

Chapter 1 Summary

1.1 Introduction

In September 2006, the Washington Energy Facility Site Evaluation Council (EFSEC) received an application from Energy Northwest to construct and operate the Pacific Mountain Energy Center (PMEC), an Integrated Gasification Combined Cycle (IGCC) facility in the Port of Kalama, Cowlitz County, Washington. As part of its review of the application, EFSEC has prepared this draft environmental impact statement (DEIS) to evaluate the potential impacts associated with construction and operation of the proposed facility.

1.2 What is being proposed?

Energy Northwest is proposing to build and operate a 680-megawatt IGCC facility on an approximately 95-acre site in the Port of Kalama's north industrial area. The site is currently an open area that was used for the deposition of dredge tailings from the Columbia River. The PMEC site would include a modern, enclosed fuel handling and storage terminal with access to both a deep water port and multiple rail systems, as well as a natural gas pipeline, for fuel transportation flexibility.

What is the Energy Facility Site Evaluation Council?

The EFSEC is a Washington State agency comprised of a Chair appointed by the Governor, and representatives from five state agencies (Ecology, Fish and Wildlife, Natural Resources, Community, Trade and Economic Development, and the Utilities and Transportation Commission). EFSEC provides a "one-stop" siting process for major energy facilities in the State of Washington. EFSEC coordinates all of the evaluation and licensing steps for siting major energy facilities in Washington. If a project is approved, EFSEC specifies the conditions of construction and operation; issues

Who is Energy Northwest?

Organized in 1957, Energy Northwest is a municipal corporation and joint operating agency of the State of Washington. The Board of Directors consists of twenty members representing 17 public utility districts and three cities (Richland, Seattle, and Tacoma).

Energy Northwest is requesting approval for the construction and operation of:

- IGCC development (including a new 230 kV switchyard)
- An approximately 5-mile, 16-inch diameter, natural gas pipeline¹
- A railroad spur from the Burlington Northern Mainline

There are three separate actions related to the PMEC that are occurring outside of EFSEC's jurisdiction, through other permitting processes:

1. Electrical transmission line: An approximately 12-mile transmission line would be constructed and owned by either Bonneville Power Administration (BPA) or Cowlitz County Public Utility District (PUD) from the site north to transmit the power to the BPA electrical grid. The line would be located within existing BPA and/or PUD right-of-way (ROW) and has not been designed yet. To the extent the potential impacts are known, the analysis of the impacts have been included in this DEIS. When designed, the transmission line would go through an additional State Environmental Policy Act (SEPA) and/or National Environmental Policy Act (NEPA) review, separate from the EFSEC process.
2. Expansion of the existing 600-foot-long dock: The Port of Kalama has obtained a permit to extend the existing 600-foot-long dock near the site to add approximately 1,000 feet of dock to the north. Because this dock has already been permitted and has already gone through a SEPA review, the environmental impacts of the dock expansion are not included in this DEIS.
3. Replacement of outfall: The Port of Kalama currently discharges domestic wastewater from the Port of Kalama

¹ At the time of preparation of this DEIS, the pipeline is proposed to be owned and operated by Energy Northwest.

wastewater treatment plant and industrial wastewater from Steelscape, Inc., a Port tenant. The existing outfall is located at the North Port pier, extends 250 feet from shore and includes a diffuser. The Port would replace the existing wastewater outfall to accommodate the flow from the PMEC, in addition to the other Port tenants. This replacement would include the installation of a new 16-inch discharge line to convey wastewater to a discharge point and diffuser to be located on the dock expansion described above. The new discharge line and diffuser would be constructed in a manner similar to the existing Port discharge line, and would be structurally supported by the dock. The potential construction and operation impacts of the new outfall are discussed in Section 3.3 of the DEIS.

4. A 2.1-acre wetland fill: The Port of Kalama has applied for a permit from the US Army Corps of Engineers (USACE), the Washington State Department of Ecology (Ecology) and Cowlitz County to fill approximately 2.1 acres of wetlands located along the north edge of the PMEC site. This wetland fill is undergoing a separate environmental analysis. The cumulative impacts of this wetland fill with the wetland fill proposed by Energy Northwest have been considered in this DEIS.

1.2.1 How does Integrated Gasification Combined Cycle work?

The PMEC IGCC design is based on a wet slurry gasification process. In this process, low-cost solid fuel (also called feedstock) such as petroleum coke and coal are crushed and mixed with water to form slurry. The slurry is combined with oxygen that has been separated from the air and is injected into the gasifiers. The slurry chemically reacts readily with the oxygen in the gasifiers to form a synthesis gas (syngas), composed mostly of hydrogen and carbon monoxide.

The high temperature of the gasifiers ensures the complete conversion of all incoming solid fuel and also traps materials like ash and metals in a glassy material resembling coarse sand. The sand-like material, referred to as slag, is inert and has a

Does Energy Northwest own and operate other energy projects in Washington?

Yes, Energy Northwest owns and operates the 1157 MW Columbia Generating Station Nuclear Plant, the 27 MW Packwood Lake Hydroelectric Project, the 64 MW Nine Canyon Wind project, and the 38.7 KW White Bluffs Solar Station.

variety of uses in the construction industry. The slag is continuously removed from the gasifiers. The syngas exiting the gasifiers is cooled and cleaned in preparation as fuel to gas turbines.

Raw syngas that comes out of the gasifiers includes solid particulates that are removed and recycled back to the gasifiers. Recycling of these solids improves the efficiency of the equipment and consolidates the solid waste from the process into one stream as a slag leaving the gasifiers. The sulfur in the syngas is recovered and converted into elemental sulfur for sale into agricultural and other markets.

Overall, this process can achieve minimal levels of emissions by converting petroleum coke and coal into a clean de-sulfurized syngas that is then supplied as fuel gas for power generation in efficient advanced combined cycle combustion turbines.

A redundant gasification train is included in the design to improve plant availability and capacity above 90%. At a 92% capacity factor, the P MEC would generate approximately 5.5 million megawatt hours (MWh) of electricity annually and approximately 164 million MWh of electricity over a 30-year operational life. To achieve this generation, P MEC would consume approximately 1.8 million tons of petroleum coke per year if operating solely on the use of petroleum coke, or approximately 2.5 million tons of coal per year based on 100% use of coal. Petroleum coke is a solid waste product and is produced in the oil refining process. The use of natural gas as a fuel source is expected to be during times of syngas unavailability or when natural gas is the most economic fuel.

1.3 What comments were received during the SEPA scoping process?

The scoping phase of the EIS process was completed on November 20, 2006. Based on the comments received and information compiled during the scoping phase, EFSEC determined that this scope of this EIS consists of the elements listed below, along with required content such as a description

Will Energy Northwest own and operate the Pacific Mountain Energy Center?

The P MEC ownership structure has two major portions. Energy Northwest will aggregate the Municipal Utilities' interests and will own 50% of the gasification complex and one of two 340 MW combined cycle combustion turbine power plants. The other 50% of the gasification complex and 340 MW combined cycle combustion turbine power plant will be owned by the Pacific Mountain Energy Group, LLC, a Washington State Limited Liability Corporation. Pacific Mountain Energy Group LLC ownership will consist primarily of investor owned utilities, with the potential for participation by electric cooperative utilities.

of the proposed action and alternatives; a discussion of the affected environment; an evaluation of the potential direct, indirect, and cumulative impacts; and an identification of suitable mitigation measures associated with the construction and operation of all components (and connected actions) of the proposed facility, including the generating plant, natural gas supply pipeline, and railroad spur.

In evaluating potential impacts from construction and operation of these components, the following elements of the natural and built environment are addressed in this EIS:

- Earth
- Air Quality
- Water
- Habitat and Wildlife
- Environmental Health, including Noise, Hazardous Materials and Electric and Magnetic Fields (EMF)
- Wetlands and Vegetation
- Land Use, Recreation, and Visual Resources
- Socioeconomics and Housing
- Cultural Resources
- Traffic and Transportation
- Public Services and Utilities

1.3.1 Are there any significant areas of controversy and uncertainty?

Based on the scoping comments, the key area of controversy and uncertainty is the mitigation for greenhouse gas emissions.

The principal greenhouse gases are CO₂, nitrous oxide (N₂O), methane (CH₄), perfluorocarbons (PFCs), chlorofluorocarbons (CFCs), and sulfur hexafluoride (SF₆). Energy Northwest anticipates that CO₂-equivalent emissions will range from 4.8 to 6 million tonnes per year. Washington's Department of

What is a "tonne" and how does it relate to a "ton"?

Greenhouse gas emissions are commonly expressed in metric tons, or "tonnes." A tonne is 1000 kilograms, or 2205 pounds (1.1 tons).

Community, Trade & Economic Development has estimated that the state's greenhouse gas emissions totaled 88.3 million tonnes in 2004. Approximately half of those emissions are attributed to the transportation sector, and 14 percent of those emissions are attributed to electric power generation. Unless other generating units are displaced when PMEC commences operation, annual state greenhouse gas emissions would increase by approximately seven percent. A discussion of potential mitigation measures is summarized in Exhibit 1-2.

1.4 Why is the PMEC needed?

The Northwest region is experiencing above-average load growth, increasing wholesale power price volatility and a lack of base load generation. Thus, it is important to build new and diverse sources of generation in order to meet our growing power supply demands. Pacific Northwest publicly and privately owned utilities need reliable resources to meet their retail electric loads and have expressed strong interest in PMEC to meet those needs.

Energy Northwest is proposing to provide low-cost and reliable base load electrical power for the Pacific Northwest. The Fifth Northwest Electric Power and Conservation Plan ("Fifth Power Plan") issued in May 2005 by the Northwest Power and Conservation Council states that "the region's individual utilities are currently in deficit and the role of the Independent Power Producers in the region's electricity future is unclear." In the plan, electricity demand in the Northwest was projected to grow at an average annual rate of nearly 1 percent per year, resulting in an over 5,000 megawatt (MW) deficit by 2025 using the medium forecast. By the time the Northwest Power and Conservation Council issued the Draft Fifth Power Plan, it was clear that the demand for new power resources exists in the Pacific Northwest and that IGCC was chosen as a viable resource technology in the plan, concluding that "the region should secure sites and permits to be prepared to begin construction of new coal generating resources as early as 2010."

The Washington State Department of Community, Trade, and Economic Development reports to the Washington Legislature on electric power demands in Washington (CTED 2005). In their report, they state “the region should begin an aggressive program to capture the large amount of cost-effective conservation that is available and to lay the groundwork for building a large amount of wind generation (and relatively small amount of coal-fired generation) that would be needed later.”

According to the Northwest Power Pool, Northwest control area loads in 2005 surpassed the previous record set in 2000. This shows that load growth has more than completely offset the load loss from the 2000-2001 energy crisis and regional loads since 2002 have grown at nearly 3% annually. Similarly, 2006 has been showing record monthly usage and continued demand growth in the region.

In the BPA July 2006 regional dialogue proposal, BPA estimates that in 2012 it may be deficit by up to 800 MW under a high load growth (2.5%) scenario for their preference customers alone. BPA recently issued the 2006 Pacific Northwest Loads and Resources Study (2006 White Book) which expresses a strong sense of urgency to create new energy sources (www.bpa.gov/power/whitebook2006)

Common estimates for the annual load growth in the coming decade range from 1 to 2 %. Energy Northwest anticipates load growth that mirrors economic development, likely in the 1.5% per year range. Over six years that equates to more than 9%, or 1800 MW growth over present load base. Regional load growth over the last few years has well exceeded the 1.5% rate.

Meeting future electricity demand requires carefully planning today. Waiting for demand to materialize, before beginning work on new generation sources, would eventually leave the state short of reliable, affordable power and at the economic mercy of the volatile open power market. This could lead to a similar set of conditions that prompted the Western energy crisis of 2000-2001.

1.5 What environmental impacts are anticipated?

The P MEC has been planned and designed to eliminate or mitigate all environmental impacts. Chapter 3 of this DEIS provides a full discussion of the impacts and mitigation measures that have been identified. The following exhibits summarize the elements of the environmental in terms of project design and operation.

Exhibit 1-1

Earth Impacts and Mitigation Measures Summary

Construction Impacts

P MEC would have minor and insignificant impacts on earth. This includes excavation, grading, trenching, backfill, and compaction associated with site development and the gas pipeline.

Soils at the site or along the gas pipeline are generally not susceptible to wind erosion but have a low erodibility potential for water-caused erosion.

Operation Impacts

The impacts from a distant great earthquake on the Cascadia Subduction Zone or local moderate to large earthquake are potentially significant to the proposed plant facilities.

Proposed Mitigation Measures

The P MEC design includes the use of BMPs and other mitigation measures to control erosion.

The placement of fill consisting of moisture-sensitive soils would be limited to the drier months.

A qualified geologist or engineer would monitor the fill placement during construction and conduct appropriate field tests to verify proper compaction of the fill soils.

Erosion control measures included in the Stormwater Pollution Prevention Plan would be implemented.

Clearing, excavation and grading would be limited to the areas necessary for construction of P MEC and would not be done far in advance of facility construction.

Ground surface restoration would be completed within fourteen days of the area's final disturbance/Interim surface protection measures, such as erosion control matting or plastic sheeting, may also be required prior to final restoration.

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 duration storm.

Proposed Mitigation Measures

These impacts can be mitigated through standard seismic design and construction measures. Visual inspection would be conducted following abnormal seismic activity to look for signs of mass movement.

Exhibit 1-1

Earth Impacts and Mitigation Measures Summary

Operation Impacts

The site is above the 100-year floodplain.

There is a low probability of either direct or indirect impacts from a volcanic eruption.

BMP – best management practice

Proposed Mitigation Measures

A more extensive site-specific geotechnical investigation 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 the gas pipeline. 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.

In areas where saturated liquefiable soils are present, some form of in-place densification may be used to improve the liquefiable soils.

Where depth to non-liquefiable soils is not too great, over-excavation and replacement of non-liquefiable soils may be used. Alternatively, pile foundation support may be used to transfer loads to competent soils below the liquefiable layers or stone column foundations can be used to mitigate liquefaction effects.

No mitigation measures for flooding are proposed.

No mitigation measures are proposed for volcanic activity.

Exhibit 1-2

Air Quality Impacts and Mitigation Measures Summary

Construction Impacts

Dust: Construction activities would produce fugitive dust due to wind erosion and the operation of construction equipment on exposed earth surfaces. Because the site is flat, there would be relatively little grading of the site prior to construction. Therefore, dust generated by excavation and grading would be short term.

Odors: Construction of the PMEC would include some activities that would generate short-term, localized odors. These impacts are anticipated to be slight and of short duration.

Emissions from Construction Equipment: Mobile construction equipment and portable stationary engines would emit air pollutants from combustion, including NO_x, CO, SO₂, PM₁₀, and toxic air pollutants. Due to their temporary and intermittent nature, the concentrations of such emissions would be substantially lower than the applicable air quality standards.

Operation Impacts

Operation of the PMEC would have minor impacts to air quality. The modeling conducted, using worst-case emissions from the PMEC, demonstrates that ambient concentrations would be far below National, Washington, and Oregon Ambient Air Quality Standards and well within allowable PSD increments for Class I and Class II areas. Concentrations of toxic air pollutants potentially attributable to the PMEC would also be either below the Small Quantity Emission Rate or meet the Washington ambient concentrations (i.e., Acceptable Source Impact Level).

Proposed Mitigation Measures

Impacts from fugitive dust, odors, and engine emissions during construction would be intermittent and short-term. Implementing the following practices would reduce adverse air quality related construction impacts and would comply with Washington State regulations to minimize fugitive dust emissions:

- Watering active construction areas as required to control dust
- Covering trucks hauling soil, sand, and other loose materials, or requiring trucks to maintain at least two feet of freeboard
- Paving, applying water regularly, or applying nontoxic soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites
- Sweeping to control dust (with water sweepers) at all paved access roads, parking areas, and staging areas at construction sites
- Limiting traffic speeds on unpaved access roads to 15 mph

No mitigation measures are proposed.

No mitigation measures are proposed.

Proposed Mitigation Measures

PMEC would employ BACT to minimize emissions. For the combustion turbines, PMEC proposes to use Selective Catalytic Reduction to reduce NO_x emissions to 3 ppm. This is equivalent to the emission rate deemed BACT for many natural gas fired combustion turbines, and far exceeds the emission control obtained by IGCC units to date. PMEC will also employ Selexol technology to remove sulfur from the syngas to a degree that far exceeds current IGCC facility performance. Emissions of CO, PM₁₀, and volatile organic compounds will be minimized by optimizing combustion and by combusting clean gaseous fuels.

Exhibit 1-2

Air Quality Impacts and Mitigation Measures Summary

Greenhouse Gas Emissions: The principal greenhouse gasses are CO₂, N₂O, CH₄, PFCs, CFCs, and SF₆. Energy Northwest anticipates that CO₂ emissions will range from 4.8 to 6 million tonnes per year. Washington's Department of Community, Trade & Economic Development has estimated that the state's greenhouse gas emissions totaled 88.3 million tonnes in 2004. Approximately half those emissions are attributed to the transportation sector, and 14 percent of those emissions are attributed to electric power generation. Unless other generating units are displaced when PMEC commences operation, annual state greenhouse gas emissions would increase by approximately seven percent.

Because mercury occurs naturally in coal, the PMEC syngas clean up process would include a system to control mercury that may remain in the syngas. Downstream of the acid gas removal system, the syngas passes through fixed beds of activated carbon that are specially impregnated to remove mercury. PMEC will *design* a dual activated carbon bed system to achieve a 95% removal of the mercury in the solid fuel feedstock, but can only *guarantee* a system that removes 90 percent of the mercury. For Powder River Basin coal, for example, the guaranteed 90 percent removal results in a maximum emission rate of 0.0033 lb/hr per turbine, or a total of 58 pounds per year for both of the PMEC combustion turbines combined.

Energy Northwest considers the selection of IGCC technology to be an important element of its CO₂ mitigation plan. While use of IGCC does not provide any "credit" toward meeting the quantitative mitigation requirements of chapter 80.70 RCW, Energy Northwest's selection of IGCC technology reduces CO₂ emissions by about 10% as compared to pulverized coal technology. Consequently, Energy Northwest's selection of IGCC technology helps to "preserve and protect the quality of the environment [and] to promote air cleanliness." See RCW 80.50.010(2).

Energy Northwest proposes a combination of near-term and long-term efforts to both comply with the state requirements (80.70 RCW) for CO₂ mitigation and serve as a proving ground for capturing and sequestering CO₂ emissions. In the near term, Energy Northwest will make annual payments to a qualified third-party organization (e.g. Climate Trust).

For the long term, Energy Northwest will develop a specific proposal for mitigation, through sequestration, conversion or otherwise, to be implemented through a third-party qualified organization and/or through a direct investment project. PMEC would be designed to be carbon capture ready. No removal would occur until technical and regulatory issues relating to sequestration have been resolved. Energy Northwest is working closely with the Big Sky Carbon Sequestration Partnership, one of seven Department of Energy-funded research associations, to evaluate the PMEC site, develop a greenhouse gas sequestration capability assessment, and promote a potential sequestration project. PMEC is a potential Department of Energy CO₂ sequestration pilot site. Several key geological formations have been identified at or near the PMEC site including mafic basalt formations, Deep Saline Aquifers, and unminable coal deposits. If proven viable, the basalts or other formations could create an opportunity to capture up to 90% of CO₂ emissions.

Exhibit 1-2

Air Quality Impacts and Mitigation Measures Summary

Odors: Operation of the facility would not generate odors that are perceptible off-site.

Visible Plumes: Energy Northwest anticipates that permit conditions will not allow visible emissions from PMEC sources, except for water vapor. However, water vapor plumes may be visible from HRSG stacks and cooling towers. The conclusions of the modeling analysis are as follows:

- It is unlikely significant ground-level fogging or icing would occur on nearby roads from either cooling tower.
- Due to the moist climate of the region, long visible plumes may result during periods of high relative humidity (i.e., when the weather is already very damp, foggy, or rainy). However, these visible plumes would usually occur during conditions of already poor or obscured visibility. During daytime hours when local weather does not obscure the plume, typical visible plume lengths would be less than 40 meters long and less than 30 meters high for both cooling towers.

Local Air Quality Impacts: PMEC emissions will not exceed PSD increments or ambient air quality standards, alone or considered cumulatively.

Regional Pollutant Concentrations: The highest Class I area concentrations were generally predicted in the Mt. Hood Wilderness and Mt. Rainier National Park. Maximum predicted concentrations were less than 26 percent of the EPA Class I screening concentrations. Predictions concentrations were somewhat higher in the CRGNSA, but still well below the proposed EPA Class I screening concentrations. The analysis concluded pollutant concentrations within the Class I areas and the CRGNSA would not significantly affect existing air quality resources.

Regional Sulfur and Nitrogen Deposition: Predicted annual deposition fluxes were highest within the Columbia River valley near the PMEC site with local maxima in the high terrain east of the PMEC site. The regional modeling study predicts sulfur and nitrogen deposition attributable to PMEC emissions would be less than 50 percent the NPS deposition screening levels within all Class I areas.

Regional Haze: The regional air quality model simulations predicted that maximum daily changes to extinction would be less than 5 percent in all the Class I areas for all days in the three-year simulations.

The regional air quality simulations also assessed potential reduced visual range at locations within the CRGNSA. The model simulations suggest the potential for perceptible changes to visual range on two winter days in three years in a small area at the extreme west end of the CRGNSA. Overall,

Exhibit 1-2

Air Quality Impacts and Mitigation Measures Summary

PMEC emissions are not expected to significantly degrade visibility in CRGNSA.

BACT – best available control technology

CO – carbon monoxide

CO₂ – carbon dioxide

CRGNSA – Columbia River Gorge National Scenic Area

EPA – Environmental Protection Agency

HRSG – heat recovery steam generator

NO_x – oxides of nitrogen

PM – particulate matter

ppm – parts per million

PSD – prevention of significant deterioration

RCW – Revised Code of Washington

SO₂ – sulfur dioxide

Exhibit 1-3
Water Impacts and Mitigation Measures Summary

Construction Impacts

Potential impacts include sediment discharge and discharge of other pollutants associated with construction, especially petroleum products.

The highest risk to surface water quality during construction is expected to occur during the initial stages of construction, when native soils are stripped to allow for the compacted placement of surcharge piles and permanent fill material.

Construction of the wastewater outfall will present the risk of minor sediment impacts to the Columbia River. The wastewater outfall will be suspended from the already-permitted port wharf expansion in similar fashion to the existing port outfall at the existing wharf. No disturbance of river sediments will be necessary, because the outfall invert will be located several feet above the river bottom.

The natural gas pipeline would cross the Kalama River by a horizontal directional drill, installing the pipeline below the river bed.

Hydrostatic test water for the natural gas pipeline would be acquired from the Port of Kalama industrial water system or from the City of Kalama municipal water system.

Operation Impacts

The PMEC's impacts to water quality would be minimal as the facility would discharge spent process water, not already recycled, and sanitary sewage through the existing, permitted water treatment systems at the Port of Kalama. Upset conditions for the process wastewater discharges imply that the wastewater is being discharged without treatment. Discharge of untreated process wastewater could result in violation of water quality standards (especially related to certain metals and ammonia).

Proposed Mitigation Measures

Stormwater quality control during construction would be achieved through compliance with an NPDES stormwater discharge permit for construction activities, application of construction stormwater pollution control methodologies, and BMPs.

Erosion would be controlled by temporarily stabilizing soils with seeding or plastic sheeting. Construction entrances would be stabilized to minimize erosion and reduce the potential for soils to be tracked off site. Sedimentation within the construction site would be controlled using silt fencing, check dams, and other types of BMPs.

A permanent stormwater management system would be implemented.

Perimeter controls will be used to prevent sediments from disturbed soils along the outfall pipeline route from entering the river.

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.

Proposed Mitigation Measures

PMEC would obtain an NPDES permit to discharge process water to the Port of Kalama's outfall.

Exhibit 1-3**Water Impacts and Mitigation Measures Summary**

PMEC plans to discharge approximately 1.89 million gallons per day (1,315 gallons per minute) of process water at 40 degrees Centigrade, which is the maximum allowable for publicly-owned treatment works. With the addition of the PMEC discharge, the combined discharge at the existing outfall will be 3.2 cubic feet per second, ten times the current discharge.

Stormwater would increase since site development will result in addition of impervious surfaces. Because of the large relative flows of the Columbia River to the potential stormwater discharge, the facility is exempt from peak flow control requirements. The 6-month, 24-hour water quality design runoff event has been estimated at 6.4 cfs, which represents 0.0003 percent of the average flow at The Dalles of 190,000 cfs.

Operation Impacts

The Port of Kalama would supply process water to PMEC from an off-site industrial source for which valid water rights are held.

The City of Kalama would provide potable water to the PMEC based upon existing water rights and water supply.

Ecology assessed the potential for the new Port of Kalama water right to impact existing water rights, and determined that no discernible drawdown (greater than 0.1 foot) is calculated to occur further than a distance of 3,4000 feet from a single withdrawal point after 30 days of continuous pumping at 6,6000 gallons per minute. This represents a worst case because actual drawdowns from the Port's three wells is anticipated to be less than the modeled single point withdrawal.

There is a potential to impact groundwater quality from improper storage and handling or spillage of materials. With appropriate management practices, including bermed areas for the collection of incidental spills and oil-water separators as required, the potential for contamination of surface or groundwater is low.

The Port of Kalama would upgrade the existing outfall to accommodate the increased flow.

This stormwater would be managed using appropriate BMPs. After collection, stormwater would be discharged via proposed ditches to a wet pond and then to the Columbia River. BMPs and the wet pond would be designed to meet the Washington State Department of Ecology's Stormwater Management Manual for Western Washington (Ecology 2005a).

Proposed Mitigation Measures

Feedstocks (petroleum coke or coal) will be managed in a manner to prevent exposure to precipitation and potential leaching, or release to the ground. In addition, a Spill Prevention, Control and Countermeasures Plan to protect ground water will be prepared and implemented. If a spill were to occur to the ground, impacted soil and groundwater would be remediated in accordance with the Model Toxics Control Act.

BMP – best management practice

cfs – cubic feet per second

NPDES – National Pollutant Discharge Elimination System

**Exhibit 1-4
Habitat and Wildlife Impacts and Mitigation Measures Summary**

Habitats and Wildlife

Construction Impacts

Construction on the P MEC site would have minimal habitat impacts by shifting the on-site habitat type from open industrial to industrial. The site is already very disturbed and dominated by non-native plant species.

Construction of the natural gas pipeline would mostly impact industrial and open industrial habitats and is not expected to impact wetland and riparian habitat.

Construction of the railroad spur would impact open industrial and wetland habitats, including the fill of approximately 1.3 acres of wetland.

Noxious weeds are present on the site and in the railroad spur area, and are not anticipated to spread further by the development. Noxious weeds are present along the natural gas pipeline. Only one of the observed species is designated for control in Cowlitz County. There is a potential for weed species to spread into areas where they are not currently present.

Upgrading the transmission line may create some vegetation impacts from access, staging, and construction, but these impacts would be temporary.

The wetland mitigation site is proposed as mitigation for the permanent wetland impacts from the filling of approximately 1.3 acres for the railroad spur. Construction at the mitigation site would alter the present wetlands and open space habitat to create improved habitat structure and species diversity.

Operation Impacts

No impacts are anticipated to occur to habitat or vegetation from the operation of the P MEC, the natural gas pipeline, the railroad spur, or the transmission line.

Proposed Mitigation Measures

The mitigation sequence is avoidance, minimization, and compensation. Many impacts to high quality habitats have been avoided by siting the development in an area that is already largely industrial.

The development would minimize impacts to the riparian habitat adjacent to the Kalama River by drilling under the river.

The loss of wetland functions would be mitigated by the creation and enhancement of new wetland areas.

Many of the on-site noxious weeds would be removed by the proposed construction. To minimize the spread of non-native species, all machinery would be washed before working in or adjacent to sensitive habitats (wetlands and riparian areas).

Disturbed areas would be revegetated with native plant materials once construction is completed.

No mitigation measures are required beyond the creation of the wetland mitigation area. Construction of the wetland mitigation site will be an improvement over existing conditions.

Proposed Mitigation Measures

No mitigation measures are required.

Wetlands

Construction Impacts

No new construction impacts to wetlands are anticipated for the P MEC beyond the Port's filling the 2.1-acre wetland lobe. (The filling of the 1.3 acre- wetland for the railroad spur is described below.)

Proposed Mitigation Measures

Construction impacts would be mitigated by applying the mitigation sequence of: avoidance; minimization; rectification; and compensation.

The Port of Kalama is proposing a 4.5 acre mitigation site to compensate for the loss of the 2.1-acre wetland.

Exhibit 1-4**Habitat and Wildlife Impacts and Mitigation Measures Summary**

Construction of the natural gas pipeline is not expected to permanently impact wetlands as it would be constructed within the existing road right of way for most of its length. Temporary wetland impacts may occur incidental to using the HDD technology to drill under the Kalama River. If a frac-out were to occur, temporary discharges of drilling slurry may escape through the underlying sands and geologic fractures.

Construction of the railroad spur would permanently fill approximately 1.3 acres of Category II palustrine scrub-shrub, emergent, and open water wetland associated with the 8.86-acre wetland southeast of the proposed P MEC site. Permanently filling a portion of this wetland would not alter the hydrologic functions of the wetland.

Temporary impacts may include dewatering an interior portion of the wetland slightly larger than the permanent impact area to create access for construction of the rail spur.

When the final transmission line route and design are determined, a wetland delineation would be conducted to identify and map locations of wetlands. Many of the wetlands along the proposed route are small enough that the towers can be positioned to avoid wetland impacts. Temporary impacts would include those that may be required for staging and construction of the new transmission line towers.

Permanent impacts to wetlands could occur from the placement of upgraded or new transmission line towers in wetlands where the distance between upland-placed towers is too far. A conservative estimate is that ten transmission line towers may be placed in wetlands, for a total wetland fill of 1,000 square feet (based on a footprint for each tower of less than 100 square feet).

Construction Impacts

New permanent vegetation clearing impacts would not occur along the transmission line corridor because this corridor is already maintained to be clear of trees to protect the existing transmission lines.

The proposed wetland mitigation site contains one palustrine emergent wetland less than 0.5 acre in size. This wetland will be incorporated into a larger proposed wetland mitigation area to compensate for the permanent loss of 1.3 acres of wetland for the rail spur.

Operation Impacts

No impacts to wetlands are anticipated from the operation of the P MEC, the natural gas pipeline, or the railroad spur. The

Any slurry that may escape during a frac-out would be removed from the wetlands and the wetland would be returned to pre-existing conditions.

Culverts would be placed along the rail spur to continue allowing permanent hydrologic connections within the remaining wetland area.

BMPs would be used to eliminate water quality problems, including turbidity, sediment escape, and invasive species control.

All access would occur using an existing access road that parallels the current transmission line. Material staging and construction would be completed whenever possible in uplands. Temporary staging and construction zones within wetlands would require clearing any vegetation and preparing a suitable work pad for safe operations. This work would be performed during the drier months to avoid and minimize water quality concerns from runoff. Any temporary work areas would be restored to pre-existing conditions when construction is complete.

Proposed Mitigation Measures**Proposed Mitigation Measures**

No mitigation measures are required.

**Exhibit 1-4
Habitat and Wildlife Impacts and Mitigation Measures Summary**

current vegetation maintenance practices in the transmission corridor would continue to occur.

Terrestrial Species

Construction Impacts

Construction of the P MEC would have minimal impact on listed and non-listed species. Construction of the project would reduce foraging, perching and other habitat for the non-listed species present, but the amount would be very small compared to abundant higher quality habitat available adjacent to the P MEC site and up or down river.

Noise, light, and visual disturbance related to construction would be temporary and would not exceed existing background levels already present in the area. Increased traffic from construction would add additional activity and noise that may reduce suitability of adjacent habitat for wildlife.

Construction of the P MEC site would have no adverse impact on terrestrial endangered, threatened, or candidate species, including bald eagles. The nearest eagle nest is greater than 0.5 mile away with trees visually blocking the nest site from light glare and noise. The limited perching and roosting that may occur by eagles on the P MEC site can move to better habitats across the river or directly upstream or downstream of the P MEC site. There is no suitable bald eagle foraging habitat on the P MEC site. Columbia white-tailed deer do not use the P MEC site or the wetlands directly north of the P MEC site. Purple martins do not use the P MEC site, but may nest in cavities or forage over the Columbia River and wetlands north and east of the P MEC site.

Proposed Mitigation Measures

BMPs would be used to avoid and minimize the temporary construction impacts to terrestrial wildlife for each of the project components. Dust reduction measures would be implemented to reduce airborne particulate matter during construction.

The line of trees along the north edge of the project site may block some noise, light and visual disturbance from construction.

Construction Impacts

Most pipeline work is expected to occur within the paved road right of way. In addition, no trees are expected to be removed for construction of the pipeline. Therefore, impacts to migratory birds (under the Migratory Bird Treaty Act of 1918) are not expected from construction of the pipeline route

No permanent loss of individuals or habitat would occur from construction of the pipeline. All construction would occur within the existing road right of way. Temporary loss of habitat from construction would displace some species of small mammals, garter snakes, and small birds that utilize these marginal quality roadside habitats.

Construction of the pipeline would not adversely impact endangered, threatened, or candidate species. Bald eagles are the only listed species in the vicinity. Pipeline construction activities near the wetlands and riparian areas would be very short duration with no work being completed in or immediately adjacent to the Kalama River. Temporary disturbance may

Proposed Mitigation Measures

These temporary habitat losses would be replanted with native vegetation during the same growing season after construction is completed.

Exhibit 1-4**Habitat and Wildlife Impacts and Mitigation Measures Summary**

occur to eagles if pipeline construction occurs during the salmon breeding season when eagles would be selecting for salmon carcasses in the Kalama River. Suitable habitat is available that eagles perched or foraging near the pipeline crossing can move a short distance upstream or downstream from the construction zone without being adversely impacted. No purple martin, deer, or suitable habitat for either species is present in or near the pipeline route.

Permanent impacts from construction of the railroad spur as proposed would permanently fill about 1.3 acres of palustrine scrub-shrub, emergent, and open water wetland within the 8.86-acre wetland southeast of the proposed P MEC site. By not altering the habitat structure, hydrology, and significant habitat features, there would be limited impacts to breeding amphibians and nesting waterfowl, including wood ducks, mergansers, geese and other species of waterfowl and cavity nesting birds.

Construction of the railroad spur would not adversely impact endangered, threatened, or candidate species.

Transmission line construction would create no permanent impacts to wildlife. No additional vegetation or land clearing would be required since the proposed route would upgrade an existing transmission line. Temporary impacts would primary result from displacement of wildlife from the localized area where and when construction is occurring.

Mitigation for losses associated with the approximately 1.3 acres of wetland habitat and habitat functions would be addressed in conjunction with required compensatory wetland mitigation for the 1.3 acres of permanent wetland loss from the railroad spur construction. The wetland mitigation project would address the wildlife habitat quality and functions being lost by creating vegetative and habitat structure and diversity that would provide cover, forage, and breeding areas for amphibians, small and large mammals, and various guilds of birds.

Construction Impacts

No permanent impacts to wildlife are anticipated to occur during construction of the proposed wetland mitigation site. Wildlife that may use the site for foraging, roosting, or loafing would be displaced to similar adjacent habitats immediately east and west of the mitigation site.

Operation Impacts

Noise disturbance and air quality related to operation of the P MEC would be similar to existing background levels already present in this industrial vicinity. Light and visual disturbance would locally increase once operation of the P MEC begins but not beyond the existing background levels.

Operational vehicle and railroad traffic would increase at the P MEC site, but the lack of suitable habitat would limit the potential for wildlife losses from vehicle collisions.

In operation, the project would eliminate the open space buffer that the wetlands north of the project currently have from light and visual disturbance at the adjacent Steelscape facility.

Proposed Mitigation Measures**Proposed Mitigation Measures**

Permanent impacts related to light pollution during facility operation would be mitigated with the installation of shielded lighting fixtures that direct light away from the wetland north of the P MEC site. Permanent impacts related to noise and visual disturbance during facility operation would be mitigated with installation of a buffer of trees and shrubs along the north edge of the property between the fence and wetland to the north.

**Exhibit 1-4
Habitat and Wildlife Impacts and Mitigation Measures Summary**

The Burlington Northern Santa Fe railroad runs up to 60 trains a day at high speed past the railroad spur wetland. The few trains a week that would move slowly through the wetland would be within the background conditions for this wetland. Also, the scrub-shrub community that borders the proposed railroad spur would act as a visual and noise buffer for the wildlife using the larger southwest corner of the wetland.

There is slight potential for coal and petcoke feedstock to spill from railcars while the train is passing through the wetland. The very small quantity of feedstock that might accidentally spill from a railcar over time would not provide enough impacts to impair water quality in the wetland beyond background levels.

No operational impacts are expected to occur to wildlife using the transmission line corridor. The transmission lines would be raised from about 60 feet to 90 feet above the ground, placing them further in the path of birds flying above the treetops. Although the increased height may put the line within flight paths, the impact may be offset by the larger diameter, more visible 230 kV line.

Overall, wildlife habitat structure and functions at the wetland mitigation sites would be improved from preconstruction conditions.

The vegetation communities and structure would be improved by the addition of interspersed shrub and tree communities. The non-native herbaceous ground cover would be supplemented with various native sedges, rushes, and other herbs. The wetland mitigation site would be graded to provide backwater habitat for salmon and steelhead migrating up the Coweeman River.

Fisheries and Aquatic Species

Construction Impacts

The construction of the plant would have no effect on threatened and endangered fish species because none are present on the P MEC site.

Resident, EFH, and ESA-listed fish species are currently present in the 2.1-acre wetland (backwater channel of the Columbia River) on the northwest corner of the site proposed to be filled by the Port. This wetland fill, however, is under a separate permitting process and impacts are being addressed by the Port of Kalama. Other than this wetland, there is no aquatic habitat on the P MEC site and thus no resulting impacts from construction to any fish species.

Minor impacts could occur from construction of the pipeline due to erosion.

Proposed Mitigation Measures

Other than the 2.1-acre northwest corner wetland to be filled and mitigated by the Port, there is no aquatic habitat on the P MEC site; therefore, no mitigation measures are necessary.

Excess soils may result from installation of the pipeline and may require stockpiling prior to disposal or reuse. These would be protected from wind and water erosion prior to appropriate disposal or reuse. If reused, the backfill soils would be properly compacted to reduce the potential for post-installation erosion and settlement.

Exhibit 1-4

Habitat and Wildlife Impacts and Mitigation Measures Summary

Site-specific BMPs would be designed and implemented for construction activities. These practices include limiting certain construction activities and installing control structures such as sediment traps, diversion ditches, and silt fences. The Stormwater Pollution Prevention Plan would include limits on the area to be disturbed, the retention of vegetation where feasible, drainage retention during construction, soil replacement, and replanting after construction.

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 Cowlitz 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.

Construction Impacts

The natural gas pipeline would cross beneath the Kalama River using HDD. The location of the proposed crossing is near a public boat ramp where vessel traffic is common. Potential impacts to fish species may occur during construction of the pipeline. Potential impacts resulting from HDD include the temporary loss of upland vegetation from the entry and exit points and the risk of drilling mud entering into the aquatic habitat (Kalama River) if a frac-out were to occur. Impacts to resident fish species, ESA-listed species, critical habitat, and EFH would not occur if the HDD process works as intended. However, if an unpredictable frac-out does occur, the impacts to species and their habitats would depend directly on the quantity of the bentonite released, the extent (area) of the spill, the effectiveness of the clean-up, and the presence or absence of the listed species in the affected area.

Proposed Mitigation Measures

Impacts from HDD would be minimized or avoided by analyzing the substrate prior to design, replanting cleared staging areas, and not staging in sensitive areas.

All staging and equipment would occur outside the 100-foot setback distance set to protect the riparian area of the Kalama River.

Silt fencing would protect the river from sedimentation.

Disturbed areas would be revegetated with native vegetation.

Activities that are potentially hazardous to aquatic habitats would not be permitted within the 100-foot restrictive area, including:

- Fueling or servicing of equipment
 - Storage of any petroleum products, chemicals, or other toxic or deleterious materials
 - Washing of construction equipment
 - Disposal of waste materials
 - NMFS and USFWS may recommend an in-water work window to reduce salmonid exposure to impacts from a potential frac-out during HDD. The in-water work window for the Kalama River is August 1 to August 31 (USACE 2006)
 - Excess excavated material would be removed immediately upon completion of construction to an appropriate upland location away from stream channels or wetlands
 - Excavated materials would be stabilized in a manner to prevent degradation of State waters
-

Exhibit 1-4

Habitat and Wildlife Impacts and Mitigation Measures Summary

The railroad spur adjacent to the P MEC site would require the filling of approximately 1.3 acres of a large 8.86-acre wetland located east of the P MEC site and between the road and the railroad tracks. This wetland does not contain ESA-listed fish species because of a blocked culvert that is a migration barrier.

In the event of an unintentional release of drilling mud under pressure into perennial streams or wetlands, the following response plan would be implemented to include pre-drilling analysis; event response; and cleanup. (See Section 3.4).

To reduce turbidity and downstream impacts from the fill of the southeastern wetland, BMPs and sedimentation minimization measures would be implemented to reduce muddy water from flowing through the culvert and discharging into the wetland complex north of the site. Hay bales, silt fencing, or other methods effective at filtering or diverting the turbid water from discharging through the culvert would be used.

To avoid accidental additional escape of mosquito fish from the wetland, temporary screening will be added upstream of the culvert to prevent the mosquito fish from being released during railroad spur construction.

Construction Impacts

Impacts to EFH and ESA-listed fish from the fill of the southeastern wetland would be insignificant to minor and result from the temporary and isolated decreased water quality during construction activity due to sedimentation impacts from the associated fill. If the sedimentation resulting from the fill does not exit the wetland then there would be no impact to ESA-listed fish or EFH. The area potentially impacted from turbid water would be localized to the area immediately adjacent to the culvert outlet and would not extend into the backwater channel or the Columbia River.

No construction or operation related impacts to aquatic habitats, fish species, or EFH are expected from the transmission line crossing.

The wetland mitigation activities would occur during the in-water work window for the Coweeman River as a protection measure, but no in-water work is proposed

Proposed Mitigation Measures

No impacts to the aquatic habitat resulting from the transmission line crossing are expected; therefore, no mitigation measures are necessary. BPA and Cowlitz County PUD would obtain and comply with the terms and conditions of applicable federal and state permits.

Wetland mitigation activities at or adjacent to the Coweeman River would be timed to avoid threatened and endangered species impacts by constructing the project during the low flow summer months when water is not present in the backwater channel and listed fish species are least likely to be in this reach of the Coweeman River. Such timing would also reduce or eliminate sediment runoff and other water quality issues because the mitigation site and the backwater channel would be dry.

Existing native vegetation will not be disturbed outside of the work area.

Stormwater at the wetland mitigation site will be controlled by the use of hay bales, silt fences, or other appropriate methods.

Exhibit 1-4**Habitat and Wildlife Impacts and Mitigation Measures Summary****Operation Impacts**

The operation of the plant facility may have a minor impact on various fish species from the resulting operational activities: water use, process water discharge, stormwater discharge, and wake stranding resulting from shipping.

Operation Impacts

By meeting the thermal state water quality standards, the discharge of process water would have a minor impact on fish resources in the Columbia River.

Long-term discharges (in excess of 30 years) from the existing outfall during operation of the PMEC site may affect fish resources, particularly salmonids depending on final water quality discharged. Although the discharges will meet state water quality standards for temperature and other pollutants, sublethal effects have been linked to low levels of certain compounds.

There would be no chronic effects to ESA-listed salmonids because salmonids won't stay in the existing or new mixing zone area for long periods of time. The effluent would not be discharged directly into the path of a rearing juvenile salmonid.

Operation Impacts

Stranding from ship wakes from the drybulk carriers may occur to Columbia River chum and Lower Columbia River coho addition to Lower Columbia River Chinook, Snake River fall run Chinook, and Upper Willamette River Chinook. Chum and coho are much less abundant than Chinook, and stranding is presumed to occur in proportion to abundance. Stranding is not expected from the barges because of the shallow draft and slower speeds.

No impacts to resident fish species, ESA-listed species, critical habitat, or EFH would occur from the use of the pipeline or the transmission line once PMEC is in operation.

No impacts to fisheries or aquatic species would be expected to occur during operation of the railroad spur.

The proposed wetland mitigation would improve existing conditions by creating additional wetlands. The design would provide additional seasonal off-channel fish habitat for when salmonids most commonly use the Coweeman River during winter and spring.

The mitigation site will be rehabilitated following the wetland mitigation planting plan, including monitoring and maintenance to ensure performance standards are met.

Proposed Mitigation Measures

Impacts from PMEC operations (i.e., water use, process water discharge, stormwater run-off, and ship/barge traffic) would be minor or insignificant and therefore would not require any mitigation measures outside of meeting federal and state permit requirements.

Proposed Mitigation Measures**Proposed Mitigation Measures**

The bulk carrier ships, which have a blunter bow configuration, would be expected to create less wake than other types of deep draft vessels. Average speed for vessels that will be traveling to the Port of Kalama dock at PMEC would be 12 knots or less. In addition, these ships would be expected to travel at an even slower rate with less ship wake when entering the Port facility.

The proposed wetland would be designed to drain as tides and river levels recede so as not to trap fish, thus protecting listed species that may use the site.

BMP – best management practice

EFH – Essential Fish Habitat

ESA – Endangered Species Act

**Exhibit 1-5
Environmental Health Impacts and Mitigation Measures Summary**

Noise

Construction Impacts

During the construction phase of the P MEC, noise from construction activities could add to the noise environment in the immediate vicinity of the project. The large distances between the plant site and nearest residential receivers on both the Washington and Oregon sides of the Columbia River, and the presence of existing noise from I-5 would minimize potential noise impacts from P MEC construction activities.

At the end of the construction process and prior to operation, steam blows would be used to clean the steam piping. This involves releasing high pressure steam into the atmosphere. Steam blow sounds are typically substantially louder than other construction activities, ranging from 117 to 128 dBA at a distance of 100 feet. The nearest residences are across the river, at approximately 3,500 feet away. The sound levels at those residences could range from 86 to 97 dBA during each steam blow.

The construction of the pipeline would occur primarily within the right of way of Hendrickson Drive. In some areas, this could put construction activities as near as approximately 350 feet from residences. However, the residences would be on the opposite side of I-5 from the construction activities, and I-5 would act as intervening terrain and would produce noise to mask the construction noise.

Operation Impacts

Equipment and site design would ensure that the P MEC would meet Washington State noise requirements and would not result in a significant increase in existing noise environment.

Proposed Mitigation Measures

Construction would generally occur only during daytime hours.

To minimize the short-term impacts, silencers providing at least 20 to 30 dBA of noise reduction would be installed on the piping vent.

Pipeline construction noise would not be in the same location each day. The limited timing of construction activities, the presence of noise from I-5, and the restriction of construction activity to daytime hours would minimize any potential noise impacts.

Proposed Mitigation Measures

The following measures would be included in the design:

- Increased thickness of the steel walls of the HRSG sections and inlet transition duct
- Increased thickness of the stack walls
- Installation of sound baffles in the HRSG exhaust stack to reduce noise from the stack exits
- Building and equipment enclosures where needed to achieve the sound levels shown in Exhibit 3-32.

Hazardous Materials

Construction Impacts

During construction, there will be chemical and hazardous materials stored on site.

Proposed Mitigation Measures

Energy Northwest has an Environmental Management System, including a pollution prevention program, that the EPC contractor will be required to follow.

A Spill Prevention, Control and Countermeasure Plan and a Hazardous Waste Management Plan will be developed and implemented for the construction phase.

Construction Impacts

Proposed Mitigation Measures

Chemical and hazardous materials would be stored in secure

Exhibit 1-5

Environmental Health Impacts and Mitigation Measures Summary

During construction, the worst-case scenario for a major spill would be during the transfer of materials from a delivery vehicle to equipment such as transformers, or during equipment cleaning when hazardous materials are used.

It is possible that hazardous materials may be uncovered during construction of the natural gas pipeline, given its linear nature and location, although the potential would be low.

Operation Impacts

The four major waste streams from P MEC would be inert slag, elemental sulfur, activated carbon impregnated to remove mercury, and spent catalyst from the combustion turbines.

Up to 130,000 tons per year, or 400 tons per day of slag would be produced.

P MEC will generate up to 100,000 tons per year, or approximately 300 tons per day of elemental molten sulfur extracted from the synthesis gas stream during the gas cleanup process.

Syngas will be passed through fixed beds of activated carbon to remove mercury. It is expected that the concentration of mercury will be less than 0.2 mg/L. If that is the case, the approximately 14 tons per year of spent carbon could be placed in a landfill.

Operation Impacts

Approximately 42 tons of spent hydrolysis catalyst will be generated from the catalyst replacement occurring every one

areas in accordance with the Uniform Fire Code and other applicable local, state and federal regulations. Chemical and petroleum products would be stored in clearly labeled and sealed containers or tanks.

Construction equipment would be monitored for leaks and undergo routine maintenance to ensure proper operation and reduce the chance of leaks. Maintenance of on-site vehicles would occur in designated locations.

The EPC contractor would provide training to all construction personnel and subcontractors on spill avoidance and countermeasures.

If hazardous materials are found, appropriate mitigation measures such as characterization, clean up and/or removal would be taken before construction would proceed.

Proposed Mitigation Measures

A Spill Prevention, Control and Countermeasure Plan and a Hazardous Waste Management plan will be developed and implemented for the operation phase.

Chemical and hazardous materials would be stored in secure areas in accordance with the Uniform Fire Code and other applicable local, state and federal regulations. Chemical and petroleum products would be stored in clearly labeled and sealed containers or tanks.

P MEC employees would be trained on spill avoidance and countermeasures.

Because of its vitrified physical and chemical form, slag from the P MEC would be environmentally inert and marketable as a substitute for sand.

The molten sulfur will be loaded directly into specialized railroad cars or truck-hauled tanker trailers. On-site storage would be short term, typically no more than one week before being shipped to purchasers. The likely buyers of the sulfur will be fertilizer and other chemical product manufacturers.

Spent carbon will be stored in a secure covered location prior to be trucked off site to a sanitary land fill.

Proposed Mitigation Measures

This material is non-hazardous and will be trucked to a sanitary landfill.

**Exhibit 1-5
Environmental Health Impacts and Mitigation Measures Summary**

to three years.

Electric and Magnetic Fields

Impacts

Proposed Mitigation Measures

The new transmission line would be constructed and operated by either the Cowlitz County PUD or BPA within existing transmission line right of way. The line has not been designed yet, however it is expected that the new 230 kV line will replace up to three existing 115 kV lines. Numerous studies have been performed on potential health risks from EMF exposure, but the results are non-conclusive.

No mitigation measures are proposed.

dBA – A-weighted decibels

EMF – electric and magnetic fields

EPC – Engineering, Procurement, and Construction

HRSG – heat recovery steam generators

kV – kilovolt

mg/L - milligrams per liter

Exhibit 1-6

Land Use, Recreation and Visual Impacts and Mitigation Measures Summary

Land Use	
Impacts	Proposed Mitigation Measures
<p>The PMEC site, proposed rail spur and loop and natural gas pipeline are within Cowlitz County, except for a small portion of the pipeline within the City of Kalama limits. The PMEC, including the land for the rail spur, is classified as heavy industrial in the Cowlitz County Comprehensive Plan and the proposed use has been determined by the County to be an allowed use.</p>	<p>To avoid or reduce impacts to adjacent land uses:</p> <ul style="list-style-type: none"> • Native vegetation would be retained as much as possible in the impact area • Landscape buffers would be installed on the perimeter of the site
<p>The proposed development would not represent a change in the planned use of the site lands and would be compatible and consistent with the immediately surrounding industrial uses.</p>	<p>See mitigation measure above.</p>
<p>Agricultural crop and animal uses do not exist on site.</p>	<p>No mitigation measures are required.</p>
Recreation	
Impacts	Proposed Mitigation Measures
<p>Recreation and recreation areas would be unchanged. There would be temporary impacts to recreational boaters on the Columbia River during the predicted six ship movements per month (arrival, docking, and departure for three ships).</p>	<p>No mitigation measures are proposed.</p>
Visual	
Impacts	Proposed Mitigation Measures
<p>The PMEC would be located within an existing heavy industrial area near other industrial uses. Visual impacts to the overall landscape setting resulting from construction of the facility are low. The facility would be visually compatible with the industrial development already existing in the area. The 80-foot domes proposed for storage would present a visual contrast with the rectangular buildings of the existing industrial uses in the vicinity of PMEC.</p>	<p>Project design and mitigation measures include the maintenance of existing trees to be used as landscape buffers, landscaping in the parking lots and along access roads, use of earth-tone colors on the facility and emission stacks. Additional measure may include additional screening using low tree/shrub plantings or construction of screening walls around ancillary elements.</p>

Exhibit 1-7

Socioeconomic and Housing Impacts and Mitigation Measures Summary

Construction Impacts

Construction of the PMEC is not expected to result in a significant impact on transient accommodations in the PMEC area.

Operation Impacts

The total project cost is more than \$1 billion.

Local (Cowlitz County) non-salary expenditures for construction materials, services and equipment leasing associated with construction are projected to total about \$18 million.

The consumption spending of project workers and their households out of their wages and salaries would stimulate the retail trade and services sector of the regional economy.

Total payroll costs for the project, including fringe benefits and other labor overhead costs, is projected at \$433 million; of which approximately \$43 million is expected to be expended over the course of the project in Cowlitz County.

State use tax would be levied on out-of-state procurements of power generation and transmission-related equipment from various domestic and foreign suppliers. Together with the in-state purchases of taxable goods and services (in all, the taxable purchases would be on the order of \$867 million), these would generate an estimated \$65 million in sales and use taxes for state and local jurisdictions.

The estimated gross payroll (including fringe benefits and other payroll overheads) for the operational work force is \$12.9 million.

A temporary work force of the appropriate skills would be utilized during major maintenance or other non-routine operational work.

Based on regional economic modeling the PMEC would generate another \$57 million, including \$25 million in purchases from suppliers (including fuels, maintenance supplies and services, retail goods and professional services). Sales, use and other indirect business taxes on that level of output are estimated at \$4 million per year, which would accrue to state and local government jurisdictions.

Employee spending from wages and salaries is estimated at around \$11 million per year.

Proposed Mitigation Measures

No mitigation measures are required.

Proposed Mitigation Measures

Investment in the project is expected to yield direct socioeconomic benefits in the form of economic development, additional jobs, increased sales, and increased tax revenues.

These procurements would augment the revenues of many construction-related businesses in Cowlitz County.

Exhibit 1-7

Socioeconomic and Housing Impacts and Mitigation Measures Summary

Operation Impacts

Property taxes to be assessed on the PMEC power plant and associated facilities have not been determined, but could amount to several million dollars per year in view of the project's private investment cost of approximately \$750 million.

Existing housing would meet the need of the operating staff and be adequate for construction workers.

Proposed Mitigation Measures

Exhibit 1-8

Cultural Resource Impacts and Mitigation Measures Summary

Impacts

The PMEC would be located in an area that has undergone considerable modern disturbances, and no impacts are anticipated.

If the pipeline can be constructed completely within areas of previous disturbance, no cultural resources are expected to be encountered.

Proposed Mitigation Measures

If foundation construction results in substantial disturbance to native soils, additional investigations are recommended. Such efforts may include mechanical trench excavation prior to construction, archeological monitoring during construction, and/or implementation of an Unanticipated Discovery Plan during construction.

If the pipeline cannot be feasibly constructed completely within areas of previous disturbance, mitigation measures would be implemented. These measures may include site avoidance, subsurface reconnaissance probing, site evaluation, data recovery, and monitoring during construction.

For both the PMEC site, including the railroad spur, and the pipeline, if cultural resources are encountered during construction, work would halt immediately and the State Archeologist would be notified. A plan for mitigating the effects on the site would be developed and implemented prior to continuation of construction.

Exhibit 1-9

Transportation Impacts and Mitigation Measures Summary

Construction Impacts

Proposed Mitigation Measures

The PMEC site is located in the North Marine Industrial Park at the Port of Kalama, on the east bank of the Columbia River near the I-5 interchange. Roadway, air, rail and river transportation are available. Impacts to transportation attributable to the PMEC would be less than significant (e.g., low to moderate).

Transportation impacts to roads would be primarily limited to the construction phase when construction activities would generally average approximately 400 workers and would peak with about 1,400 workers. The peak would be for a 1-year duration of the 4-year construction period and would have only minor impacts on the local street system and area intersections.

Impacts from the gas pipeline construction would be consist of temporary short-term impacts during the construction phase which would impact the right of way along Hendrickson Drive and Tradewinds Road potentially requiring traffic control. Any traffic delays would be short-term in nature.

Construction of the rail spur would require temporary traffic control.

Operation Impacts

During operation of the facility approximately 80 full-time workers would be employed with an allocation of approximately 40 people for each 12-hour shift.

Additional shipments to the site by rail or by river during operation are not anticipated to impact BNSF rail operations, river transportation, or local roadway traffic patterns.

No road improvements are needed. Large pieces of equipment during construction could be delivered to the site by rail or river transport further reducing any potential impact on local roads. Measures to reduce any minor impacts would include providing WSDOT-approved safety signs during construction, scheduling of daily construction activity to avoid typical peak traffic periods, especially during construction of the natural gas pipeline along Hendrickson Drive south of West Kalama River Road, and promotion of rideshare and vanpool programs for construction works during the 12-month peak construction period.

Roadway control measures would be determined in agreement with the Port of Kalama to provide for continued movement of vehicles within the Port area.

Temporary traffic control would be implemented during the installation of the rail spur.

Proposed Mitigation Measures

No mitigation measures are required.

**Exhibit 1-10
Public Services Impacts and Mitigation Measures Summary**

Construction Impacts	Proposed Mitigation Measures
<p>Impacts to the Cowlitz County Sheriff Department and emergency medical service providers during construction resources are expected to be low.</p>	<p>On-site security personnel would be provided.</p>
<p>Transportation routes and adjacent roadways may experience temporary congestion, particularly during construction of the natural gas pipeline along Hendrickson Drive, and could increase emergency response times.</p>	<p>To the extent feasible, daily construction activity would be scheduled to avoid typical peak AM and PM traffic periods.</p>
<p>No impacts to existing utilities are expected to occur during construction. Cowlitz County PUD would provide temporary power hook-ups.</p>	<p>A construction traffic management plan would be prepared to ensure access by emergency service providers, including: (1) advance notice of construction activities to emergency services and law enforcement agencies; and (2) stipulating detour routes and parking locations.</p>
	<p>Communication with utility providers would occur prior to construction to coordinate the relocation of utilities within an alternate right of way if necessary.</p>
	<p>Construction would be schedule to minimize or avoid potential service interruptions.</p>
	<p>Precautions would be taken to ensure that excavations to no damage underground utilities, including communications tables.</p>
Operation Impacts	Proposed Mitigation Measures
<p>Impacts to local public services and utilities during operation are expected to be low.</p>	<p>On-site security personnel would be provided.</p>
	<p>Emergency response plans would be implemented during operations to protect plant employees and structures in emergency situations.</p>
	<p>An on-site fire protection system would provide the required fire protection for the P MEC.</p>
	<p>All P MEC personnel would be trained on operating procedures and requirements of the safe operating plan.</p>

1.6 Are there any significant adverse impacts that cannot or will not be mitigated?

As described above, Energy Northwest is proposing a number of mitigation measures designed to eliminate or less the potential environmental impacts of the PMEC. If not mitigated, significant impacts are unavoidable to air quality, water quality, and wetlands, however the proposed mitigation measures would reduce these impacts to less than significant levels.

Exhibit 1-11

Summary of Significant Unavoidable Adverse Impacts

Element of Environment	Significant Adverse Impacts
Geology and Soils	No significant unavoidable adverse impacts to or from geology, soils, seismic conditions, or flooding have been identified.
Air Quality	No significant unavoidable adverse impacts to air quality are expected to result from the Proposed Action. To address impacts from greenhouse gas emissions, Energy Northwest proposes a combination of near-term and long-term efforts to both comply with the state requirements (80.70 RCW) for CO ₂ mitigation and serve as a proving ground for capturing and sequestering CO ₂ emissions. In the near term, Energy Northwest will make annual payments to a qualified third-party organization (e.g. Climate Trust). For the long term, Energy Northwest will develop a specific proposal for mitigation, through sequestration, conversion or otherwise, to be implemented through a third-party qualified organization and/or through a direct investment project.
Water Resources	No significant unavoidable adverse impacts to water resources have been identified. A wastewater treatment system and wastewater cooling system, in combination with a mixing zone developed in the NPDES permit process, would be devised to meet all applicable surface water quality standards. The mixing zone analysis indicated that the existing mixing zone dimensions (already the maximum size allowed by regulation) can meet water quality criteria with appropriate treatment prior to discharge. No expansion of the mixing zone would be necessary.
Habitat and Wildlife	One 2.1 acre wetland is proposed to be filled by the Port of Kalama under the No Action Alternative. Continued regional growth not associated with the PMEC would continue to impact wetlands and wetland functions under the No Action Alternative. No significant unavoidable adverse impacts to non-wetland or wetland habitats or vegetation, to wildlife, or to fisheries and

Exhibit 1-11

Summary of Significant Unavoidable Adverse Impacts

Element of Environment	Significant Adverse Impacts
Noise	aquatic species have been identified to occur as a result of the Proposed Action. The loss of approximately 1.3 acres of Class 2 wetlands would be mitigation through the creation and enhancement of new wetland area.
Hazardous Waste	No significant unavoidable adverse impacts from noise have been identified
Electric and Magnetic Fields	No significant unavoidable adverse impacts from hazardous waste have been identified.
Land Use	No significant unavoidable adverse impacts from EMF have been identified.
Recreation	No significant unavoidable adverse impacts to land uses have been identified.
Visual Resources	No significant unavoidable adverse impacts to recreation resources have been identified.
Socioeconomics and Housing	Unavoidable adverse impacts to visual resources in the form of nighttime lighting, would occur as a result of the proposed action. Residents from across the Columbia River in Prescott, Oregon as well as visitors to Prescott Beach County Park would have views of the PMEC site and would view the change from open undeveloped land to an industrial use. While the increase in nighttime lighting and the change from undeveloped land to an industrial use would be adverse to existing conditions, the overall impact would be less than significant when viewed as part of the industrial park.
Cultural Resources	No significant unavoidable adverse impacts to socioeconomics or housing have been identified.
Traffic and Transportation	No significant unavoidable adverse impacts to cultural resources have been identified.
Public Services and Utilities	No significant unavoidable impacts to traffic and transportation have been identified.
Public Services and Utilities	No significant unavoidable adverse impacts to public services and utilities have been identified.

CO₂ – carbon dioxide

NPDES – National Pollutant Discharge Elimination System

RCW – Revised Code of Washington