Up Critical Task	External Tasks	
Milestone	Rolled Up Milestone	Project Summary	

Figure 2.12-1e
Project Milestones

Job No. 33758342

URS

Pacific Mountain Energy Center
Kalama, Washington

TABLE 2.12-1
ESTIMATED QUARTERLY CONSTRUCTION PERSONNEL

Year	Quarter	Estimated Number of Construction Personnel
2008	1	0
	2	50-100
	3	100-200
	4	150-250
2009	1	200-300
	2	600-800
	3	1,200-1,400
	4	1,100-1,300
2010	1	900-1,100
	2	1,200-1,400
	3	900-1,100
	4	405-400
2011	1	200-300
	2	100-200
	3	50-100

Most of the construction labor force would likely be hired from the Longview-Kelso area, the Portland-Vancouver metropolitan area, and the Seattle-Tacoma metropolitan area. An estimated 10 percent of the workers would be residents of Cowlitz County, and would commute on a daily basis to and from the jobsite (Schinnell 2006). This estimate is based on the relative size of the labor force in Cowlitz County compared to larger labor forces in metropolitan areas that are slightly further away. Other construction personnel would also likely be hired from the Portland-Vancouver area (approximately 60 percent), and next from the Seattle-Tacoma area (approximately 20 percent) (Schinnell 2006). The construction workers hired from the Portland-Vancouver metropolitan area (60 percent) are expected to commute on a daily basis due to the 30-40 mile distance to the site. The majority of workers commuting from Seattle-Tacoma would likely commute on a weekly basis, staying in RV parks and motels near the PMEC site during the workweek.

2.12.2.2 Natural Gas Pipeline

Construction of the natural gas pipeline will begin in late 2009 or early 2010, and is scheduled for approximately 6 months.

During the construction of the natural gas supply pipeline, the average workforce headcount is expected to be 24 people. Once the pipeline reaches normal operating conditions, up to one maintenance technician will be responsible for the pipeline and associated facilities.

The labor force during construction will include the following positions:

4	Welders/Pipefitters
8	General Laborers
4	Operating Engineers
4	Truck Drivers
1	Inspector
1	Surveyor
1	X-ray Technician
1	Construction Manager

The equipment utilized in installing the pipeline consist of excavators, backhoes, dump trucks, loaders, dozers, pipelayers, horizontal directional drilling (HDD) equipment, and bore and jack equipment.

2.12.3 OPERATION

When operational, the PMEC will employ 80-100 people. Table 2.12-2 provides a breakdown of labor categories. The facility will be staffed 24 hours per day, 7 days per week, with two 12-hour shifts. The maximum personnel per shift would be approximately 40 people. In addition, a temporary work force of the appropriate skills will be utilized during major maintenance or other non-routine operational work.

Hiring and training of operations personnel will begin about one year before the commencement of start-up. Gasification island personnel will be provided extensive training in plant operations, reactive chemicals and safety, and industrial hygiene, based upon the training provided to operators in refineries and chemical plants. Power island personnel will be provided appropriate training based upon standards in the power industry. The staff will consist of management and engineers (many of whom will have been participating on the Owner/Operator's behalf in the plant design), shift supervision and operations management (who will be hired first and trained at other gasification facilities to the extent practical) and shift operating personnel (who will be trained by the shift supervision personnel). Process simulators will be used as part of the training program. The operations staff will be integrated into the commissioning team so that they will have hands on experience with the plant beginning when construction of each system is completed.

In addition to the permanent operations staff, contract maintenance personnel will be retained during outages. Contract Maintenance will include inspections and overhauls for the ASU compressors, the combustion turbine generators and the steam turbine, gasifier refractory repair and replacement, catalyst and sorbent change outs, and other non-routine maintenance.

TABLE 2.12-2
OPERATION STAFF BREAKDOWN

Gasification and ASU Positions	**Number of Operating Personnel**
Plant manager	1
Manager, Services/Projects	1
Manager, Production	1
Production, Eng - Mechanical Reliability	3
Production Eng - Process Optimization	1
Production Eng - Air Separation	1
Control Engineer	1
Buyer	1
Accounting Clerk	1
Shift Supervisor - Production	4
Shift Supervisor - Training	1
Inventory Supervisor	1
Maintenance Supervisor	1
Environmental & Safety Controller	1
Shutdown Coordinator	1
Permit Coordinator	1
Material Controller	1
Maintenance Planner	1
Administrative Assistants	3
Laboratory Technicians	2
I/E/A Technicians	4
Operating Technicians (Level 3 - Field)	19
Operating Technicians (Level 5 - Control)	17
Gasification and ASU Subtotal	**69**
Power Block Plant Positions	**Number of Operating Personnel**
Maintenance Engineer	1
Maintenance Planner	1
I/E/A Technicians	1
Operating Technicians (Level 3 - Field)	4
Operating Technicians (Level 5 - Control)	4
Power Block Total	**11**
TOTAL FOR PMEC	**80**

2.13

WAC 463-60-245 Proposal—Construction management.

The application shall describe the organizational structure including the management of project quality and environmental functions.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-245, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-245, filed 10/8/81.]

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

2.13.1 CONSTRUCTION MANAGEMENT ORGANIZATION

It is anticipated that Energy Northwest would contract with three Engineering, Procurement, and Construction (EPC) Contractors, one for the Pacific Mountain Energy Center (PMEC), one for the natural gas pipeline, and one for the site rail roads including high speed rail off loading facilities for solid fuel conveyance.

An EPC Contractor would be hired for the design, procurement, construction, and start-up of the PMEC. The contract would include the full scope associated with the design, construction and start up of a fully functional nominal 600 MW IGCC power generating complex including but not limited to: two 300 MW combined cycle gas turbine electric generators in a 1-on-1 configuration, a gasification complex capable of fueling full power operation of both gas turbines and provides for the future capability to remove bulk CO_2, administration/ maintenance building, water processing facilities, site roads, coal handling/storage equipment and high speed ship off loading equipment. The EPC Contractor would be responsible for managing several construction subcontractors.

The EPC Contractor would have a lead Project Manager, a Project Engineer and a Site Manager supported by a field engineering team, quality assurance and quality control (QA/QC) specialists, environmental specialists, and site safety officer. The EPC Contractor would be required to implement and perform a safety plan, a QA/QC plan, an environmental protection plan, a storm water pollution prevention plan (SWPPP), and a Spill Prevention, Control, and Countermeasure (SPCC) plan.

The EPC Contractors for the natural gas pipeline and the rail line would follow the same organization and procedures.

2.13.2 SAFETY PROGRAM

Prior to the commencement of any construction work, each of the three EPC Contractors would be required to prepare a safety plan that would apply to EPC Contractor personnel and all subcontractor personnel working at the PMEC site. The plan would be designed to ensure compliance with all laws, ordinances, regulations and standards concerning health and safety. Each EPC Contractor would have a safety manager with the authority to issue a “stop work” notice when health and safety issues are violated, including any subcontractor safety issues, and the health and safety of construction personnel are in danger. Upon identification of a health and safety issue, the safety manager would work with the responsible department or subcontractor to correct the issue.

It is expected that during operations, the PMEC would comply with Energy Northwest’s policies and procedures, including the Industrial Safety Program Manual (ISPM). The ISPM would be modified, as necessary, for situations that are unique to PMEC. In addition to describing the safety program, the ISPM would cover:

- Fire Protection and Life Safety,
- Hazard Communications,
- Hearing Conservation,
- High Temperature Work Areas,
- Job Hazard Analysis,
- Material Handling,
- Personal Protective Equipment,
- Respiratory Protection,
- Safety Administrative Controls,
- Tools, Machinery, and Equipment Safety,
- Compressed Gases,
- Electrical Arc Protection Work Practices and Personal Protective Equipment (PPE) Requirements,
- Confined Space Entry,
- Control of Hazardous Energy Sources,
- Crane/Hoist Operations and Safety,
- Electrical Appliances,
- Electrical Safety,
- Excavation, Trenching, and Shoring, and
- Fall Protection.

2.13.3 TRAINING PROGRAMS

Each EPC Contractor would be required to have a training program to ensure that safety and environmental regulations and permits are followed. The program would include training on:

- Drug and alcohol free workplace policy,
- Personal health and safety,
- Fall safety,
- Confined space,
- Excavation,
- Crane and rigging,
- Equipment and operations safety,
- Fire prevention,

- Electrical safety,
- Emergency response,
- Hazards communication,
- Storm water pollution prevention, and
- Spill prevention, control, and countermeasures.

Operator selection and training would begin about one year before the commencement of start up. Gasification area personnel need extensive training in plant operations, reactive chemicals and safety, and industrial hygiene, similar to that of operators in refineries and chemical plants. Process simulators would be used as part of training on all levels. The program would combine theory and operation procedures, as well as extensive training on the plant controls. Depending on the technology chosen, members of the operating staff could be trained at other facilities using the technology to gain "hands-on" experience. Training is expected to take three to six months.

During operations, Energy Northwest personnel would receive initial and annual training. In addition to training to support proficiency on the operations and maintenance required for the facility, personnel would receive training related to health and safety, hazards communication, storm water pollution prevention, and spill prevention, control, and countermeasures.

2.13.4 QUALITY CONTROL SYSTEMS AND RECORD KEEPING

A QA/QC program would be implemented during all phases of the PMEC to ensure that the engineering, procurement, construction, and startup of the facility are completed as specified. The elements of the QA/QC Program would include:

- A formal QA/QC program would be in place to ensure that the equipment suppliers deliver their components as designed and specified and that the installation of equipment is completed as specified.
- A procedures manual would be developed that describes PMEC activities from the initiation of final design activities through start up of the plant.
- The EPC Contractors would describe the activities and responsibilities within its organization, and measures taken to assure quality work. Some of the topics would include design control, configuration management, and drawing control.
- Independent QA/QC personnel would review all documentation and witness field activities as a parallel organization to that of the construction organization to assure compliance with the specifications.
- Field inspectors' acceptance would be required for the installation, alignment, and commissioning of all major equipment and for the energizing of all electrical systems.

Typical QA/QC checks include:

- Factory QA/QC
  - Inspection of major equipment at manufacturer's facilities,

  - Review and inspection of third party test verification reports,
  - Review and inspection of manufacturer's QA/QC procedures,
  - Manufacturing drawing review and verification,
  - Visual inspection,
  - Witness and/or review of testing,
  - Verification of factory wiring and tagging,
  - Shipment packaging and handling, tracking, and identification, and
  - Pre-commissioning field testing and verification.

- Field Inspection QA/QC
  - Review equipment and material delivery acceptance inspection procedures,
  - Inspection of all critical interfaces including flanges and electrical termination points,
  - Verification of all mechanical assembly work including erection of major components,
  - Verification of field wiring and tagging, and
  - Pre-commissioning field testing and verification.

- Concrete/Structural
  - Inspection of forms, structural steel, and rebar prior to backfilling and prior to casting,
  - Field engineer's witness of concrete pouring, and
  - Inspection of concrete testing during pour (slump) and verification of break test results.

- Electrical Collection System
  - Inspection of cables and trenches prior to burial and backfilling,
  - Witness of proper backfilling procedures,
  - Inspection of terminations and termination hardware,
  - Witness and/or review of polarity, cable marking, and phase rotation tests,
  - Witness and/or review of grounding system resistance measurements, and
  - Inspection of all lock-out/tag-out locations and energizing sequences and plan.

Energy Northwest would periodically audit the EPC Contractors, including reviews of documentation and surveillances of field activities, to ensure compliance with the specifications and with the requirements of the QA/QC plan. Checks may include:

- Verification of drawings,
- Verification of materials,
- Verify compliance to engineering specifications,
- Verify compliance with environmental permits and regulations, and
- Verify compliance with health and safety program.

Records would be maintained at the PMEC in accordance with Energy Northwest's records management program and state archivist requirements.

2.14

WAC 463-60-255 Proposal—Construction methodology.

The application shall describe in detail the construction procedures, including major equipment, proposed for any construction activity within watercourses, wetlands and other sensitive areas.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-255, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-255, filed 10/8/81.]

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

2.14.1 PACIFIC MOUNTAIN ENERGY CENTER (PMEC) CONSTRUCTION

2.14.1.1 Construction Summary

The proposed Pacific Mountain Energy Center (PMEC) would be located in the Port of Kalama's North Port Marine Industrial Park in Kalama, Washington. Several paved and graveled access roads exist throughout the site. The PMEC site is composed of fine to course dredge spoils approximately 6 to 16 feet thick draped across the site (Parametrix, 1995; Hart Crowser, 1995b). Much of this fill came from the 1980 Mt. St. Helens eruption and the balance came from annual dredging for channel maintenance. Vegetation is sparse with various shrubs and grass and is nearly uniform across the site.

Storm water pollution prevention activities would occur prior to any clearing and site preparation. Measures would include installation of a stabilized construction entrance, wheel wash, silt fences, hay bales, temporary and/or permanent water conveyance systems, and installation of temporary and/or permanent retention ponds.

The plant site contains a 2.1-acre wetland that defines the upstream end of a Columbia River backwater channel. This wetland would be filled as part of the Port of Kalama's long-range management plan for development of the site. The permit application for this work has been submitted by the Port to the USACE. This permit action is not a part of this Application process.

Construction of the railroad spur would fill approximately 3.2 acres of palustrine open water wetland associated with an 8.86 acre wetland complex southwest of the proposed PMEC site. Filling this open water wetland and rerouting existing culverts draining to the wetland would also impact the remaining approximately 5.66 acres of scrub-shrub and forested communities. This wetland is confined by developed lands to the west and north, the BNSF railroad to the east, and Tradewinds Road to the south. (See Figure 3.4-1 in Section 3.4 Habitat, Vegetation, Fish and Wildlife)

Conventional construction equipment, including bulldozers, front-end loaders, trucks, tractor-scrapers, and graders would be used to final grade the site. During construction, the site would be fenced to provide security. Foundations would be installed, followed by installation of the equipment and construction of the buildings. Site landscaping is expected to be the last construction activity.

Approximately 5000 amperes of 480-volt, 3-phase temporary power would be installed within the site boundary to supply construction power. Startup power would be obtained by a step down transformer located adjacent to the high voltage switching station.

Field toilets and temporary holding tanks would be placed on site for use by construction personnel. During construction, potable water would be provided in containers until the potable water supply system is installed.

Construction worker parking would be provided on the northeast portion of the property. Materials to be used during construction are expected to be staged on the southern portion of the property and in additional Port industrial sites within one mile of the site.

2.14.1.2 Site Preparation

Preliminary analysis performed by PBS Engineering and Environmental indicates that the near surface soils up to a depth of 50 feet are potentially liquefiable under the design seismic event. Post liquefaction vertical settlements were calculated to be on the order of 4 to 6 inches.

PBS Engineering and Environmental completed three consolidation tests to evaluate the settlement characteristics of the near surface soft soils. Due to the potential for large magnitudes and time required for the primary and on-going secondary consolidation settlements, they recommend that fill on the site be minimized.

There would be minimal excavation for the drainage system, retention ponds, foundations, buried pipes, and electrical duct banks.

A Phase I Environmental Site Assessment completed by URS as summarized in Subsection 4.1.2 of Section 4.1, Environmental Health of this Application, indicates that there is no evidence of environmental contamination with hazardous materials at the site and that the likelihood of such contamination being present in subsurface soils is low. If contamination is encountered during excavation and grading, Energy Northwest would notify EFSEC and take appropriate remedial actions.

During site preparation, the contractor would install storm water pollution prevention measures and the drainage system. This system would consist of drainage ditches and retention ponds that would convey surface water runoff to a drainage ditch in the south central portion of the site. Dust would be controlled as needed by spraying water on dry, exposed soil. A Certified Erosion and Sediment Control Lead would be responsible for ensuring that storm water pollution prevention measures meet BMPs in accordance with the Ecology's Stormwater Management Manual for Western Washington (SWMMWW), February 2005 or as may be revised.

Security fencing would be provided. (See Section 2.16 Security Concerns.)

2.14.1.3 Foundations

Foundations and buildings would be designed for Seismic Zone 3. The initial phase of foundation construction would include foundations for all heavy equipment except for transformers and other electrical switchyard foundations, which would be constructed at a later time.

The presence of potentially liquefiable and relatively soft soils indicates that the proposed structures would be supported on deep foundation systems. Several pile systems to support the structures are under consideration, including continuous flight auger cast pile, driven pipe piles, and torque down piles. In addition, soil stabilization using stone columns or other similar methods may be considered if post-liquefaction settlement is a concern. As part of the final

design studies, additional geotechnical investigations would be conducted to determine the appropriate types of foundations for the facilities. (PBS Engineering and Environmental, Geotechnical Engineering Services Report, 2006)

Construction of foundations would 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.

The EPC contractor would determine the need for an on-site concrete batch plant.

2.14.1.4 Equipment Installation

A number of component systems would be fabricated and delivered to the site. This includes the combustion turbine/generators, HRSG, steam turbine generators, gasifiers, gas cleanup systems, air separation systems, tanks, major pumps, electrical equipment, and associated process sections. Fabrication and delivery of these components would be scheduled to coincide with their requirement in the construction sequence. Heavy and large equipment components would likely be delivered to the site by truck, rail, or barge. A boom crane would 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 would be installed, including electrical equipment, control equipment, piping installation, wiring cable, and conduits. Typical construction activities would include mechanical fastening, welding, preparation, and painting.

2.14.1.5 Startup Testing

At the completion of the construction sequence, each system would be energized and operational testing undertaken. This would include testing of each of the major component systems in a predetermined sequence and completion of QA/QC checks to ensure that each system is ready for full operation. After the electric generating power plants are fully operational, emission compliance testing would be conducted. At the end of the startup testing phase, each unit would be separately certified for commercial operation.

2.14.2 NATURAL GAS PIPELINE CONSTRUCTION

The new pipeline would be 16 inches in diameter, which is consistent with the gas pressure and applicable state or federal regulations. For the majority of the route, the pipeline would be located underneath Hendrickson Drive.

2.14.2.1 Construction Right-of-Way and Terrestrial Construction

The width of the area required for pipeline construction would vary according to site-specific conditions. It would be designed to fit within the existing roadway right-of-way, and be located beneath the existing paved roadway.

Easements would be negotiated with the Port of Kalama, City of Kalama, and Cowlitz County. In general, the right-of-way easements obtained would be in the existing Port roadways. Energy Northwest would clean and grade the right-of-way to accommodate construction, install the pipeline, clean up and return to grade, revegetate areas where vegetation was removed, repave roadway sections that are temporarily removed, and provide later access to the pipeline for operation and maintenance.

Specific procedures for construction would be dependent upon conditions identified during final engineering and design studies. The construction is expected to be completed by a single pipeline "spread," which is a coordinated crew with the major construction equipment necessary to complete sections of the pipeline installation from start to finish. Final engineering design studies would determine the appropriate number of spreads.

Work would proceed in the following sequence: temporary fence installation as required, installation of storm water pollution prevention measures, clearing of pavement or vegetation, grading of right-of-way, trenching, hauling and stringing the pipe, pipe bending, pipe laying and welding, x-ray inspection, applying external coating to field welds, coating checks, lowering-in, backfilling, hydrostatic testing, and cleaning and restoring the right-of-way.

Storm water pollution prevention would be implemented, as appropriate, in accordance with the Ecology's SWMWW. A Certified Erosion and Sediment Control Lead would be responsible for ensuring that storm water pollution prevention measures meet BMPs. Methods may include silt fences, hay bales, rock bases, retention ponds, and dust management. Specifics would be included in the final engineering design.

After vegetation clearing has been accomplished, any salvageable topsoil would be piled along the outer extreme of the right-of-way. The right-of-way would then be leveled to allow the construction equipment room to work. There would be a pipe fabrication area, room for the construction equipment to work, and passing lanes.

Construction within the paved roadway area would be performed using the open-cut method. Traffic would be diverted around the construction area via detours or temporary roads. To minimize the duration of traffic disruption, the pipe would be prepared prior to commencement of roadway excavation. Once the pipeline has been installed, the trench would be backfilled and compacted in lifts in accordance with relevant agency specifications. The roadway would be resurfaced over the compacted trench. In order to minimize disruption to traffic and to minimize the need for detours, it is not envisioned that the ditching operation would have numerous pieces of equipment spread over the length of the pipeline. Construction sequencing would be coordinated with the Port of Kalama to maintain vehicular access to all Port properties.

After the pavement is removed, subsurface materials or topsoil segregated, and the right-of-way is leveled, ditching would begin. Materials removed from the ditch would normally be placed adjacent to the topsoil pile. Backhoe equipment would normally be used to dig the ditch. If rock is encountered, the ditch would be dug by first breaking the rock with hoe rams.

Precoated pipe sections would be hauled to the right-of-way on stringing trucks. The pipe would be unloaded from the trucks with a sideboom tractor and placed end-to-end alongside the ditch.

Where water, road, or railroad crossings are to be accomplished, the appropriate pipe would be stockpiled on one or both sides of the crossing so it is available to the construction crews that would follow.

Before the pipe is welded, a bending crew would bend the pipe in place to match the contours of the ditch. The crew would use a hydraulic bending machine to put gradual bends in the pipe. The bending would be limited to making many small bends along the length of a pipe section until the desired bend angle is obtained. The pipeline centerline would be determined with bending limitation in mind. Where the bend could not be made gradually enough because of local conditions, a preformed factory bend would be inserted into the pipeline.

After bending has been completed, a welding crew would join the lengths of pipe together. The pre-bent pipe would be supported with sidebooms and rotated so the pipe matches the ditch contour. A lineup clamp would be used to temporarily hold the pipes in proper alignment until the welders can put an initial welding pass on the joint. Electric arc welding would be used to join the pipes together. As soon as sufficient weld material has been deposited into the joint, the clamp would be released and the crew would move forward to the next joint. Additional welding crews would follow and place the remainder of the weld material into the joint except for the final pass. A capping crew would follow immediately to put the finish "cap" weld on the joint. All welders that work on a joint have a unique identifying code. The codes are marked on the area adjacent to the pipe so that complete records of the welding would be maintained.

After the pipe is welded, it would be placed on skids or earthen berms so the joint is supported above the ground. This would allow the joint to be X-rayed to check its quality and also would allow the coating crew to clean and coat the bare, welded joint.

Shortly after the welding crew has passed, an independent X-ray crew would test the welds. United States Department of Transportation (USDOT) code requires a minimum of 10 percent of the welds be tested in unpopulated areas of the pipeline. Welds in highly populated areas and under water and road crossings require 100 percent testing. A portable lab would develop X-rays shortly after they are taken, and an evaluation of the weld would be made. Defects in the welds would normally be corrected within a day of the original welding, and the joint would be X-rayed again to verify that the repair is good.

After the welds have been checked, the coating crew would clean the exposed steel at the joint between the pipes and apply a protective coating. The coating would commonly be a heat-shrinkable polyethylene wrapped around the pipe. After the longitudinal ends are sealed, heat would be applied to the coating material to shrink it around the joint and form a tight, impervious covering on the joint. After the joints have been coated, an inspection crew would check the pipe for nicks and abrasions in the coating with a high-voltage testing device. Chips or abrasions in the coating would sound an alarm on test equipment and the crew would place a mark on the pipe to indicate the defect. Repair crews would patch the defects prior to lowering the pipe into the ditch.

The pipe would be lowered into the ditch by a team of sideboom tractors. If there is a rocky bottom, dirt or foam berms would be placed in the bottom of the ditch to suspend the pipe above

the bottom. If necessary, heavy duty plastic mesh would be wrapped around the pipe in rocky areas to protect the pipe and coating from damage during the lowering process.

Depending on the final pipeline design and material selection, an impressed-current cathodic protection system may be installed to protect the pipeline from corrosion. The system components and locations along the alignment would be determined during the final design and engineering studies.

Backfill would normally be placed over the pipe within a day of the pipe being lowered into the ditch. Bulldozers would normally be used to push stockpiled materials removed from the ditch bank into the ditch to cover the pipe. In areas that contain large quantities of rock, select fill material may be imported to put the first one foot of cover over the pipe, or special padding machines may be brought in to screen the rock from the backfill before it is placed in the ditch. Extreme care would be taken with the initial fill to avoid damage to the coating during backfill. After the one foot of screened material is placed on the pipe, the remaining soil and rock mixture would be returned to the open ditch to complete the backfill. The amount of backfill (cover) required between the top of the pipe and the ground level is presented in Table 2.14-1.

TABLE 2.14-1
COVER STANDARDS FOR BURIED PIPELINES

Location	Cover (inches)	
	Normal Excavation	Rock Excavation
Industrial, commercial and residential areas	36	30
Crossings of bodies of water with a width of at least 100 feet from high water mark to high water mark	48	18
Drainage ditches at public roads and railroads	48	36
Any other area	36	18

After the contours have been re-established, the topsoil or roadbed subsurface materials that had been previously segregated would be redistributed across the surface of the right-of-way. As appropriate, the roadway would be repaved to County standards. For areas outside of the paved roadway area, native grasses or other native vegetation would be planted and fertilized in accordance with Port of Kalama and agency requirements. Temporary fencing that was installed at the beginning of construction would be removed and any original fences re-established where appropriate.

Pipeline markers would be installed along the route to show the location of the pipeline, identify the owner, and provide a local or toll-free telephone number to contact the owner regarding activities that may affect the pipeline.

2.14.2.2 Crossings

Crossings would be installed concurrently with the mainline construction period. Separate crews would install open-cut or bored crossings of the railroad. All crossings of public thoroughfares would be 100 percent X-rayed before the pipe is installed. The Kalama River would be crossed by either suspending the pipeline from the bridge, or by boring under the river.

Railroad Crossings

For the majority of the route, the natural gas pipeline would parallel the existing BNSF mainline. The pipeline would cross the proposed rail spur line at the PMEC site. Railroad crossings would be installed by the bored-crossing method unless the gas pipeline is installed prior to the construction of the rail spur line.

Boring would require the digging of a large pit on one side of the rail line. The boring machine would be lowered into the pit to begin boring, with the pipe inserted into the hole as it is drilled. The outside of the pipe would be coated with concrete or abrasion resistant material to protect the pipe from scarring and nicking as it is pushed through the bore hole. As each complete joint is installed, the boring shaft would be separated and another joint of pipe welded to the first joint. The shaft would then be reconnected through the new section of pipe and the boring would continue. This method would continue until the boring head and the pipe is received in a "capture" pit on the opposite side of the crossing. Because the pipe being installed would be the actual pipeline carrier pipe, all welds would be X-rayed as they are completed. Casing would not be installed, because the potential for future corrosion problems and potential failure of the pipe would be increased. Upon completion of the boring, the pits would be backfilled, with the exception of the exposed ends of pipe. These ends would remain exposed until the mainline spread reaches the crossing and are then connected to the rest of the pipeline.

The pipe would be installed in accordance with the latest requirements of the American Railroad Engineering Association. Because the minimum depth requirements for uncased crossings are six feet of cover in the ditches and ten feet of cover below the rails, additional working space would generally be required to allow the pipeline to reach the greater depth and to provide an area to deposit materials removed from the larger boring pit.

Kalama River Crossing

The natural gas pipeline would need to cross the Kalama River. The pipeline would either be secured to the lower portion of the existing county bridge within the Port of Kalama, or alternatively, use a HDD to install the pipeline below the river bed. The process includes drilling a pilot hole using a large drill bit and an injection of bentonite slurry under pressure to remove the cuttings and hold the hole open. After the pilot hole is completed, a reamer and bentonite slurry combination is used to enlarge the hole so that the preassembled string of pipe can be pulled back through the hole. This method requires the preparation of an entrance site and an exit site. Some types of substrate are unsuitable for drilling, such as hard fractured rock or sugar sand type soils. An evaluation of the geotechnical conditions along the pipe alignment would be necessary to determine the feasibility of a drilled installation at this site. The pipeline would be buried beneath Hendrickson Drive on either side of the bridge. The pipeline route includes no other water body or wetland crossings.

2.14.2.3 Hydrostatic Testing

The entire pipeline would be hydrostatically tested in accordance with USDOT regulations and in compliance with the requirements for water withdrawal and discharge that may be imposed by EFSEC. Pipe that is proposed for stream crossings would be air tested before placement. If

leaks are detected, they would be repaired or the pipeline section would be replaced and the section retested.

Water for testing would be obtained from either the Port of Kalama or the City of Kalama. When hydrostatic testing is complete, the test water would be analyzed and treated if necessary to make it suitable for discharge into area drainage ditches in compliance with water discharge permits issued for the PMEC. If an appropriate discharge location is not immediately adjacent to any facility being tested, the used test water can be trucked to an appropriate discharge point.

2.14.3 RAILROAD SPURS AND RAIL LOOP CONSTRUCTION

A realignment to the existing northbound rail siding or spur and new southbound rail siding would be needed to connect the PMEC rail loop to the BNSF and UP joint rail line. These spurs would likely be at 16 to 20 foot track centers and would be constructed within the present rail right-of-way (ROW), requiring modifications to the existing rail spurs servicing the Steelscape plant. The loop track and siding would consist of about 11,300 lineal feet for the loop (turnout on mainline, around the site, to loop closure) and about 4,500 feet of sidings for non-feed stock shipping and receiving, resulting in a total of about 15,800 lineal feet of new railroad track.

A portion of the rail line would cross a wetland area of approximately 3.99 acres that would first need to be filled. The first step in filling wetlands is to identify the existing water source and to establish drainage to eliminate both surface and groundwater. The existing wetland has a blocked outlet culvert at its north end. The blockage would be removed, and the new drainage likely designed to utilize the culvert. The existing soils would then be tested and any unsuitable materials (not suitable for compaction and rail construction) would be removed and suitable materials backfilled into place.

The railroad construction would follow typical industry standards for rail construction. The track alignment and construction limits would be established by a field survey. The ROW would be cleared by following accepted industry practices and sound construction guidelines. Debris created from preparation of the ROW would be disposed of using approved methods.

The low areas would be filled and hills would be removed to provide a smooth grade. Drainage structures would be built. These activities would be done with large earth moving equipment normally used for road building. The embankments would be compacted and 12 inches of finely graded compacted granular material (sub-ballast) would be placed on the top. Vegetation would be reestablished on the slopes and other impacted areas.

After the sub-ballast is placed, specialized construction equipment would be used to construct the track. The track would consist of railroad ballast (rock), steel rails, timber crossties and other miscellaneous materials. A stockpile area for the track material would be located on the plant site.

The material would be distributed by truck to the final location and the rails would be carefully spiked to the proper gage on the crossties. Railroad ballast would be dumped using construction equipment mounted on the rails. A specialized piece of construction equipment, called a tamper, would be used to raise the track through the ballast, and the ballast would be compacted under

the crossties. The track surface would be smoothed to a tolerance of 1/16 of an inch. The ballast would then be shaped to form a uniform ballast section.

2.15

WAC 463-60-265 Proposal—Protection from natural hazards.

The application shall describe the means to be employed for protection of the facility from earthquakes, volcanic eruption, flood, tsunami, storms, avalanche or landslides, and other major natural disruptive occurrences.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-265, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1). 92-09-013, § 463-42-265, filed 4/2/92, effective 5/3/92. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-265, filed 10/8/81. Formerly WAC 463-42-290.]

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

2.15.1 INTRODUCTION

The following are conditions that exist on site or measures that are planned as part of the Pacific Mountain Energy Center (PMEC) design to protect the facility from natural hazards.

2.15.2 EARTHQUAKE HAZARD

Earthquake related damage to industrial facilities, such as the PMEC and associated gas pipeline typically arises from surface fault rupture, liquefaction and lateral spreading of soils, slope failures, or ground shaking. In addition, tsunamis or seiches may impact facilities located near the Pacific Coast or adjacent to other water bodies in seismically active areas.

2.15.2.1 Surface Fault Rupture

Surface rupture is highly unlikely at the plant site or along the pipeline corridor because of the absence of known faults beneath the site and pipeline corridor and the absence of evidence of historical or geologically recent surface rupture in the Kalama site area. No surface fault movement has been recorded in Washington within historic time (McCrumb et al., 1989). In general, faults that have had a surface rupture during the Holocene epoch (last 10,000 years) or multiple ruptures during the Pleistocene epoch of the Quaternary period (last 10,000 to 1.8 million years) are considered to have a potential for future surface rupture. The known faults with Holocene or late Pleistocene surface displacement within the Puget Sound and Willamette lowlands are distant from the site (see Section 3.1). No Quaternary faults have been previously mapped or inferred within the site boundaries (Walsh et al, 1987; Noson et al., 1988; and Rogers et al., 1996).

2.15.2.2 Strong Ground Motion

Southwestern Washington and Northwestern Oregon, in which the PMEC is situated, is an area of low to moderate historical seismicity but characterized as one of high seismic hazard due to the potential for strong earthquake ground motion (see Section 3.1.2.1) from regional potential seismic sources. These sources include the Cascadia Subduction Zone (CSZ) located offshore of the west coast and shallow crustal faults in the Puget Sound and Willamette lowlands. According to the probabilistic Seismic Hazard Maps published by the USGS in 2002 (http://earthquake.usgs.gov/research/hazmaps/), the estimated peak ground acceleration for the site is on the order of 0.18g for a 475-year return period earthquake (10 percent chance of not being exceeded in 50 years). For a 2475-year return period earthquake (2 percent of not being exceeded in 50 years), the estimated peak acceleration for the site is on the order of 0.35g. Design of facilities for the USGS estimated levels and potentially higher levels of ground shaking can be accommodated within the current level of earthquake engineering design practice.

2.15.2.3 Liquefaction and Lateral Spreading

Liquefaction and/or lateral-spreading, and accompanying loss of strength and load bearing capacity of soil, is a potential hazard at this site. Liquefaction can occur in shallow loose saturated granular soils due to strong ground shaking during an earthquake. Liquefaction generally occurs in saturated soils at depths of less than 40 feet below ground surface. Lateral spreading may occur when liquefied soils flow laterally towards a slope or river bank. Geotechnical reports for the PMEC site and several existing facilities along the river to the south of the site of the proposed facility indicate the presence of loose to medium dense sand layers with the potential to liquefy. Ground modification techniques and specialized foundations for power plants and other large structures can and have been designed to mitigate liquefaction impacts in seismically active areas worldwide. Specific design criteria to address the risk of liquefaction would be developed as part of site-specific geotechnical studies to be performed prior to final design. These design criteria would consider appropriate earthquake-induced ground motion estimates.

2.15.2.4 Tsunamis and Seiches

Tsunami waves may enter the Columbia River from distant circum-Pacific earthquakes, local offshore earthquakes on the CSZ, or submarine landslides in the adjacent Pacific Ocean offshore area. However, the historical data and numerical modeling estimates of runup wave height along the Columbia River inland from the river mouth indicate a low potential for inundation at the site (Priest, 1995).

Although seiches have been observed in the Pacific Northwest during the 1949 Queen Charlotte Islands, Canada, and the 1964 and 2002 Alaskan earthquake of approximately moment magnitude M8 or greater, seiches have not been reported in the Columbia River, except in the reservoir directly behind the Grand Coulee Dam farther upstream. In our judgment, the seiche potential in this river near the site is minimal, and the potential for damage from any seiche that might occur is considered remote.

2.15.2.5 Mitigation Measures for Seismic Hazards

The impacts from a distant great earthquake on the CSZ or local moderate to large earthquake are potentially significant to the proposed plant facilities but can be mitigated through standard seismic design and construction measures. The strong and/prolonged shaking may cause soil failure due to liquefaction and/or lateral spreading. The following measures can mitigate the earthquake hazard presented to the PMEC and gas pipeline:

A more extensive site specific geotechnical investigation program would be undertaken during design to further evaluate whether there are areas of potentially liquefiable soil layers in the proposed site of the facility and gas pipeline.

In the areas where saturated liquefiable soils are present, some form of in place densification may be used to improve the liquefiable soils. Whenever depth to non-liquefiable soils is not too great, over-excavation and replacement with non-liquefiable soils may also be used.

Alternatively, pile foundation support may be used to transfer loads to competent soils below the liquefiable layers.

In addition to the above mitigation measures during the design and construction of the plant and gas pipeline, the following mitigation measures would be undertaken during the operation of the facilities:

Visual inspection would be conducted following abnormal seismic activity. These inspections would look for signs of incipient mass movement in those areas identified as potentially susceptible to such failures.

2.15.3 SLOPE FAILURE AND MASS WASTING

Slope failures and mass wasting are not a consideration at this relatively flat site. According to the topographic map, the site consists of stable natural slopes with less than five percent grade.

2.15.4 VOLCANIC ERUPTION

The Cascade Mountains of the Pacific Northwest region contain sixteen major volcanoes which extend from Mount Garibaldi in British Columbia to Mount Lassen in California (Harris, 1980). Four of the volcanoes within Washington and Oregon have experienced activity within the historic time: Mount Baker, Mount Rainier, Mount Hood, and Mount St. Helens. Mount St. Helens is the closest volcano to the project site, situated approximately 35 miles to the northeast (see Figure 2.15-1).

Effects of volcanic activity may include lava flows, mudflows, pyroclastic flows, and ash-fall. Volcanic flows are typically limited to the flanks of the volcano and major drainage channels extending from the volcano. The USGS has estimated the areas most likely to be impacted from future eruptions of Mount St. Helens and the site is not situated in an area identified as having a potential hazard from a pyroclastic flow or lahar (Wolfe and Pierson, 1995). Of greatest impact in terms of area affected by an eruption is the tephra, or ash, carried aloft that subsequently falls to the land surface. Modern meteorological records show that both high altitude wind directions and speeds in Washington have been more prevalent and stronger toward east than toward the west in the site region. The USGS (Wolfe and Pierson, 1995) estimates that there is between a 0.01% and 0.02% annual probability that there would be 4-inches (10 cm) or more of ash deposited at the site from eruptions throughout the Cascade Range (Figure 2.15-1). Therefore, no mitigation measures are proposed for direct volcanic hazards.

Secondary processes associated with volcanic eruption, such as lahars, flooding and sediment loading can result in more serious damage. Flooding may affect those areas on the modern floodplain of rivers within the watershed of the volcano. The site of the proposed facility and pipeline are situated near the confluence of the Kalama River and the Columbia River. The head of the Kalama River is on the flanks of Mt. St. Helens, therefore, there is a potential for flooding and lahars (Wolfe and Pierson, 1995) at the river mouth in the event a future eruption occurs that has significant deposition of volcanic deposits and debris in the Kalama River drainage. Flooding and lahars did not occur at the river mouth during the 1984 eruption which affected the Cowlitz River and Lewis River (Schuster, 1989). Additional mitigation measures beyond that

for potential rainfall/runoff induced flooding from the Kalama and Columbia Rivers are not proposed.

2.15.5 FLOODING

The PMEC is located within the 100-year floodplain for the Kalama and Columbia rivers as currently mapped by FEMA (1974). However, this map was based on 1980 elevations and shows the flood elevation at 19 feet. The current site elevation is at 22 feet due to subsequent deposition of dredge soils and was not flooded in 1996. Therefore, the current elevation of the site is above the 100-year floodplain and additional mitigation measures for flooding are not planned.

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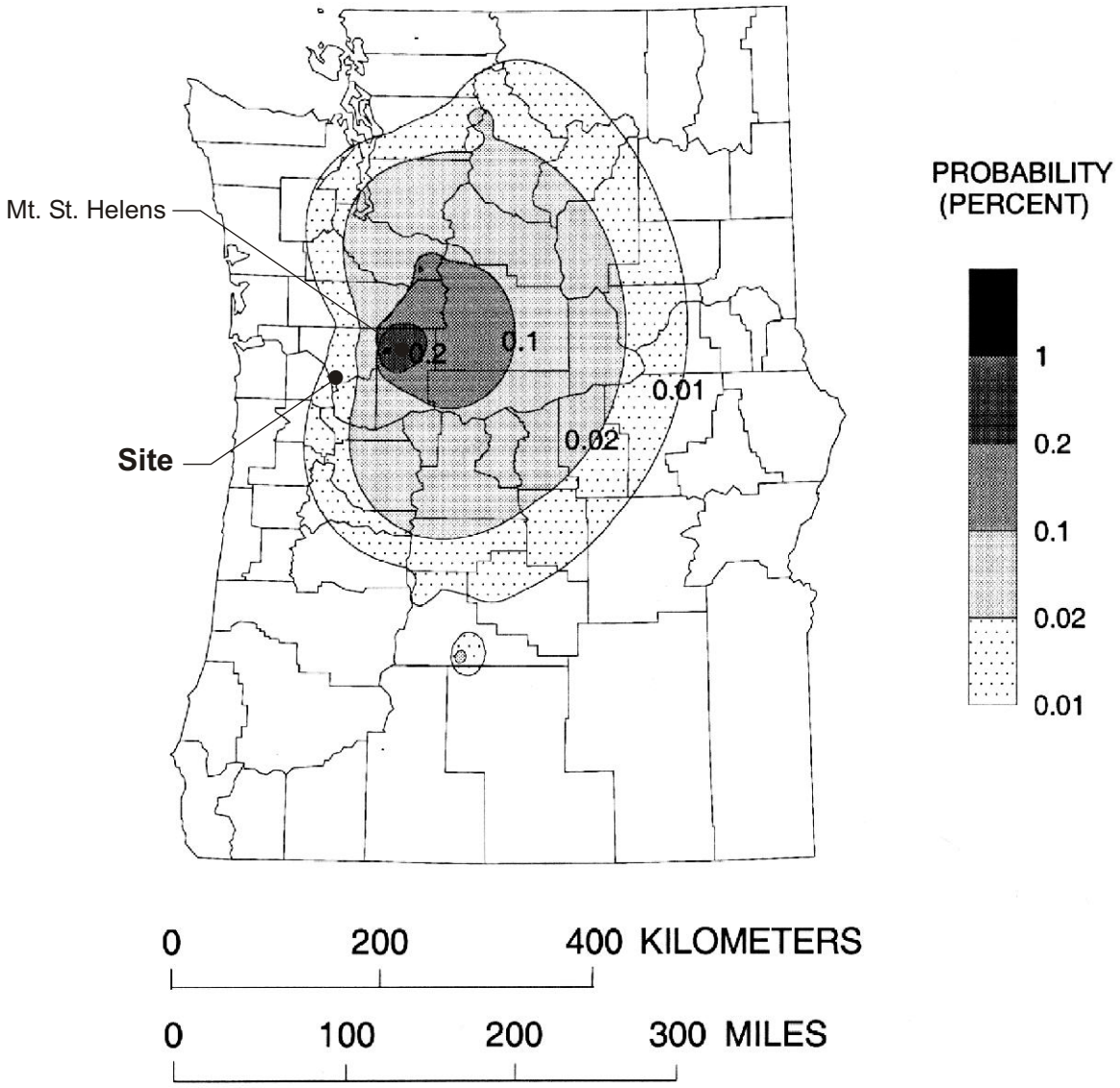

Explanation

Annual probability of accumulation of ten or more centimeters (four or more inches) of tephra in Washington and Oregon from eruptions throughout the Cascade Range. Probability distribution reflects the frequency of explosive eruptions at each major Cascade volcano, the variability in the thickness of tephra that could be deposited at various downwind distances, and the variability in wind direction.

SOURCE: Wolfe and Pierson, 1995

Figure 2.15-1

Job No. 33758342

Annual Probability of 10 cm of Volcanic Ash

URS

Pacific Mountain Energy Center
Kalama, Washington

2.16

WAC 463-60-275 Proposal—Security concerns.

The application shall describe the means employed for protection of the facility from sabotage, terrorism, vandalism and other security threats.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-275, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-275, filed 10/8/81. Formerly WAC 463-42-300.]

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

2.16.1 SECURITY PLAN FOR THE PACIFIC MOUNTAIN ENERGY CENTER

The Pacific Mountain Energy Center (PMEC) site is located within the Port of Kalama Industrial Park approximately three miles north of the City of Kalama, Washington. The site is bounded by Tradewinds Road on north and east, Steelscape steel coil facility on the south, and the Columbia River on the west.

2.16.1.1 Construction Phase

The project site perimeter would be enclosed with a permanent chain link fence and would have two (2) ingress and egress gates. During construction, the gates would be staffed 24 hours per day or locked. Access to the project site by all personnel would be through the staffed security gate.

Parking for the construction contractor employees would be in an assigned parking area. A barrier or other device would be erected around protected areas to exclude vehicles and pedestrians until protection is no longer required.

2.16.1.2 Operation Phase

The PMEC site would retain the perimeter fencing and access gates used during construction. The access gate would be monitored by on-site personnel from the main control room using closed circuit television and voice intercom recorders.

Parking for operations and maintenance personnel would be inside the fenced area. Personnel would use a card/code entry system to access the facilities. Vendor equipment personnel, maintenance contractors, material suppliers, and all other third parties would require permission for access from a designated site employee prior to entrance. Access to critical areas would be granted on a project/job need basis by the Plant Manager.

2.16.1.3 Emergency Response Plan

PMEC would establish an emergency response plan for the plant to ensure employee safety from the following emergencies: on-site chemical release, flood, tsunami, medical emergency, major power loss, fire, extreme weather, earthquake, volcano, lahar, and bomb threat. The plan would be established prior to completion of construction. The plan would follow the requirements of WAC 296-24-567 and 296-62-3112 and 29 CFR 1910.38, Emergency Action Plan. All hourly and salaried employees, including administrative staff as well as contractors and visitors, would be covered by the plan. The Emergency Response Plan would be administered by the Plant Manager who would be responsible for overall coordination of the plan. See Section 4.1.6 Emergency Response Plans.

The plan elements would include:

- General Evacuation Plan,
- Fire/Explosion On-Site,

- Natural Gas Release On-Site,
- Natural Gas Release Off-Site,
- Chemical Release,
- Oil Release,
- Flood,
- Tsunami
- Tornado,
- Earthquake,
- Volcanic Eruption (Ashfall),
- Lahar,
- Injury,
- Facility Blackout, and
- Facility Bomb Threat.

2.17

WAC 463-60-285 Proposal—Study schedules.

The application shall furnish a brief description of all present or projected schedules for additional environmental studies. The studies descriptions should outline their scope and indicate projected completion dates.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-285, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-285, filed 10/8/81. Formerly WAC 463-42-150.]

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

All environmental studies required for this Application and to support State Environmental Policy Act (SEPA) have been completed.

2.17.1 ADDITIONAL SUBMITTALS

Prior to construction, the applicant will submit the following additional documents to EFSEC:

- Notice of Intent to be covered by Ecology's Construction Stormwater General Permit, including Stormwater Pollution Prevention Plan
- Emergency plan, safety plan, and environmental compliance procedures, to be completed by PMEC's contractor,
- A site-specific erosion control plan,
- Additional information on project hardware and features not currently available,
- A SPCC plan to cover construction activities, if needed.
- An initial site restoration plan,
- Construction schedule, and
- A Certificate of Water Availability from the City of Kalama for the potable water supply.

Prior to commencement of operation, the applicant will submit:

- An Emergency Action Plan,
- A Health & Safety Plan, including details on training, education and equipment,
- A revised spill prevention, control, and countermeasure plan, and
- Notice of Intent to be covered by Ecology's Industrial Stormwater General Permit, and attendant Stormwater Pollution Prevention Plan.

2.18

WAC 463-60-295 Proposal—Potential for future activities at site.

The application shall describe the potential for any future additions, expansions, or further activities which might be undertaken by the applicant on or contiguous to the proposed site.

[Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-295, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-295, filed 10/8/81. Formerly WAC 463-42-140.]

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

2.18.1 DEVELOPMENT OF PACIFIC MOUNTAIN ENERGY CENTER (PMEC)

At this time, there are no plans for any future additions, expansions, or future activities by the applicant on or contiguous to the proposed site. However, both the site and the existing and planned facilities would support an expansion in the future should the demand for power of this type or syngas continue to grow.

The Pacific Mountain Energy Center (PMEC) would be comprised of a gasification facility and two combined cycle power generation plants. The gasification facility converts solid or liquid feedstocks into a syngas that will be used to run the gas turbines. The composition of the syngas is primarily Hydrogen (H_2) and Carbon Monoxide (CO). The syngas can be reformed to support a number of industrial processes including Substitute Natural Gas Production (SNG), Hydrogen Production, and Methanol\Biodiesel Production. There are no plans for any of these expansions at this time.

Sufficient space is available on the site to add another gasification train and 300 MW combined cycle power generation plant. The site as well as the supporting infrastructure, such as rail and unloading facilities, could support the expansion with minimal or no future modifications. The proposed natural gas pipeline, water delivery, and other support systems have adequate capacity to serve a larger project than is currently planned.

The area is zoned for, and planned for, industrial use, so it is anticipated that additional industrial uses will be constructed in the future on surrounding sites.

2.19

WAC 463-60-296 Proposal—Analysis of alternatives.

The application shall include an analysis of alternatives for site, route, and other major elements of the proposal.

[04-23-003, recodified as § 463-60-296, filed 11/4/04, effective 11/11/04. Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013,§ 463-42-296, filed 10/11/04, effective 11/11/04.]

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

2.19.1 INTRODUCTION

This section summarizes the alternatives that were explored during the development of the Pacific Mountain Energy Center (PMEC). They include eight alternative sites for the plant, including the selected site at the Port of Kalama, alternative routing for the natural gas pipeline, alternative cooling systems, and alternative technologies and fuel.

2.19.2 PMEC SITE SELECTION PROCESS

The PMEC is an Integrated Gasification Combined Cycle (IGCC) development, which will gasify coal or petroleum coke to power two 300 MW combined cycle CTG electric power generating plants. In a desire to be close to the load requirements of the West Coast, only sites west of the Cascade Mountain range were considered. The primary criteria for identifying potential sites included:

- Location in Western Washington near load centers,
- Size of site and ability for future expansion,
- Availability of major transportation facilities (dock and rail),
- Site infrastructure and zoning, and
- Community support.

Using this primary criteria, eight sites that were zoned for industrial use were initially identified:

- Port of Kalama,
- Port of Longview,
- Port of Grays Harbor,
- Mint Farm, Longview,
- BP, Bellingham,
- Satsop Combustion Turbine Project,
- Centralia, and
- Port Westward, Clakskanie, Oregon.

These eight sites were then initially screened using the following key criteria:

- Industrial zoned property of a minimum of 40 acres available for lease or purchase,
- Shoreline location with available dock or port, and

Proximity to existing rail line for transport of coal or petroleum coke.

Table 2.19-1 identifies the sites, the results of the initial site screening, and recommendations for further consideration.

TABLE 2.19-1
INITIAL SITE SCREENING

Site	Industrially Zoned Property	Adequate Area Available for Lease or Purchase	Availability of Rail	Dock or Port Location	Recommend for Further Consideration?
Port of Kalama	80 acres	Yes	BNSF/UP	Yes, expansion	Yes
Port of Longview	Approximately 200 acres, development ready	Yes	Port/UP/BNSF	East end available	Yes
Port of Grays Harbor	90 acres, development ready	Yes	Short line, Puget Sound Pacific	New dock	Yes
Mint Farm, Longview	70 acres	**No,** extensive wetlands	Weyerhaeuser short line	**No, Alcan possibility**	**No**
BP – Bellingham	500 acres, undeveloped	Yes	BNSF	New dock	Yes
Satsop	20 acres Duke CT, developed	**No**	Short line, Puget Sound Pacific	Small river barge	**No**
Centralia	40 acres, undeveloped	**No,** site locked in	**No**	**No**	**No**
Port Westward, Clatskanie, Oregon	50 acres, undeveloped	**No,** site has an existing 40 year lease	Short line, Columbia Pacific	Yes, PGE. Upgrade required	**No**

After the initial screening, four of the eight sites were eliminated (Mint Farm, Satsop, Centralia, and Port Westward) due to either site size and availability, or transportation reasons.

The remaining four sites were then evaluated using the following four criteria. All sites were in areas designated as Enterprise Zone/Distressed Area.

- Proximity to high voltage transmission lines,
- Availability of water for water cooling,
- Access to natural gas for backup fuel source, and
- Availability of wastewater discharge.

Table 2.19-2 identifies the four remaining sites, the results of the second tier site screening, and recommendations for further consideration.

TABLE 2.19-2
SECOND TIER SITE SCREENING

Site	High Voltage Transmission	Water Availability (gallons/day)	Natural Gas Availability	Wastewater Discharge	Recommend for Further Consideration?
Port of Kalama	12 miles	5 million	8" Cascade Natural Gas line; 4 miles to Williams Pipeline	Existing outfall, Port to upgrade	Yes
Port of Longview	BPA Longview Substation, 3 miles	15 million	12" high pressure line; 6 miles to pipeline	City, Port of Longview	Yes
Port of Grays Harbor	Aberdeen, 5 – 10 miles	1 million, upgrade needed	20 miles	New discharge required	**No**
BP – Bellingham	Bellingham, 5 – 10 miles	Need to acquire from BP or new water right	BP expansion, new pipeline	New discharge required	**No**

The Port of Grays Harbor site was eliminated based on the need for a 20-mile new natural gas pipeline and a new wastewater discharge. The BP site was eliminated due to the need to acquire water and a new wastewater discharge.

Both of the remaining two sites, at the Port of Kalama and at the Port of Longview, met the screening criteria. The Port of Kalama site was selected for financial reasons.

2.19.3 GAS TRANSMISSION ROUTING ALTERNATIVES

Energy Northwest requested that Williams and Pacific Energy Systems both perform a preliminary route evaluation. The purpose of the pipeline would be to serve a new power plant with natural gas from Williams Northwest Pipeline Corporation's line mainline located several miles to the east of the plant location.

In order to minimize impacts, Energy Northwest has selected Route #1, routing the natural gas pipeline along the Port access road (Hendrickson Drive).

2.19.3.1 Route #1 – Port Access Road (4.83 miles long)

This route begins near the existing Williams Northwest Pipeline Corporation's Kalama meter station located on the Astoria lateral at milepost 2.94. The route proceeds North following the Port access road (Hendrickson Drive) until it reaches the Kalama River where it would make a jog to West to cross the Kalama River either by hanging the pipeline on the existing bridge or by HDD under the river, before turning Northward towards the plant site. Route #1 has the following characteristics:

- Locating the tap at the existing Kalama meter station has the advantage of utilizing existing telemetry and metering facilities,

- The majority of the route is on property or roadway owned by the Port of Kalama, the City of Kalama, and Cowlitz County,
- The route will not require clearing of timber and underbrush,
- With the exception of the marina, the land use is industrial,
- With the exception of boats in the marina, there are no residences that border the proposed route,
- The topography along the route is flat and most of the excavation will be in the existing roadway and Port property that was identified as fill,
- There are no stream crossings,
- There are no crossings of I-5 or railroad lines,
- There are no visual impacts,
- 16" pipe would be required,
- One crossing of the Kalama River either by drilling under the river or by suspending the pipeline on the underneath side of the existing vehicular bridge, and
- At least three road crossings and six rail spur crossings.

2.19.3.2 Route #2b – Direct Connect to Mainline (3.0 miles long)

This route begins at Williams existing mainline near milepost 1254.2 and heads to the west through the hills to the north side of the large pond (located to the north of Kalama River Road) where it heads to the West under I-5 and the railroad to the plant site. Route #2 has the following characteristics:

- 12" pipe would be required,
- Significant rock covering a large percentage of the route,
- One HDD crossing of I-5 and the railroad,
- Route will pass through rural residential sites,
- Two stream crossings – assumption is that endangered species are present and that a conventional bore would be required,
- Two road crossings, assuming that all crossing could be open cut except for Old US Highway 99 which would likely require a conventional bore.,
- No crossing of Kalama River,
- Shortest route of the three alternatives,
- Route will require a new tap to the Williams pipeline and new metering and telemetry,

- Only direct connection to the mainline – probability of being able to deliver requested pressure more often increases compared to the other routes since they both originate off the Astoria Lateral,
- Approximately 60% of route traverses high topographic relief areas, and
- Timber clearing would be required over approximately 60% of this route resulting in a permanent visual impact.

2.19.3.3 Route #3 – Olympic (5.66 miles long)

This route begins where the existing Olympic products pipeline intersects the Astoria lateral at milepost 1.40. The route proceeds North following the existing Olympic pipeline corridor to the north side of the large pond (located to the north of Kalama River Road), where it heads to the West under I-5 and the railroad to the plant site. Route #3 has the following characteristics:

- 16" pipe would be required,
- One HDD crossing of the Kalama River,
- One HDD crossing of I-5 and railroad,
- Six stream crossings – assumption is that endangered species are present and that a conventional bore will be required - geotechnical risks are unknown,
- Eight road crossings, assuming that the crossing could all be open cut except for Old US Highway 99 and Kalama River Road which would likely require a conventional bore,
- Longest route of the three alternatives,
- Follows an existing utility corridor,
- Route with the most environmental permitting issues,
- Impacts the highest number of current residents. There are several clusters of development where obtaining a new easement may be difficult and expensive,
- Development is present along the majority of this route and will result in higher land acquisition and construction costs,
  - Several areas with little or no space available for use as temporary extra workspace,
  - Route with highest potential for public opposition,
- Passes through an area with known geotechnical concerns (landslides),
- Additional ROW would be required adjacent to Olympic pipeline,
- Rock likely present over 50% of this route that would require mechanical excavation instead of explosives due to the proximity to the Olympic pipeline and population,
- Approximately 50% of route traverses high topographic relief areas, and
- Timber clearing would be required over approximately 55% of this route resulting in a permanent visual impact.

2.19.4 COOLING SYSTEM ALTERNATIVES

Four heat dissipation technologies to the atmosphere are available. Use of all four was examined for this proposed PMEC. The technologies are (1) natural draft cooling tower; (2) dry cooling tower; (3) wet forced draft (mechanical) cooling tower; and (4) wet/dry hybrid tower. The technologies are discussed below and summarized in Table 2.19-3. Based on the available water supply, and the achieved efficiencies, the wet forced draft (mechanical) cooling tower has been selected for the PMEC.

TABLE 2.19-3
COMPARISON OF ALTERNATIVE FORMS OF HEAT DISSIPATION

Option	Visual (Size)	Water Use	Power Requirement	Costs	Plume	Unit Performance Impact
Natural Draft Cooling Towers	High	High	Low	High	High	Low
Dry Cooling Tower	Med	Low	Med	High	Low	High
Wet Forced Draft Cooling Tower	Low	High	Med	Low	Med	Low
Wet/dry hybrid Tower	Med	Med	High	Med	Low	Med

Natural draft cooling towers operate as a chimney to induce air flow to enter the bottom of the tower, causing cooling of the water as the water falls through it, and with the air exiting at the top. The towers are large hyperbolic structures. The negative aspects of using a natural draft cooling tower include the high cost of such large structures, relatively high water use, and a high visible vapor plume when atmospheric conditions make the plume visible. The positive aspects are that the cooling tower has a low adverse affect on the power plant performance and low power requirements for cooling tower performance. The visual size impact and high cost make the natural draft cooling tower the least desirable technology.

Dry cooling towers were developed for use in arid areas without water supplies. The system is entirely closed. Hot water leaves the condenser and flows through banks of finned coils that dissipate heat to the atmosphere. The cooling water can only approach the temperature of the air flowing across the outside of the tubes. Dry cooling towers are expensive because of the large number of tubes required. Their benefits are that water use is very low and there are no visible plumes. Their use is normally limited to arid areas because they have a very high impact on power plant performance. The cooling water temperature exceeds 75º F whenever the air temperature approaches 75º F. As cooling water temperature increases over 75º F, condenser back pressure begins to increase. Increased back pressure is very detrimental to steam turbine performance; therefore, on the power plant's performance and efficiency of fuel use. This multiplies the impacts of extracting, refining, transporting, and consuming fuel. Therefore, dry towers are used only where there is no other choice. The dry tower technology was not selected for PMEC because of the availability of water and the impact a dry tower would have on costs and on plant performance

The wet forced draft or mechanical cooling tower uses fans to force air movement through the cooling tower. The thermodynamic benefits of a natural draft cooling tower are obtained while the negative aspects of large size and high cost are eliminated by the use of fans. The negative aspect, the power used by the fans, is offset by the fans allowing the tower to be optimized in terms of performance, cost and size. Because air and water are mixed, the tower uses approximately the same amount of water as the natural draft tower. Wet cooling systems require substantial amounts

of water, but require less fuel to operate, are more energy efficient, and are less expensive to purchase, operate and maintain. Based on the available water supply, and the achieved efficiencies, this system has been selected for the PMEC.

The wet/dry hybrid tower combines the features of the dry and wet towers. The resulting hybrid tower costs more, uses more power, is physically bigger and impacts power plant performance more than the forced draft cooling tower. However, use of a hydrid tower would require approximately 30 percent of the water supply necessary for an all-wet cooling system. The wet/dry hybrid tower technology was not selected for PMEC because of the availability of water and the impact a hybrid tower would have on costs and plant performance.

2.19.5 ALTERNATIVE TECHNOLOGIES AND FUEL

Petroleum coke is intended to be the primary feedstock for PMEC, while coal will serve as a secondary feedstock. The refining process of coking was developed to process heavy crude oil bottoms into light transportation products, such as gasoline and jet fuel. The by-product of the coking process is petroleum coke (petcoke). Refiners usually try to minimize or eliminate the production of fuel-grade petcoke, which is often thought of as a waste product. Petcoke is a preferred fuel due to its high Btu content and very low amounts of mercury.

The Port of Kalama location is well positioned to take advantage of a growing petcoke supply due to the increased processing of heavy crude in the West. Heavy crude coking expansion occurring in California, Montana, Washington, Utah, and Western Canada will triple the current supply of 14 million tons/year over the next five years. Most likely supply sources are California, Puget Sound, and Alberta, and can be transported by ship and/or rail.

Abundant coal supply exists in the PRB and in Western Canada. The primary source for coal is expected to be sub-bituminous coal from PRB mines. The targeted mines are located in the Northern PRB and southeast Montana regions to minimize transportation congestion risk. In addition, higher sulfur coals are available at a discount.

Delivered petcoke and coal must conform to certain quality specifications on a shipment, weekly or monthly basis. The minimum measures of quality defined will include but not be limited to: proximate analysis (moisture, ash, volatile matter and fixed carbon), sulfur, heat content, particle size, grindability, and ash fusion temperatures. Other parameters may also be included depending on operational concerns. Quality limits will be established to identify quality parameter maximums and minimums beyond which a shipment may be rejected by PMEC. Specific analysis procedures will comply with standards developed by the American Standards and Testing and Materials (ASTM) or International Organization for Standardization (ISO).

The PMEC generation complex showcases the latest advancements in IGCC technology. The basic IGCC technology involves the gasification of petcoke or solid coal feedstock to produce hydrogen and carbon monoxide based syngas. This syngas is then used to fuel the CTG powered electrical generating power plants. The current industry IGCC reference plant designs being used for PMEC have advanced to higher levels of optimization to lower the cost of electrical power generated. In addition, the improved designs enhance process reliability and reduce operation emissions.

The preliminary PMEC design is based on a slurry-fed system utilizing two-stage gasifiers coupled with a HRSG. Gasification is accomplished by partial combustion of the feedstock with air or high purity oxygen in the first stage creating hot synthetic gas with the mineral content forming a molten slag. The slag is continuously removed from the gasifier via a slag removal system. In the second stage, the heat content of the hot syngas from the first stage is used to vaporize and gasify additional slurry introduced in the second stage. The syngas exiting the gasifier is cooled and cleaned in preparation for being fed to a CTG. Raw syngas exiting the gasifier contains entrained solids that are removed and recycled back to the first stage of the gasifier. Recycle of these solids also enhances efficiency and consolidates the solid effluent from the process in one stream as a slag leaving the gasifier. This process can achieve minimal levels of emissions by converting coal and petcoke into a clean de-sulfurized syngas that is then supplied as fuel gas for power generation in efficient advanced combustion turbines.

Below are the key features of this technology:

- Patented slurry-oxygen mixer facilitates high carbon conversion,
- Proprietary low profile slag removal system avoids expensive, structure-elevating and maintenance-prone lock hoppers,
- Patented two-stage design improves heating value of the gas and energy efficiency,
- Unique fire-tube syngas cooler minimizes the size and cost of the heat recovery system and results in high conversion efficiencies for both thermal and chemical energy,
- Dry solid particulate removal and recycle system also improves thermal efficiency and consolidates the solid effluent from the process in one stream, namely the slag byproduct leaving the first stage gasifier,
- Elemental sulfur is recovered from the gas flow stream in a process that approaches 99.9% recovery under optimal operating conditions, and
- A redundant gasification train is included in the design to improve plant availability and capacity above 90%.

2.19.6 NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed PMEC facility would not be built. The objectives of Energy Northwest would go unrealized. Western Washington electrical utilities would lose one important resource alternative. The economic benefits associated with this capital investment, and the economic activity associated with construction and operation of the facility would be foregone.

2.20

WAC 463-60-297 Proposal—Pertinent federal, state and local requirements.

(1) Each application shall include a list of all applicable federal, state, and local statutes, ordinances, rules, permits, and required use authorizations (i.e., leases, easements, rights of way, or similar authorizations) that would apply to the project if it were not under council jurisdiction. For each federal, state, or local requirement, the applicant shall describe how the project would comply or fail to comply. If the proposed project does not comply with a specific requirement, the applicant shall discuss why such compliance should be excused.

(2) Inadvertent failure by the applicant to discover and list a pertinent requirement shall not invalidate the application, but may delay the council's processing of the application.

[04-23-003, recodified as § 463-60-297, filed 11/4/04, effective 11/11/04. Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, § 463-42-297, filed 10/11/04, effective 11/11/04.]

SECTION 2.20 PERTINENT FEDERAL, STATE AND LOCAL REQUIREMENTS (WAC 463-60-297)

2.20.1 TABLE OF APPLICABLE FEDERAL, STATE AND LOCAL PERMIT REQUIREMENTS

Table 2.20-1 lists all applicable federal, state, and local permits and related requirements that would apply to construction of the Pacific Mountain Energy Center (PMEC) if it were not under EFSEC jurisdiction. The table lists the permits or requirements, identifies the permitting agency, and cites the authorizing statute or regulation. The table also identifies the section(s) in the application relating to each permit or requirement.

TABLE 2.20-1
APPLICABLE FEDERAL, STATE AND LOCAL REQUIREMENTS

Permit or Requirement	Agency/Statute & Regulation	Application §§
Federal		
Department of Army Dredge and Fill Permit(s)	U.S. Army Corps of Engineers (USCOE) Clean Water Act, § 404; Rivers and Harbors Appropriation Act of 1899, § 10; 33 U.S.C. § 1344; 33 CFR Part 320 et seq.; 40 CFR Part 230 et seq.	§§ 3.5
Threatened or Endangered Species Assessment	NEPA lead agency (USACOE and EPA) Endangered Species Act, §7; 16 U.S.C. § 1531 et seq.; 50 CFR Pt 402	§ 3.4.2
Historic Preservation/Landmark Review	National Historic Preservation Act, § 106; 16 U.S.C. § 470 et seq.; 36 CFR §§ 60-63, 800; Historic Sites, Buildings, Objects, and Antiquities, 16 U.S.C. § 469 et seq.; 36 CFR §§ 296.1; 43 CFR §§ 7.1 et seq.	§ 4.1
Gas Pipeline Safety Approval	U.S. Department of Transportation, Office of Pipeline Safety 49 CFR part 192	
State of Washington		
State Environmental Policy Act (SEPA)	Port of Kalama would likely be the SEPA lead agency, absent EFSEC review. Ch. 43.21C RCW; Ch. 197-11 WAC	Parts 3,4,and 5
Notice of Construction Approval (NOC)	Southwest Clean Air Agency (SWCAA) Ch. 70.94 RCW; Ch. 173-400 WAC; Ch. 173-460 WAC;	§§ 2.11; 3.2; and 5.1
Prevention of Significant Deterioration (PSD) Permit	SWCAA Ch. 70.94 RCW; Ch. 173-400 WAC; 40 CFR § 52.21	§§ 2.11; 3.2 and 5.1
Air Operating Permit (Application must be filed within 1 year after facility begins operation) WAC 173-401-500(3)(c)	SWCAAA RCW 70.94; Ch. 173-401 WAC	§§ 2.11 3.2 and 5.1

TABLE 2.20-1 (Continued)
APPLICABLE FEDERAL, STATE AND LOCAL REQUIREMENTS

Permit or Requirement	Agency/Statute & Regulation	Application §§
State of Washington (Continued)		
Acid Rain Permit	SWCAAA 40 CFR Part 72; Ch. 173-401 WAC; Ch. 173-406 WAC	
Hydraulic Project Approval (HPA)	Washington Dept. of Fish & Wildlife (not anticipated to be needed due to proposed Kalama River crossing method) Ch. 75.20 RCW; Ch. 220-110 WAC	§ 2.14; 3.4
Water Quality Certification	Ecology, Shorelands and Wetlands Program Federal Clean Water Act, § 401; 33 U.S.C. § 1344; Ch. 173-225 WAC	§ 3.4 and 4.1.1
Coastal Zone Management Program Consistency Certification	Ecology, Shorelands and Wetlands Program 16 U.S.C. § 1451 et seq.; 15 CFR parts 923-930; Ch. 173-27 WAC	§ 4.1.1
Construction Stormwater General Permit, Industrial Stormwater General Permit, Industrial Waste Discharge Permit	Ecology, Water Quality Program Federal Clean Water Act, 40 CFR Parts 122, 123 & 124, Subchapter D; Chs. 80.50 & 90.48 RCW; Chs. 173-216 & 220 WAC	§ 2.10; 5.2
Natural Gas Pipeline Construction Approval	Washington Utilities and Transportation Commission Ch. 80.28 RCW	
Electrical Construction Permit	Department of Labor & Industries Ch. 296-746 WAC	
Port of Kalama		
State Environmental Policy Act (SEPA)	Port of Kalama would likely be the SEPA lead agency, absent EFSEC review. Ch. 43.21C RCW; Ch. 197-11 WAC	Parts 3,4,and 5
Water Availability	Industrial water will be provided by the Port of Kalama.	§ 2.5
Local – Cowlitz County		
Accommodation of Utilities on Right-of-Way and Utility Construction Approval (Right of Way/Easement)	Cowlitz County Engineer Chs. 16.10 and 16.30 Cowlitz County Code (CCC)	
Road Approach Construction Permit	Cowlitz County Engineer Ch. 12.15 CCC	
Encroachment Permit	Cowlitz County Engineer Chs. 16.10 and 16.30 CCC	
Building Permit (Civil, Structural, Mechanical, Plumbing)	Cowlitz County Building Official Ch. 16.05 CCC (adopting the UBC, UPC, UFC, and UMC)	§ 4.2.1
Critical Areas Permit (including Wetland Protection)	Cowlitz County Planning Department Ch. 19.15 CCC	§ 4.2.1
Comprehensive Land Use Plan and Zoning Compliance	Cowlitz County Planning Department Ch. 18.10 CCC	§ 4.2.1
Shoreline Substantial Development Permit	Cowlitz County Ch. 19.20 CCC	§ 4.2.1
Floodplain Management	Cowlitz County Chs. 16.25 and 19.15 CCC	§ 4.2.1
Local – Cowlitz County (Continued)		

TABLE 2.20-1 (Continued)
APPLICABLE FEDERAL, STATE AND LOCAL REQUIREMENTS

Permit or Requirement	Agency/Statute & Regulation	Application §§
Compliance with Noise Regulations	Cowlitz County Sheriff Department Ch. 10.25 CCC Ch. 70.107 RCW; Ch. 173-60 WAC;	§ 4.1.1
Fire Marshal Permit	Cowlitz County Fire Marshall Uniform Fire Code (UFC) §§ 4.108 and 80.103	§ 2.9
Local - City of Kalama		
Certificate of Water Availability	City of Kalama Ch. 12.28.020	§ 2.5
Accommodation of Utilities on Right-of-Way and Utility Construction Approval (Right of Way/Easement)	City of Kalama Public Works Department	

2.20.2 FEDERAL PERMITS

2.20.2.1 Army Corps of Engineers Dredge and Fill, § 404 Permit

Army Corps of Engineers
Clean Water Act, § 404; Rivers and Harbors Appropriation Act of 1899, § 10; 33 U.S.C. § 1344; 33 CFR 320 et seq.; 40 CFR Pt 230 et seq.

An Army Corps of Engineers (Corps) § 404 permit is required to locate a structure, excavate, or discharge dredge or fill material into the waters of the United States, including most wetlands. A Corps individual permit is required for proposals that are not authorized under a nationwide permit. The Corps has primary responsibility for the § 404 permit program and must evaluate whether the benefits from the project outweigh the predicted environmental impacts. The Environmental Protection Agency may, however, veto Corps issued permits. The review process for an individual permit typically takes from 6 to 12 months, depending on project complexity.
The proposed wetland fill for the railroad spur is anticipated to require an individual § 404 permit.

Compliance Plan

A JARPA application will be filed for the proposed wetland fill. The JARPA application will be accompanied by a proposed wetland mitigation plan that addresses wetland replacement for the filled area, either through wetland creation or wetland enhancement.

2.20.2.2 Threatened or Endangered Species Assessments

National Environmental Policy Act (federal) lead agency (OFE)
Endangered Species Act, § 7; 16 U.S.C. § 1531 et seq.; 50 CFR Pt 402

The Endangered Species Act (ESA) provides for the conservation of endangered and threatened species and the ecosystems upon which they depend. The ESA establishes, for federal agency actions, a "procedural obligation to consult" with the United States Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS).

The consultation process generally involves three steps. First, a federal agency proposing to take action inquires with FWS and NMFS as to whether a protected species may be present in the area

affected by the project. Second, if there is reason to believe the federal action will likely affect a protected species the agency must consult with FWS and NMFS and avoid jeopardizing the species. The agency prepares a "biological assessment" to determine whether the species (if present) or its habitat would likely be affected by the action. FWS and NMFS will review the biological assessment for completeness and determines whether the federal action would jeopardize the species or not, and will suggest alternatives to reduce or eliminate impacts of the action on the species.

Compliance Plan

A Biological Assessment will be prepared and consultation initiated with the United States Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service (NMFS).

2.20.2.3 Historic Preservation/Landmark Review

National Environmental Policy Act (federal) lead agency (OFE)
National Historic Preservation Act § 106; 16 U.S.C. § 470 et seq.; 36 CFR §§ 60-63, 800; Historic Sites, Buildings, Objects, and Antiques, 16 U.S.C. § 469 et seq.; 36 CFR § 296.1; 43 CFR § 7.1 et seq.

The National Historic Preservation Act (NHPA) authorizes the Secretary of the Interior to expand and maintain a National Register of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering and culture. Federal agencies having authority to license any undertaking must, prior to approval of funds or issuance of any license, take into account the effect of the undertaking on any district, site, building, structure or object that is included in or eligible for inclusion in the National Register.

The purpose of the Natural Landmarks program is to identify and encourage the preservation of nationally significant examples of the full range of ecological and geological features that constitute the nation's natural heritage. Federal agencies are responsible for considering the existence and location of natural landmarks when assessing the effects of their actions on the environment pursuant to NEPA.

Compliance Plan

A survey for potential historic sites has been prepared. (See Section 4.2.5) The proposed PMEC would be located in an area that has undergone considerable modern disturbances, including the placement of dredge spoils and grading. The presence of dredge spoils to depths of 10 to 15 feet precludes efforts for shovel testing of native soils where *in situ* archaeological deposits would be most likely to occur. No previously recorded sites are located in this area. Modern development has likely impacted any potentially significant resources within the PMEC site. However, it is possible that deeply buried archaeological deposits may still be present underneath the fill material. If proposed construction of the PMEC would not exceed the depth of the fill, then no further investigations are recommended. Should development components include substantial disturbance to native soils, additional efforts are recommended given the archaeological sensitivity of the Columbia River, and the historic record, which demonstrates considerable use of the area near the Kalama River confluence with the Columbia River. Such efforts may include mechanical trench

excavation prior to construction, archaeological monitoring during construction, and/or implementation of an Unanticipated Discovery Plan during construction.

2.20.2.4 Gas Pipeline Safety Approval

U.S. Department of Transportation, Office of Pipeline Safety
49 CFR Part 192

Natural gas pipelines must be inspected for their compliance with the minimum federal standards. The minimum standards prescribe minimum safety requirements for design, materials and construction of natural gas pipelines, and their operation and maintenance.

Compliance Plan

The PMEC natural gas pipeline location, design and construction plans will be developed so that the project complies with the minimum standards. The Washington Utilities and Transportation Commission also has jurisdiction over the PMEC natural gas pipeline and will be the lead agency for this approval, with USDOT oversight.

2.20.3 STATE PERMITS

2.20.3.1 State Environmental Policy Act (SEPA)

Port of Kalama
Ch. 43.21C RCW; Ch. 197-11 WAC

Compliance with the State Environmental Policy Act (SEPA) is required before any state or local permits or approvals can be issued for the construction or operation of the facility. The Port of Kalama would be the likely SEPA lead agency absent EFSEC review. The SEPA process would be generally the same, regardless of lead agency.

Compliance Plan

It is anticipated that EFSEC will make a threshold determination regarding the appropriate level of SEPA review requiring the preparation of a limited scope SEPA Environmental Impact Statement.

2.20.3.2 Notice of Construction Approval

Southwest Clean Air Agency (SWCAA)
Ch. 70.94 RCW; Chs. 173-400; 173-460 WAC

A Notice of Construction (NOC) Order of Approval is combined with the PSD permit and will be issued by EFSEC (see below). The key requirements for NOC approval are: employing Best Available Control Technology (BACT); demonstrating that the source will not cause or contribute to a violation of any ambient air quality standard; compliance with the prevention of significant deterioration (PSD) program; and compliance with the requirements for new sources of toxic air pollutants.

Compliance Plan

PMEC has coordinated with the SWCAA and Department of Ecology (Ecology) as appropriate to ensure compliance with local, state and federal air pollution standards and regulations. Because the PMEC is subject to the more stringent requirements of the PSD permit process (see below), compliance with the PSD requirements will fulfill the substantive NOC approval requirements.

2.20.3.3 Prevention of Significant Deterioration (PSD) Permit

Washington Department of Ecology
Ch. 70.94 RCW; Ch. 173-400 WAC; 40 CFR § 52.21

The PMEC is subject to PSD review. PSD is a federal program that has been delegated to EFSEC by the federal Environmental Protection Agency (EPA). EFSEC will be responsible for reviewing and approving the PMEC's PSD permit application.

A PSD permit application requires extensive identification of potential air quality impacts, including the following: emission estimates; employment of BACT; analysis of present air quality at the source location; dispersion modeling to determine impacts on ambient air quality; PSD increments analysis; demonstration that visibility in Class I areas will not be impaired; and an analysis of impacts on air quality related values, such as impacts to soils and vegetation.

Compliance Plan

BACT analyses and dispersion and visibility modeling have been completed and submitted to EFSEC in this application. Energy Northwest has submitted a PSD permit application as part of this application to EFSEC and is coordinating with the designated Ecology official to ensure compliance with local, state and federal air pollution standards and regulations. The PSD permit approval is part of the EFSEC review and site certification approval.

2.20.3.4 Air Operating Permit

Southwest Clean Air Agency
Ch. 70.94 RCW; Ch. 173-401 WAC

As a new major source, Energy Northwest is required to file a complete air operating permit application within 12 months after beginning PMEC operation. The operating permit program will not affect the PMEC preconstruction permitting process.

Compliance Plan

Air operating permits are designed to compile in one document all existing emission limits and other applicable requirements for an emissions source. Because Energy Northwest must apply for an operating permit soon after commencing operation, all such requirements are expected to be contained in one document: the Notice of Construction Order of Approval and PSD permit. Energy Northwest plans to apply for its Air Operating Permit shortly after EFSEC approval of the PSD Permit.

2.20.3.5 Acid Rain Permit

Southwest Clean Air Agency
40 CFR Part 72; Ch. 173-401 WAC; Ch. 173-406 WAC

The PMEC will be subject to Phase II of the Clean Air Act Amendments, including the Title IV acid rain program that went into effect January 1, 2000. Energy Northwest will be required to submit a complete acid rain permit application to EFSEC two years before the first unit commences operation. The application of the acid rain program to the PMEC will not affect the preconstruction permitting process.

Compliance Plan

The PMEC will be subject to the acid rain program because it falls within the definition of a new utility unit. This program is administered as part of the Prevention of Significant Deterioration (PSD) permit. The project is anticipated to begin operation in early 2012. A complete acid rain permit application will be submitted to EFSEC by early 2010 (two years prior to the start of operation).

2.20.3.6 Hydraulic Project Approval

Washington Department of Fish & Wildlife
Ch. 75.20 RCW; Ch. 220-110 WAC

A Hydraulic Project Approval (HPA) is required for any construction that disturbs the natural flow or bed of a stream or river. An HPA application must include general project plans, a vicinity map, complete plans and specifications for work within the ordinary high water line, as well as plans and specifications for protecting fish life.

Compliance Plan

Natural Gas Pipeline. The natural gas pipeline will be directional drilled under the Kalama River, or hung on the underside of the existing vehicular bridge, avoiding work within the streambed and the need for an HPA.

On-Site Activities. The applicable NPDES stormwater general permits for construction and operation of the PMEC will require best management practices (BMPs) to control erosion and sediment runoff and contamination of stormwater. On-site work is not within the ordinary high water line (OHWL) of a regulated stream and Energy Northwest would not disturb the natural flow of any fish bearing streams. Therefore, an HPA is not required for the construction of the PMEC.

2.20.3.7 Water Quality Certification

Washington Department of Ecology
Federal Clean Water Act, § 401; 33 U.S.C. § 1344; Ch. 173-225 WAC

A Section 401 Water Quality Certification will be required in connection with federal permits needed for PMEC construction activities. For project's subject to EFSEC review, EFSEC issues the

certification to inform the relevant federal agency (e.g., the Army Corps of Engineers in the case of a Section 404 dredge and fill permit) that the proposed activities will comply with applicable water quality standards of the state. Authorizations from the Corps for an individual 404 permit and some nationwide permits require an individual 401 Certification from Ecology. Generally, the form used to apply for the Section 404 permit (JARPA) is also an application for EFSEC's 401 Certification.

Compliance Plan

EFSEC anticipates contracting with Ecology to prepare a recommendation on 401 Certification. Energy Northwest will construct the PMEC to prevent or minimize violations of water quality standards and discharge limitations. Energy Northwest will design and construct the PMEC to ensure compliance with applicable state requirements regarding water quality standards and wetlands mitigation. Specifically, the wetlands mitigation plan prepared for Corps approval will also be designed to meet Ecology standards for 401 Certification. Energy Northwest expects that the Site Certification from EFSEC will include 401 Certification for the Corps authorization for wetland fills.

2.20.3.8 Coastal Zone Management Program Consistency Certification

Washington Department of Ecology
16 U.S.C. § 1451 et seq.; 15 CFR parts 923-930; Ch. 173-27 WAC

A Coastal Zone Management Act Consistency Certification is required for Corps authorizations or other federal licenses or approvals for projects in coastal counties, including Cowlitz County. Ecology reviews proposed projects for consistency with state environmental requirements, including shoreline permits. If the PMEC is consistent with those requirements, EFSEC issues the certification.

Compliance Plan

The PMEC will be designed to be consistent with applicable shoreline regulations and policies, as well as other state environmental requirements. See discussion of Federal (Corps) permits and compliance with shoreline regulations.

2.20.3.9 Construction Stormwater General Permit

Washington Department of Ecology
Federal Clean Water Act; 40 CFR Parts 122, 123 & 124, Subchapter D; Chs. 80.50 & 90.48 RCW; Chs. 173-216 & 220 WAC

Coverage under the 2005 Construction Stormwater General Permit will be required for stormwater discharges resulting from construction of the PMEC. Construction activities that disturb more than five acres of land and certain industrial activities must file a notice of intent with Ecology and comply with the conditions of the general permits. Permit conditions include the preparation of stormwater pollution prevention plans to implement best management practices (BMPs) to prevent or control stormwater pollution.

Compliance Plan

At least thirty (30) days prior to beginning construction, Energy Northwest will develop and submit to EFSEC a notice of intent to be covered by Ecology's 2005 Construction Stormwater General Permit for discharges associated with construction. Pursuant to the general permit, Energy Northwest will prepare Stormwater Pollution Prevention Plans that identify appropriate BMPs to reduce the pollution loadings resulting from construction activities and industrial operations. These BMPs will be incorporated into project design, and Energy Northwest will ensure that they are observed during construction of the PMEC facility.

2.20.3.10 Industrial Stormwater General Permit

Washington Department of Ecology
Federal Clean Water Act; 40 CFR Parts 122, 123 & 124, Subchapter D; Chs. 80.50 & 90.48 RCW; Chs. 173-216 & 220 WAC

Coverage under the State of Washington Industrial Stormwater General Permit will be required for stormwater discharges resulting from operation of the PMEC.

Compliance Plan

Coverage for stormwater discharges will be sought under the State of Washington Industrial Stormwater General Permit. Energy Northwest will file an application with EFSEC for coverage under the general permit. The application will include submitting a Notice-of-Intent (NOI) form to be covered under this permit, and preparing the required public notices of such intent. Permit conditions include the preparation of stormwater pollution prevention plans to implement best management practices (BMPs) to prevent or control stormwater pollution. The application will be filed approximately 90 days prior to the start of operation.

2.20.3.11 Industrial Waste Discharge Permit

Washington Department of Ecology
Ch. 90.48 RCW; Ch. 173-216 WAC

An industrial waste discharge permit from Ecology would be required to discharge wastewater from the PMEC into the Columbia River. The permit application requires information on water supply volumes, water utilization, wastewater flow, characteristics and disposal methods, planned improvements, stormwater treatment, plant operation, materials and chemicals used, production, and other relevant information.

Compliance Plan

As part of this application for an Agreement for Site Certification, Energy Northwest has applied to EFSEC for a NPDES permit for discharge of industrial wastewater.

2.20.3.12 Natural Gas Pipeline Construction Approval

Washington Utilities and Transportation Commission

Ch. 80.28 RCW; Ch. 480-93 WAC

The Washington Utilities and Transportation Commission (WUTC) regulates the construction, maintenance and operation of intrastate natural gas pipelines, under certification from the U.S. Department of Transportation Office of Pipeline Safety (OPS). The gas pipeline must meet WUTC and OPS design standards and construction specifications, as well as requirements for operations, maintenance and emergency procedures, and safety audit reporting.

Compliance Plan

Energy Northwest will design and construct the natural gas pipeline in a manner that complies with WUTC and OPS regulations, and will obtain WUTC approval of its gas pipeline design drawings, construction specifications, and operations, maintenance and emergency procedures manual. Energy Northwest will also comply with WUTC's annual pipeline test report filing requirements in coordination with EFSEC.

2.20.3.13 Electrical Construction Permit

Department of Labor and Industries
Ch. 296-46 WAC

The Department of Labor and Industries (DLI) is responsible for inspection of electric wires and equipment within the PMEC. DLI requires that electric wires and equipment comply with National Energy Code standards.

Compliance Plan

Energy Northwest will design and construct the PMEC in compliance with the applicable electrical regulations and standards to ensure that the PMEC complies with DLI inspection requirements. Energy Northwest will coordinate with EFSEC to ensure all necessary DLI inspections and approvals are obtained.

2.20.4 PORT OF KALAMA

2.20.4.1 State Environmental Policy Act

Port of Kalama
Ch. 43.21C RCW; Ch. 197-11 WAC

Compliance with the State Environmental Policy Act (SEPA) is required before any state or local permits or approvals can be issued for the construction or operation of the facility. The Port of Kalama would be the likely SEPA lead agency absent EFSEC review. The SEPA process would be generally the same, regardless of lead agency.

Compliance Plan

It is anticipated that EFSEC will make a threshold determination regarding the appropriate level of SEPA review requiring the preparation of a limited scope SEPA Environmental Impact Statement.

2.20.4.2 Water Availability

No new water rights or authorizations are being requested by Energy Northwest. Process water will be acquired from the Port of Kalama and potable water will be supplied by the City of Kalama.

Compliance Plan

Process water will be supplied from the Port of Kalama from off-site municipal and industrial sources for which valid water rights are held (see page 30 of the lease between the Port of Kalama and Energy Northwest). The Port of Kalama has been awarded water rights by the Washington State Department of Ecology; the two separate groundwater permits allow the Port a water usage of 3,472 gpm. This will be achieved by drilling several Ranney wells to an estimated depth of 200 feet. The Port has also applied to the Department of Ecology for a permit for another 10,417 gpm. It is anticipated that this additional water right will be granted to the Port, allowing the Port to supply PMEC with enough water to operate during all ambient conditions.

2.20.5 LOCAL PERMITS

2.20.5.1 Accommodation of Utilities on Right of Way and Utility Construction Approval

Cowlitz County Engineer
Ch. 16.30 Cowlitz County Code (CCC)

A permit will be required from the Cowlitz County Engineer (County Engineer) for the occupancy of road right-of-way. Under the permit requirements, the PMEC underground natural gas pipeline must comply with all state and federal construction and materials requirements.

Compliance Plan

Energy Northwest will submit plans to the County Engineer that conform to all applicable right-of-way construction requirements and will obtain from the County the necessary permits or entitlements from the County to enable the natural gas pipeline to cross and locate within county right-of-way.

2.20.5.2 Road Approach Construction Permit

Cowlitz County Engineer
Ch. 12.15 CCC

Construction of an approach to county roads requires the issuance of a permit from the County Engineer. Energy Northwest will be required to construct the natural gas line approach to a county road in a manner that will cause the least interference with the county road.

Compliance Plan

Energy Northwest will comply with County standards and will obtain from the County Engineer the necessary permit to construct the natural gas pipeline near county roads.

2.20.5.3 Encroachment Permit

Cowlitz County Engineer and Public Works Department
Ch. 16.30 CCC

Energy Northwest is required to obtain an encroachment permit to work within county right-of-way related to the construction of the gas pipeline. The encroachment permit allows the temporary occupation of county right-of-way for constructions of the pipeline.

Compliance Plan

Energy Northwest will obtain from the County Engineer the necessary approval to work within county right-of-way for the construction of the natural gas pipeline.

2.20.5.4 Cowlitz County Building Permit

Cowlitz County Building Official
Ch. 16.05 CCC

A building permit would be required to allow construction of permanent buildings, and for above-ground structures associated with the natural gas pipeline, including a regulator building and odorant tank foundation and enclosure. The building permit application typically requires detailed final plans for structures, including size and shape of lot and buildings, setbacks, floor layout, electrical plan, plumbing plan, HVAC plan etc. A permit is issued upon approval of the submitted plans.

The natural gas pipeline is a customer distribution line, and not a transmission line for a regulated utility. It is allowed as an accessory use to a permitted use (Cowlitz County Code Section 18.10), as long as all fire and safety specifications are met. It would not require special use approval.

Compliance Plan

Energy Northwest will coordinate with EFSEC and Cowlitz County to ensure PMEC is in compliance with the necessary building permit requirements from the county and adopted UBC standards.

Floodplain Management

Cowlitz County Department of Public Works
Chs. 16.2512 and 19.15 CCC

A development permit is required before any construction may occur in an area designated as a county flood hazard area. The PMEC site is located at an approximate elevation of 22 feet above sea level. The Port of Kalama has sent an letter to the Federal Emergency Management Agency (FEMA) requesting that existing floodplain maps be updated to reflect that the site is no longer within the flood area due to the deposition of fill material.

Compliance Plan

Energy Northwest will coordinate with EFSEC, the Port of Kalama and Cowlitz County to ensure that the PMEC is in compliance with applicable flood damage prevention requirements.

2.20.5.5 Critical Areas Permit (including Wetland Protection)

Cowlitz County Planning Department
Ch. 19.15 CCC

Authorization and review under the Critical Areas Ordinance is conducted as part of the underlying permit approval (CCC 19.15). Any project that alters a critical area but does not require any other County approval must still comply with the critical area requirements. Upon submittal of any project application, the County determines whether a project is located within a critical area. Where the County determines that a project may impact a regulated critical area, the County requires an assessment, including how the impacts may be minimized.

Compliance Plan

Approximately 3.2 acres of Classification 2 wetlands would be filled for the railroad spur and loop line. The wetlands have been delineated in accordance with the procedures as specified in the Washington State Wetlands Identification and Delineation Manual. The Cowlitz County Code requires a minimum ratio of replaced wetland to lost wetland of 1:1. The wetland mitigation measures will comply with the Cowlitz County Code.

The proposed natural gas pipeline, at the crossing of the Kalama River, will be located in areas designated as critical areas, but its impacts on critical areas will be minimized under strict safety standards imposed by other laws and regulations. The pipeline safety regulations administered by the Washington Utilities and Transportation Commission and the U.S. Department of Transportation establish standards for natural gas pipeline construction that account for engineering and construction of pipelines in seismic hazard areas. The pipeline will be located underground, avoiding changes in surface elevation within the floodplain. The project is designed to prevent unreasonable adverse effects on the environment by locating it within an existing right-of-way and drilling under streams.
Energy Northwest will apply to Cowlitz County for approval of the pipeline placement under the Critical Areas Ordinance.

2.20.5.6 Compliance with Cowlitz County Comprehensive Land Use Plan and Zoning

Cowlitz Planning Department
Cowlitz County Comprehensive Land Use Plan and Zoning Code, Ch. 18.10 CCC

The PMEC is an industrial use contemplated in the Cowlitz County Comprehensive Plan. The site is located within the Port of Kalama Industrial Park. Land uses within and adjacent to the development site are unzoned but designated heavy industrial in the Cowlitz County Comprehensive Plan.

Compliance Plan

Cowlitz County will be asked to provided EFSEC with a letter regarding its land use consistency determination indicating that the project meets local land use development standards.

2.20.5.7 Shoreline Substantial Development Permit

Cowlitz County Shoreline Management Master Program
Ch. 19.20 CCC; Ch. 90.58 RCW; Ch. 173-14 WAC

Facilities located in shoreline areas will need to be consistent with the Shoreline Management Act (SMA) and the applicable shoreline management master programs. A shoreline substantial development permit would be required for any substantial development located within 200 feet of a shoreline area. The PMEC site is located within 200 feet of the Columbia River. The proposed natural gas pipeline will be bored under the Kalama River or hung on the underside of the existing vehicular bridge.

Compliance Plan

The PMEC will be designed and constructed to ensure that it is consistent with the Shoreline Management Act. As part of this Application for Site Certification, Energy Northwest is requesting EFSEC approval of a Shoreline Substantial Development Permit, and will coordinate with EFSEC and Cowlitz County to insure that the requirements of the SMA are met.

2.20.5.8 Noise Regulations

Cowlitz County Sheriff Department
Ch. 10.25 CCC; Ch. 70.107 RCW; Ch. 173-60 WAC

Although no permit is required, the Cowlitz County Sheriff Department is responsible for noise control and abatement. State standards have been established for maximum environmental noise levels. Permissible noise levels established by state regulation vary depending on the source of the noise (which in this case is "industrial") and the nature of the receiving environment (in this case, largely industrial with some residential). Noise performance standards established by state regulation must be met during the construction and operation of the PMEC.

Compliance Plan

The PMEC will be designed to ensure that all noise generated will be below the applicable standards with noise mitigation measures. Modeling indicates that the PMEC will meet all applicable noise regulations. See Section 4.1.1 Noise of this Application.

2.20.5.9 Fire Marshal Permit

Cowlitz County Fire Marshal
Uniform Fire Code §§ 4.108 and 80.103

A Fire Marshal Permit would be required for the fuel oil storage tank associated with the emergency diesel generator. The purpose of the permit is to ensure compliance with applicable fire code standards for construction and operation of the tanks.

Compliance Plan

Energy Northwest will coordinate with Cowlitz County Fire Marshall to ensure that the PMEC complies with these requirements, including all necessary inspections. The above-ground fuel storage for the emergency diesel generator complies with EPA and federal standards for fuel storage.

2.20.6 CITY OF KALAMA

2.20.6.1 Certificate of Water Availability

City of Kalama Public Works Department
City of Kalama Municipal Code Ch. 12.28.020

Industrial water will be obtained from the Port of Kalama. The potable water supply to the PMEC will be provided by the City of Kalama. Any person owning property outside the city limits and desiring to have their property connected to the city's water supply system or sewer system shall make application at the office of the city clerk-treasurer on the appropriate form. Every such application shall be made by the owner of the property to be connected and supplied the service or by his/her authorized agent. The applicant must state fully the purposes for which the water and/or sewer service is required. Applicants must agree to conform to the city's rules and regulations concerning water and sewer service set forth in this title, as the same now exists or may be amended in the future. If the city receives such a water service application and subsequently issues a water availability certificate, such certificate shall expire within one year of the date of issuance, if the applicant does not pay the required fees and request an actual hookup or connection to the subject property within that time period. (Ord. 1160 § 2 (part), 2005).

Compliance Plan

Energy Northwest has discussed its potable water needs with the City of Kalama and will apply for a certificate of water availability from the City of Kalama in 2007 prior to the completion of the Site Certification Agreement. A copy will be provided to EFSEC.

2.20.6.2 Accommodation of Utilities on Right-of-Way and Utility Construction Approval

City of Kalama Public Works Department

A portion of the natural gas pipeline will cross through property within the City of Kalama.

Compliance Plan

Energy Northwest will submit plans to the Kalama Public Works Department that conform to all applicable right-of-way construction requirements and will obtain from the City the necessary

permits or entitlements from the City to enable the natural gas pipeline to cross and locate within city right-of-way.

Any person owning property outside the city limits and desiring to have their property connected to the city's water supply system or sewer system shall make application at the office of the city clerk-treasurer on the appropriate form. Every such application shall be made by the owner of the property to be connected and supplied the service or by his/her authorized agent. The applicant must state fully the purposes for which the water and/or sewer service is required. Applicants must agree to conform to the city's rules and regulations concerning water and sewer service set forth in this title, as the same now exists or may be amended in the future. If the city receives such a water service application and subsequently issues a water availability certificate, such certificate shall expire within one year of the date of issuance, if the applicant does not pay the required fees and request an actual hookup or connection to the subject property within that time period. (Ord. 1160 § 2 (part), 2005).