5. Environmental Consequences

This section describes the impacts of the proposed action and alternatives to the proposed action on the environment. Most impacts are from the proposed cogeneration plant.

Impacts are organized by proposed action, that is, impacts to resources from the cogeneration plant are first, followed by impacts from the transmission line and the natural gas line. Impact matrices are provided at the beginning of these impact discussions and provide an overview of predicted impacts. Impact narratives follow the matrices and provide more detailed explanations of predicted environmental consequences.

Environmental Impact Definitions - Analysts evaluated the proposed action and alternatives to determine if these actions would cause significant adverse change to present environmental conditions. A significant adverse change to present environmental conditions would satisfy one or all of these outcomes:

1. Create an effect that cannot be mitigated.
2. Significantly reduce the quantity or quality of a regionally or nationally significant resource.
3. Pose a clear risk to human health or safety.
4. Affect the long-term productivity of the affected environment.
5. Irreversibly or irretrievably damage the environment.
6. Consume significant quantities of non-renewable natural resources.

Analysts considered short-term and long-term impacts. Impacts that do not meet the definitions above, or that can be mitigated, are not considered significant.

5.1 Impacts of the Proposed Action

5.1.1 Coyote Springs Cogeneration Plant Impacts

Impacts predicted to occur from the cogeneration plant are summarized in Table 5-1. Narrative descriptions of predicted impacts are provided below.

Land Use Impacts - Cogeneration Plant

Construction of the proposed power plant would alter the land use at the proposed site from gravel mining to an industrial use. The proposed project has been sited in an industrial park and is appropriately zoned for the proposed use. Power-generating facilities are permitted uses in the Port Industrial Zone, under the Morrow County Zoning Ordinance, MC-C-2 Section 3.073 (1)(L). A land use compatibility statement for the proposed use was approved by the County of Morrow

and the City of Boardman in September 1991. The City of Boardman submitted a letter commenting on the DEIS that states that the project is in complete compliance with zoning and the City's Comprehensive Plan. Furthermore, the proposed project would be surrounded by other industrially zoned parcels. No land use conflicts or incompatibilities with existing or future industrial land uses are anticipated.

Transportation Impacts - Cogeneration Plant

Possible train derailments adjacent to the proposed project site are unlikely to impact any of the proposed facilities (Egan, 1993). With a permanent work force of 20-30 full-time employees, the proposed project would generate approximately 40-60 vehicle trips per day in the local area. Construction vehicles and equipment used in the construction of the proposed project could damage existing roads in the local area.

Mitigation - Road improvements necessary to provide access to the proposed facility could be financed and constructed by PGE in accordance with the Morrow County Street Classification policies and the County's Transportation Policy #10. Prior to any construction activities taking place, PGE could place sufficient funds in escrow to return any roads damaged during construction to their preconstruction condition.

Recreational Impacts - Cogeneration Plant

Recreational facilities and opportunities in Morrow County would not change as a result of this project (PGE, 1993).

Construction noise could cause short-term impacts; noise could increase to 68 dBA L_{max} for 4 hours (PGE, 1993). Temporary disturbance of recreational opportunities at Messner Pond may occur during plant construction due to increased noise levels. Plans to develop recreational trails and/or other facilities would not be impacted by developing the power plant near the west side of Messner Pond. No disturbance of recreational opportunities at Messner Pond during facility operation is expected, so no mitigation is needed.

Primary recreational facilities and opportunities within the 8-km (5-mile) impact area are at the Umatilla National Wildlife Refuge, Boardman Marina Park, Coyote Springs Wildlife Area, and Riverside High School. These facilities would not be impacted by the proposed plant.

The visual impact discussion describes visual impacts to recreational areas and activities.

Impact Table - Coyote Springs Cogeneration Plant

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
WATER				
Resulting from Construction Activities				
Messner Pond	Unlikely	None	NPDES requirements	DEQ 1200 C
Columbia River	Unlikely	None	NPDES requirements	DEQ 1200 C
Unnamed Irrigation Pond	Certain	Moderate	NPDES requirements	DEQ 1200 C
Resulting from Facility Operation				
Shallow aquifer water quality	Unlikely	Slight	None	Water Rights Permit
Degradation of water quality	Unlikely	Slight	City of Boardman's sewa treatment facility	None
Deep aquifer lowering of w table	Possible	Slight	None	Water Resourc Permit
Spills of fuel or other hazardous materials	Unlikely	Major	NPDES requirements	None
Fisheries impacts	None	None	NPDES requirements	DEQ 1200 C
Wetlands/Messner Pond	Unlikely	Slight	NPDES requirements	DEQ 1200 C
Boardman sewer facilities	Likely	Unknown	None	None
VEGETATION				
Habitat disturbance	None	None	Recontouring and revegetation	None
Sensitive plant species	None	None	None	None
WILDLIFE				
Fauna				
Mortality of individuals	Unlikely	Unlikely	None	None
Temporary displacement	Unlikely	Unlikely	Place fence around swall nests and plant trees o west shore of Messner Po	None
Stress in crucial life cycle times	Unlikely	Unlikely	None	None
Wildlife Habitat				
Wildlife habitat impact sh steppe	Minimal	Unlikely	None	None
FISH				
Mortality/displacement	Unlikely	None	None	None
SPECIAL STATUS SPECIES				
None found in project area	None	None	None	None

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
THREATENED AND ENDANGERED SPECIES (Federally Listed)				
Plants				
None found in project area	None	None	None	None
Wildlife				
Peregrine falcon	Unlikely	None	None	None
Bald eagle	Unlikely	None	None	None
Fish				
Salmon River fall chinook salmon	Unlikely	None	None	None
Salmon River spring/summ chinook salmon	Unlikely	None	None	None
Salmon River sockeye salmon	Unlikely	None	None	None
GEOLOGIC HAZARDS				
Seismic Hazards (Possibil that ground shaking, fault c soil liquefaction, or seism induced waves and floodin could affect the integrity c facility.)	Possible	Local area	Construct facilities accor to the Uniform Building Code, and the appropriate importance factor for essential and hazardous facilities.	Building Perm
SOIL				
Wind erosion due to remova vegetation	Slight	Localized short-term	NPDES Requirements	DEQ 1200 C
Water erosion due to remo of vegetation.	Slight	Localized short-term	NPDES Requirements	DEQ 1200 C and Plot Plan Revi Permit
LAND USE				
Land use will change from vacant to industrial.	Certain	Localized	None	None
Plant will generate approximately 50 vehicle each day.	Likely	Localized	Project proponent could f necessary road improvements.	None
Construction vehicles ma damage local roads	Unlikely	Project Area	Project proponent could f any repairs necessary t repair roads to preconstruction conditi	None
CULTURAL RESOURCES				
Historic, cultural and archeological resources	Unlikely	None	Site-specific survey	None
SOCIOECONOMIC				
Significant increase in th assessed value of Morrow County	Likely	County-wide	Positive impact	None
Construction and operation proposed project will incr employment in local area	Likely	Local area	Positive impact	None

Table 5-1
Impact Table - Coyote Springs Cogeneration Plant

Impact Table - Coyote Springs Cogeneration Plant

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
SOCIOECONOMICS Cont.				
Construction of proposed project will increase dema for temporary housing	Likely	Local area	None	None
Incremental increase in demand for law enforceme and fire protection servic	Likely	Plant/local ar	Increased property tax revenue should more tha compensate for increase demand	None
Increase in school distri enrollment	Likely	County-wide	Increased property tax revenue should more tha compensate for increase costs	None
Increased demand for libra services.	Likely	Slight-local area	Increased property tax revenue should more tha compensate for any increased demand.	None
RECREATION				
Nearby recreation sites	Unlikely	None	None	None
VISUAL AND AESTHETIC RESOURCES				
Nearby residences, Washington Highway 14, I-Columbia River, portions of Umatilla Wildlife Refuge, a the Coyote Springs State Wildlife Refuge.	Likely	Moderate	(1) Paint buildings and exhaust stacks in neutr shades to minimize visu impacts. (2) Minimize th amount of exterior lightin night. (3) Use native mat landscaping.	None
Other key observation points	Unlikely	Slight	(1) Paint buildings and exhaust stacks in neutr shades to minimize visu impacts. (2) Minimize th amount of exterior lightin night. (3) Use native mat landscaping.	None
PROTECTED RESOURCES				
Oregon DOE designated protected resources	Unlikely	Slight	None	None
PUBLIC HEALTH AND SAFETY				
Toxic and hazardous waste	Minimal	Localized area	Requirements of SPCC Pla pursuant to the Clean Wa Act	None
Electric fields	Likely	None	Standard safety precautions	None
Magnetic fields	Likely	Unknown	None	None
NOISE				
Construction noise	Likely	Significant, localized/short term	None	None
Operation noise (increase above background)	Likely	Insignificant, localized/long-term	None	None

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
OTHER ENVIRONMENTAL ISSUES				
Global warming	Likely	Slight	Control emissions by be available control technol Natural gas used as fue	None
Acid rain	Likely	Slight	NOx emission minimize with selective cataly combustion.	None
AIR QUALITY				
Particulates released duri construction	Likely	High-localized	Wet soil as needed.	None
Mist from cooling tower	Likely	Localized-slight	None	None
Criteria Pollutants				
NOx	Likely	Moderate	Analyze impacts to so vegetation and visibili demonstrate non-impact Class 1 areas. Use "bes available control technology."	Prevention o Significant Deterioration (PSD), and DEQ Air Contamina Discharge Permit
CO	Likely	Moderate	See above	Prevention o Significant Deterioration (PSD), and DEQ Air Contamina Discharge Permit
SO2	Likely	Slight	Use of natural gas	DEQ Air Contaminant Discharge Permit
TSP/PM-10 (Particulate Matter)	Likely	Slight	See above	DEQ Air Contaminant Discharge Permit
Air Toxins				
Iron, arsenic, barium, sil (cooling towers)	Unlikely	None	None	None
Ammonia (Boilers and turbines)	Likely	Slight	Selective catalytic redu system adjusted to mini ammonia release.	DEQ Air Contaminant Discharge Permit
Formaldahyde (Boilers and turbines)	Likely	Slight	Good combustion controls	DEQ Air Contaminant Discharge Permit
Odor	Unlikely	None	None	None
Photo-Chemical pollutants	Minimal	Slight	None	None

Table 5-1 (continued)
Impact Table - Coyote Springs Cogeneration Plant

Natural Resource Impacts - Cogeneration Plant

Soils and Geology

Soils - Minimal impacts to soils are expected from plant construction other than construction-related impacts such as fugitive dust leaving the site, and erosion caused by soil disturbances during construction. Determination of soil impacts are based on soil characteristics, topography, vegetation, and erosion elements including water and wind. The proposed project site is mostly flat, dry, and sparsely vegetated. Water erosion would be minimal because soils are permeable. Topsoil and vegetation must be replaced to avoid wind erosion. An Erosion and Sedimentation Control Plan was prepared for the Coyote Springs Plant by Ebasco (see Appendix H). The plan was approved by the Morrow County Planning Department on December 6, 1993. Measures such as sediment basins, sediment traps, storm inlet protection, and drainage swales would be used to control erosion and sedimentation.

Seismic Hazards - Earthquake damage to structures is based on the magnitude of the event, distance from the earthquake epicenter, type and depth of soils, degree of saturation of underlying soils, and type of construction and materials used in the structure.

The proposed project site is east of the Cascade Mountain Range in Oregon and within seismic Zone 2B, according to the 1991 Edition of the UBC. Construction must be based on the seismic zone factor Z of 0.2 (.2g-Acceleration/gravity) or greater in this area. Structures designed to pass this code are considered appropriate for occupant safety for a seismic event with a 475-year return period. However, facilities may be inoperable or unsafe. The minimum code is adjusted depending on the type of facility and soil conditions at the site.

To ensure essential facilities are operable and hazardous facilities (containing or supporting toxic or explosive substances) would not endanger the public, the seismic zone factor is multiplied by an importance factor of 1.25. The seismic zone factor for construction of this type of facility in this zone is .25 (for a seismic event with a 950-year return period).

Soil type at the plant site may raise the seismic zone factor and require an appropriate change in building construction. Soil liquefaction is a phenomenon in which loose, submerged, cohesionless soils lose strength during cyclic loading in strong earthquake ground shaking. Clay soils and an increase in the density of cohesionless soils minimizes this effect. A Standard Penetration Test (SPT) was conducted to determine the density of the soils at the plant site. (PGE, 1993.)

Seismic Risk - The Coyote Springs Project location is within seismic zone 2B. The ODOE Proposed Order, (Appendix D, page 22) requires that PGE design and construct the facility to address any estimate of peak ground acceleration which exceeds that covered by seismic zone 2B.

Ground Shaking - All non-critical buildings and structures would be designed and constructed in accordance with the latest UBC requirements with an importance factor of 1.00. All critical project structures would be designed and constructed with an 1.25 importance factor.

Fault Offset Hazard - The likelihood of surface rupture or fault offset in the project area is very remote, due to the lack of identifiable active faults in the area.

Soil Liquefaction - Loose layers of fill in upper materials at the site would be compacted to minimize the potential for soil liquefaction. The potential for liquefaction in underlying dense and very dense soils is slight.

Seismically Induced Waves and Flooding - During strong earthquakes, strong waves such as tsunamis or seiches can be generated in large bodies of water. These waves can cause substantial damage to shoreline facilities. Seiches occur in large inland bodies of water such as lakes or wide rivers.

The site is about 190 m (625 ft.) south of the Columbia River. Columbia River water levels are controlled by a system of dams to a minimum pool level of elevation 78.3 m (257 ft.) and a maximum pool level of 81.7 m (268 ft.). The plant site elevation is 86.7 m (285 ft.), which is well above the maximum pool level. An existing earth embankment for the railroad is between the river and the main plant site. The chance of seismically-induced wave damage such as a seiche, and damage from flooding is remote.

Stability - Plant operations would not impact site stability. Heavy equipment would be operated on properly designed spread footing and mat foundations. Water storage tanks would be supported on grade and on ring footing foundations. All foundations would be on compacted fill placed over the DDC-densified fill during construction. Chemical storage tanks would be surrounded by confinement barriers to contain potential spills or leakage. Barriers would be either a reinforced concrete slab with surrounding perimeter walls or a perimeter earth berm with a waterproof membrane.

Fish and Wildlife Impacts - Cogeneration Plant

Fisheries - Potential impacts to fish and wildlife during construction and operation of the proposed project were evaluated based on the likelihood that the project would cause direct mortality of individuals, temporary or permanent loss or alteration of habitat, or disturbances that may cause wildlife to avoid areas of suitable habitat.

Filling the gravel pond at the plant site would likely eliminate fish and low-quality fish habitat. The number and kind of fish impacted is not known, but would not be significant based on the poor quality of fish habitat and the limited recreational fishing that occurs there.

No impacts on water quality or fish habitat would occur in the Columbia River or Messner Pond from construction or operation of the proposed project. During operation, all wastewater from the plant would be discharged to the Port's industrial wastewater system. Wastewater with oil contaminants would be treated prior to discharge to the City of Boardman sewage treatment facility.

Wildlife - About 9 ha (22 acres) of wildlife habitat of varying quality would be permanently lost from construction of buildings and other project facilities at the main plant site. Some direct mortality of wildlife could occur during project construction. This is particularly true for less mobile species such as reptiles and small mammals, burrowing species (e.g., ground squirrels), and ground-nesting birds (e.g., lark sparrow, western meadowlark) in areas where vegetation clearing and construction equipment traffic would occur. The impact of this loss of wildlife is considered insignificant due to the low quality of habitat that currently exists there. Proposed landscaping around the site following construction would provide new, although low-quality, wildlife habitat.

During construction and operation of the cogeneration plant, wildlife use of Messner Pond could be inhibited by increased human activity. This is particularly true for species most sensitive to visual and auditory disturbances (e.g., mule deer, some raptors). However, a well-developed riparian fringe dominated by Russian olive trees surrounds much of Messner Pond, and would provide some buffering of visual and auditory disturbances from the main plant site. In addition, wildlife use of the pond and surrounding habitat currently exists with daily visual and auditory disturbances from trains, trucks, and a rock-crushing plant. These existing sources of noise and visual disturbance are closer to the pond than construction activities at the plant site would be.

PGE conducted a detailed study of cooling tower impacts to Messner Pond. Operation of the cooling tower may deposit dissolved chemicals contained within drift water droplets into Messner Pond and on surrounding vegetation. The chemicals of greatest concern, heavy metals, would either be nondetectable or only present in trace amounts. The majority of dissolved chemicals in drift water occur commonly in nature (salts). The operation of the cooling tower is not expected to result in adverse effects to Messner Pond water quality and surrounding vegetation, and any change in chemical composition within the pond would be below levels considered toxic.

Mitigation - PGE, in conjunction with ODFW, prepared an Ecological Monitoring Program. This plan is in Appendix E. This plan outlines a number of actions that will be taken to prevent project impacts to fish, wildlife and vegetation.

To provide a visual and sound buffer, PGE proposes to plant trees along the west shore of Messner Pond. The plantings would extend from the railroad embankment to the gravel pond.

If other concerned agencies or subsequent studies indicate there would be adverse impacts on fish, wildlife, or their respective habitats, PGE would develop and implement (in conjunction with ODFW) a ***mitigation*** plan and other measures as may be deemed necessary to offset anticipated impacts.

Threatened and Endangered Species Impacts - Cogeneration Plant

Federally Listed Animals - Impacts to listed threatened or endangered animal species were evaluated by Beak Consultants. A copy of their Biological Assessment in Appendix C. The bald eagle, the peregrine falcon, and three salmonoids are the only listed species known or suspected to occur in the project area. Specialists evaluated impacts using the following general criteria: potential of the project to cause direct mortality of individuals, alter suitable habitat either temporarily or permanently, or cause a disturbance (visual or auditory) that results in avoidance of suitable habitat. The Biological Assessment concludes: "the proposed action may effect, (sic) but is not likely to adversely effect (sic) individuals or populations of the bald eagle or its habitat. It is also concluded that the proposed action will not effect (sic) individuals or populations of the peregrine falcon, Snake River spring/summer chinook salmon, Snake River fall chinook salmon, and Snake River sockeye salmon or their habitat. These conclusions are based on strict adherence to the conservation measures described herein..."

Measures defined to reduce impact on listed species are described in Appendix C, and PGE has agreed to adhere to these measures. Possible actions include: erection of perch guards to protect raptors from electrocution; provide information to construction workers on minimizing disturbance; planting of trees along the shore of Messner Pond; construction of a sediment retention pond to protect water quality; monitoring wildlife impacts during construction, and if necessary, consulting with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service if unanticipated impacts occur.

BPA has reviewed the Biological Assessment and concurs with the opinion that the Coyote Springs Cogeneration Project is not likely to affect the bald eagle and the peregrine falcon. A copy of this detemination and the Biological Assessment were sent to the U.S. Fish and Wildlife Service. BPA also agrees with the no effect determination regarding impacts to threatened or endangered salmon species. BPA provided the National Marine Fisheries Service with a copy of the Biological Assessment and the no effect determination. (See also Cumulative Impacts.)

State Special Status Species Impacts - Special status species identified within the project area were described in Chapter 4. See Federally listed species if a species is listed by both the state and Federal government. Although four species of concern (American white pelican, Franklin's gull, bank swallow, and long-billed curlew) were documented to occur in the project area, only the bank swallow colony on the plant site would potentially be impacted by the proposed project.

Based on field surveys, bank swallow populations in the area appear abundant. On the railroad embankment just north of the project site, 3-4 dozen nest holes were observed. It is estimated that 12 pairs are actively using these nests. PGE proposes to build a fence to restrict pedestrian and equipment intrusion near the bank swallow colony. The fence would be a three-strand wire fence about 1.5 m (5 ft.) high and would extend about 76 m (250 ft.). The fence would be about 7.6 m (25 ft.) south of and parallel to the bank swallow colony site. The fence would have a sign that identifies the area as sensitive bird habitat. The fence would be built during the winter, prior to the first arrival of any bank swallows (April 1). Based on these measures, project construction is not expected to negatively impact the bank swallow colony.

PGE has prepared an Ecological Impact Monitoring Plan (Appendix E), in conjunction with the ODFW to insure protection of nearby vegetation, fish and wildlife. Potential measures included in the plan are: seasonal restrictions on construction within a species-specific radius of a nest site (e.g., Swainson's hawk, long-billed curlew) or colony location (e.g., Washington ground squirrel); and placement of nest platforms on transmission towers for raptors (e.g., Swainson's hawk, ferruginous hawk).

Federally Listed Plants -There are no known or suspected Federally listed threatened or endangered plant species within the project area. A survey for threatened and endangered plants, conducted during spring 1993, identified no special status plant species (see Appendix A).

State Special Status Plants - Potential impacts on special status plant species were evaluated relative to OAR 603-73-090. A survey for threatened and endangered plants, conducted during spring 1993, identified no special status plant species within the impact zone (see Appendix A).

Water Impacts - Cogeneration Plant

Construction of the proposed project could also cause erosion from stormwater or wind. Ground disturbing activities during construction of the proposed project could lead to erosion of unprotected soil, which could cause siltation of adjoining waterways. The Oregon Department of Energy's Proposed Order imposes a series of conditions on PGE relating to preventing water impacts. A copy of the Proposed Order is in Appendix D. A ***stormwater pollution prevention plan (SWPP Plan)*** was prepared by PGE and approved by Morrow County in December 1993. A copy of the plan is in Appendix G. PGE also has prepared an Erosion and Sedimentation Control Plan (see Appendix H). This plan will serve as a guide to protect water from soil disturbing activities during construction of the plant.

Surface Water - No direct impact to the Columbia River is expected from construction. Plant operation may reduce the volume of water in the alluvial aquifer and might reduce the volume of water recharging the river. Because the gradient is from the southeast to the northwest, the river is not expected to recharge the alluvial aquifer being used by the City of Boardman.

No direct impact to Messner Pond is expected by construction. Particulate deposition from cooling tower drift will not result in significant adverse impacts to Messner Pond air quality and surrounding vegetation (see Appendix I, Potential Cooling Tower Drift Effects on the Water Quality and Vegetation at Messner Pond).

Wastewater effluent from the facility would be discharged to the Port's industrial wastewater system. Effluent from the industrial wastewater system is used for crop irrigation (see Exhibit O, PGE, 1993). No adverse impact to protected areas is expected from use of this existing wastewater treatment system.

Impacts to the gravel quarry pond would be direct and long term**.** The impact would be caused by filling 1.25 ha (3 acres) of the pond with gravel (presently 4.36 ha [10.4 acres]) for the plant foundation. No impact is expected from plant operation. Mitigation for filling the pond is not expected to be required as pits excavated in dry land for obtaining fill, sand, or gravel are not regulated under the Clean Water Act (40 CFR328.3(e)) or under Oregon's Removal-Fill Law (OAR 141-85 010).

PGE has registered for coverage under the Oregon DEQ General Permit 1200 to construct and operate storm water control facilities and to discharge treated storm water to waters of the state (see Appendix G). Morrow County issued a National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permit to PGE on May 27, 1993. An Erosion and Sedimentation Control Plan (Appendix H) was submitted by Ebasco Constructors Inc. and was approved by Morrow County on November 6, 1993.

Hazardous materials would be handled on-site and transported to the site according to applicable Federal and state requirements and the Spill Prevention Control and Countermeasure Plan (SPCC Plan). Accidental release or spill of hazardous materials is unlikely, and no adverse impacts to protected areas are expected.

Groundwater - Water needs and planned sources for the Coyote Springs Plant were described on pages 3-10 and 3-11. Existing permitted Port of Morrow wells will supply the plant. Carlson Sumps 1 and 2, and Port Well #3, alluvial aquifer wells, will provide 7.2 m^3/m (1910 gpm), a majority of plants water needs. Port Well #4, an existing deep basalt well, will provide 2.9 m^3/m (758 gpm). Water withdrawals from these wells were transferred from irrigation or industrial use in order to serve the Coyote Springs Plant. Well withdrawal rates to serve Coyote Springs will not increase from their present rates. The City of Boardman has agreed to provide a back up supply of 7.6 m^3/m (2,000 gpm) of water for Coyote Springs from their Ranney Collector (also alluvial).

The alluvial aquifer transmits water quickly and impacts from pumping are generally very localized. The rate of water withdrawals from the alluvial wells will not increase from existing levels due to the Coyote Springs Plant. Thus no significant changes in groundwater levels are expected due to alluvial groundwater pumping for the plant (CH2M Hill, 1994).

The hydrologic connection between the alluvial aquifer and the Columbia River creates a condition in which pumping from alluvial wells to serve the Coyote Springs Cogeneration Project could reduce flows in the Columbia River. The maximum water demand of the plant was calculated and is equivalent to a 0.17 cms (6 cfs) reduction of groundwater inflow to the John Day pool of the Columbia. Considering that flows in the John Day pool average over 8,495 cms (300,000 cfs), a 0.17 cms (6 cfs) reduction in flow is not significant.

Pumping from Port Well #4, which draws from the deep basalt aquifer, could cause a long-term reduction in the groundwater level. If unacceptable impacts due to pumping from Port Well #4 are observed in the future, the Oregon Water Resources Department (**OWRD**) has the authority to limit further appropriations and reduce the total pumping demand based on seniority of water rights. This authority has been exercised at the Ordinance Critical Groundwater Area (**OCGA**) which is located east of the Boardman near Hermiston. The OWRD is not considering expanding the OCGA. The City of Boardman's Ranney Collector (alluvial) provides a 7.6 m^3/m (2,000 gpm) backup water supply should withdrawals from the deep basalt aquifer be restricted.

In summary, no direct adverse impacts to groundwater are attributed to the Coyote Springs Plant. See section 5.1.4 for a discussion cumulative groundwater Impacts.

Impacts to groundwater from accidental spills of toxic or hazardous substances will be minimized through PGE's SPCC Plan which will be completed 90 days prior to operation of the plant.

Air Impacts - Cogeneration Plant

The Oregon DEQ issued an Air Contaminant Discharge Permit to PGE for the Coyote Springs Plant on April 6. 1994. A copy of this permit is in Appendix F. The permit imposes a variety of conditions and limitations on operation of the project. Air emissions and resulting impacts predicted are described in the following pages and tables.

Turbine and auxiliary boiler operations would generate significant quantities of NO_x and CO as well as lesser quantities of particulate matter, sulfur dioxide and VOCs. (See Table 5-2.) The quantity of pollutants emitted from the turbines would vary with ambient air density and load conditions; the denser the air and the greater the load, the greater the emissions. Emissions from the auxiliary boilers are more consistent and vary only with load. Worst case emission rates are expected to occur in the winter because cold air is denser than warm air and because the load is higher in the winter. The values presented as Plant Site Emission Limits in Table 5-2 reflect worst case operating conditions. Varying emission rates (including worst case) were used to predict impacts to existing air quality.

Impact of criteria pollutants emitted from the proposed facility were evaluated under the Prevention of Significant Deterioration/New Source Review process. Several criteria pollutants such as volatile organic compounds, sulfuric acid and beryllium are exempt from PSD process for this facility because they would be emitted in small quantities. Two EPA-approved Gaussian

dispersion models (ISC2ST and COMPLEX1) were used to predict the proposed facility's impacts on the Boardman airshed. Impacts were predicted for oxides of nitrogen, carbon monoxide, particulate matter, ammonia and formaldehyde. The emission points considered were the two 64 m (210 ft.) high turbine stacks, and the 56 m (185 ft.) high stack serving the two auxiliary boilers. Impacts were predicted for emission rates reflecting various loads. For each load condition, three separate model runs were made, one for each of the representative ambient temperatures -5.3°, 11.6°, and 29°C (22.5°, 52.8°, and 85°F). EPA screening meteorological conditions and additional wind speed/stability category combinations suggested by DEQ were used for all modeling runs. Mixing heights were set equal to worst case conditions as determined by the EPA SCREEN dispersion model. The models receptor grid extended approximately 21 km (13 miles) from the proposed facility. Receptors were spaced at 500-m (1,640-ft.) intervals except for fenceline and maximum impact receptors (around Canoe Ridge, Washington), which were spaced at 100-m (328-ft.) intervals.

Table 5-2
Potential Annual Emissions of Criteria Pollutants

ID	Description	Maximum Operating Hours[a]	Pollutant	Emissions		Total tons/yr.	Combined Total tpy[b]
				ppm	lb./hr.		
1 2	HRSG A & HRSG B Stacks	8,760 each	NO_x CO SO_2 TSP/PM10 VOC	4.5 15 NA NA .4	30 49 1.09 9 3	130 215 4.8 39 13	<u>260</u> 430 <u>10</u> <u>78</u> <u>26</u>
3	Aux Boiler A & Aux Boiler B Common Stack	8,760 each	NO_x CO SO_2 TSP/PM10 VOC	40 200 NA NA 10	17.7 58.6 0.22 1.84 1.66	77.5 257 0.96 8.06 7.27	155 <u>513</u> 2 16 15

a. Expected operating hours:
   1. HRSG emissions - 7,760 hours/year/unit.
   2. Auxiliary boilers - 1,000 hours/year/unit.

   Note: There may be cases where one turbine and one auxiliary boiler would operate simultaneously. However, the emissions from this operating scenario will not exceed the case where just two turbines are operating simultaneously.

b. Underlined values are proposed annual plant site emission limits (PSELs). Figures are rounded off to the nearest whole number.

NA - not applicable.

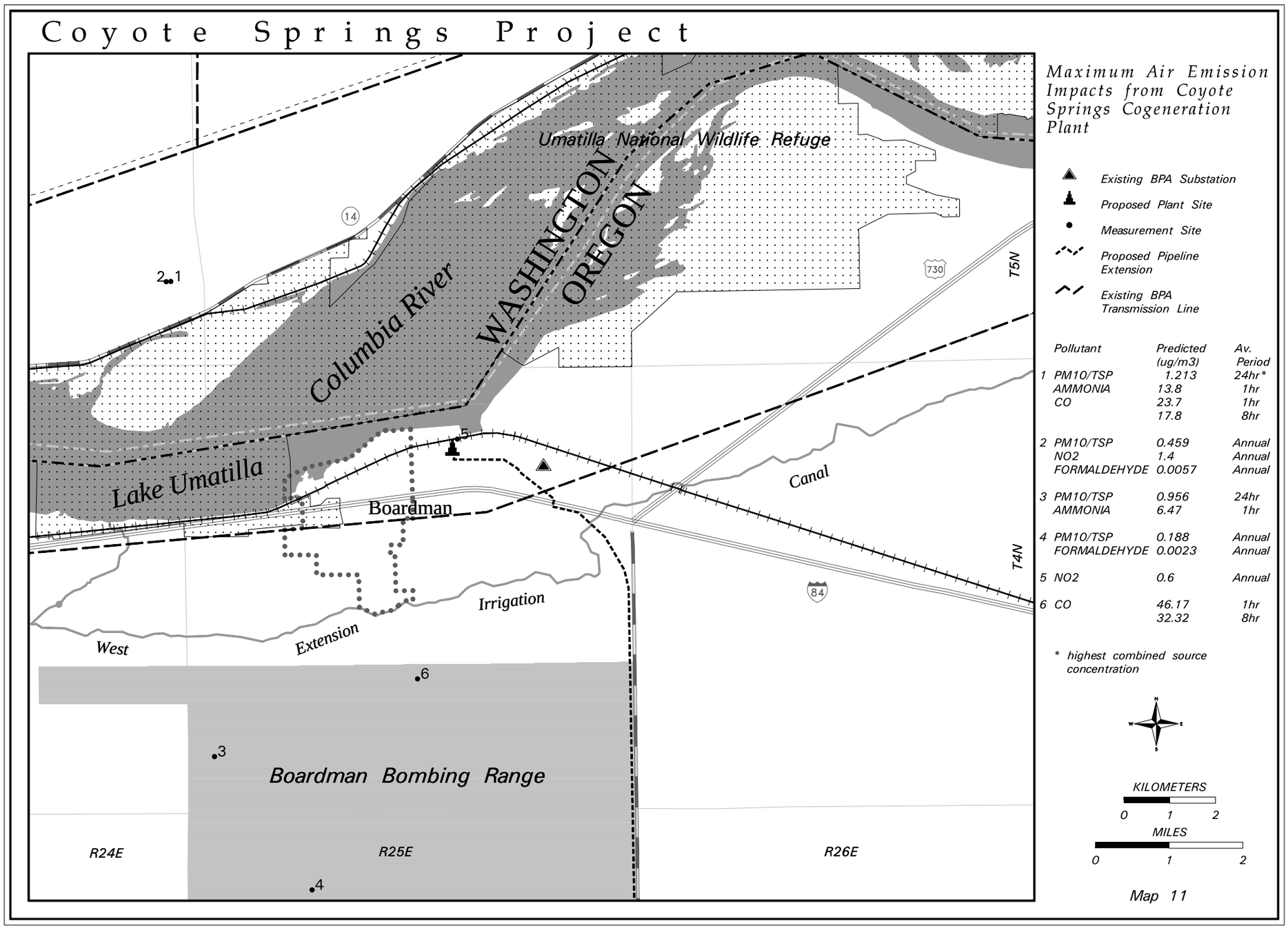
Maximum predicted ambient concentrations due only to proposed facility emissions are shown on Map 11. Canoe Ridge, 7.2 km (4.5 miles) northwest of the proposed facility in Washington, had the highest predicted impacts. Ambient concentrations on Canoe Ridge were predicted to be: NO_2 1.4 ug/m³ (annual average), PM-10 1.2 ug/m³ (24-hour average), CO 23.7 ug/m³ (1-hour average), ammonia 13.8 ug/m³ (1-hour average) and formaldehyde 0.0057 ug/m³ (annual average). The EPA NO_2 Significant Impact Level (40 CFR 51.165 (2) b (2)) is exceeded in Washington. Exceedance of the NO_2 significant impact level triggers the requirement for more comprehensive modeling of other competing NO_2 sources in the airshed (see discussion below). Predicted ambient concentrations of other priority pollutants did not exceed state or Federal significant impact levels, indicating that emission of these pollutants from the proposed facility would not significantly impact existing air quality. The maximum predicted PM-10 concentration in Oregon (0.956 ug/m³ - 24-hour average) approached the Oregon Significant Impact Level of 1 ug/m³ (OAR 340-20-220). Also note that the maximum Washington 24-hour PM-10 concentration (1.2 ug/m³) exceeds the Oregon significant impact level. See Map 12 for NO_2 contours and locations of maximum impact.

NO_2 competing-source modeling was accomplished for 37 significant NO_2 sources in the region, including two natural gas-fired cogeneration plants proposed for the Hermiston area. Competing-source modeling determined the amount of PSD increment remaining in the airshed after all proposed facilities are operational. The modeling also determined if the NAAQS would be exceeded. The entire airshed, with existing and proposed sources, would consume 13.6 percent of the available 25 ug/m³ NO_2 increment. PGE's Boardman Coal Plant and the NW Pipeline compressor station in Benton County, Washington 25 km northeast of Boardman are included in the computer modeling, but do consume increment because they were built prior to EPA's PSD regulations. The amount of NO_2 increment consumed by the Coyote Springs facility is 1.16 ug/m³. The maximum combined impact of the proposed facility and the 37 other NO_2 sources including the Boardman Coal Plant but not the compressor station, was predicted to be 31.4 ug/m³ NO_2 (annual average), occurring 500 m (1,640 ft.) southwest of the proposed facility. DEQ has determined that this area's background NO_2 concentration is 30 ug/m³. The predicted NO_2 combined impact (31.4 ug/m3) coupled with background concentration gives a total maximum impact of 61.4 ug/m³. The NAAQS NO_2 standard is 100 ug/m³.

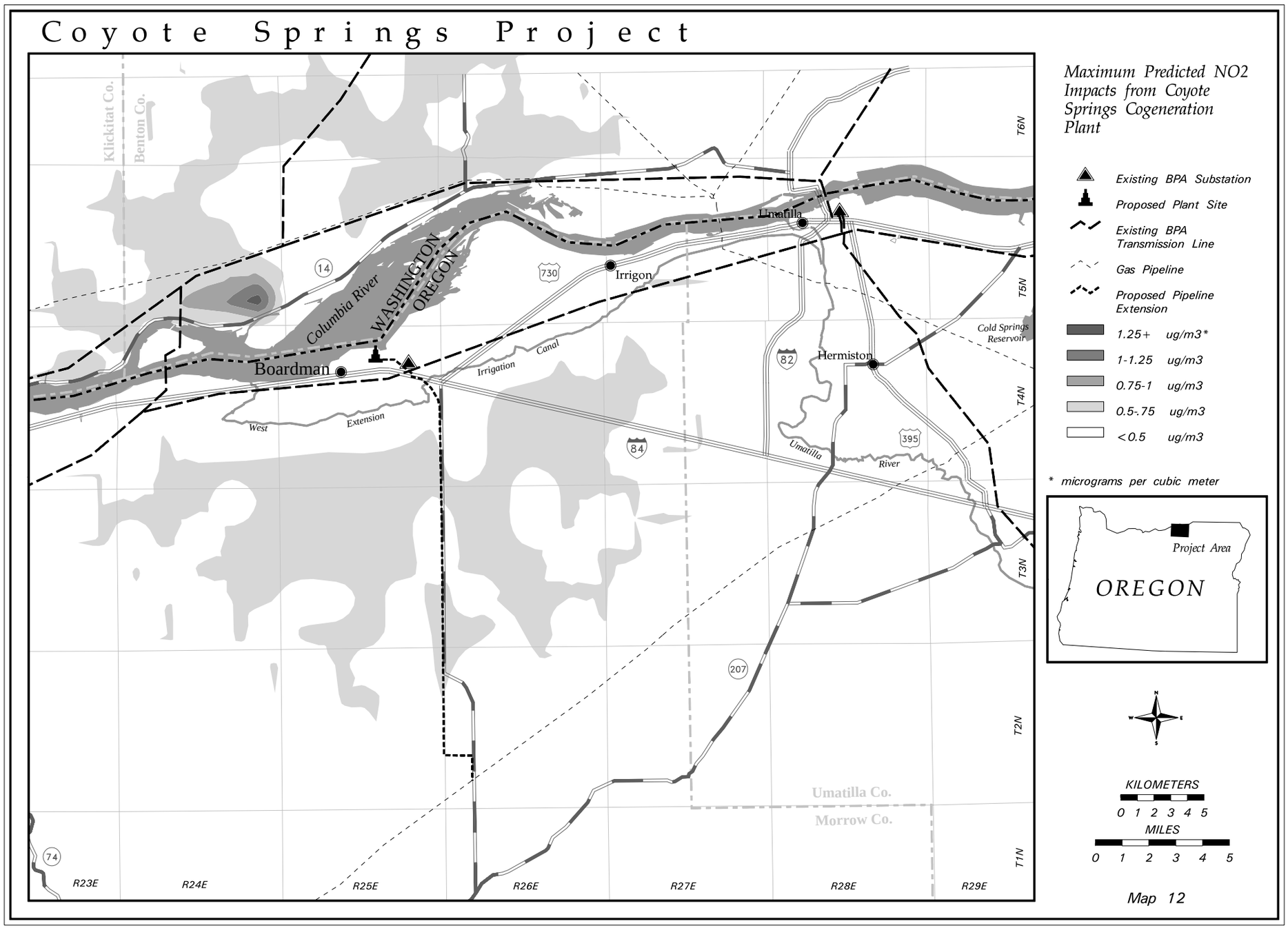
Chester Environmental also performed combined source modeling which included both the compressor station and the Boardman Coal Plant. With the compressor station, the highest predicted NO_x impact was located near the compressor station and was 485 ug/m³. The Coyote Springs Plants contributes only 0.135 ug/m³ (or 0.03 percent) to this total.

The NAAQS are designed to protect human health and the environment. Because none of the NAAQS would be exceeded in the Boardman airshed because of the proposed project, no measurable effects to local vegetation, soils, wildlife or human health should be expected to occur as a direct result of facility emissions. The NAAQS are exceeded in the vicinity of the compressor station. This exceedence may be affecting local vegetation/wildlife, however the proposed facility has insignificant impacts on this area's air quality.

Map 11. Maximum Air Emission Impacts from Coyote Springs Cogeneration Plant.



Map 12. Maximum Predicted NO2 Impacts from Coyote Springs Cogeneration Plant.



Odor - Ammonia is the only pollutant emitted from the proposed facility in significant quantity to possibly pose an odor problem. The highest predicted one hour ammonia concentration in Oregon was 6.47 ug/m³**,** and 13.8 ug/m³ in Washington, which are below the odor threshold for ammonia (26.6 ug/m³). No odor impacts are expected.

Class I Areas and National Scenic Areas - The Valley screening mode of COMPLEX1 was used to predict the potential impacts to Class I areas. Modeled impacts were well below PSD Class I increments for all criteria pollutants and below detection limits in most cases. Model predictions indicate that there would be no measurable impacts to these sensitive areas from the criteria pollutants emitted by the proposed facility.

Effects of NO_2 on plant life in these Class I areas were also considered. Maximum modeled impacts of NO_2 are at least two orders of magnitude below the U.S. Forest Services' *No Impact Level* for lichen and all plant species. Impacts on aquatic resources in Class I areas are also expected to be nondetectable.

EPA-recommended visibility analysis model VSCREEN was used to evaluate the visibility impacts of the proposed facility on nearby Class I areas. Modeled results predict that the proposed facility would not adversely degrade visibility in the nearby Class I areas or in the Columbia Gorge Scenic Area.

Because no protected area is closer than 6 km (4 miles) to the proposed plant, no significant impacts are expected.

Air Toxics - Chester Environmental estimated emission rates of air toxics from the proposed facility (see Tables 5-3 and 5-4). Emission rates for the boilers and the turbines were derived from one of two methods: the California Air Resource Board Speciation Manual, or by using emission factors based on heat input published in EPA's *Toxic Air Pollutant Emission Factors* (EPA-450/290-011). Ammonia emission rates were provided by the selective catalytic reduction unit vendor (Peerless). Emissions from the cooling tower were calculated using mass balance techniques.

Calculated emission rates were compared to DEQ's significant emission rates. Dispersion modeling must be performed for all compounds emitted from new sources which exceed these rates. Dispersion modeling predicts the pollutants' ambient concentration. From this prediction an estimate of the environmental impacts can be made. Emissions less than the specified significant emission rates are presumed to have an insignificant effect on the environment. Only two toxic compounds were found to exceed the significant emission rates: formaldehyde and ammonia. Ammonia generated from the selective catalytic reduction unit is estimated at 434.4 tonnes (427.5 tons/year). Formaldehyde, a by-product of natural gas combustion, is estimated at 1029 kilograms (2,269 pounds)/year. Impacts from these two pollutants were modeled using an EPA-approved model (ISC2).

Table 5-3
Emission Rates for Known and Suspected Carcinogenic Pollutants

Pollutants of Concern	Total Emissions Firing Turbines[a] (lb/yr)	Total Emissions Firing Auxiliary Boilers[b] (lb/yr)	Total Emissions Firing Both (lb/yr)	DEQ Significant Emission Level (lb/yr)
Benzene	174	234	408	3,100
Formaldehyde	1,716	553	2,269	2,000

a. Assumes 7,760 hours/year/turbine multiplied by emission rate (lb/hr) in Table 5-3.
b. Assumes 1,000 hours/year/boiler multiplied by emission rate (lb/hr) in Table 5-3.

The highest predicted formaldehyde concentration in Oregon was 0.0023 ug/m³, at a location on the bombing range approximately 10 km (6.2 miles) south-southwest of the proposed facility (see Map 11). At this low level the only concerns are long-term health effects such as cancer. This concentration has an associated cancer risk of 2.49×10^{-8}, nearly two orders of magnitude less than EPA's acceptable risk level of one in a million (1×10^{-6}) excess cancer cases. The highest formaldehyde concentration in Washington was 0.0057 ug/m³ at a location on Canoe Ridge (see Map 11). Formaldehyde emissions would not harm plants or animals.

The maximum predicted one hour ammonia concentration in Oregon was 6.47 ug/m³ at a location on the bombing range approximately 8 km (5 miles) southwest of the facility. This one hour impact corresponds to a 4.5 ug/m³ 8-hour average. Oregon's acceptable ambient concentration for ammonia is 170 ug/m³ (8-hour average). The maximum ammonia concentration in Washington was 13.8 ug/m³ (1-hour average) at a location on Canoe Ridge. Washington's Acceptable Source Impact Level for ammonia is 59.9 ug/m³ (24-hour average) and 0.077ug/m³ (annual average) for formaldehyde. Both the Oregon and Washington maximum predicted ammonia impacts are an order of magnitude below state safety thresholds and an order of magnitude below the inhalation ***No Observed Effects Level (NOEL)*** (Integrated Risk Information System December 1993). Maximum predicted ammonia concentrations would not adversely effect animals or plants. Maximum impact locations are presented on Map 11.

Table 5-4
Emission Rates for Non-Carcinogenic Pollutants

Pollutants of Concern	Total Emissions Firing Turbines[a] (lb/8 hr)	Total Emissions Firing Auxiliary Boilers[a] (lb/8 hr)	DEQ Significant Emission Level (lb/8 hr)
Ammonia (NH_3)	390.4	0	31
N-Butane	2.04	4.7	3,500
Cyclohexane	0	0.50	1,920
Hexane	0	0.5	3,210
N-Pentane	0.2016	3.1	3,300
Pentane	0.2016	4.7	3,300
Toluene	0	0.9	685
Chromium (Cr)	0.07	0	0.9
Cobalt (Co)	0.07	0	0.09
Copper (Cu)	0.07	0	2
Manganese (Mn)	0.07	0	6
Mercury (Hg)	0.00	0	0.2
Nickel (Ni)	0.07	0	2

a. Based on converting emission rates in Tables 7-1 and 7-2 to lb/8 hr. Emissions presented are from both turbines

Air Impacts from the Cooling Tower - An analysis of potential cooling tower drift effects is in Appendix I. Air toxins emitted from the cooling tower are presented in Table 5-5. All listed pollutants are emitted in small quantities and no impacts are expected to result from their release. Tolyltriazole, acrylate copolymer and potassium hydroxide are chemicals are corrosion/deposit inhibitors. Potassium Hydroxide, tolyltriazol and acrylate copolymer are not assigned Oregon significant emission rates, Washington acceptable source impact levels or Oregon acceptable ambient concentrations. However, Washington's acceptable source impact level for potassium hydroxide is 6.7 ug/m³-24-hour average.

A hard-water mist, 5.0 liters (1.32 gal.)/minute with 2400 mg/L total dissolved solids would be emitted from the cooling tower. The volume of mist and distance the mist would travel before evaporating or condensing would vary with ambient temperature and humidity. Less mist would be emitted on cold, moist days than on warmer days. During damp, cold periods, the mist emitted would condense and deposit relatively close to the tower. During sunny, hot weather the mist would rapidly evaporate and disperse into the atmosphere.

Fogging would take place during cold moist periods and is expected to occur occasionally on Ullman Boulevard west of the plant but is not expected to occur on I-84. On average, the mist is expected to evaporate within 305 m (1000 ft.) of the tower, leaving behind a small amount of dissolved solids to disperse as particulate matter 130 kg (280 lb). (PGE, 1993.) Moisture emitted from the cooling tower which condenses and impacts the ground is called drift. Drift from the cooling tower would amount to one gallon/minute. The dissolved solids would contain small amounts of iron, silica, arsenic and barium (see Table 5-5). In addition, small amounts of tolyltriazole, acrylate copolymer and potassium hydroxide (corrosion inhibitors/ deposit control agents) would be emitted. The small amount of pollutants emitted from the tower would have no impact on the Boardman airshed.

Air Impacts from Construction Operations - Emissions generated during construction of the proposed facility would originate from temporary fuel oil tank(s), construction equipment, fugitive dust, and vehicles used by workers to commute to the site. Vehicle exhaust connected with construction operations would be insignificant compared to exhaust generated by traffic on I-84, located directly south of the proposed facility. Fugitive dust generated by construction operations would be minimized by soil wetting on an as-needed basis. Though dust would be controlled, there is expected to be some adverse, but short-term effects on local air quality during the early phases of construction.

Global Warming - Gases thought to contribute to global warming are commonly referred to as "greenhouse" gases. Greenhouse gases include: CO_2, methane (CH_4), nitrous oxide (N_2O), NO_x, non-methane VOCs and stratospheric ozone depleting substances such as chlorofluorocarbons.

Table 5-5
Calculated Cooling Tower Emissions

Chemicals	Water Concentration (mg/L)	Air Emissions (tons/year)	DEQ Significant Emission Rate (tons/year)	Oregon Air Regulations Citation
Total Dissolved Solids	2084	6	15 (jPM-10)	340-20-225
Total Suspended Solids	5.3	0.02		
Calcium	779	2		
Magnesium	476	1		
Sodium	205	1		
Iron	1.9	0.01		
Copper	ND	ND		
Zinc	ND	ND		
Chloride	168	0.49		
Sulfate	1085	3		
Phosphate	15.7	0.05		
Silicate	149	0.43		
Potassium	19.2	0.06		
Nitrate	9.8	0.03		
Antimony	ND	ND	5	340-32-450
Arsenic	0.042	0.0001	0.005	340-32-450
Barium	0.49	0.001		
Beryllium	ND	ND	0.008	340-32-450 (0.0004 in 340-20-225)
Cadmium	ND	ND	0.01	340-32-450
Chromium	ND	ND	5	340-32-450
Lead	ND	ND	0.6	340-32-450 (same in 340-20-225)
Mercury	ND	ND	5	340-32-450 (0.1 in 340-20-225)
Nickel	ND	ND	1	340-32-450
Selenium	ND	ND	1	340-32-450
Thallium	ND	ND		
Acrylate Copolymer	10.2	0.03		
Tolyltriazole	3.9	0.01		

ND - not detected.

The quantity of CO_2 emitted when fossil fuels are burned is proportional to the carbon content of the fuel. The more carbon present, the more CO_2 emitted. The proposed plant would use natural gas to fire the combustion turbines. Natural gas is primarily composed of methane, which contains one carbon atom and four hydrogen atoms. Because of its low carbon content, natural gas combustion produces about 40 to 50 percent less CO_2 than coal and approximately 25 percent less than petroleum products (Cornot-Gandolphe, 1993).

As mentioned above, the plant would use methane to fire the turbines. Methane is at least 20 times more potent a greenhouse gas than CO_2. Because of this, it is important to keep methane releases to a minimum. Methane emitted from the world's natural gas pipelines and natural gas mining operations is less than 10 percent of methane emitted from natural sources such as tundra, swamps, forest floors, termites and cows (Sheppard, et al., 1982). In addition, most natural gas leaks occur within residential distribution systems and not in wholesale distribution systems such as the one linked to this plant. New techniques have virtually eliminated methane escape during drilling.

The source of natural gas for the proposed cogeneration plant is from actively producing gas fields in Alberta and British Columbia, Canada. The number of natural gas wells that would be needed to supply PGE requirements was estimated by PGT. The average total yield of Canadian natural gas wells was divided into the total requirements of the Coyote Springs Plant (41 billion BTUs per day). Using this method, the output of 16 gas wells would be used each year by the Coyote Springs Plant (PGT, 1993). For perspective, 4,000 Canadian gas wells were drilled in 1991 and the total number of wells in Canada number in the hundreds of thousands (PGT, 1992). Thus the Coyote Springs Plant would use only a small amount of gas compared to that available in Canada. The world's proven reserves are expected to last approximately 58 years at the present consumption rate (*Inside Energy/with Federal Lands, 1993*).

Emissions of NO_x from the facility would be controlled by best available control technology.

Reducing greenhouse gas emissions also involves energy conservation. If less fossil fuel is consumed, fewer pollutants are generated. Cogeneration facilities are considered energy efficient because excess steam generated from power production is used by nearby industries that would otherwise generate their own steam, which would consume energy.

President Clinton has committed the United States to reducing its greenhouse gas emissions to 1990 levels by the year 2000. The Clinton administration has issued a Climate Change Action Plan to accomplish this objective. The plan encourages the use of natural gas as opposed to other fossil fuels, for power generation, energy conservation measures, and reforestation projects. Currently, PGE does not plan to offset plant CO_2 emissions with reforestation.

In summary, the proposed plant's comparatively low CO_2 emissions, the gas industry's low percentage of losses in the wholesale gas distribution system, the plant's control of NO_x and N_2O emissions, and the facility's cogeneration capability combine to minimize the plant's global warming impacts. However, plant impacts could be further reduced by reforestation.

Acid Rain - SO_2 and NO_x are the main precursors to acid rain. The proposed facility would emit significant quantities of NO_x but not SO_2. NO_x emissions are being minimized by selective catalytic reduction. The selective catalytic reduction process not only reduces NO_x emissions, it also releases ammonia into the atmosphere. Ammonia has the capacity to act as a buffer and helps minimize nitric acid (acid rain) formation. Because of these factors, the proposed plant is not expected to significantly contribute to downwind acid rain.

Photochemical Pollutants - NO_x and VOCS emitted from the proposed facility can form other pollutants in the presence of sunlight. During stable atmospheric conditions, when sufficient quantities of ultraviolet light are present, NO_x can form detectable levels of tropospheric ozone, peroxyacetal nitrate and peroxybenzoyl nitrate, which are respiratory and/or eye irritants at elevated concentrations. In addition, these pollutants, along with NO_2, form aerosols that reduce visibility and give the atmosphere a brownish cast. Most volatile organic compounds emitted from the facility can form ozone in the presence of ultraviolet light. Volatile organic compounds are not emitted in large enough quantities to form detectable levels of ozone. Photochemical pollutants from plant emissions are expected to have a negligible impact on the Boardman airshed and no detectable impact on human health.

There are several reasons why photochemical pollutants would not accumulate in this area: (1) this area is rural and does not generate many pollutants, (2) at this latitude, high angle radiation necessary for photochemical pollutant formation only occurs during a short period of the year, (3) wind channeling by the Columbia River prevents pollutant build up, and (4) stable atmospheric conditions (necessary for pollutant buildup) only occur in this area approximately 5 percent of the year, predominately during night and early morning hours when UV radiation is absent or at too low of an angle to generate photo chemical pollutants (Thorkildson, 1993). Aerosols formed from photochemical pollutants and NO_2 may have some impact on local visibility during stable atmospheric conditions.

Vegetation/Wetland Impacts - Cogeneration Plant

Appendix I presents an analysis of potential cooling tower drift effects on water quality and vegetation. Impacts to wetland plant communities are not expected to be significant.

Socioeconomic Impacts - Cogeneration Plant

The construction, operation and maintenance, and eventual decommissioning of a major cogeneration facility can create both short-term and long-term impacts on the social and economic resources in a community. Socioeconomic impacts have been separated here into short-term impacts (preconstruction/construction/maintenance and decommissioning) and long-term impacts (facility operation). The study area to identify these impacts includes portions of Morrow and Umatilla counties in eastern Oregon.

Short-term socioeconomic impacts would include those impacts associated with construction of the proposed project, so-called "boom/bust" effects. Long-term impacts would include impacts on population, housing, employment, and impacts on local government services and infrastructure such as schools, health care, library services, solid waste disposal and water and sewer services.

It is difficult to forecast the short-term socioeconomic impacts related to large construction projects in rural areas. Uncertainties such as labor disputes, material shortages or weather-related problems may affect the peak level of the number of construction workers. Construction employment is the key variable affecting socioeconomic impacts for the short term.

Other impacts could include secondary impacts on the local economy, such as an increase in the supply and demand for goods and services, which could affect the price of these goods and services; an increase in crime with an increased population; and the temporary disruption to the agricultural resource from crop disturbances. Secondary impacts related to the construction work force are expected to be minor.

Increase in Tax Revenue - Construction and operation of the proposed project would significantly improve the assessed value of taxable property in Morrow County, and increase the local property tax revenues received by Morrow County. With PGE's capital investment of between $150 and $300 million depending on whether the utility constructs one unit or two, the assessed value of real property within the county would be expected to increase from 20-40 percent. BPA, as a Federal agency, pays no local property taxes so no revenue would be received by the county from BPA's new transmission facilities. BPA's investment in the proposed project, however, is negligible.

The proposed project is within Morrow County tax code area 25-04, one of 33 tax code areas within the County. The current tax rate (for tax year 1993/94) for this tax code area is $21.24. The actual ad valorem taxes that can be collected under Oregon's Measure 5, has been reduced to $17.85/per thousand of valuation (for this particular tax code area) for tax year 1993/94. Assuming the first tax year that the proposed plant would be assessed property taxes would be tax year 1995/96, the maximum amount that could be collected for the Morrow County School District would be $5.00 per thousand, plus any bonded indebtedness, and $10.00 per thousand for general government, plus any bonded indebtedness. Bond levies are unaffected by Measure 5.

Property taxes generated by the proposed plant would likely range between $750,000 and $1,500,000 annually (in 1993 dollars) for the Morrow County School District, and between $1,500,000 and $3,000,000 for general county government, plus any bonded indebtedness, depending on whether PGE completed one or both units. Tax revenue received by the County would be shared with the City of Boardman (Sweek, August 1993).

Although the new revenue would be a significant increase in the amount of local taxes received by the county, it is doubtful, according to the Oregon Department of Revenue, that the increase would have the effect of reducing individual tax burdens, due in part to limitations placed on individual taxing districts by Measure 5. New revenue could reduce individual taxes, however, if the total amount collected exceeded the amount required by individual taxing entities (Oregon Department of Revenue, August 1993).

Although the state does not receive any property tax revenues generated at the local level, the state would likely benefit from the proposed project because the state's contribution to Morrow County School District, if any, as a result of the reductions required under Measure 5, are likely to be less with the plant than without it. The state needs to make up the difference of what is collected under Measure 5, and the actual cost of operations of the Morrow County School District, as well as the other 266 school districts in Oregon. Differences have not been computed, because of the number of unknown variables.

Population - The proposed project is not expected to add significantly to the area's population. Assuming half of the permanent jobs come from outside the local area, an added 12 employees and their families would relocate to the area. Assuming 2.5 persons per household, this increase would be 30 individuals. Since this would be a population increase of less than 1 percent of Morrow County's population, there would be a negligible impact to the local population.

Employment - Construction of the proposed plant would likely take place over an 18-month period beginning in 1994. Construction of the power plant and attached substation/switchyard would peak with about 200 construction workers (Mayson, August 1993). In addition, about 130 construction workers would be required to construct the gas transmission line required to serve the facility, and another 20-25 construction workers would be required to construct BPA's portion of the project. While construction of the gas transmission line is expected to last five to six weeks (PGT, May 1993), construction of BPA's portion of the project is expected to be completed in one month or less.

As many as 355 construction workers are expected to work on various portions of the project, but not at the same time. While the three projects are expected to be constructed concurrently, peak employment could reach a total of 355 workers, depending on whether the peak period for the construction of the power plant coincides with construction of the gas pipeline. Because of the number of variables involved, it is difficult to accurately predict the actual number of construction workers in the area during the peak construction period.

Plant operation is expected to create about 20-30 full-time positions over the life of the facility. Three shifts are anticipated to be necessary to operate the plant: 16-20 workers during the day shift, and the remainder during each of two subsequent shifts. While this level of employment would not be considered to be a significant impact on the local area's employment base, due to the existing size of the labor force (28,000), it is considered a positive impact on employment in the local area.

Housing - The influx of non-local construction workers would likely affect the demand for temporary housing facilities in the local area. Construction of the proposed project and related facilities would require 355 workers, most likely from outside the local area. Construction is anticipated to begin in 1994 and be completed in 1995.

It is difficult to predict where construction workers would come from in advance of the award of a construction contract. It is assumed most craft workers would originate from the Tri-Cities area of southeastern Washington. Most individuals would likely commute to Boardman daily. Some of the workers would come from the local area. Some craft workers and laborers would be found in the local labor force. Craft workers would leave when their work is accomplished, to be replaced by other crafts persons. Not all of the construction work force would be present in the area at the same time.

A sufficient supply of temporary housing exists in the area to provide for the temporary housing needs of the non-local construction workers and their families. Because all facilities would likely be constructed concurrently, the vacancy rate is expected to be low, especially during the summer months of 1994-95.

The 1990 Census identified nearly 800 vacant units of rental housing (including both apartment units and single-family structures) in Morrow and Umatilla counties. In addition to these housing units, there are 11 motels that supply about 490 motel rooms in the Hermiston, Umatilla, and Boardman area. There are 20 mobile home parks in the Pendleton, Milton-Freewater, Umatilla, and Hermiston area, with seven RV/mobile home parks in the Hermiston area alone. All are within 70 km (45 miles) of the City Boardman. According to the Electric Power Research Institute (EPRI), which studied socioeconomic impacts from power plant construction and operation, including the Boardman power plant, construction workers frequently commute up to 97 km (60 miles) daily to project sites.

The City Manager of Boardman believes the 200-person construction workforce would create no problems for the City of Boardman. Mobile home parks and motels in the City, and the City itself, have been preparing for the influx of construction workers. (Palmer, 1993.)

Impact on Essential Government Services - Cogeneration Plant

Law Enforcement - Although the proposed project would likely increase the demand for law enforcement services over the life of the project, the Sheriff's Office does not feel this project alone would cause the county to hire additional law enforcement personnel (Morrow County Sheriff's Office, August 1993). Additional property tax revenue expected to be apportioned to the County Sheriff's Office from this project should offset any added costs caused by the proposed project.

Fire Protection - The facility would be designed to meet the code requirements of the UBC, as amended, by the state of Oregon and the National Fire Protection Association (NFPA) Standards. In addition, each gas turbine generator enclosure is protected by a self-contained, low pressure, CO_2 fire protection system. Various sensors would be provided as part of the system to automatically actuate the CO_2 fire protection system. An existing 7,600 m^3 (2 million gal.) water tank about 1 km (0.6 mile) south of the proposed site would also be available for fire suppression.

The permanent on-site work force would be trained in hazardous materials training, as are Boardman Rural Fire Protection District personnel (PGE, 1993).

Water Service - The Port will serve the water needs of the Coyote Springs Project from existing permitted wells. The Port estimates that there is approximately 3.8 m^3/m (1,000 gpm) of undedicated capacity available. The City of Boardman will supply up to 7.6 m^3/m (2,000 gpm) of unused capacity to the Port of Morrow for delivery to Coyote Springs. The City of Boardman has a water right for 61 m^3/m (16,000 gpm) of which only 25 m^3/m (6,600 gpm) is reported to be developed. Thus, the water service capability of the Port and the City of Boardman should not be adversely impacted by Coyote Springs.

Sewer Service - The proposed project is expected to generate about 33 m^3 (8,640 gal.) of sanitary wastewater per day into the City of Boardman's sewage treatment facility. (PGE, 1993.) Wastewater would flow through a 50-cm (20-inch) industrial sewer pipe just south of the proposed plant site. According to the City Manager, the sewer line and treatment facility are sufficiently sized to handle the sanitary wastewater that would be generated by the proposed plant. The City's sewage treatment facility is currently processing about 1136 m^3 (300,000 gal.) per day, with a capacity of 1520 m^3 (400,000 gal.) per day. The additional sanitary wastewater would not adversely impact the City's sewage treatment facility.

Sanitary waste generated during construction of the proposed project would be discharged into chemical facilities. These portable units would be pumped out periodically by licensed contractors into transport vehicles.

Education/Schools - The proposed project would likely impact the Morrow County School District by increasing student enrollment. The school district has recently completed a study that revealed an annual cost increase of $4,500 (in 1993 dollars) for each student added to the existing student enrollment within the district. Because the proposed plant would create an added 20-30 permanent new jobs in the area, not all filled with members of the Morrow County-Umatilla County labor force, it is likely a portion of the new residents would create an increase in the existing student enrollment, and increase district costs.

Because the proposed project would generate a minimum of an additional $750,000 in property tax revenue (in 1993 dollars) to the County-wide school district each year, the proposed project would need to impact the school district by more than 165 students before it would negatively impact the school district's budget (166 @ $4500 = $747,000).

If at least half of the new hires come from outside the Umatilla-Morrow County area, the in-migrants would need to impact the school district with more than an average of eleven students per household (15 x 11 = 165) to create a negative financial burden on the school district. This is unlikely. The proposed project would likely have a beneficial impact on the school district, and the state. Because the state has the responsibility of making up budget shortfalls experienced by school districts across the state, the state would also benefit by the proposed project because its financial responsibility would likely be less.

Library Services - The proposed project would have an impact on the demand for library services offered by the two libraries within the Oregon Trail Library District. The district presently employs four part-time employees, and a full-time director. While the proposed project alone would likely not create the need to hire additional library staff, the additional growth from a portion of the new employees who would relocate to the local area would put an increased demand on library services. This demand, along with the increased demand from growth that would occur because of the plant, would likely create the need for either a new position or an increase in hours worked by existing staff (Oregon Trail Library, August 1993).

The increased property tax revenue received by the library district would likely more than offset any costs incurred by the library as a result of the proposed project. No negative impacts to the library district are anticipated.

Health Care - Health facilities in the local area are sufficiently staffed to handle any medical needs that may arise both for short-term construction personnel and for the increase in the resident population from the proposed project.

Solid Waste Disposal - The proposed plant is expected to generate about 275 kg (600 lb) of solid waste per month. This amount should not create a burden on the Finley Butte Landfill.

Impacts to Other Government Services - Other government services, such as maintenance of the County road system, vector control and the cemetery district, would receive tax revenue that would likely offset any increased costs in services. Though the proposed plant site is outside the City of Boardman, Morrow County government shares tax revenues received with other affected jurisdictions. According to the EPRI study mentioned previously on the socioeconomic impacts from 12 power plants, including the Boardman coal-fired power plant, impacts from the Boardman power plant have been minimal. Some impacts to the school district and to county roads were mentioned, but the report stated that the county road system was in poor repair prior to construction of the power plant and a bond issue had been recently passed to construct two new schools and to expand others within the District (EPRI, 1982).

Impacts to Columbia River Hydroelectric Energy Production and BPA Rates

Reduced Energy Production - It is estimated that the Coyote Springs water withdrawal of 0.17 m^3/s (6 cfs) would have produced 1,000,000 kilowatt hours of electricity annually if allowed to remain in the Columbia River. Assuming the other proposed turbine generators are built and have an equivalent effect, 3,000,000 kilowatt hours of generating capability would be foregone.

Rate Impact - The average value of the lost energy production (1,000,000 kilowatt hours) is assumed to be 60 mills based on 1993 replacement costs. At this rate annual lost revenues would be $60,000. BPA would charge PGE $3-4 million annually for wheeling power from each of the two Coyote Springs units. Thus the Coyote Springs Plant would have a positive impact on rates. BPA uses the following rule of thumb to calculate the impact of expenditures and income on rates: each $100 million dollar change in annual costs or revenues will contribute one mill to BPA's rates. Neither a $60,000 reduction in revenues nor a $6-8 million increase in revenues would have a discernible effect on BPA rates.

Health and Safety Impacts - Cogeneration Plant

Air Emission Impacts to Public Health - The extent and magnitude of toxic air pollutants being released to the atmosphere from the plant were evaluated by Chester Environmental (see pages 5-15-16). Results are summarized in Tables 5-2 through 5-4. The plant would exceed the significant emission rates for NO_x, formaldehyde, a suspected human carcinogen, and ammonia, a non-carcinogenic pollutant. Pollutants exceeding the significant emission rate were modeled for ambient impact. Ambient concentrations of these pollutants pose no human health risks. Modeled ambient impacts of these pollutants are presented in Map 11.

Toxic or Hazardous Materials - A variety of toxic or hazardous materials will be used at the Coyote Springs Plant. A SPCC Plan will be prepared 90 days prior to beginning operation of the plant (PGE, 1994). The following hazardous wastes are expected to be produced from the project:

- Used lead acid batteries
- Spent Selective Catalytic Reduction (SCR) Catalyst
- Oily rags, oil absorbent materials
- Used hydraulic fluids
- Boiler cleaning waste
- Waste oil

Used batteries and spent SCR catalyst are only produced when the equipment has served its useful life and requires replacement. Batteries are used as a source of backup power for plant system controls and safety-related equipment functions. Typical battery life is expected to range from 10-15 years. Used batteries would be shipped to vendor recycling facilities for recycling to minimize the final amount of waste materials requiring disposal at a hazardous waste disposal site.

SCR catalytic systems are used to convert NO_x in the gas turbine exhaust into nitrogen and water vapor. The catalyst system contains heavy metals that are considered hazardous materials. SCR catalysts would be shipped to a hazardous waste disposal facility. The amount of waste catalyst materials generated would be minimized by using clean-burning natural gas and through proper operation and maintenance of system components.

Oily rags and oil absorbent materials would be generated if and when oil spills occur. The plant would be operated and maintained according to rigid written operations and maintenance procedures by qualified and properly trained personnel, which would minimize the potential for oil material spills.

Relatively small quantities of used hydraulic fluids (less than 19 liters [5 gal.] per day) occur on an intermittent basis from routine maintenance and operation functions. These would be stored on-site for periods less than 90 days and periodically shipped to an oil recycling facility.

Following mechanical installation of the boilers, they would be chemically cleaned internally prior to start-up. The cleaning solution would dissolve metallic and other debris created during construction. Boiler cleaning waste would be classified as hazardous. The estimated 152 m^3 (40,000 gal.) of waste solution would be shipped off-site to a hazardous waste disposal facility. This is a one-time waste stream associated with boiler construction.

Waste oil would be generated at the facility from various equipment and plant operations. Sources of waste oil include turbine lube oil system waste oil (oil changes at major overhaul maintenance periods), drains from the natural gas knockout drums, and plant oil/water separators (equipment drains). Only a small amount of waste oil is produced at the plant. Most waste oil comes from maintenance oil changes from the gas turbine and steam turbine generators. Waste oil would be collected in a single underground 23 m^3 (6,000 gal.) storage tank. This size tank would hold a complete lube oil system drained from one of the gas turbine generators. The waste oil would be pumped out by tank truck and trucked off-site to an approved recycling and disposal facility. The underground tank would be of fiberglass double-wall construction to provide corrosion protection and secondary containment. Leakage monitoring would also be provided. (See Tables 3-2 and 3-3 for materials used and stored on-site.)

Electric or Magnetic Fields - The proposed plant would produce some levels of electric and magnetic fields within the plant. Workers in that plant would be exposed to these fields during the course of performing their jobs. Exposure and level duration are unknown.

Because scientific evidence about EMF has not established a cause-and-effect relationship between electric or magnetic fields and adverse health effects, specific health risks, or specific potential level of disease related to exposure to EMF are unknown.

Electric and magnetic field effects are discussed at length under the transmission line impacts discussion on Page 5-38 and in Appendix B.

Visual and Aesthetic Impacts - Cogeneration Plant

Section 4.1.6 discussed the project, impact area visual characteristics, land use designations (visually sensitive), and viewers potentially exposed (see Table 4-7). The following discussion identifies the compatibility or impact of the proposed cogeneration plan with these characteristics. Visual impact findings are based on a field evaluation of visually sensitive sites, and computer-assisted viewshed analysis. Table 5-8 identifies the distance from which the project is seen and the significance of visual impact. Map 9 illustrates the sensitive viewer observation areas which are located in the viewshed . Unless views are blocked by vegetation all areas in the viewshed would see at least part of the project.

The significance of impact (high, moderate, low or none) was determined based on the sensitivity of viewing activity, the degree of visibility (distance), the significance of the viewing area (designated, protected) and the number or type of viewers. The analysis was based on the visibility of the most significant elements of the project, the main turbine built and emissions stacks and transmission towers. The analysis was completed based on the assumption that strobe lights would be put on the stacks to meet FAA requirements.

The methodology used for determining impact significance was interpreted from the threshold distances proposed to BPA in the 1976 study *Measuring the Visibility of H.V. Transmission Facilities in the Pacific Northwest* and the *1986 Cape Blanco Wind Farm Feasibility Study Technical Report No. 7 - Visual*. The thresholds distances used were:

High to Moderate Visibility - 2.2 km (1.4 miles) or less
Moderate to Low Visibility - 2.2 - 6.2 km (1.4 to 3.9 miles)
Low Visibility - 6.2 km - 30 km (3.9 to 18.9 miles)

With the exception of the Columbia River, Lake Umatilla, portions of the Umatilla Wildlife Refuge, I-84, nearby residences and Port work areas, Washington State Highway 14, and the Coyote Springs State Wildlife Refuge, the proposed plant would not be visible or would have only low impact significance on any of the key observation areas identified on Table 5-6 and Map 9. The predominant visual features of the facility would be the 55 m and 64 m (180 ft. and 210 ft.) exhaust stacks, associated steam plumes and the new 500-kV transmission towers. On clear days the stacks and transmission towers could be visible from distances as far as 30.6 km (19 miles). However, their visual impact is reduced in significance by the flat terrain surrounding the site and the large number of trees (Russian olive and cottonwood) in the adjacent area. These trees obstruct views from many of the viewer observation areas. The visual impact is also reduced in significance by the many industrial and transmission structures in the area. In particular, the Boardman Chipping Company facility is a visually dominate feature and tends to attract viewer attention.

Table 5-6
Visual Impact Assessment

Viewer Observation Areas	View Distance	Visible (yes/no)	Designation in Land Use Plan	Impact Significance
Boardman Marina Park	2.4 kilometers (1.5 miles)	Yes (partly screened)	Not Designated	Low
Boardman Research Natural Area	1.5 kilometers (.95 miles)	Yes	Protected Area	Low (partly screened)
Boardman Sailboard Beach	4.0-4.8 kilometers (2.5-3.0 miles)	Yes	Not Designated	Low
Cold Springs Reservoir	38.6 kilometers (24 miles)	No	Designated	None
Cold Springs National Wildlife Refuge	38.6 kilometers (24 miles)	No	Protected Area	None
Horn Butte BLM Area of Critical Environmental Concern	28 kilometers (17.4 miles)	Yes	BLM Designated and Protected Area	Low
Coyote Springs State Wildlife Area	2.9 kilometers (1.8 miles)	Yes	Not Designated but Protected Area	Moderate
Hat Rock State Park	38.5 kilometers (23.9 miles)	No	Designated and Protected Area	None
I-84 Rest Stop (east & west-bound)	6 kilometers (3.7 miles)	Yes	Not Designated	Low
Irrigon Marina Park (ODFW)	19 kilometers (11.8 miles)	No	Not Designated	None
Irrigon State Wildlife Area	19 kilometers (11.8 miles)	No	Not Designated or Protected	None
Lake Wallula	30.6+ kilometers (19.+ miles)	No	Designated	None
Lake Umatilla	.5+ kilometers (.3+ miles)	Yes	Designated	Moderate-Low
Lindsay Grassland	16 kilometers (10 miles)	No	Designated	None
McNary Lock and Dam	30.6+ kilometers (19+ miles)	No	Designated	None
Messner Pond	0.1 kilometers (400 feet)	Yes	Not Designated	Moderate
Oregon Trail BLM Area of Critical Environmental Concern (Bucks Corner)	29 kilometers (18 miles)	Yes	BLM Designated and Protected Area	Low (can see only stack and steam plume)
Power City Wildlife Area	30.9 kilometers (19.2 miles)	No	Not Designated or Protected	None
Riverside High School	1.6 kilometers (1 mile)	Yes (only stack and plume visible)	Not Designated	Low
Travelers on I-84	0.9+ kilometers (.55+ miles)	Yes	Not Designated	High
Umatilla County Scenic-Historic Road	30+ kilometers (18+ miles)	Yes (only stack and plume visible)	Designated	Low-None
Umatilla National Wildlife Refuge	2.4-3.2 kilometers (1.5-2.0 miles)	Yes	Protected Area	Moderate-Low

During certain times of the year when the relative humidity is high, steam plumes may be visible from the cooling tower, HRSG stack, and auxiliary boiler stack. Plumes would be 107-122 m (350-400 ft.) high. Since the proposed facility is in a semi-arid area, the ambient relative humidity is generally low and plumes would only be visible when temperatures fall below freezing. Plumes would be seen until the temperature of the plume declines to the ambient air temperature.

The views of the facility are particularly open from the Columbia River, and the Washington shoreline. There are several scenic viewpoints, boat ramps and wildlife refuge access roads on the Washington side of the river. They would expose viewers to an open panorama of the site. This views across the river and Umatilla Wildlife Refuge would be the most incompatible. The proposed facility would increase the industrial appearance of the wildlife refuge's natural vistas. However, this impact would be somewhat reduced due to the views of the Boardman Coal Plant and stack, which are visible in the background. The plant site would also be highly visible from I-84. Average daily traffic on I-84, 500 m (1,600 ft.) west of the Boardman interchange, totals over 9,450 vehicles a day (1991). The unimproved appearance of the Port property would be accented by the new plant and associated transmission lines. This could leave a negative visual impression to the public traveling on I-84. The exhaust stacks and steam plumes would attract attention and be highly visible.

Figures 4-4, 4-6, and 4-8 (see Section 4) are simulations of what the plant would look like from key vantage points. These photographs were included in PGE's site application and were taken from I-84 south, east, and west of the proposed site. The view from the Boardman residential area should be similar to the views shown on Figures 4-6 and 4-7.

Mitigation - PGE indicated that topographic screening was not practical due to the flat terrain surrounding the site. PGE's conclusions were based on topography or vegetation not being strong visual elements in the site area. However, PGE has proposed several mitigation measures to be used to minimize the visual impact of the plant:

- Paint buildings and exhaust stacks in neutral shades to minimize visual impacts.
- Minimize exterior lighting at night. The minimum number of lights would be used as required by safety standards. The FAA may require aircraft warning lights on the tallest stacks. There is no way to minimize the visual impacts of strobe lights.
- Use native plant materials to enhance the appearance of the site.

Noise Impacts - Cogeneration Plant

Operational Noise - Future noise levels for the plant were calculated by Chester Environmental using a widely used and accepted acoustic computer program called "Noisecalc." Future noise was then compared with DEQ's nighttime standard of 50 dBA for residential sites and with existing noise levels at these sites. DEQ's industrial noise standard takes into consideration existing noise levels at industrial sites when evaluating future industrial noise. Its standard is

either the maximum existing noise level or the speech interference criteria of 55 dBA. The results of the noise analysis are presented in Table 5-7. Locations of noise recordings are shown on Map 4 (follows page 4-2).

As Table 5-7 shows, DEQ noise standards are met at each of the noise analysis sites. Several of the noise analysis sites (2,4, and 5) already experience high noise levels. The cogeneration plant would not worsen this condition. It would be possible to hear the turbine generators' high frequency tonal sound at some of the nearest occupied sites. During east to northeast wind conditions, some locations may experience downwind refraction of sound causing short-term noise increases of up to 10 dBA.

Table 5-7
Future Nighttime Noise Levels

Site	Site Type	Existing Noise (L-10)	Predicted Noise (L-10)	DEQ Standard (L-10)
1	Wildlife Area	51 dBA	57 dBA	62 dBA
2	Industrial Site	51 dBA	44 dBA	55 dBA
3	Residential	50 dBA	39 dBA	55 dBA
4	Industrial Site	56 dBA	41 dBA	55 dBA
5	Residential	57 dBA	31 dBA	50 dBA
6	Residential	50 dBA	30 dBA	55 dBA
		Existing Noise (L-50)	**Predicted Noise (L-50)**	**DEQ Standard (L-50)**
1	Wildlife Area	36 dBA	57 dBA	62 dBA
2	Industrial Site	46 dBA	44 dBA	50 dBA
3	Residential	44 dBA	39dBA	50 dBA
4	Industrial Site	50 dBA	41 dBA	50 dBA
5	Residential	56 dBA	30 dBA	50 dBA
6	Residential	48 dBA	30 dBA	50 dBA

Source: Chester Environmental.

Construction Noise - The exact mix of construction equipment to be used at the plant is unknown. However, experience suggests that certain types of equipment would be used for this type of facility. Table 5-8 lists construction equipment expected to be used to build the plant and the noise levels created by each. The number of each machine used is based on EPA estimates. The usage factor is an estimate of how much time a piece of equipment would be used in an 8-hour work day (expressed as a percentage).

Table 5-8
Construction Equipment Noise Levels

Equipment Type	Quantity	Noise at 50 ft. (dBA)	Usage %
Bulldozer	2	80	40
Road Grader	1	78	40
Back Hoe	1	85	20
Crane	1	84	20
Dump Truck	3	85	40
Paving Machine	1	85	10
Paving Roller	1	85	10
Concrete Truck	2	86	20
Air Compressor	2	81	100
Water Pump	2	76	100

Based on the equipment noise levels at 15 m (50 ft.) and the individual usage factor, a composite noise level at 15 m (50 ft.) of 89 dBA (L_{50}) was calculated by Chester Environmental. This noise level would occur up to 4 hours. Taking into account noise reduction due to distance, noise at Messner Pond (the nearest sensitive site), would be 65 dBA, which is less than DEQ's allowable noise maximum of 68 dBA. Construction noise at the nearest residential site (Site 5) would be under the existing industrial ambient noise, and would be inaudible at Site 3.

Cultural Resource Impacts - Cogeneration Plant

The proposed plant would not be on or within any known historic, cultural, and/or archeological resources. However, site-specific surveys have been performed to check for the presence of historic, cultural, and archeological resources, and provide for any needed protection, recovery, or avoidance. A draft of the survey report is included in PGE's *Application for Site Certificate*.

Protected Resource Impacts - Cogeneration Plant

No impacts to other protected resources are anticipated from the proposed project. The City of Boardman has defined a wellhead protection zone and is developing an Ordinance designed to regulate land use development to protect their drinking water supply. The City of Boardman is confident that PGE will protect the wellhead area.

5.1.2 Power Integration Impacts

Impacts predicted to occur from power integration facilities are summarized in Table 5-9. Narrative descriptions of predicted impacts are provided below.

Land Use Impacts - Power Integration

Construction of the proposed transmission line would alter the land use within the right-of-way from vacant and agricultural to industrial. The proposed transmission line has been sited on land that has been zoned PI (Port Industrial) and MG (General Industrial). Transmission lines are an allowed use in the PI Zone within Morrow County, however, they are not allowed outright in the MG Zone. To site a transmission line in the MG Zone within Morrow County, PGE first needs to obtain a variance from the County to allow this use. The County Planning Department would process the permit quickly once it is received (Seeger, 1993).

The transmission line would parallel the Port access road as it enters/exists the proposed plant over approximately 900 m (1,000 yards). The transmission line would then pass over Columbia Avenue before turning southeast for approximately the same distance before tapping into the existing McNary-Slatt 500-kV transmission line. The applicant would need to obtain a conditional use permit from the county before stringing a transmission line over a public right-of-way. The conditional use permit would specify the minimum clearances required for such use.

Land use restrictions are necessary for land contained within transmission line rights-of-way. Such restrictions would be contained in the easement between PGE and BPA and the Port of Morrow. These restrictions would identify what uses are not allowed within the right-of-way. For example, no structures may be built and no flammable liquids may be stored within a BPA transmission line right-of-way.

Construction of the proposed transmission line across the irrigated agricultural field (circle 53) may cause noxious weeds to spread within the existing field and/or within nearby fields.

Mitigation - PGE would obtain a variance from the county to allow construction of the proposed transmission line in the MG Zone.

PGE would obtain a conditional use permit from the county before stringing a transmission line across Columbia Avenue, a public right-of-way.

PGE would acquire the appropriate easement rights (meeting all BPA easement requirements) from the landowner prior to construction. PGE would assign these rights to BPA.

Noxious weed survey would be undertaken by a qualified individual(s) prior to any earth moving activities taking place.

Natural Resource Impacts - Power Integration

Soils and Geology - Minimal impacts to soils are expected from construction of the substation and tap lines. Determination of soil impacts are based on soil characteristics, topography, vegetation, and presence of erosion elements including water and wind. The proposed project site is nearly flat, dry, and sparsely vegetated. Water erosion is expected to be minimal. Vegetation must be replaced to avoid wind erosion.

Transmission towers would be supported on drilled shaft foundations and the substation equipment would be supported on spread footing foundations. Operating the transmission line and substation would have no impact on site stability.

Water - The substation and transmission line structure locations avoid surface water features. The construction period would be the only period in which water impacts might be caused by power integration facilities. Oregon requires SWPP Plans for construction sites that exceed 2 ha (5 acres), such as the Coyote Springs Plant. This plan would define techniques that would be used to prevent pollution from entering aquatic systems, and prevent wind or water erosion, and ensure that transmission facilities would not adversely affect water resources.

Air Quality - The typically high electric field strength of 500-kV transmission lines causes a breakdown of air at the surface of the conductors called corona. Corona has a popping sound, which is most easily heard during rain storms. When corona occurs, small amounts of ozone and NO_x gases are released. These substances are released in such small quantities that they are generally too small to be measured or to have any significant effects on humans, plants or animals.

Impact Table - Coyote Springs Power Integration (Substation and Transmission Line)

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
WATER				
Resulting from Construction Activities				
Messner Pond	Unlikely	None	NPDES Requirements	DEQ 1200 C
Columbia River	Unlikely	None	NPDES Requirements	DEQ 1200 C
Unnamed irrigation pond	Certain	Slight	NPDES Requirements	DEQ 1200 C
Resulting from Facility Operation				
Degradation of water quality	Unlikely	Slight	City of Boardman's sewa treatment facility	None
Lowering of water table in d aquifer	Possible	Slight	None	(Water Resourc Permit)
Spills of fuel or other hazard materials	Unlikely	Slight	Fulfill requirements of RCRA	None
Fisheries	Unlikely	Slight	Denial of new wells in alluvial aquifer	Water Resource Permit
VEGETATION				
Habitat disturbance	Slight	None	Recontouring and revegetation	None
Wetland vegetation disturbance	Likely	Moderate	Recontouring and Revegetation	None
Sensitive plant species	Unlikely	Unlikely	None	None
WILDLIFE				
Fauna				
Mortality of individuals	Unlikely	Localized	None	None
Temporary displacement	Unlikely	Localized	None	None
Stress in crucial life cycle times	Unlikely	Localized	None	None
Wildlife Habitat				
Wildlife habitat impact	Minimal	Localized	Revegetation	None
FISH				
Mortality/displacement	Unlikely	Localized	None	None
SPECIAL STATUS SPECIES				
None found in project area	None	None	None	None
THREATENED AND ENDANGERED SPECIES (Federally listed)				
Plants				
None found in project area	None	None	None	None

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
THREATENED AND ENDANGERED SPECIES (Federally listed) Cont.				
Wildlife				
Peregrine falcon	Unlikely	Localized durir construction	None	None
Bald eagle	Unlikely	Localized durir construction	None	None
Fish				
Salmon River fall chinook salmon	None	None	None	None
Salmon River spring/summe chinook salmon	None	None	None	None
Salmon River sockeye salmon	None	None	None	None
GEOLOGIC HAZARDS				
Seismic Hazards (Possibilities ground shaking, fault offset, liquefaction, or seismicall induced waves and flooding co affect the integrity of the f	Possible	Project Area	Construct facilities acc to the Uniform Building Code, and the appropriat importance factor for essential and hazardous facilities.	Building Perm
Floodplains	Unlikely	Slight	None	None
SOIL				
Wind erosion due to removal vegetation	Likely	Localized, sho term	NPDES Requirements	DEQ 1200 C
Water erosion due to removal vegetation	Unlikely	Localized, sho term	NPDES Requirements	DEQ 1200 C
LAND USE				
Land use within the right-of will be altered from vacant agricultural to industrial us	Certain	Slight	None	None
Transmission lines in the Ger Industrial zone of Morrow Cou require a variance.	Certain	Localized	Project developers will a variance..	Variance
The transmission line will cro public right-of-way.	Certain	Localized	As required in permit	Conditional Us Permit
The transmission line will r certain uses within the righ way.	Certain	Localized	Landowners will be compensated for easeme	None

Table 5-9
Impact Table - Coyote Springs Power Integration (Substation and Transmission Line)

Impact Table - Coyote Springs Power Integration (Substation and Transmission Line)

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
LAND USE (Cont.)				
Construction of the transmis line may cause an infestation noxious weeds in existing nea agricultural fields.	Likely	Localized	A noxious weed survey be conducted by a qualifi individual(s) prior to a construction activities t place. All constructio vehicles will be washe prior to entering and bef leaving construction are	None
CULTURAL RESOURCES				
Historic, cultural and archeol resources	Unlikely	None	Site-specific survey	None
SOCIOECONOMIC				
Construction of proposed pro will increase the demand fo temporary housing.	Likely	Local area	None	None
Construction and operation proposed project will increa employment in local area.	Likely	Local area	None-Positive impact	None
RECREATION				
Local recreation sites	Unlikely	None	None	None
VISUAL AND AESTHETIC RESOURCES				
Nearby residences, Washingto Highway 14, I-84, Columbia R portions of the Umatilla Wi Refuge, and the Coyote Spring State Wildlife Refuge.	Likely	Low	Structures will be loca parallel to existing stru if possible. Insulator a tower colors will be mat between lines, etc. Measures will be used t reduce visibility and glar new conductors and towe	None
Other key observation points	Unlikely	Slight	(1) Paint buildings in ne shades to minimize visu impacts. (2) Minimize t amount of exterior lightin night. (3) Use native mat landscaping.	None
PROTECTED RESOURCES				
Oregon DOE designated Protected Resources	Unlikely	Slight	None	None
PUBLIC HEALTH AND SAFETY				
Toxic and hazardous waste (Substation)	Unlikely	Localized	Requirements of SPCC Pl pursuant to the Clean Wa Act	None
Electric fields	Likely	Localized	Safety standards to pre accidental shock.	None
Magnetic fields	Likely	Unknown	Line design to reduce fields.	None

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
NOISE				
Construction noise	Likely	Moderate, Short-term	None	None
Operation noise (line and substation)	Likely	Localized, insignificant d to existing noi	Special design of transmission lines and transformers to meet n standards.	None
AIR QUALITY				
Pollutants from constructi equipment	Likely	Slight	None	None
Pollutants released during operation	Likely	Slight	None	None
Fugitive dust	Likely	Slight	Water area as needed.	None

Table 5-9 (continued)
Impact Table - Coyote Springs Power Integration (Substation and Transmission Line)

Fish and Wildlife Impacts - Power Integration

Fisheries - No fisheries impacts would occur from construction of the electrical transmission line.

Wildlife - Along the electrical transmission line corridor, temporary impacts to wildlife habitat would result from equipment operation to access the transmission tower construction sites, and minimal permanent loss of habitat would occur at the base of the transmission towers. The effect of this habitat loss on wildlife populations is expected to be minor due to the temporary nature of the impact and the small amount of habitat impacted. No excavation would occur except to construct the footings for the transmission towers. Minor amounts of vegetation would be cleared because most of the electrical transmission line route lacks significant vegetation. The proposed mitigation measure to reestablish vegetation (grasses) would provide habitat in areas presently bare. Also, the erection of the transmission towers may provide new perching and nesting habitat for some avian species (e.g., raptors, western kingbird).

Construction activities along the transmission line could also cause disturbance (visual and auditory) and displacement of wildlife from these areas to adjacent areas. Displacement would be temporary and most wildlife would likely return to the area after construction is complete. The degree of this disturbance would depend on several factors including time of year, duration of disturbance, and the species' sensitivity to disturbance.

Mitigation - Electrocution of raptors is unlikely based on the design specifications of the transmission towers, but modifications would be added if warranted to raptor-proof the transmission towers and minimize electrocutions. Because phase-to-phase and phase-to-ground distances of the 500-kV transmission lines and towers are greater than the wing span of eagles and other large birds, electrocution of these species would not be a concern. If, for some unforeseen reason, an individual tower is determined to be a potential hazard, appropriate mitigation measures would be taken (erection of perch guards or modification of the lines as described in Olendorf, et al., 1981) to eliminate the hazard.

Vegetation/Wetland Impacts - Power Integration

Direct but short-term impacts would occur to upland vegetation during construction of the towers.

Socioeconomic Impacts - Power Integration

Socioeconomic impacts for the power integration facilities are minor and cogeneration plant impacts include power integration facilities.

Public Health and Safety Impacts - Power Integration

Toxic and Hazardous Materials - Minimal amounts of hazardous waste would be generated from routine maintenance procedures performed on substation equipment and lines. Kinds and volume of waste would depend on the maintenance procedure and would be the same as that generated at any electrical substation.

Safety Precautions - Power lines, like electrical wiring, can cause serious electric shocks if certain precautions are not taken. These precautions include building the lines to minimize shock hazard. All BPA lines are designed and constructed in accordance with the ***National Electrical Safety Code (NESC)***. NESC specifies the minimum allowable distances between the lines and the ground or other objects. These requirements determine the edge of the right-of-way and the height of the line, that is, the closest point that houses, other buildings, and vehicles are allowed to the line, to limit electric field effects to acceptable levels.

People must also take certain precautions when working or playing near power lines. It is extremely important that a person not bring anything, such as a TV antenna or irrigation pipe, too close to the lines. BPA provides a free booklet that describes safety precautions for people who live or work near transmission lines (*Living and Working Around High Voltage Power Lines*).

Transmission lines can also induce voltages into objects near the lines. This effect can lead to nuisance shocks if a voltage is induced on something like wire fencing on wood posts insulated from ground. Usually this becomes a problem only with lines of voltages above 230-kV. Should problems develop with either high- or low-voltage lines, they can be corrected by simple grounding techniques. For 500-kV lines, grounding of certain objects near the lines is a routine part of the construction process.

Audible Noise Limits - All new BPA lines are designed and constructed to comply with state noise regulations. The new transmission line would meet Oregon's noise standard, 50 dBA.

Electric and Magnetic Fields - BPA recognizes public concern regarding the possible effects of the electrical properties of transmission lines on public health and safety. These effects include electric shocks, noise and potential long-term health effects. In response to the public concern regarding EMF, BPA has taken these steps:

- Developed Interim Guidelines of EMF. These guidelines name EMF as a major decision factor to be considered in locating and designing new BPA facilities.

- Discouragement of intensive uses of rights-of-way. In 1990, BPA revised its right-of-way management practice. BPA no longer encourages new uses in rights-of-way that would increase human exposure to EMF.

- Exposure Mitigation. BPA was among the first to voluntarily adopt practices to mitigate EMF exposures. This means taking reasonable or practical actions that would keep human exposure to new sources of EMF as low as reasonably available.

All BPA lines and electrical facilities are designed and constructed in accordance with the NESC to minimize electrical shock hazards. New BPA lines are also designed and constructed to comply with Oregon's electric field strength standard of 9 kV/m maximum on the right-of-way. This project would meet this standard.

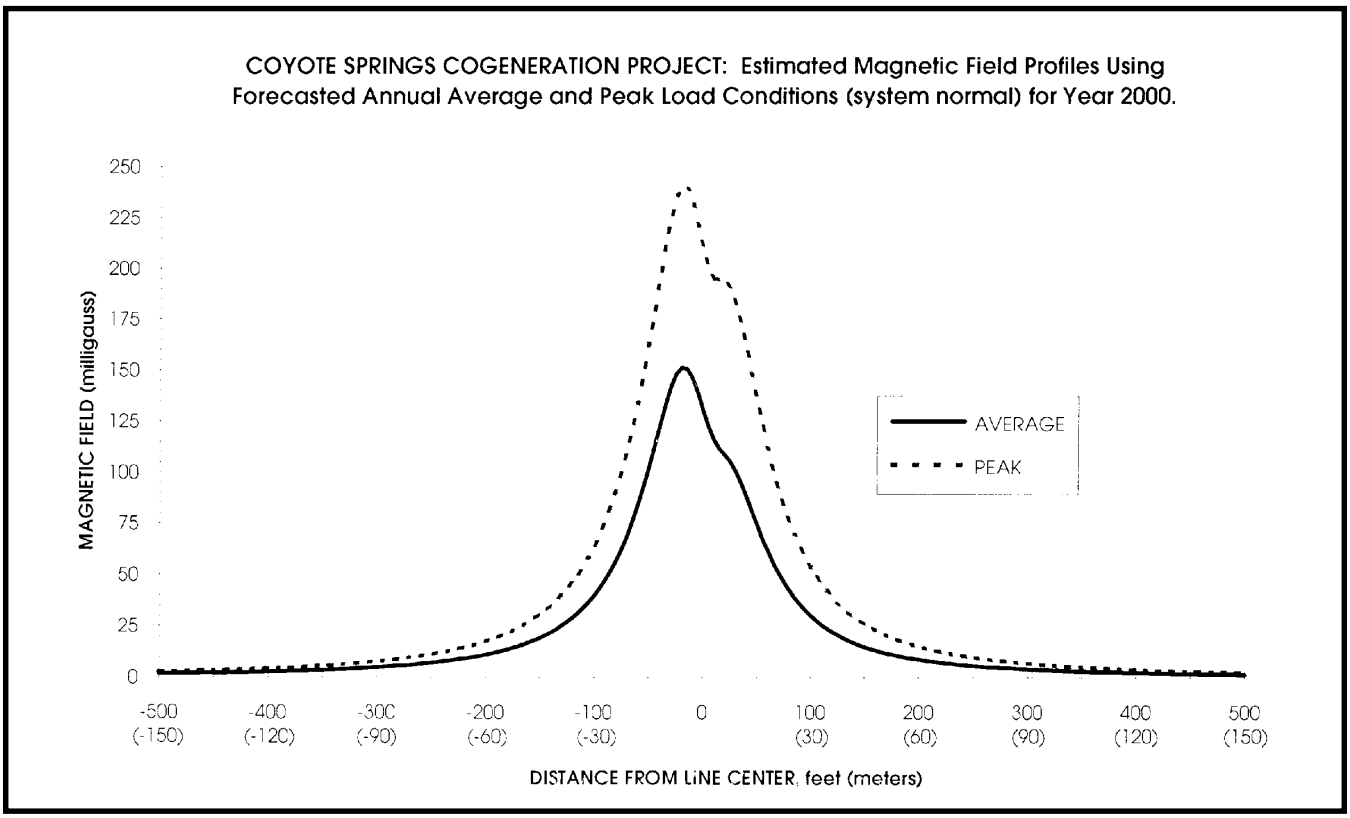
Both electric and magnetic alternating-current (AC) fields induce currents in conducting objects, including people and animals. These currents, even from the largest power lines, are too weak to be felt. However, some scientists believe these currents might be potentially harmful and that long-term exposure should be minimized. Hundreds of studies on electric and magnetic fields have been conducted in the U.S. and other countries. Studies of laboratory animals generally show that these fields have no obvious harmful effects. However, a number of subtle effects of unknown biological significance have been reported in some laboratory studies (Frey, 1993).

Much attention at present is focused on several recent reports suggesting that workers in certain electrical occupations and people living close to power lines have an increased risk of leukemia and other cancers (Sagan, 1991; National Radiological Protection Board, 1992; Oak Ridge Associated Universities Panel, 1992; and Stone, 1992). Most scientific reviews, however, find that the overall evidence is too weak to establish a cause-and-effect relationship between electric or magnetic fields and cancer. For this reason specific health risks related to exposure to EMF are unknown. A review of some of the studies relating to EMF and possible biological and health effects are included in Appendix B.

Significance of EMF Exposures - Adverse health effects, specific health risks, or specific potential levels of disease related to exposure to EMF are unknown. BPA conducts *exposure assessments* of magnetic fields from transmission lines. Exposure assessments are estimates of the field levels that people are potentially exposed to.

Exposure Assessment - In general, magnetic field exposure assessments are performed by calculating field levels in locations where there are potential long-term exposures to people. This is usually done by assessing the number of homes, schools or businesses near the proposed project where magnetic field exposures may be created by the proposed project. Estimated magnetic fields along the proposed transmission line are provided in Figure 5-1. Figure 5-1 shows that magnetic fields drop rapidly as distance from the transmission line increases.

Figure 5-1
EMF Exposure Assessment



The proposed transmission line is within the Port of Morrow Industrial Park, thus EMF exposure to people would be limited. There is only one building employing or housing people close enough to the transmission corridor to potentially experience an increase in magnetic field exposure. The onion processing plant is about 130 m (425-450 ft.) from the centerline of the new transmission line. As Figure 5-1 indicates, this building is estimated to experience 2-3 milligauss magnetic field exposure from the new transmission line. The onion processing plant may already receive some magnetic field exposure from the existing 115-kV line along the Port access road. There are two mobile homes in the area owned by the Port that would be removed. Also, two buildings associated with the concrete batch plant are scheduled for removal because the plant is moving to a new location.

Electrical current levels and EMF exposure levels along other parts of the transmission system may be affected because of this project. Increases or decreases to the magnetic field environment may occur in some areas along the transmission system.

Visual and Aesthetic Impacts - Power Integration

Section 4.1.6 discussed the project, impact area visual characteristics, land use designations (visually sensitive), and viewers potentially exposed. The following discussion identifies the compatibility or impact of the proposed transmission line and tap with these characteristics. Table 5-8 identifies the sensitive observation areas that can see the project (plant facilities and transmission), the distance, and the degree of significance of the visual impact. Figure 5-2 simulates the appearance of the new transmission line as viewed from I-84.

The significance of impact has been determined based on the sensitivity of viewing activity, the degree of visibility (distance), the significance of the viewing area (designated, protected), and the number or type of viewers. The analysis was based on the visibility of the most significant elements of the project, the transmission towers and plant substation. Because of the existing impact and visual dominance of the existing transmission corridors and Boardman Substation, the increased visual impact on viewers or sensitive observation areas beyond 6.3 km (3.9 miles) would be minimal.

The visual impacts of the transmission facilities would occur primarily to the near views. These impacts would occur to people using the Columbia River, portions of the Umatilla Wildlife Refuge, I-84, nearby residences and Port work areas, Messner Pond, Washington Highway 14, and the Coyote Springs State Wildlife Refuge. The proposed transmission line would not be visible or have only low impact significance on any of the key observation areas identified on Table 5-6. The dominant transmission visual features would be the new 500-kV transmission towers and the tap structure that would be within 0.4 km (1/4 mile) of I-84. The proposed transmission line alignment would cross over a vegetated portion of the Messner Pond natural area. Russian olive trees that would be crossed may require clearing, which would increase the visual impact of the project.

Mitigation - Topographic screening is not practical due to the height of the transmission structure and the flat terrain surrounding the site. BPA would use the following measures to minimize the visual impacts of transmission lines structures built for the plan proposed.

- Transmission structures for parallel lines would be designed and located to provide uniformity to the extent practical. That is, structures would be parallel to existing structures. Insulator colors would be matched between existing and new lines.

- The galvanized transmission towers would be specially treated to reduce reflectance and match the existing weatherized transmission towers.

- ***Non-specular*** conductors could be used to reduce visibility between the existing transmission corridor and the generation plant.

- The substation and tap installations would be designed to be aesthetically pleasing. The substation would be landscaped with native plant materials. Substation structures would be painted in a color compatible with the surrounding area.

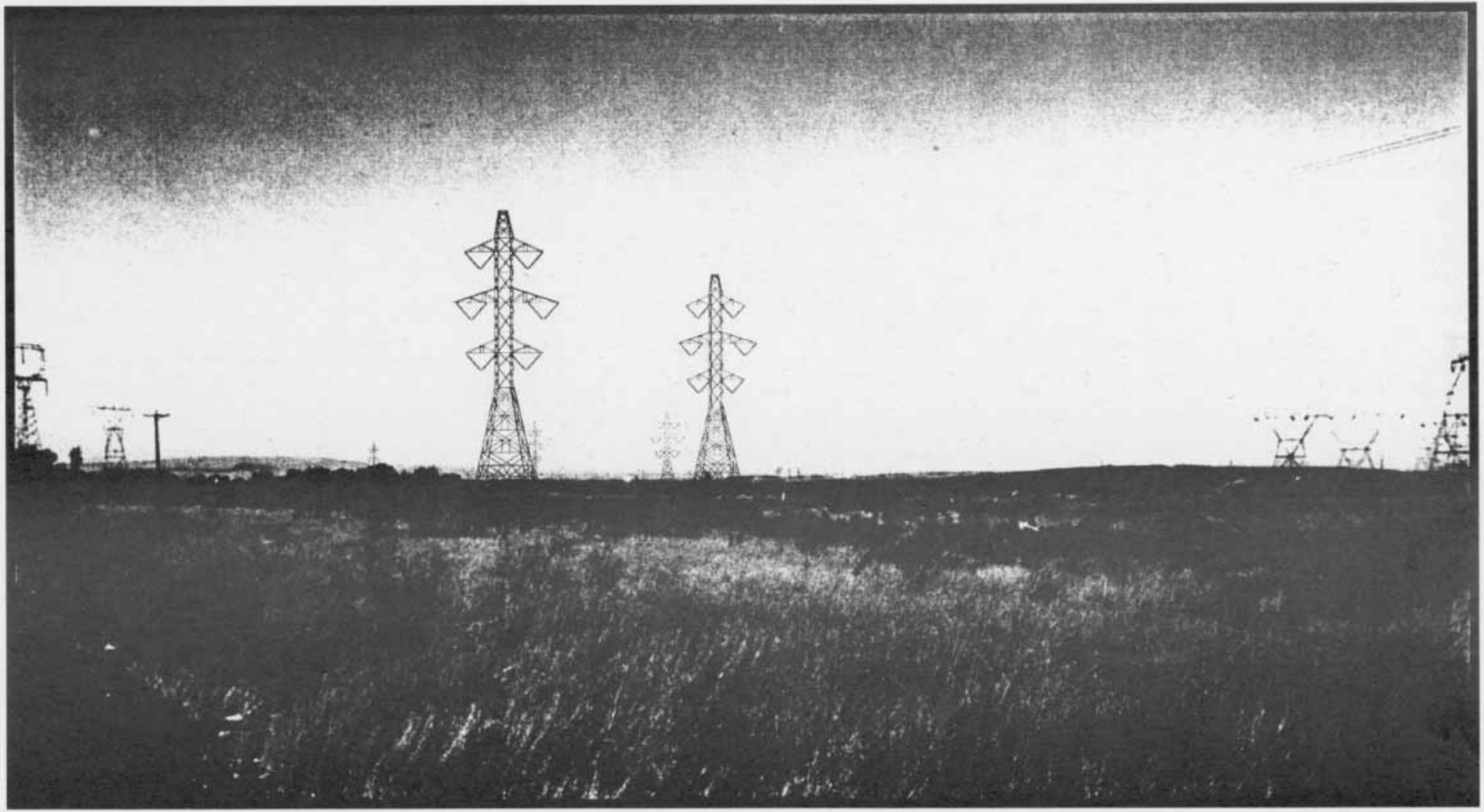


Figure 5-2
Transmission Tap and
Loop Line Simulation

Coyote Springs Cogeneration Plant - Morrow County, Oregon

Noise Impacts - Power Integration

Power transformers within the Coyote Springs substation switchyard would create noise. While old power transformers at times exceed nighttime noise standards, modern transformers are designed to meet the most stringent noise standards.

Transmission lines also create noise through a process called corona activity. An audible popping sound occurs when air breaks down due to the high fields on the surface of the transmission line conductors. During fair weather, 500-kV lines typically create noise levels below normal background (ambient) at the edge of the right-of-way. During heavy precipitation noise levels increase. The use of conductor bundles (2-4 conductors/phase) has considerably reduced transmission line noise levels. A three conductor/phase design will be used for the proposed loop line.

Considering that no noise sensitive properties are near the transmission line route, no significant noise impacts would result from power integration. The proposed transmission loop line will meet the Oregon noise standard in both fair and foul weather conditions.

Cultural Resource Impacts - Power Integration

The proposed 500-kV transmission line and substation would not be on or within any known historic, cultural, and/or archeological resources. Site-specific surveys have been performed to check for the presence of historic, cultural, and archeological resources, and provide for any needed protection, recovery, or avoidance. (See Section 4.1.7.)

Should any archeological, historical, or cultural resources be encountered during construction or operation of the proposed facilities, both ORS 358.920 and 36 CFR 800.11 apply. The former statute prohibits the disturbance or excavation of an archeological site on public lands (including lands owned by port districts) without a permit issued by the state under ORS 390.235. The latter regulation addresses procedures in the event of cultural resource finds made during the course of Federally permitted or licensed undertakings. In pursuant of these legal authorities, if any cultural resource discoveries are made during development or operation of Coyote Springs facilities, all ground-disturbing activity in the vicinity of the find would be halted immediately and the following agencies notified: the Oregon State Historic Preservation Office, FERC, and the Confederated Tribes of the Umatilla Indian Reservation.

ORS 97.745 prohibits the disturbance or removal of Indian burials or graves, whether on public or private lands. Should an Indian burial or possible burials be encountered during construction or operations of the Coyote Springs facilities, all ground-disturbing activity in the vicinity would cease immediately and the following agencies notified: the Oregon State Historic Preservation Office, the Oregon Commission on Indian Services, and the Confederated Tribes of the Umatilla Indian Reservation.

Protected Resource Impacts - Power Integration

Construction and operation of the transmission line is not expected to have a significant adverse impact to Protected Resources. The proposed 500-kV electrical transmission line is about 3.7 km (2.3 miles) from the McCormack unit of the Umatilla National Wildlife Refuge and 1 km (0.6 mile) from the Coyote Springs Wildlife Area.

5.1.3 Coyote Springs Extension Pipeline Impacts

Public distribution of an Environmental Assessment (EA) on PGT's proposed Coyote Springs and Medford Lateral pipelines is planned for released by FERC in the fall of 1994. Impacts reported here and in Table 5-10 are taken from environmental resource reports commissioned by PGT for submittal to FERC in Docket No. CP93-618-000 and CP93-618-001.

Land Use Impacts - Pipeline

Since most of the proposed route is located within or adjacent to existing, previously disturbed right-of-way, construction effects for the pipeline on land use should be minor and insignificant. Traffic along Bombing Range Road will be disrupted by interruptions for short periods due primarily to the precautions for safe movement of equipment or pipe. The crossings of Interstate I-84 and Wilson Road will be bored because of high traffic volumes and requirements by Morrow County Public Works and Oregon Department of Transportation. Traffic will not be disrupted. The West Extension Irrigation Canal would be bored to avoid interruption of water flow.

Minor short-term inconveniences may occur to some property owners because of construction activities. Access to homes and business will be provided at all times. All landowners will be compensated for unforeseen damage to property.

Mitigation - Special safety precautions and traffic control would be implemented during construction along Bombing Range Road. PGT would inspect and maintain the pipeline for the life of the project.

Natural Resource Impacts - Pipeline

Geology

Impacts on geology would be minor and insignificant, and would only occur during grading and excavation of the pipeline trench. With the nearest known fault miles away, seismic ground shaking is not expected to strain the earth surrounding the pipeline. It is possible that shaking could affect the integrity of the pipeline, however welded steel pipelines have good inherent ductility, and potential damage is not probable.

Potential effects to soil could include loss of topsoil, mixing of topsoil and subsoil, compaction, and wind or water erosion. Since the majority of the route is located in existing utility or transportation corridors which are not on lands used for agriculture, the effects would be minimal.

Mitigation - PGT will follow FERC's "Erosion Control, Revegetation, and Maintenance Measures" guidelines. Preconstruction contours will be reestablished to minimize erosion. Topsoil stockpiled during construction will be replaced last. Disturbed areas will be stabilized. The working area will be reseeded during the final cleanup phase of construction, unless property owners prefer otherwise.

Air Quality

Effects on air quality from construction of the pipeline would be temporary, and are not expected to exceed any air quality standards. Dust created as a result of vegetation clearing and disturbances by construction equipment would be minor. No impacts are expected after construction.

Mitigation - Watering of the working area during construction would control dust levels, and revegetating the exposed soil after project completion would provide final stabilization.

Vegetation

Throughout the 30 km (18.5 mile) pipeline route, agriculture and road/utility line maintenance operations have virtually eliminated all tracts of native vegetation. Existing vegetation communities along the route will be disturbed by the construction activities. Disturbance will be limited to the construction period, and will be restricted to within 10 m (35 ft.) or less of the pipeline centerline. Vegetation disturbed will largely consist of disturbed weedy grassland and grazed grassland communities. These impacts are not considered significant as these vegetation communities are common in the area, and are already highly disturbed. No protected sensitive plant species were identified during field surveys along the route.

Mitigation - In spring 1994, plant surveys were repeated because part of the pipeline route has been shifted to the west side of Bombing Range Road. A revegetation plan will be developed as part of the FERC required Erosion Control, Revegetation, and Maintenance Plan. The plan will include at a minimum: plant species to be used for restoration, site preparation, timing of planting or seeding, fertilization, monitoring program, and a contingency program in case of failure. Local soil conservation authorities will be consulted in the preparation of the plan and for the identification and procedures for minimizing effects of noxious weeds.

Fish and Wildlife

No fish or threatened and endangered species are expected to be affected by the construction or operation of the pipeline.

Impact Table - Coyote Springs Pipeline Extension

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
SURFACE WATER				
Erosion of streambanks	Unlikely	Unlikely	NPDES Requirements. Follow guidelines provided by FERC's Wetland and Waterbody Construct and Mitigation Procedures	DEQ 1200 C
Increased sediment transport	Unlikely	Unlikely	(See above)	DEQ 1200 C
Resuspension of toxic contaminants	Unlikely	Unlikely	(See above)	DEQ 1200 C
Spills of fuel or other hazardous fluids	Unlikely	Unlikely	(See above)	DEQ 1200 C
WETLANDS				
Degradation of water quality	None	None	NPDES Requirements (i.e., reseedi disturbed areas, sediment filte watering to control dust, locat staging areas away from wate features, refueling 200 feet fr wetland boundaries). Also see abo	DEQ 1200 C
Chemical releases to groundwater	Unlikely	Small, localized and insignificant	(See above)	DEQ 1200 C
Fisheries and aquatic	None	None	(See above)	None
VEGETATION				
Herbaceous habitat disturbance	Likely	Short-term	Native plant restoration after construction	None
Woody shrub habitat disturbance	Likely	Long-term small acreag	Native plant restoration after construction	None
Wetland vegetation disturbance	None	None	Native plant restoration after construction	None
WILDLIFE				
Fauna				
Mortality of individuals	Likely	Less mobile, dormant species	Surveys of critical habitat, sche construction activities to avoid i	None
Temporary displacement	Likely	Mobile species	(See above)	None
Stress in crucial life cycle times	Likely	Less mobile species	(See above)	None
Wildlife Habitat				
Shrub-steppe	Likely	Conversion to grassland	Reseeding, native plant restorat after construction.	None
Grazing/agriculture	Likely	Disturbance with recover within 2 seasons	(See above)	None
Impact to grassland habitats	Likely	Temporary alteration	(See above)	None
Impact to sandy bitterbrush step habitats	Likely	Cheatgrass replacement	(See above)	None
Indirect impacts to wildlife due increased access	Likely	Slight	None	None
FISH				
None	None	None	Follow guidelines provided by FER Wetland and Waterbody Construct and Mitigation Procedures.	None

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
SPECIAL STATUS SPECIES				
Washington ground squirrel	Likely *	Mortality i occupied burrows are excavated. Loss of habit	Surveys of critical habitats, sche construction activities to avoid i	None
Burrowing owl	Likely *	Mortality i occupied burrows are excavated. Loss of habit	(See above)	None
Pygmy rabbit	Unlikely	Mortality o young or dormant rabbits	(See above)	None
Long-billed curlew	Likely *	Loss of eggs, nest abandonment	(See above)	None
Columbia cress	Unlikely	Slight	None	None
Lawrence's milkvetch	Unlikely	Moderate	None	None
Robinson's onion	Unlikely	Slight	None	None
Thompson's sandwort	Unlikely	Slight	None	None
THREATENED AND ENDANGERED SPECIES				
Plants				
None found	Unlikely	None-slight	Field Survey-Consultation with USF	WS None
Wildlife				
None found	Unlikely	None-slight	Field Survey-Consultation with USF	WS None
Fish				
None	None	None	Field Survey-Consultation with USF	WS None
CULTURAL RESOURCES				
Disturbance of prehistoric and his archeological sites during constru	Unlikely	Unlikely	Cultural resource survey prior t construction, consultation with S Tribes, avoidance of identified s excavation and recording of the s avoidance impossible.	None
Destruction of standing buildings structures within the impact area pipeline route.	Unlikely	Unlikely	(See above)	None
Vandalism of sites due to increas access.	Unlikely	Unlikely	(See above)	None

* Unlikely if constructed in non-breeding season

Table 5-10 - Impact Table
Coyote Springs Pipeline Extension

Impact Table - Coyote Springs Pipeline Extension

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
SOCIOECONOMIC				
4 person-years of labor (32 short	Likely	Short-term employment increase	Socioeconomic effects from th pipeline project are not expected t significant. No mitigation is plar	None
12 person years of construction la (100 non-local workers) would temporarily in-migrate to work on pipeline.	Likely	Temporary population increase of 17 persons (families of workers).	(See above)	None
Loss of agricultural income within right-of-way during constructio	Likely	Small acreag impacted fo one season.	(See above)	None
Construction workers would place demand on locally available housin	Likely	52 units of temporary housing needed.	(See above)	None
Minor demands for local services (primarily the road system).	Likely	Minor impact on schools.	(See above)	None
Real property tax revenues would paid after the pipeline is comple	Likely	$181,000 annually	(See above)	None
Pipeline completion makes sever projects (including Coyote Spring Cogeneration Plant) viable.	Likely	Major-positive economic benefits	None	None
GEOLOGY/HAZARDS				
Clearing, grading, trenching, stock of excavated materials would imp topography	Likely	Minimal	Disturbed areas will be graded a restored to approximate preconstruction conditions. Eros controls will be used at disturbed The pipe design will take into acc seismic conditions for the project	
The proposed pipeline could limit a to exploitable aggregrate resourc within the pit mine it crosses	Unlikely	Minor - aggregate supplies in th area are abundant	Compensate owner for loss of income.	None
Geologic hazards could affect th integrity of the pipeline (seismic s or erosion at stream crossings)	Unlikely	Stress to th pipeline and creation of potential wea points.	See Text (No Streams are crossed)	None
SOIL				
Construction resulting in: loss vegetative cover, and topsoil; mixin topsoil with less fertile subso deposition and sedimentation of lo lying lands from increased soil ero soil compaction. Permanent loss soils/productivity.	Likely	Conversion to grassland	Follow guidelines provided by FER Erosion Control, Revegetation, ar Maintenance Plan.	None
LAND USE				
Road crossings could disrupt tra during construction.	Likely	Short-term, minor		
	Unlikely	Short-term	Utilities would be located prior construction.	None
Pipeline storage yards would disr current land uses until the pipelin complete and lands are restored to prior condition.	Unlikely	Short-term	The site selected for pipeline stor currently unused and vacant	

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
LAND USES Cont.				
Clearing and construction of the pi would disrupt current land uses.	Likely	Short-term, temporary	78% of the proposed route is adja to existing, previously disturbed of-way. Landowners would be compensated for losses. Land wo be restored to prior conditions Activities such as grazing and agriculture would resume in rig way.	
Pipeline construction, if overlapping building the power plant, could inconvenience local area resident	Likely	Short-term temporary	Construction will occur over a per about 2 months. Because the perio disruption will be short, no mitiga planned.	None
RECREATION				
The pipeline crosses the Oregon T Construction would have a short-t (about 1 day) impact on trail use	Likely	Short-term minor	Access to trail users would be pro during construction	None
People using Messner Pond for fish or birdwatching could be disrupte during construcion of the pipelin Public access would not be impact	Unlikely	Short-term, minor	None	None
PROTECTED RESOURCES				
Oregon DOE-designated Protected Resources	Unlikely	Slight	None	None
VISUAL AND AESTHETIC RESOURCES				
The pipeline passes through areas slightly altered landscapes for most length. In these areas impacts wou moderate. In the industrial park landscape is highly altered and th pipeline would have low impact.	Likely	Moderate to low	Minimizing clearing to reduce con Stockpile and replace native soils disturbed areas. Restore contours revegetate disturbed areas with n plants.	None
AIR QUALITY AND NOISE				
Air emissions (carbon monoxide, nitrogen oxides, volatile organic compounds, particulate matter and dioxide) from construction of the p would be negligible.	Minimal	Localized and slight	None	None
Fugitive dust emissions would occur result of soil exposure	Minimal	Localized	Limit right-of-way clearing. See mulch to protect soil. Water expo soil during periods of high wind. low velocity equipment.	None
Construction of the pipeline wou increase noise levels.	Likely	Localized	Work will be limited to daytime h Mufflers and quieting devices woul used when needed. Work schedulin to avoid periods of noise annoyan Install temporary or portable no barriers around stationary nois sources, if needed.	None

Table 5-10 - Impact Table (continued)
Coyote Springs Pipeline Extension

Impact Table - Coyote Springs Pipeline Extension

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
SOCIOECONOMIC				
4 person-years of labor (32 short	Likely	Short-term employment increase	Socioeconomic effects from th pipeline project are not expected t significant. No mitigation is plar	None
12 person years of construction la (100 non-local workers) would temporarily in-migrate to work on pipeline.	Likely	Temporary population increase of 17 persons (families of workers).	(See above)	None
Loss of agricultural income within right-of-way during constructio	Likely	Small acreag impacted fo one season.	(See above)	None
Construction workers would place demand on locally available housin	Likely	52 units of temporary housing needed.	(See above)	None
Minor demands for local services (primarily the road system).	Likely	Minor impact on schools.	(See above)	None
Real property tax revenues would paid after the pipeline is comple	Likely	$181,000 annually	(See above)	None
Pipeline completion makes sever projects (including Coyote Spring Cogeneration Plant) viable.	Likely	Major-positive economic benefits	None	None
GEOLOGY/HAZARDS				
Clearing, grading, trenching, stock of excavated materials would imp topography	Likely	Minimal	Disturbed areas will be graded a restored to approximate preconstruction conditions. Eros controls will be used at disturbed The pipe design will take into acc seismic conditions for the project	
The proposed pipeline could limit a to exploitable aggregrate resourc within the pit mine it crosses	Unlikely	Minor - aggregate supplies in th area are abundant	Compensate owner for loss of income.	None
Geologic hazards could affect th integrity of the pipeline (seismic s or erosion at stream crossings)	Unlikely	Stress to th pipeline and creation of potential wea points.	See Text (No Streams are crossed)	None
SOIL				
Construction resulting in: loss vegetative cover, and topsoil; mixin topsoil with less fertile subso deposition and sedimentation of lo lying lands from increased soil ero soil compaction. Permanent loss soils/productivity.	Likely	Conversion to grassland	Follow guidelines provided by FER Erosion Control, Revegetation, ar Maintenance Plan.	None
LAND USE				
Road crossings could disrupt tra during construction.	Likely	Short-term, minor		
	Unlikely	Short-term	Utilities would be located prior construction.	None
Pipeline storage yards would disr current land uses until the pipelin complete and lands are restored to prior condition.	Unlikely	Short-term	The site selected for pipeline stor currently unused and vacant	

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
LAND USES Cont.				
Clearing and construction of the pi would disrupt current land uses.	Likely	Short-term, temporary	78% of the proposed route is adja to existing, previously disturbed of-way. Landowners would be compensated for losses. Land wo be restored to prior conditions Activities such as grazing and agriculture would resume in rig way.	
Pipeline construction, if overlapping building the power plant, could inconvenience local area resident	Likely	Short-term temporary	Construction will occur over a per about 2 months. Because the perio disruption will be short, no mitiga planned.	None
RECREATION				
The pipeline crosses the Oregon T Construction would have a short-t (about 1 day) impact on trail use	Likely	Short-term minor	Access to trail users would be pro during construction	None
People using Messner Pond for fish or birdwatching could be disrupte during construcion of the pipelin Public access would not be impact	Unlikely	Short-term, minor	None	None
PROTECTED RESOURCES				
Oregon DOE-designated Protected Resources	Unlikely	Slight	None	None
VISUAL AND AESTHETIC RESOURCES				
The pipeline passes through areas slightly altered landscapes for most length. In these areas impacts wou moderate. In the industrial park landscape is highly altered and th pipeline would have low impact.	Likely	Moderate to low	Minimizing clearing to reduce con Stockpile and replace native soils disturbed areas. Restore contours revegetate disturbed areas with n plants.	None
AIR QUALITY AND NOISE				
Air emissions (carbon monoxide, nitrogen oxides, volatile organic compounds, particulate matter and dioxide) from construction of the p would be negligible.	Minimal	Localized and slight	None	None
Fugitive dust emissions would occur result of soil exposure	Minimal	Localized	Limit right-of-way clearing. See mulch to protect soil. Water expo soil during periods of high wind. low velocity equipment.	None
Construction of the pipeline wou increase noise levels.	Likely	Localized	Work will be limited to daytime h Mufflers and quieting devices woul used when needed. Work schedulin to avoid periods of noise annoyan Install temporary or portable no barriers around stationary nois sources, if needed.	None

Table 5-10 - Impact Table (continued)
Coyote Springs Pipeline Extension

Impact Table - Coyote Springs Pipeline Extension

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
LAND USES Cont.				
Clearing and construction of the pi would disrupt current land uses.	Likely	Short-term, temporary	78% of the proposed route is adja to existing, previously disturbed of-way. Landowners would be compensated for losses. Land wo be restored to prior conditions Activities such as grazing and agriculture would resume in rig way.	
Pipeline construction, if overlapping building the power plant, could inconvenience local area resident	Likely	Short-term temporary	Construction will occur over a per about 2 months. Because the perio disruption will be short, no mitiga planned.	None
RECREATION				
The pipeline crosses the Oregon T Construction would have a short-t (about 1 day) impact on trail use	Likely	Short-term minor	The trail would be restored to original condition after pipelin construction.	None
People using Messner Pond for fish or birdwatching could be disrupte during construcion of the pipelin Public access would not be impact	Unlikely	Short-term, minor	None	None
PROTECTED RESOURCES				
Oregon DOE-designated Protected Resources	Unlikely	Slight	None	None
VISUAL AND AESTHETIC RESOURCES				
The pipeline passes through areas slightly altered landscapes for most length. In these areas impacts wou moderate. In the industrial park landscape is highly altered and th pipeline would have low impact.	Likely	Moderate to low	Minimizing clearing to reduce con Stockpile and replace native soils disturbed areas. Restore contours revegetate disturbed areas with n plants.	None
AIR QUALITY AND NOISE				
Air emissions (carbon monoxide, nitrogen oxides, volatile organic compounds, particulate matter and dioxide) from construction of the p would be negligible.	Minimal	Localized and slight	None	None
Fugitive dust emissions would occur result of soil exposure	Minimal	Localized	Limiting right-of-way clearing. S or mulching to protect soil. Wat exposed soil during periods of hi wind. Using low velocity equipm	None

POSSIBLE IMPACTS	IMPACT LIKELIHOOD	IMPACT EXTENT	MITIGATION IDENTIFIED	PERMIT REQUIRED
AIR QUALITY AND NOISE (Cont.)				
Construction of the pipeline wou increase noise levels.	Likely	Localized	Work will be limited to daytime h Mufflers and quieting devices woul used when needed. Work schedulin to avoid periods of noise annoyan Install temporary or portable no barriers around stationary nois sources, if needed.	None

Table 5-10 (continued)
Impact Table - Coyote Springs Pipeline Extension

The major impact to wildlife will be the temporary disturbance to wildlife habitat, largely consisting of disturbed grassland and grazed grassland. A small amount of shrub-steppe habitat may be impacted. These habitat impacts are not considered significant as they are common in the area, and are already disturbed. There may also be some direct mortality of wildlife in underground burrows or of young birds in ground nests during pipeline construction. This is not considered a significant impact to local populations of common species. Common species are widespread and abundant: mortality from construction would be minor relative to both local populations and normal annual mortality, and losses are expected to be replaced during the following breeding season.

Three sensitive avian species may be impacted by construction of the proposed pipeline: long-billed curlew, grasshopper sparrow, and burrowing owl. All are ground nesting birds whose nests and young could be destroyed if construction occurred during the breeding season in portions of the route where they might nest. The Washington ground squirrel could also be affected if it is using rodent burrows along the route. Other sensitive species were not observed in the project area, were observed outside the area to be impacted, or appropriate habitat was not found in the pipeline route and thus are not expected to be impacted by the project.

Mitigation - In 1994, surveys to determine breeding locations were repeated for long-billed curlews, grasshopper sparrows, burrowing owls, and Washington ground squirrels because part of the pipeline route had been shifted to the west side of Bombing Range Road.

Construction is not anticipated to occur during long-billed curlew, grasshopper sparrow, burrowing owl and Washington ground squirrel breeding season (May to August), in areas where these species have been found breeding. This will prevent destruction of eggs or young in nests.

All mitigations described in the vegetation section will be followed. Revegetation of disturbed areas with native plants will enhance wildlife habitats in the area. Revegetation should take place as soon as possible following disturbance to minimize the impact to wildlife populations and to reestablish wildlife habitats promptly.

Socioeconomic Impacts - Pipeline

Significant socioeconomic benefits are anticipated from the pipeline construction in the form of increased construction-related employment, income, and sales, and increased property tax revenues for Morrow County.

The only negative impact is the possible shortage of temporary housing for in-migrant construction workers due to competition for housing units with the construction workers for the cogeneration plant. Since the period of pipeline construction is only 5 to 6 weeks, this impact is considered minor. The housing shortage could be reduced by doubling up workers in motel rooms and apartments, and the use of recreation vehicles and mobile homes which are typically brought in by transient pipeline construction workers.

Public Health and Safety Impacts - Pipeline

Impacts on public health and safety are not expected. The PGT pipeline would be designed, constructed, operated and maintained in accordance with Department of Transportation Minimum Federal Safety Standards (CFR 49 Part 192).

Noise Impacts - Pipeline

No long-term noise impacts would result from construction of the pipeline. Increased noise levels resulting from construction activities would be localized. Nighttime noise levels normally would be unaffected because work would be limited to daylight hours. Construction activity occurring during the daytime (7:00 a.m. to 10:00 p.m.) is exempt from Oregon noise level requirements. Standard operation and maintenance of the pipeline would not significantly increase noise levels. Noise from blowdown would be temporary and would occur only during emergency situations or planned maintenance activities.

Recreation/Protected Resources/Visual and Aesthetic Impacts - Pipeline

No impacts will occur to recreation or protected resources. Access to the Oregon Trail entrance where it crosses the Boardman Bombing Range will be provided for hikers during construction.

Impacts will be negligible for visual and aesthetic resources during construction of the pipeline. Visual impacts along the generally flat, open route, are considered short-term because vegetation would recover during the year or two after construction. The revegetation plan mentioned previously will augment restoration of the right-of-way and working area.

Because it would be buried, the pipeline will not be visible for the entire length of the route. Only identification markers spaced at varying intervals would be evident. Above ground facilities which include the meter station and mainline valve would be located at the proposed cogeneration plant, and would have no adverse effect of the site. The mainline valve at the mainline system connection would have no visual effect on the area.

Cultural Resources Impacts - Pipeline

Intensive cultural resource field surveys were performed along the route, and no prehistoric or significant historic resources were found. Twelve historic resources were identified, only one of which was recommended as significant (the West Extension Irrigation Canal). Additionally,

investigation of the Oregon Trail crossing indicated that the trail segment is unrecognizable as a result of irrigation systems' construction and agricultural plowing. The segment, therefore, is not recommended as eligible for listing on the National Register. The SHPO, the Bureau of Reclamation, the Navy and the Umatilla were provided the survey results. To date, only the Umatilla have commented.

5.1.4 Cumulative Impacts

The Council on Environmental Quality (CEQ) defines ***cumulative impact*** as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

Within this context, several cumulative impacts are foreseeable.

Global Warming - Cumulative Impacts

The Coyote Springs Plant would release greenhouse gases. Greenhouse gasses reflect infrared radiation back to earth thus preventing heat loss to outer space. Because of this reflective capability greenhouse gases may contribute to global warming.

The proposed Coyote Springs Plant, together with PGE's existing Boardman Coal Plant and proposed cogeneration plants near Hermiston, Oregon would cumulatively emit approximately 15 percent of Oregon's 1990, or 0.04 percent of global human-caused 1990 CO_2 emissions. In spite of these facilities comparatively large CO_2 emissions, it is important to realize that the CO_2 emissions per thousand kWh from new efficient natural gas combustion turbines such as Coyote Springs and the proposed plants near Hermiston, are 40 to 50 percent of those from coal-fired plants. Cogeneration units emit even less if offset emissions from steam boilers are considered.

One mitigating action that has been taken to offset CO_2 emissions is planting trees. Trees use airborne CO_2 to grow. A new policy of the Clinton administration is to grant tax credits to utilities that take actions to offset CO_2 emissions from their generating plants. PGE has not decided to undertake CO_2 offset mitigation at this time.

Transmission Capacity - Cumulative Impacts

Integrating the Coyote Springs Cogeneration Plant over the BPA transmission system would diminish surplus capacity on BPA's McNary-Slatt 500-kV transmission line. Presently, the surplus capacity of this line has been rated at 700-800 MW, which is more than the total output of both Coyote Springs generation units. The proposed Hermiston Generation Plant and the Hermiston Power Plant also intend to use BPA's transmission system. Their combined capacity would be 800-900 MW. If all three proposed plants are built, demands would exceed BPA's existing

transmission system capabilities. Using projected completion dates for these units and assuming all three were integrated, BPA would need to install additional transmission capacity by the year 2000.

BPA has considered how this might be done. The most favorable solution would be to build a new 500-kV transmission line from McNary Substation adjacent to the 345-kV McNary-Ross transmission line to an interconnection with BPA's existing 500-kV Ashe-Marion lines northeast of Crow Butte, Washington. BPA's Ashe-Marion transmission lines were built in the late 1970s to integrate energy from several nuclear power plants proposed at the Hanford Reservation and near Boardman (Pebble Springs Nuclear Plant). Only one nuclear power plant was completed on the Hanford Reservation, which left surplus capacity on the Ashe-Marion 500-kV transmission lines. Tapping these lines in Washington north of Crow Butte would provide a path for power from the proposed cogeneration plants west to the Willamette Valley in Oregon. This option and other ways to expand transmission capacities would be evaluated for environmental impacts before a decision is made.

Groundwater - Cumulative Impacts

To assess the significance of potential present and future incremental impacts due to groundwater pumping, an inventory of groundwater rights has been prepared for both alluvial wells and basalt wells located within 1.6 km (1 mile) of the Coyote Springs Plant, including all Port of Morrow wells (see Table 5-11). The information was obtained from OWRD files and the Port of Morrow. The Port of Morrow controls 93 percent of the total permitted groundwater withdrawals within a mile of the Coyote Springs Plant. This does not include the City of Boardman's appropriation. The City of Boardman has a surface water right for 61 m^3 per minute (16,100 gpm [36 cfs]), of which 25 m^3 per minute (6,600 gpm [14.7 cfs]) is reported to be developed. Although the City of Boardman has a surface water right, some of this appropriation is supplied by groundwater from the alluvial aquifer because the City uses a Ranney Collector next to the Columbia River.

As shown in Table 5-11, 70 percent of the Port's permitted appropriation is from the alluvial aquifer and 30 percent is from the basalt aquifer. The total Coyote Springs Plant demand will make up 22 percent of the total Port-owned alluvial aquifer appropriation. As stated previously, the Coyote Springs Plant demand will not result in an increase in the alluvial aquifer pumping in the area since the wells supplying the project have been used historically by the Port for its other operations. In fact, there will be a net 0.17 m^3/s (4.5 cfs) reduction in pumping during the summer as a result of transferring the water right at the Carlson Sumps from a 6-month agricultural right to a 12-month municipal right. Furthermore, the cooling and blowdown wastewater generated by the Coyote Springs Plant will be reused to irrigate crops at the Port of Morrow land application sites. The Port presently beneficially reuses a total of nearly 3 800 000 m^3 (1 billion gal.) of water per year, which results in significant conservation of water that would otherwise be obtained from the Columbia River or groundwater.

While not directly associated with the Coyote Springs Plant, the Port of Morrow's new basalt well (Port Well # 5) will make up 41 percent 7.6 m^3/s (2,693 gpm) of the total permitted basalt aquifer withdrawals within a mile of the Coyote Springs Plant (Table 5-11). The OWRD has responsibility and authority to review and approve all requests for groundwater appropriations. The review process includes an assessment of whether or not the aquifer can support the additional pumping without injuring senior water rights holders. The OWRD has determined that Port Well #5 will not create unacceptable present or future impacts and has issued a favorable technical review of the Port's application. Further, OWRD has stated that there are sufficient water rights within the Port of Morrow to support the project.

If unacceptable impacts due to pumping are observed in the future, the OWRD has the authority to limit further appropriations and reduce the total pumping demand based on seniority of water rights. This authority has been exercised at the Ordinance Critical Groundwater Area (OCGA). The OWRD is not considering expanding the OCGA.

There is no information that indicates that the proposed groundwater withdrawals for the project would result in unacceptable present or future cumulative impacts. This conclusion is supported by the following:

- The Coyote Springs Plant will derive its water supply from existing permitted shallow aquifer water sources at the Port of Morrow.
- The OWRD has stated that there are sufficient water rights available at the Port to supply the project.
- There will be a net 0.17 m^3/s (6 cfs) reduction in pumping from the alluvial aquifer during the summer months when low flow in the Columbia River is a concern for fish protection reasons.
- OWRD has issued a favorable technical review of the Well #5 permit application.
- The number of groundwater users near the Coyote Springs Plant are limited; the Port controls 93 percent of the groundwater rights within 1.6 km (1 mile) of the project.
- OWRD has the responsibility to monitor future impacts caused by overpumping and will limit further appropriations if it is found that senior water rights holders are being adversely impacted.

Threatened or Endangered Salmon - Cumulative Impacts

In testimony relating to PGE's Application for a Site Certificate before the Oregon EFSC John Pizzimenti, a scientist specializing in studies on fish in regulated rivers, provided the following explanation of how the Coyote Springs Cogeneration Project might impact threatened or endangered salmon; "In theory, the Coyote Springs project could impact fish in the Columbia River in the following four ways:

1. ***Entrainment*** of fish through water withdrawal intakes.
   This does not occur because the water supply is from wells and is not taken directly from the river.

2. Degradation of water quality through land use modification or point source discharge.
   These do not apply because construction and operation permits will require appropriate control measures. There are no planned discharges from the project to the river.

3. Habitat destruction.
   This does not occur because the project is totally away from the river and does not require construction in the river.

4. Reduction in flows of the Columbia River.
   A maximum of 0.17 m^3/s (6 cfs)) will be appropriated to the project through existing water supply wells. These wells rely on aquifer that have connection with the river and thus affect the water budget of the river up to a maximum of 0.17 m^3/s (6 cfs)." (Pizzimenti, 1994)

Thus, the avenue by which cumulative impacts might affect threatened or endangered salmon species is by means of water withdrawals from shallow aquifers bordering the Columbia River. In 1992, Jeff Barry of CH_2M Hill conducted an extensive study of groundwater in the Boardman area in connection with an EPA funded study titled "Wellhead Protection Demonstration Project, Boardman, Oregon." Jeff Barry was hired to help assess the cumulative impact of groundwater withdrawals which has been used to predict cumulative impacts to threatened or endangered Snake River salmon species.

In Appendix C Beak Consultants concluded that the Coyote Springs Project "is not expected to result in direct mortality or disturbance (visual or auditory) to listed species." This conclusion is supported by the testimony of John Pizzimenti before the Oregon EFSC where he concludes "... diminished flows due to the Coyote Springs project are negligible. They will have no effect on the survival or recovery of threatened or endangered fish species."

Table 5-11 was developed by CH_2M Hill and provides an inventory of existing groundwater rights within a 1.6 km (1 mile) zone surrounding the Coyote Springs Plant. The total alluvium

Table 5-11
Inventory of Groundwater Rights
Near the Coyote Springs Cogeneration Project

Well Location (by section)	Owner	Local Name	Distance from Site (ft)	(cfs)	(gpm)	Aquifer	Use	Water Right Status	Permit, or Certificate Number	Well Depth (ft)
T4N R25E 1 ab	Port of Morrow	Farm Well #4	13,000	9.60	4,310	Alluvium	Irrigation	Application	Not available	
T4N R25E 1 bb	Port of Morrow	Farm Well #5	12,000	(This well is part of the above water right application)						
T4N R25E 10 aac	Port of Morrow	Well #4	3,500	1.69	758	Deep basalt	Industrial	Permit	10975	900
T4N R25E 10 abc	Port of Morrow	Toadvin Pond	2,300	6.53	2,929	Alluvium	Irrigation	Permit	10550	
T4N R25E 10 acc	Port of Morrow	Well #1	2,000	3.00	1,346	Deep basalt	Industrial	Permit	7158	685
T4N R25E 10 ada	Port of Morrow	Carlson Sumps 1&2	4,200	2.26	1,013	Alluvium	Municipal	Certificate	51782	
T4N R25E 10 ba	Port of Morrow	Well #3	1,000	2.00	898	Alluvium	Municipal	Certificate	47191	685
T4N R25E 10 bbd	Port of Morrow	Well #2	1,300	1.11	498	Deep basalt	Municipal	Certificate	58866	685
T4N R25E 12 bbc	Port of Morrow	Farm Well #1	4,000	1.60	718	Alluvium	Irrigation	Certificate	57216	71
T4N R25E 11bd	Port of Morrow	Well #5	4,000	6.00	2,693	Deep basalt	Municipal	Application	13408	900
T4N R25E 2 caa	Port of Morrow	Farm Well #3	7,000	1.58	709	Alluvium	Irrigation	Certificate	51822	93
T4N R25E 12 bba	Port of Morrow	Farm Well #2	10,000	2.88	1,293	Alluvium	Irrigation	Certificate	51822	88
T4N R25E 9 acd	Riverview Cemetary		2,000	0.06	27	Deep basalt	Irrigation	Certificate	34385	470
T4N R25E 9 cba	City of Boardman		5,000	1.50	673	Deep basalt	Municipal	Certificate	34275	585
T4N R25E 10 ccb	Homer G. Prichard		2,000	0.60	269	Shallow basalt	Irrigation	Certificate	56159	72
T4N R25E 10 ccb	Homer G. Prichard		2,000	0.28	126	Deep basalt	Irrigation	Certificate	56160	502
T4N R25E 10 dcb	Tallman and Sons		3,000	0.48	215	Shallow basalt	Irrigation	Permit	11026	210
			Total withdrawal:	41.17	18,476					
			Total alluvium withdrawal:	26.45	11,869					
			Total basalt withdrawal:	14.72	6,606					
			Total Port of Morrow withdrawal:	38.25	17,165					
			Proposed cogeneration demand:	5.95	2,668					

cfs = cubic feet per second
gpm = gallons per minute

withdrawal from the 1.6 km (1 mile) zone is 0.17 m^3/s (26.4 cfs). The demand of Coyote Springs 0.17 m^3/s (6 cfs) is included within this total. These withdrawals would not significantly impact flows in the John Day pool of the Columbia River.

When assessing cumulative impacts, reasonably foreseeable future actions are to be evaluated in combination with the proposal. The following future actions are reasonably foreseeable: (1) the Hermiston Generation Project (see page 2-3) would reduce flows in the McNary pool of the Columbia River by about 0.17 m^3/s (6 cfs); (2) the Hermiston Power Project would also reduce flows in the McNary pool of the Columbia River by about 0.17 m^3/s (6 cfs); (3) additional industrial development is likely to occur within the Port of Morrow, however the water demands of such uses is unknown.

BPA, the Bureau of Reclamation and the Army Corps of Engineers are reviewing the operation of 14 Columbia River system hydro projects. A Draft System Operation Review EIS is scheduled for release in late July 1994. Options being considered would drop the level of the John Day pool to minimum irrigation pool level of 80 m (262.5 ft.) or alternatively the minimum operation pool level of 78 m (257 ft.) minimum needed to operate the navigation locks. The John Day Pool would drop 1.5 - 3 m (5-10 ft.) if these options are selected. The outcome of the System Operation Review is considered speculative and thus is not included in the cumulative impact analysis for the Coyote Springs Plant.

Cumulative alluvial aquifer water withdrawals attributed to the Coyote Springs Plant when added to existing and foreseeable future water uses is not expected to jeopardize the continued existence of endangered or threatened Snake River salmon species. If the Coyote Springs Plant, existing withdrawals from the alluvial aquifer, and foreseeable future withdrawals are added together, the cumulative reduction of Columbia River flows due to groundwater withdrawals would be about 1.1 m^3/s (38 cfs). Compared with the spring runoff during juvenile migration in the John Day pool of the Columbia River of 7400 m^3/s- 9800 m^3/s (260,000-343,000 cfs) in 1983, the Coyote Springs Plant withdrawal of 0.17 m^3/s (6 cfs) even when viewed in an incremental and cumulative manner is insignificant. The significance of an incremental 0.17 m^3/s ($^{6\ cfs}$) decrease in flow cumulating to a 1 m^3/s (38 cfs) flow reduction, might be debated. However, in John Pizzimenti's testimony he states; "there is no evidence that mainstream flow is the primary determinant of salmon survival in most years in the Snake and Columbia rivers, and especially in the John Day pool." Thus flows may not be a significant factor in salmon survival.

Regional Energy Resource Needs - Cumulative Impacts

The Coyote Springs Plant, together with the combustion turbine generation projects proposed near Hermiston, if completed, would provide over 1300 aMW of energy. BPA's *1992 Pacific Northwest Loads and Resources Study* projects a 3,425 MW deficit in 2003 based on the medium load forecast. These plants in combination would satisfy a significant portion of the Northwest's forecast energy needs.

The three combustion projects would reduce flows in the Columbia River which reduces the volume of water available to downstream turbine generators. It is estimated that Coyote Springs Plant's water withdrawal of 171 liters (6 cfs) would have produced 1,000,000 kilowatt hours of electricity annually if allowed to remain in the Columbia River. Assuming the other proposed turbine generators are built and have an equivalent effect, 3,000,000 kilowatt hours of generating capability would be foregone. The average value of this energy is assumed to be 60 mills (replacement cost), annual lost revenues would be $180,000.

Compared with the combined output of the three plants (1300 aMW), a 3 aMW loss in energy is not significant. The revenue loss of $180,000 would be offset by BPA wheeling charges to project sponsors. BPA would receive between $6-8 million in annual revenues from PGE if both units are built and wheeled over the BPA transmission system. Similar wheeling charges would accrue from the Hermiston Generation Project. The Hermiston Power Project would provide for BPA loads and thus would not yield wheeling revenues. Annual wheeling revenues would range from $12-16 million and more than offset the lost energy revenues.

Tax Revenues - Cumulative Impacts

Construction of the Coyote Springs Cogeneration Project in Morrow County and the two cogeneration projects proposed for the Hermiston area could offset the tax reduction measures mandated by Oregon's Measure 5 for local governments in the area. The state of Oregon could also benefit, in that the state, under Measure 5, has the responsibility of providing the necessary funding for the local school districts beyond the maximum of $5/$1000 of valuation that can be collected for tax year 1995/96 and beyond.

Housing - Cumulative Impacts

A shortage of temporary housing facilities in the area could result if all three cogeneration projects' peak construction periods occur concurrently. Construction of large-scale cogeneration plants, such as the proposed projects, normally take place over an 18-24 month period. At peak construction of the Coyote Springs Project, an estimated 200 workers would be on-site (Mayson, 1993). At peak construction for the Hermiston Power Project, 250 workers are expected to be employed (Smith, 1993); U.S. Generating Company's Hermiston Generation Project peak employment is expected to be 450 workers (Oregonian, September 1993).

Both PGE and U.S. Generating Company propose to begin construction sometime in 1994. However, the decision to start construction of the Hermiston Power Project is dependent on BPA's need for power. At this time Hermiston Power Project sponsors state construction would begin between 1995 and the year 2000 (Hermiston Power Partnership). If peak construction were to occur simultaneously, more than 900 workers could be working in the area.

While not all construction workers would likely be from outside the local area, most construction workers are likely to seek temporary housing in the local area. A number of these workers may bring dependents with them during project construction, although this figure is not expected to be significant.

Natural Gas Supply - Cumulative Impacts

The source of natural gas for the proposed cogeneration plant is from actively producing gas fields in Alberta and British Columbia, Canada. The number of natural gas wells that would be needed to supply PGE requirements was estimated by PGT. The average total yield of Canadian natural gas wells was divided into the total requirements of the Coyote Springs Plant (41 billion BTUs per day). Using this method, the output of 16 gas wells would be used each year by the Coyote Springs Plant (PGT, 1993). For perspective, 4,000 Canadian gas wells were drilled in 1991 and the total number of wells in Canada number in the hundreds of thousands (PGT, 1992). Thus the Coyote Springs Plant would use only a small amount of gas compared to that available in Canada. The world's proven reserves are expected to last approximately 58 years at the present consumption rate (*Inside Energy/with Federal Lands, 1993*).

5.2 Impacts of the No Action Alternative

The No Action alternative assumes the Coyote Springs Plant is not built. Impacts reported for the proposed Coyote Springs Plant and associated transmission facilities and the pipeline would not occur, at least not to the same extent and in the same locations. If the No Action alternative is chosen, PGE's need to replace energy lost through closing the Trojan Nuclear Power Plant would not be met.

Two similar cogeneration plants are proposed at Hermiston, Oregon. The proximity of BPA's transmission lines to these plants makes wheeling of power over BPA's lines almost certain. Surplus capacity on BPA's transmission lines would still be used under the No Action alternative.

As the need for additional power resources would remain under the No Action alternative, PGE would most probably build a generation plant of similar size and type at a different location. PGE could also acquire an equivalent amount of energy from independent power producers. Either option appears likely, considering that two very similar generation plants have been proposed at Hermiston, Oregon, and energy produced by combustion turbines is cost-effective.

PGE's investment in the Coyote Springs Project would be lost under the No Action alternative, as would the time committed to this proposal. Development of another generation proposal would take several years to reach an equal level of refinement. In the interim, PGE would need to acquire power during periods when demand exceeds their energy resources, as was the case in winter 1992-1993. The cost of power acquired during winter peaks is high, which would increase costs to PGE's customers.

To Chapter 6