

4. Affected Environment

This section describes the environment that would be affected by construction and operation of the proposed Coyote Springs Cogeneration Project and related facilities. The description provides the baseline for comparing the No Action alternative to the proposed action. Environmental consequences are discussed in Section 5.

4.1 Coyote Springs Cogeneration Plant and Transmission Loop Line

4.1.1 Land Use and Community Character

The area's land use has been influenced by several important characteristics: (1) geography, including latitude, elevation, and relative position with respect to the Cascade Mountain Range; (2) meteorology, including annual rainfall, seasonal and diurnal temperatures, relative humidity, length of the growing season and prevailing winds; (3) geology, including soils and availability of subterranean water; (4) location relative to major transportation routes, primarily the Columbia River and I-84, one of the principal east-west highway corridors in the western United States; (5) proximity to the City of Boardman and other population centers both within and outside the State of Oregon, including markets overseas; and (6) an available labor supply in Morrow and Umatilla counties.

The proposed project is outside the City of Boardman, but within the City's urban growth boundary (UGB) (see Map 3). Title to the 9-ha (22-acre) site for the proposed plant is held by the Port of Morrow. This site is a small portion of approximately 2800 ha (7,000 acres) under the Port's control in the area. The major portion of the Port's holdings is also shown on Map 3. Title to the proposed 2.4-km (1.5-mile) transmission line corridor is also held by the Port. The Port has agreed to lease the power plant site to PGE and issue PGE an easement for the 500-kV transmission line.

The proposed plant site is about 400 m (1/4 mile) east of the City of Boardman. The City of Boardman is about 70 km (45 miles) west of the City of Pendleton, approximately the same distance from the Tri-Cities area of southeastern Washington, and about 225 km (140 miles) east of the Portland metropolitan area. The Tri-Cities area is the nearest large population center to the City of Boardman. The combined population of the incorporated areas of Pasco, Kennewick and Richland is over 100,000 (Lowe, 1993). The City of Spokane in northeastern Washington, with a 1992 population of approximately 180,000, is about the same distance from the City of Boardman as is the City of Portland.

Existing Land Use

The current land use of the proposed power plant site is vacant. The area has been mined for aggregate, but the 9 ha (22 acre) site has not been mined for over a year (Neal, Port of Morrow General Manager, June 6, 1994). Mining by Ready Mix Limited has been an ongoing activity for 15 years (verbal information from the Port of Morrow). As the mining operation moved east, the western portion was filled in. This western portion is now the proposed site for the cogeneration project. Land uses adjacent to the proposed site include the Union Pacific Railroad on the north, Messner Pond and an irrigation pond on the east, a vacant parcel on the south, and Ullman Boulevard on the west. Land near the proposed plant site is also used for potato and onion processing plants, two mobile homes, potato storage barns, the City of Boardman's sewage lagoons, a quarry for mining *riprap*, and BPA's Boardman Substation.

The proposed transmission line route would cross vacant land and land used for a public right-of-way (Columbia Avenue), a concrete batch plant that may soon close, a portion of the City of Boardman's sewage treatment facilities, and an irrigated agricultural field (see Map 4). Land in the area is also used for a number of Federal facilities such as the Boardman Bombing Range, the Umatilla Ordinance Depot, and the Umatilla National Wildlife Refuge (see Map 5).

Planning and Zoning

The proposed plant site is in the unincorporated area of Morrow County, but within the City of Boardman's UGB. Because the Port controls a significant amount of land within the City's UGB, the Port was included with the City and Morrow County when they developed an agreement to promote consistency in planning and development efforts between governmental and quasi-governmental entities. The agreement states that Morrow County shall retain responsibility for land use decisions and actions affecting lands within the City of Boardman's UGB. Most of the proposed transmission line will be on land within the City's UGB, but approximately 400 m (500 yards) would be outside the UGB.

The proposed plant site is on land zoned Port Industrial (PI). The proposed transmission line would be on land zoned PI and General Industrial (MG) (see Map 6).

Transportation

The transportation network in the local area includes most modes of travel including: (1) highway travel on I-84, just south of the proposed site; (2) passenger and freight rail service on the Union Pacific Railroad corridor, immediately north of the proposed site; (3) barge transportation on the Columbia River, just north of the Union Pacific Railroad corridor; (4) air service at the Boardman flight strip, about 8 km (5 miles) west-southwest of the City of Boardman; (5) public and private (Port) roads in the immediate vicinity of the proposed project; and (6) trails in the Umatilla National Wildlife Refuge used for hiking and horseback riding.

Currently, two passenger trains and 24 freight trains use the Union Pacific Railroad corridor adjacent to the proposed project site each day (Hill, 1993). This rail corridor is a portion of Union Pacific's main line, which travels to Omaha, Nebraska, and points east. Average daily traffic on I-84, just south of the proposed site, was 9,450 vehicles as of 1991, the most recent information available (Alexander, 1993). Average daily traffic on Columbia Avenue near the proposed project was 3,100 vehicles in 1989, the most recent information available, and 1,800 vehicles for Ullman Boulevard during the same year (Morrow County, 1993).

Recreation Resources

Existing and potential recreational resources within an 8-km (5-mile) impact area are shown on Map 7 and described below.

A wide range of recreational opportunities are available within 8 km (5 miles) of the plant site, including facilities for hunting, fishing, picnicking, swimming, boating (including launching facilities), nature observation, and hiking. Camping and picnicking are permitted at Boardman Marina Park, which is operated by the Boardman Parks and Recreation District. Boat ramp access to the Columbia River is available at Boardman Marina Park and the Umatilla National Wildlife Refuge. Swimming and other beach activities including sailboarding are popular at Boardman Marina Park and at beach areas along the Columbia River.

There are no recreational facilities, and limited opportunities at the proposed plant site for recreation and within the proposed right-of-way for the transmission line.

The Columbia River is fished for sturgeon, salmon, steelhead, bass and walleye.

Umatilla National Wildlife Refuge is 9,250 ha (22,860 acres) along the Columbia River north and northeast of the proposed plant site. The refuge is also popular for fishing. McCormack Slough, ponds and water impoundments on the refuge are open to fishing February 1 through September 30. The refuge has trails for hiking, horseback riding, and waterfowl viewing. About 186 ha (460 acres) of refuge land are farmed to provide food and cover for wildlife. Horseback riding is popular along the Columbia River within this refuge. Camping and overnight parking are not permitted in the refuge.

The Port of Morrow and Boardman Regulated Hunt Areas (RHA) are within the impact area and provide opportunities for upland game bird, waterfowl, and big game hunting during authorized seasons. The RHA Area includes the Willow Creek Wildlife Area, Sixmile Canyon Potholes Area, Threemile Canyon, Taggares Farms, and adjacent land south of I-84. Port of Morrow RHA, North Unit, includes the Coyote Springs Wildlife Area and the area north of I-84 to the Umatilla National Wildlife Refuge. Hunting is permitted on about 70 percent of the refuge. The McCormack Unit of the refuge issues waterfowl permits to hunt waterfowl, with upland game permits also available.

A 9-hole golf course is located at the west end of Wilson Road, southwest of Boardman. Riverside High School in Boardman has athletic facilities for tennis, basketball, baseball and other sports, and a running track. Additional baseball diamonds are at Boardman Marina Park, Boardman City Park and Sam Boardman Elementary School on West Wilson Road. Sam Boardman Elementary School and Boardman City Park have playgrounds. A privately owned indoor riding arena is south of Boardman.

Messner Pond, in the Port of Morrow adjacent to the proposed plant site, is occasionally fished for warm water species, primarily bass and walleye. There are no designated trails along the east side of Messner Pond. Messner Pond is also used by Morrow County residents and tourists for birdwatching and wildlife viewing. Hunting is permitted at Messner Pond only by permit from the Port of Morrow. According to the Oregon Department of Fish and Wildlife, Messner Pond is discussed in several Oregon birding guides.

Other Nearby Recreational Facilities

Many recreation facilities outside the impact area but within the vicinity are used by Morrow County residents. In addition to the boat ramp facilities discussed above, boat access to the Columbia River is also available at Irrigon Marina Park and Quesnel Park (Threemile Canyon). Hat Rock State Park, 13 km (8 miles) east of Umatilla, is a 297-ha (735-acre) park on the banks of the Columbia River. Picnicking, hiking trails, and fish viewing areas are available at Hat Rock State Park. McNary Dam, and Cold Springs Recreation Area also have boat facilities.

The Cold Springs National Wildlife Refuge is a 1260-ha (3,100-acre) refuge, 11 km (7 miles) east of Hermiston around Cold Springs Reservoir. The refuge has a trail system for hiking and wildlife viewing. Hunting is permitted on 506 ha (1,250 acres) of the refuge, and the reservoir is fished for warm water species. A boat ramp is available at South Point, and parking and rest rooms are also available.

Fishing is popular in the Umatilla River, with steelhead the primary game fish. An asphalt boat ramp enters the river at Nugent Park. Parking and rest room facilities are available.

Future Recreation Opportunities

Morrow County, the Port of Morrow, and the City of Boardman do not have plans to develop any new recreation facilities or opportunities. Existing recreational facilities will be more than adequate to meet the needs of an increased population caused by construction and operation of the proposed plant according to the Planning Director of Morrow County.

The Morrow County Comprehensive Plan (1986) has 20 Recreation Policies, with the first policy stating that the county wants to “. . . encourage the development of public meeting places and indoor recreational facilities for all age groups, with special attention to young adults.” The county encourages combining certain recreation facilities and activities with the school district to reduce public costs. At this time, there are no plans to build any new facilities associated with schools. However, Morrow County encourages continued and expanded use of schools for community activities, including using playing fields on school grounds.

A recreation plan for Messner Pond was developed but never implemented. The stated goal of the plan was to provide additional recreational opportunities and to aesthetically enhance the industrial zone, while maintaining the wildlife values of the area. This included plans for carp management, trail building, and the addition of a picnicking area on the northeast side of the pond.

4.1.2 Natural Resources

Regional Geology

The proposed plant site is within a 129-km (80-mile) wide unit of plain and low plateau topography called the Walla Walla Section of the Columbia River Plateau Physiographic Province. The plain is underlain by rocks of the Columbia River Basalt Group and the Dalles Formation. These bedrock units are covered by glaciofluvial deposits and loess. The Columbia River Basalt Group is mostly flood basalts extruded during the late Tertiary between 17 to 6 million years before present (B.P.). They are collectively up to 3.7 km (12,000 ft.) deep. The beds were later deformed into many structural features including folds, faults and basins. Major structural features include the Blue Mountain Anticline southeast of the site, the Rattlesnake Hills Anticline and Wallula-Walla Walla Fault System to the northeast, and the Dalles-Umatilla Syncline to the southwest. (PGE, 1993.)

Local Geology

The proposed plant site is underlain by river deposited sands, gravels, and cobbles, extending approximately 17-18 m (55-60 ft.) deep. The river deposits are underlain by the Columbia River Basalt Group. The Columbia River shoreline is approximately 190 m (625 ft.) north of the proposed generation plant. The proposed plant site and transmission line corridor are within the *historic* Columbia River floodplain. However, dams on the Columbia River now regulate its flows, so the proposed locations for the plant and transmission line are not now considered in the Columbia River's 100-year floodplain.

Seismic Hazard

Ground Shaking - The proposed plant site lies within the Columbia River Plateau Seismotectonic Province. Two fault zones/faults within 100 km (62.5 miles) of the site, the Walla Walla Fault Zone and the Toppenish Ridge Fault, are possible seismic generation sources (Ebasco Infrastructure, 1993). The estimated maximum magnitude of the Walla Walla Fault Zone, which is approximately 80 km (50 miles) from the proposed site, ranges between 6.5 and 6.7 on the Richter scale. The Toppenish Ridge Fault, which is approximately 136 km (85 miles) from the proposed site, is considered capable of generating an earthquake of 7.3 in magnitude.

Other possible sources of seismic activity are earthquakes in adjacent Seismotectonic Provinces, subduction earthquakes or intraplate earthquakes.

No active faults (faults with surface displacement within the last 11,000 years) have been identified within the proposed plant, substation or transmission line alignment.

Estimated Earthquake Potential - Ebasco conducted a study for PGE to determine possible seismic sources and their associated earthquake potential. The potential is based on the combination of the estimated maximum magnitude of the event and its distance from the proposed facility site. Of the sites, including discrete known fault zones, seismotectonic provinces and the postulated subduction zone at the interface between the Pacific Plate and the North American Plate, the largest expected earthquake potential was estimated at MM VII intensity. MM VII intensity roughly equates to a magnitude of 5.5 +/- .5 on the Richter scale and .13 g to .16 g (peak horizontal acceleration).^{*} This estimated magnitude is one of the controlling factors in the design of the facility.

Local Soil Conditions

Two soil phases exist within the study area, Burbank loamy fine sand and Quincy loamy fine sand. Both soil types are excessively drained. Runoff is slow, and water erosion hazard is slight. Soil blowing hazard is high. Protection from soil blowing is critical.

The soil at the plant site is Burbank loamy fine sand. The site has been extensively mined for gravel and then was overlain with 2-4 m (8-13 ft.) of fill dredged from the Columbia River. The fill is intermingled sands, gravels, and cobbles. Natural soils below the fill are dense cobbles and dense sands. (See Exhibit G-3 in Volume 1 of PGE, 1993.)

Soils along the transmission route are Burbank loamy sands at the plant site, then change to Quincy loamy fine sand along the proposed route of the tapline to the existing BPA line. Test holes have been drilled along the proposed electrical transmission line alignment. Soils are naturally deposited dense sands, gravels and cobbles.

^{*}Note: BPA estimates a MM VII intensity to be approximately 6.0 on the Richter Scale and equivalent to approximately .24 g (peak ground acceleration).

Water Resources

General - Aquatic systems protected under the Federal Clean Water Act (CWA) in general are rivers, stream, lakes, estuaries and special aquatic sites. Sections 402 and 404 of the CWA describe certain conditions that must be met if pollutants (including sediment) or fill are discharged into areas designated as Waters of the United States. In Oregon, the Division of State Lands (DSL) and the U.S. Army Corps of Engineers (Corps) regulate the discharge of fill (ORS. 196.800-.990) into these waters. Waters of the State include most wetlands and other aquatic habitats. Delineation criteria used by the Corps and the Oregon DSL to determine the extent of jurisdictional wetlands are published in *Corps of Engineers Wetlands Delineation Manual, Tech. Report Y-87-1*. Criteria are based on the presence of positive indicators for three parameters: (1) wetland hydrology; (2) wetland vegetation; and (3) hydric (requiring moisture) soils.

Surface Water - Three surface water systems occur within or adjacent to the plant site: the Columbia River; Messner Pond; and gravel mining ponds (see Map 8).

The Columbia River, adjacent to the project site, is the major water body in the area. Water levels in the river are artificially maintained by John Day and McNary dams.

Messner Pond, a former embayment of the Columbia River, is about 12 ha (30 acres) and is within 181 m (600 ft.) of the plant site property line. Although water in the pond is restricted by the Union Pacific Railroad right-of-way, two culverts connect the pond to the river. Surface drainage from the southeast also recharges water in Messner Pond. An analysis of cooling tower drift effects on the water quality of Messner Pond was prepared for PGE by Beak Consultants in Appendix I. It provides information on the existing water quality of the Columbia River and Messner Pond.

The National Wetland Inventory (NWI) map for Boardman, Oregon (1982) was reviewed. Wetlands indicated on the NWI are shown on Map 8. Wetlands are indicated on the NWI within the proposed Coyote Springs Plant site. These open water sites are the result of gravel extraction by Ready Mix Limited and are identified as being "excavated" on the NWI. They are part of the gravel mining process and most have been filled as the mining operation moved from west to east. The irrigation/mining pond that lies immediately west of Messner Pond that would be impacted by construction of the plant, is the only open water site mapped in 1982 that still exists on the site.

The pond within the construction site of the main plant is one of many gravel ponds in the vicinity shown as palustrine/open water/permanent/excavated on the National Inventory sheet (NWI, Boardman, Oreg., 1981). It is called Toadvin Pond and is a permitted (ODWR permit #G10550) source of irrigation water for the Port. Approximately 2000 m² (1/2 acre) of this pond

will be filled for the foundation for the plant. Discharging fill into the gravel mining pond that is currently being mined, generally is not a regulated activity under Section 404 of the Clean Water Act. No other aquatic systems occur along the proposed transmission line location.

Oregon Division of State Lands regulates the discharge of fill or the removal of material from waters of the state. Oregon does not regulate surface mining pits if the site is not protected in the local comprehensive plan. The gravel mining pond is not regulated under the Oregon Removal Fill law (OAR 141-85-010.20. (c)(F.).

Groundwater - Because surface water in the Columbia Plateau is almost fully allocated, groundwater is heavily used. The regional aquifer system, formed in sedimentary material interbedded within basalt flows, is the major source of deep groundwater for municipal, industrial, domestic and irrigation uses within the Columbia Plateau. Use of deep groundwater has lowered levels as much as 30 m (100 ft.) in some portions of the aquifer. Water quality in shallow alluvial wells is generally poor and water from these wells is used for irrigation. Water levels in the shallow alluvial aquifer have been raised by the discharge of irrigation water into these porous, sandy soils. Permanent features like wetlands, ponds and perennial streams have been established on this historically dry land. Many ponds and wetlands near the plant site are created and recharged by surface/irrigation water.

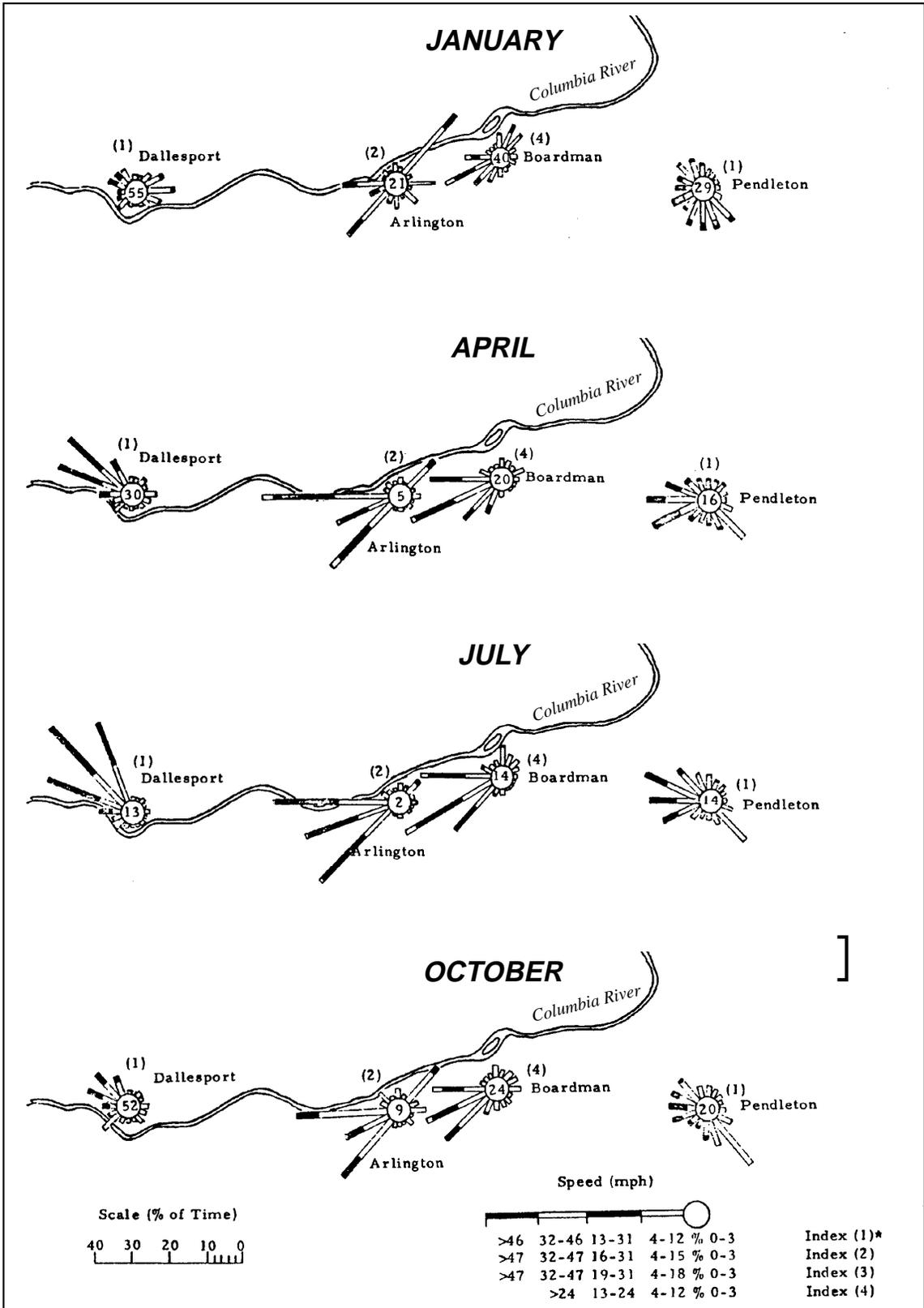
The Port obtains water from two aquifer systems: a shallow alluvial aquifer; and a deeper basalt aquifer. The Port has eight permits for water rights from three basalt aquifer wells and eight alluvial aquifer wells. The Port also has a permit to use water from the Columbia River. (PGE, 1993.)

Air Quality

The proposed plant site is in relatively flat terrain near Lake Umatilla (the Columbia River). Terrain to the south of the site slopes gently upward, with the nearest abrupt terrain change about 19 km (12 miles) to the south. Washington is across the river to the north. In Washington, a series of moderately sloped ridges line the Columbia River.

Joint frequency distributions of wind direction and wind speed, commonly known as wind roses, are presented in Figures 4-1 and 4-2. These figures illustrate that the wind at the site is predominately from the west and southwest quadrants and that there are frequent northeasterly winds in the winter months as high pressure moves west from eastern Oregon and Washington. Winds often blow from the west and southwest as marine air moves through the Columbia River Gorge. The wind roses also show that calm wind conditions are more common in the fall and winter than during spring and summer. Data presented in these wind roses is dated (1976 and 1935-38, respectively). However, direction and speed frequencies are not expected to change appreciably from year to year.

Figure 4-1
Wind Direction and Speed in the Boardman Area (1976)



Morrow County is designated by the **Environmental Protection Agency (EPA)** as an unclassified/**attainment area** for **criteria pollutants**, which means insufficient ambient air data is available to determine whether **ambient air** exceeds **National Ambient Air Quality Standards (NAAQS)**. EPA has determined that the Wallula area in Washington State is a moderate **nonattainment** region for particulate matter 10 microns or less (**PM-10**). EPA is considering expanding this nonattainment region to include larger portions of Benton and Franklin counties. Benton and Walla Walla counties are directly north of the proposed facility, across the Columbia River.

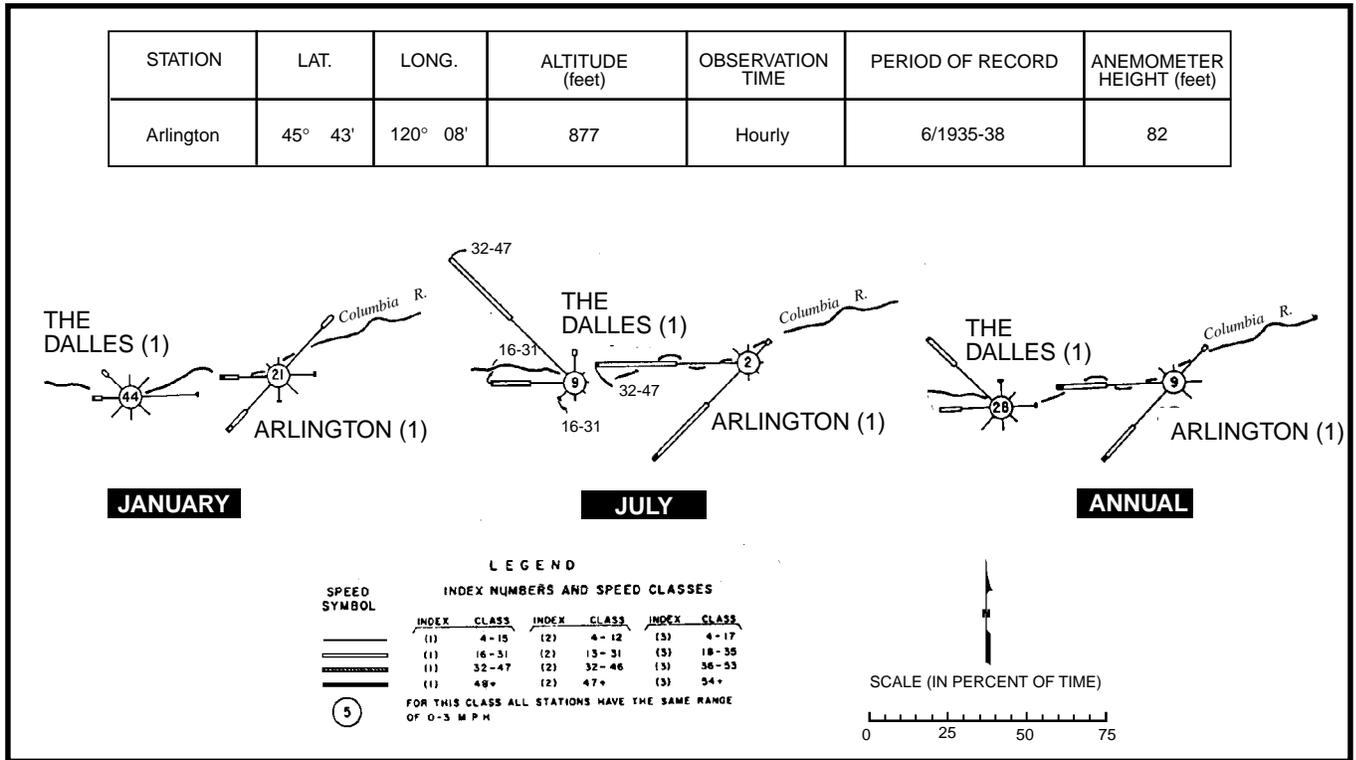
EPA has also designated all areas in the U.S.--except pristine areas such as National Parks--as **Class II areas**, allowing limited industrial growth. Thus the proposed facility is consistent with EPA **airshed** designations.

There has been one ambient air monitoring study in the Boardman area. In the mid-1980s, PGE monitored ambient air for an Air Contaminant Discharge Permit for its Boardman Power Plant. This study monitored two of the three pollutants identified as triggering New Source Review/Prevention of Significant Deterioration (NSR/PSD) requirements for the Coyote Springs Plant. Study results reflect the influence of PGE's Boardman Power Plant.

The study measured annual average total suspended particulate (TSP) in the range of 20-30 ug/m³. All annually averaged TSP measurements were less than 50 ug/m³, the annual geometric mean NAAQS for TSP/PM-10. However, the study recorded several exceedances of the 24-hour TSP/PM-10 NAAQS of 150 ug/m³. These exceedances were associated with strong winds that create windblown dust, a condition common to eastern Oregon and Washington.

The study also monitored sulfur dioxide (**SO₂**). Measurements indicated that the three-hour sulfur dioxide average was 424 ug/m³, the 24-hour average 112 ug/m³, and the annual average 1 ug/m³. These levels are below the national primary standards of 80 ug/m³ (annual mean) and 365 ug/m³ (24-hour maximum). The national secondary ambient air standard, 1,300 ug/m³ (3-hour average), also was not exceeded. The Boardman study also monitored nitrogen oxides in the form of nitrogen dioxide (**NO₂**). The annual NO₂ ambient concentration was 30 ug/m³, compared to the NAAQS of 100 ug/m³ (annual average).

Figure 4-2
Wind Direction and Speed Boardman Area (1935-38)



The only pollutant triggering major NSR/PSD review requirements not monitored during the Boardman Power Plant study was carbon monoxide (**CO**). Background CO levels in the Boardman area are expected to be low because this region is not highly industrialized and does not have heavy automobile traffic. Ambient concentrations of other pollutants of concern such as **volatile organic compounds (VOC)**, sulfuric acid and beryllium are also expected to be low in this region.

Class I Areas and National Scenic Areas - The proposed facility is required to go through the New Source/Prevention of Significant Deterioration permitting process (NSR/PSD). Typically, under PSD requirements, impacts of criteria pollutants emitted from proposed facilities are only evaluated for the nearest Federal **Class I area**. However, the Oregon NSR/PSD process strongly encourages impact assessment of all Class I areas within 200 km (120 miles) of proposed projects. Three Class I areas are within 200 km of the proposed facility and were evaluated for possible impacts: Mt. Hood Wilderness Area, Eagle Cap Wilderness Area and Strawberry Mountains Wilderness Area. The Columbia Gorge Scenic Area, although not designated a Class I area was also included in the evaluation. (See Section 5.1.1. for impact discussion.)

Vegetation

Plant Associations - Plant associations at the site are common in the Boardman-Umatilla area and are characteristic of disturbed communities of the shrub-steppe vegetation zone in the Columbia Basin physiographic province. Vegetation is primarily adapted to a dry environment (xeric) and non-native. Forested areas surrounding ponds are dominated by Russian olive (*Elaeagnus angustifolia*), and common cocklebur (*Xanthium strumarium*), grading into tumbleweed (*Salsola kali*), tumbledustard (*Sisymbrium officinale*), common yarrow (*Achillea millefolium*), cheatgrass (*Bromus tectorum*), intermediate wheatgrass (*Agropyron intermedium*), and tarweed (*Amsinckia lycopsoides*). In less disturbed areas the composition changes slightly to include antelope brush (*Purshia tridentata*), and sagebrush (*Artemesia tridentata*). This vegetation occurs along the Port of Morrow access road in the proposed transmission line corridor.

Messner Pond is a lake (lacustrine) system surrounded by swamp (**palustrine**) **emergent wetlands** grading into forested wetlands. Emergent wetlands are dominated by hardstem bulrush (*Scirpus acutus*), broad-leaf cattail (*Typha latifolia*), and ovate spikerush (*Eleocharis ovata*) grading into forested wetland dominated by Russian olive (*Elaeagnus angustifolia*). These forested wetlands next to Messner Pond are about 30 m (100 ft.) to the north of Ullman Boulevard. They also form a thin unit between Messner Pond and the irrigation/gravel mining pond.

Vegetation near the irrigation/gravel mining pond is sparse, covering only about 20 percent of the surface. The dominant vegetation, cheatgrass (*Bromus tectorum*), and tumbleweed (*Salsola kali*), is representative of disturbed xeric plant communities. No hydrophytic or aquatic vegetation was observed. (See Exhibit R, PGE, 1993.)

Federally Protected Plants - No Federally listed **threatened** or **endangered** plant species are known to occur within the project area. Within Oregon, none of the plant species currently listed under the Endangered Species Act (ESA) are found near the project vicinity. Three Federal candidate species: Thompson's sandwort (*Arenaria franklinii* var. *thompsonii*), Lawrence's milkvetch (*Astragalus collinus* var. *laurentii*), and Columbia cress (*Rorippa columbiae*), possibly occurring within the project area, were not present during a plant survey conducted in July 1993.

State Protected Plants - Thompson's sandwort, Lawrence's milkvetch, and Columbia cress also constitute Oregon state species of concern, and as noted, these were not found on or near the proposed plant site. These candidate species are also listed by the Oregon Natural Heritage Data Base. A fourth plant, Robinson's onion, became a state candidate species in 1980 but was subsequently dropped from consideration and may be extinct in Oregon.

Fish and Wildlife

The proposed plant site is outside of any wilderness study, research, natural, wildlife, or other similarly designated area. However, many wildlife and fish species are found within the project vicinity. Several designated wildlife refuges and other natural areas are nearby.

Most of the proposed 2.4 km (1.5 mile) transmission line route is vegetated. An 0.8 km (0.5 mile) portion of the transmission line is shrub-grassland and cultivated fields entirely within the Port of Morrow Industrial Park. Both areas provide little wildlife habitat. Wildlife use of this area is likely to favor those species associated with industrial sites (e.g., house sparrow [*Passer domesticus*], small mammals, and gulls), agricultural fields (e.g., California quail [*Callipepla californica*], and ring-necked pheasant [*Phasianus colchicus*]), or disturbed shrub-steppe habitat (e.g., coyote [*Canis latrans*]) and western meadowlark [*Sturnella neglecta*]).

Several fish species are present in Messner Pond including smallmouth bass, crappie, and rough fish such as carp, northern squawfish and peamouth. A wetland community exists next to the pond, but wildlife use of the site is somewhat limited by poor quality habitat plus ongoing industrial activities and adjacent development. Some small mammals (e.g., mice and voles) and birds (e.g., gulls, sparrows, doves) may be found in this area. Small ponds also provide some limited aquatic **habitat** for waterfowl and shorebirds.

Federally Listed Animals - The U.S. Fish and Wildlife Service (USFWS) reported two Federally listed species known or suspected to seasonally occur near the project area: the bald eagle (threatened) and peregrine falcon (endangered).

There are no bald eagle nest sites within or adjacent to the impact zone of the facility. No portions of the facility area have been designated as critical habitat for the bald eagle. Approximately 20-100 bald eagles winter along the Columbia River and within the Umatilla National Wildlife Refuge. There are two Oregon Natural Heritage Program (ONHP) occurrence records within the facility area: approximately 16 km (10 miles) southwest of the facility site on Carty Reservoir; and 4.8 km (3 miles) northeast of the facility site on the Umatilla National Wildlife Refuge.

The peregrine falcon is almost exclusively a cliff-nesting species and primarily found in locations near water. Occurrence within the project vicinity would be expected only during migration. The U.S. Fish and Wildlife Service, Olympia Field Office, listed this species as potentially occurring (but rare) in the project area in both summer and fall within the Umatilla National Wildlife Refuge. There are no Oregon Natural Heritage Program records of occurrence within the project area. No peregrine falcons have been reported around Messner Pond, although an occasional bird may utilize the area.

No Federally listed threatened or endangered animal species were recorded during four wildlife surveys (May and June 1993). One Federal candidate species, a long-billed curlew (*Numenius americanus*), was recorded northeast of Messner Pond in grassland-shrub habitat during the surveys.

Listed fish species noted by the National Marine Fisheries Service (NMFS) include Snake River spring/summer chinook salmon (threatened), Snake River fall chinook salmon (threatened), and Snake River sockeye salmon (endangered). The Oregon Fish and Wildlife Commission list

the Snake River spring/summer chinook salmon and Snake River fall chinook salmon as threatened in 1993 as provided under Oregon law. Although the project does not directly affect these species, the Columbia River in the project vicinity serves as a migratory corridor.

Additional information on Federally listed threatened and endangered species is included in Chapter 5 and within Appendices A and C.

State Special Status Animals - Regulatory protection at the state level is based on citations within OAR 635-100-040. Three Oregon state sensitive species (American white pelican [*Pelecanus erythrorhynchos*], bank swallow [*Riparia riparia*], and Franklin's gull [*Larus pipixcan*]) were recorded during wildlife surveys conducted in May and June 1993. All three of the state sensitive species were observed at Messner Pond during the late spring and early summer surveys noted. Other species known or suspected to occur during other seasons of the year include the bald eagle (threatened), peregrine falcon (endangered), Barrow's goldeneye (protected), and bufflehead (protected), as noted in Appendix A.

Several special status species were identified as occurring infrequently in the project area (yellow-billed cuckoo, pygmy rabbit, tri-colored blackbird, upland sandpiper) or using habitat that would not be altered by the project (bufflehead, American white pelican, bull trout, Barrow's goldeneye, dusky Canada goose).

4.1.3 Socioeconomics and Public Services

This section of the environmental document describes the social and economic characteristics of the local area, and the essential local government services available to area residents.

Social Characteristics

Population - The population of Morrow County as of July 1, 1992 was 8,100 (Portland State University, 1993). The county is about 5,500 sq. km (2,000 sq. mi.) with a population density of nearly 1.4 persons per sq. km (4 persons per sq. mi.). Only eight of Oregon's 35 other counties are less densely populated than Morrow County. All are in eastern Oregon.

The five incorporated communities in Morrow County and their populations (as of July 1, 1992) are the City of Boardman (1,480), the City of Heppner, county seat (1,420), the City of Irrigon (830), the City of Lexiton (290) and the City of Lone (240). As of July 1992, about 52 percent of the county's residents lived in these five communities, a slight reduction from the 1980 Census, when 55 percent of the county's residents lived in these five communities. The county's population is becoming increasingly rural.

As of July 1992, Umatilla County, the county immediately east of Morrow County, had a population of 61,000. The county is about 5,100 sq. km (3,200 sq. mi.), for a population density of 12 persons per sq. km (19 persons per sq. mi.). The principal urban communities in Umatilla

County are the City of Pendleton (15,400), the City of Hermiston (10,150), the City of Milton-Freewater (5,630), the City of Umatilla (3,090), the City of Stanfield (1,580) and the City of Pilot Rock (1,500). Approximately 66 percent of Umatilla County's population lived in 12 incorporated communities in 1992, approximately the same proportion of the county's residents 12 years earlier (65 percent).

The closest urban area with a population over 25,000 is Kennewick and Richland, Washington with 1993 populations of 45,000 and 34,000, respectively. These communities are about 70 km (45 miles) northeast of the City of Boardman. The closest urbanized area in Oregon with a population over 25,000 is the City of Gresham, with a 1992 population of 72,000. The City of Gresham is 225 km (140 miles) west of the City of Boardman, on the east side of the Portland, Oregon metropolitan area, which has a population over 1,300,000.

The populations of Morrow and Umatilla counties have increased by only 4 percent since 1981, while Oregon's population has increased 13 percent over the same period. The main reason for the slow growth experienced by both counties has been the amount of population lost through migration. During the decade of the 1980s, Morrow County lost 650 persons, while Umatilla County experienced a loss 4,800 persons, approximately 8 percent of their respective populations. (Portland State University, 1992.) Migration cancelled out most growth from natural increase (births over deaths). The migration was likely related to the relatively high unemployment rate in the area, and lack of opportunities experienced by the resident population, particularly the area's youth.

Employment - The combined labor force of both Morrow and Umatilla counties as of July 1, 1992 was 33,860 with an unemployment rate of 9.5 percent. The employed population amounted to 30,630. (Oregon Employment Division, 1993). With a combined population of 69,100 persons in the two counties, the labor force participation rate was just under 50 percent.

During the late 1970s, employment in Morrow and Umatilla counties expanded rapidly. The growth in employment then slowed considerably before actually declining in the 1980s. Employment in the two counties peaked in 1981, at the start of the 1981-83 recession, with 31,490 jobs. The labor force, however, continued to climb in the mid-1980s, peaking in 1986 with 34,900 people. The unemployment rate in the two counties reached 12.1 percent in 1986. Although the unemployment rate has subsided significantly over the past few years, it remains high (8-10 percent). The Oregon Employment Division expects the unemployment rate to remain high in the 1990s. (Oregon Employment Division, 1993.)

The agricultural sector is the largest sector of employment in Umatilla and Morrow counties. Including the agricultural portion of nondurable goods manufacturing, food processing and direct agricultural employment, the agricultural sector employed 7,200 people in 1991, nearly 25 percent of total employment. Three sectors follow the agricultural sector in people employed within the two counties: government (approximately 5,600), and retail and services (approximately 2,500 each). Government employment is relatively high compared to other rural counties in the area, due to the Umatilla Army Depot, the Navy Bombing Range, the Umatilla National Forest, the Eastern Oregon Correctional Institution and the Eastern Oregon Psychiatric Center.

Housing - The 1990 Census shows that 3,410 housing units existed in Morrow County in 1990, with 82 percent (2,805 units) occupied when the Census was taken on April 1, 1990. The median value of occupied housing units in the county was \$43,500 (in 1990 dollars). Of these occupied housing units, 68 percent (1,905 units) were owner-occupied, and 32 percent (895) were rental properties. Excluding multi-family dwellings, mobile homes and homes on more than 4 ha (10 acres), approximately 60 percent (525 units) of the owner-occupied housing units had an existing mortgage. The median mortgage payment was \$536, which was 17.8 percent of 1989 household income. Of those 32 percent of occupied households that were rented, the median gross rent amounted to \$332, which was 23.7 percent of 1989 household income. The vacancy rate for non-rental units was 1.7 percent, while the vacancy rate for rental property, was 10.6 percent. (State of Oregon, 1990.)

Umatilla County's 1990 housing stock was 24,335 total units, with 90 percent (22,020 units) occupied. The Census shows that Umatilla County had more rental properties than Morrow County, both in absolute numbers and as a percentage of the whole. Only 62 percent (13,650 units) of Umatilla County's housing stock was owner-occupied, while the remainder, 38 percent (8,375 units), was occupied by renters. The median value of all occupied housing units was \$47,800 (in 1990 dollars). Excluding multi-family dwellings, mobile homes and homes on more than 4 ha (10 acres), about 61 percent (5490 units) of the owner-occupied housing units had an existing mortgage. The median mortgage payment was \$552, which was 19.2 percent of 1989 household income. Of those 38 percent of occupied households rented, the median gross rent amounted to \$313, which was 19 percent of 1989 household income. The vacancy rate for homes that were not for rent was 2.1 percent, while the vacancy rate for rental properties was 8.6 percent.

Statewide on Census Day, April 1, 1990, 63 percent of the occupied housing units were owner-occupied, with a median value of \$66,600. The median mortgage payment was \$650, which was 20.4 percent of monthly gross household income in 1989. The vacancy rate for non-rental properties was 1.4 percent. The median rent payment was \$344 for rental properties, with a vacancy rate of 5.3 percent. A 5 percent vacancy rate is considered a normal vacancy rate for residential rental properties. The vacancy rates experienced by both Morrow and Umatilla counties (10.6 percent and 8.6 percent, respectively) are considered relatively high.

The temporary housing stock in the area consists of those single family houses and apartment units identified above that are in the rental market, in addition to motel units. Mobile home parks, in some instances, have mobile home units "that are available for rent, but normally provide only physical space and utility "hook ups" for those with their own accommodations. This is also true for RV parks.

Within the Boardman/Hermiston /Umatilla area there are 11 motels that have an inventory of 490 units (See Table 4-1); 20 mobile home/RV parks in the Umatilla, Hermiston, Pendleton, Pilot Rock and Milton Freewater area that supply 132 spaces, seven of these mobile home/RV parks are located near Hermiston alone; and 36 apartment complexes that are located in the Boardman, Hermiston, Umatilla, Irrigon, Pendleton and Milton-Freewater area.

Economic Characteristics

The economy of Morrow and Umatilla counties is primarily based on agriculture, with government employment being an important contributor. Counting direct agricultural employment, food processing, and nondurable goods wholesale employment, the agricultural sector within Morrow and Umatilla counties employed 7,155 persons in 1991. (Oregon Employment Division, 1993.) This amount of employment does not include the portions of transportation, and other sectors directly involved in agricultural activities. Government employment is also high for the region. Federal government employment is 16 percent of government employment, state government employment makes up 24 percent, and local government employment is 60 percent of government employment, most for education.

Table 4-1
Motel Accommodations in the Project Area

COMMUNITY	NUMBER OF MOTELS	NUMBER OF MOTEL ROOMS
Boardman	3	111
Hermiston	4	193
Umatilla	4	181
Total	11	485

Source: Hermiston Chamber of Commerce, July 1993

Median Family Income - Median family income is a measure of income at the midpoint of all household incomes, for a particular defined area. Usually larger communities have a more diversified economy because a larger population base can support businesses and services not found in smaller communities. These larger communities are likely to have a higher labor force participation rate, and a higher median family income, than smaller, more rural communities. In 1989 (the most recent information available), Morrow County's median family income was \$23,970. This was 88 percent of the state median family income (\$27,250) during the same year. (U.S. Department of Commerce, 1990.)

Per Capita Income - Per capita income is an estimate of total personal income divided by the area's total population. It includes wages, rents, interest, dividends, and all other "money" income. The per capita income is used as a rough measure of how well one area is doing compared to another. Overall, Morrow County's per capita income has been declining considerably since 1978, as compared with the per capita income for the State as a whole. In the 13-year period from 1978 to 1991, the County's per capita income has increased only 15 percent while the state's per capita income has more than doubled (Oregon Employment Department, 1993).

While Umatilla County's per capita income is slightly below that of Morrow County (\$15,102 vs. \$14,805 for 1991), Umatilla County's per capita income has shown a stronger growth through the 1980s than Morrow County's. Umatilla County increased its per capita income 63 percent through the decade, while Morrow County's per capita income increased by only 18 percent.

**Table 4-2
PER CAPITA INCOME FOR MORROW COUNTY AND THE STATE OF OREGON
(in \$ millions)**

YEAR	MORROW COUNTY	STATE OF OREGON	COUNTY AS A % OF STATE
1978	\$13,100	\$8,250	159%
1979	\$13,350	\$9,150	146%
1980	\$12,790	\$9,870	130%
1981	\$11,200	\$10,480	107%
1982	\$9,390	\$10,650	88%
1983	\$10,780	\$11,380	95%
1984	\$12,700	\$12,300	103%
1985	\$12,350	\$12,930	95%
1986	\$12,200	\$13,540	90%
1987	\$12,490	\$14,180	88%
1988	\$14,370	\$15,020	96%
1989	\$15,640	\$16,190	97%
1990	\$17,340	\$17,040	102%
1991	\$15,100	\$17,500	86%

Source: Bureau of Economic Analysis, U.S. Bureau of Commerce

Table 4-3
ASSESSED VALUE OF MORROW COUNTY AND THE STATE OF OREGON
(in \$ millions)

YEAR	MORROW COUNTY	STATE OF OREGON	COUNTY AS A % OF STATE
1970-71	89	18,800	0.47%
1971-72	89	20,261	0.44%
1972-73	92	22,113	0.42%
1973-74	101	24,899	0.41%
1974-75	127	28,402	0.45%
1975-76	193	32,175	0.60%
1976-77	236	35,547	0.66%
1977-78	285	40,704	0.70%
1978-79	328	46,646	0.70%
1979-80	472	59,025	0.80%
1980-81	527	73,402	0.72%
1981-82	664	82,427	0.81%
1982-83	688	86,429	0.80%
1983-84	769	85,365	0.90%
1984-85	806	85,400	0.94%
1985-86	814	83,035	0.98%
1986-87	879	82,944	1.06%
1987-88	848	83,111	1.02%
1988-89	769	84,258	0.91%
1989-90	832	88,076	0.94%
1990-91	804	95,850	0.84%
1991-92	728	112,135	0.65%
1992-93	725	123,756	0.59%

Source: Bureau of Economic Analysis, U.S. Bureau of Commerce

According to the Oregon Employment Development Department, Morrow and Umatilla counties have been below the state average in per capita income over the years. During the late 1970s and early 1980s, however, Morrow County was considerably above the state average, as shown in Table 4-2, due to the construction of the Boardman coal-fired plant underway at that time, and also because potato and onion processing plants were being built. Large scale corporate farms in the area and extensive use of center-pivot irrigation systems have expanded the agricultural sector of the local economy in recent years. These new sources of raw materials have attracted the food processing industry to the area. (Electric Power Research Institute, 1982.)

Assessed Value of Morrow County - Morrow County's assessed value of all real taxable property has increased nine-fold since the early 1970s, increasing in value from \$89 million in 1972-73 to \$725 million in 1992-93 (see Table 4-3). Table 4-3 also reveals that the County's share of assessed value of taxable property against that of the assessed value of private taxable property statewide increased during the period of 1972-73 to 1985-86. From 1985-86 on, however, the County's share of private taxable property (as compared to Oregon's), has been declining, and has actually fallen in absolute dollars from \$879 million in 1986-87 to \$725 million in 1992-93. While Morrow County has realized this 18 percent decline in assessed value over the past six years, Oregon has realized nearly a 50 percent increase during this same period, increasing from \$83 billion to \$124 billion.

The apparent aberration in Table 4-3 showing a sharp rise in the county's share of assessed value in the 1970s and early 1980s, compared to Oregon as a whole, was related to construction of the Boardman coal-fired plant in the late 1970s, and also the addition of large potato and onion processing plants built in the county in the early 1980s. Since that time, however, as Table 4-3 reveals, property development in the county has not kept pace with Oregon as a whole.

Essential Government Services

Law Enforcement - Law enforcement services in the project area are provided by the Morrow County Sheriff's Office, which provides law enforcement services primarily to the unincorporated portion of Morrow County. The county, however, also maintains mutual aid agreements with the State of Oregon, larger incorporated cities within Morrow County, such as Boardman and Heppner, and neighboring counties. Primary responsibilities of the Morrow County Sheriff's Office is to conduct criminal investigations and to provide security. Providing traffic control is considered a secondary responsibility of all uniformed officers within the County Sheriff's Office.

The Sheriff's Office consists of seven sworn officers: the sheriff, an undersheriff, a detective and four deputy sheriffs. Response times depend on time of day, and location and availability of personnel. Response times for emergency services would normally be within 10 minutes and no more than 45-60 minutes on a worst-case basis (Morrow County Sheriff's Office, August 1993).

Fire Protection - Fire protection services in the project area are provided by the City of Boardman Fire Department and the Boardman Rural Fire District. These two fire departments include the same individuals who work out of the same fire station. The two separate departments exist for budgetary purposes only (Boardman Fire Department, August 1993).

The Boardman Rural Fire District encompasses approximately 160 sq. km (100 sq. mi.) and provides fire protection to the City of Boardman and to rural areas around the City of Boardman. At the present time firefighters consist of the Fire Chief and 18 volunteer firefighters. The Chief's position is a paid position, and as such, the Chief is an employee of the City of Boardman.

The Boardman Rural Fire District's primary responsibility is to provide fire protection services to the City of Boardman and the rural areas around the City of Boardman. The District has a 7.6 m³ (2,000 gal.) water tender, a 12.5 m³ (3,300 gal.) water tender with a 3.8 m³ (1,000 gal.) per minute pump, a rescue unit, a 3.8 m³ (1,000 gal.) water tender, and a personnel carrier. The City of Boardman maintains 3.8 m³ (1,000 gal.) and 5.8 m³ (1,500 gal.) water tenders (City of Boardman, April 1993).

The Boardman Rural Fire District also maintains mutual aid agreements with the City of Irrigon and the Umatilla Army Depot, each able to respond to a fire at the Port of Morrow within 15 minutes after receiving a call for support. In addition, the fire district can request help, if needed, from the fire brigade at the Boardman coal-fired plant, 16 km (10 miles) southwest of Boardman. The fire brigade has 47 members, each qualified to fight industrial structure fires. Additional help is also available from other fire districts in the county. These fire districts include Heppner, Lone, and Lexiton Fire Districts.

Water Service - The City of Boardman's municipal water supply is provided by a Ranney water collection system, one of two such systems currently being used in the State of Oregon (City of Boardman, July 1993). The water system draws both induced Columbia River water and groundwater from the shallow aquifer at the rate of 22.8 m³ (6,000 gal.) per minute. According to the City's Public Works Director, this volume of water is sufficient to serve a community of 6,000 people. In addition to the existing well site, the City of Boardman has identified two additional sites that could be used to install additional Ranney units should that ever become necessary to increase the water volume to 60.6 m³ (16,000 gal.) per minute, sufficient to serve a community of 16,000 people.

Sewage Treatment Facilities - The City of Boardman's sewage treatment facility has sufficient capacity for 4,000 residents. The current population of Boardman is approximately 1,500 (Portland State University, 1992). The existing sewage treatment facility should be adequate for some years to come.

Education/Schools - The Morrow County School District's boundaries are the same as the county's boundaries. As a result, all schools in the county are contained within a single county-wide school district, including those schools within the cities of Boardman and Irrigon. The

school district operates four schools: two elementary schools, one junior high school, and one high school. Of these four schools, Riverside High School and Sam Boardman Elementary School in Boardman, and the A.C. Houghton Elementary School in Irrigon, are at capacity. The fourth, Columbia Junior High School in Irrigon, is nearing capacity. The school district hopes to pass a bond issue soon to provide for additional classroom space within these four schools. The school district needs to expand its facilities even if the Coyote Springs Plant is not constructed. (Morrow County School Superintendent, August 1993).

Library Services - Library services are provided to the local area by the Oregon Trail Library District, which maintains a library in the City of Boardman and in the City of Heppner. The library district, formed in early 1991, encompasses the northern portion of the county, about half of Morrow County. The library district serves a population of about 4,000 persons. (Oregon Trail Library, August 1993). Irrigon and Lone, and the remaining rural areas of Morrow County have elected not to join the library district.

Health Care - Health care services for the City of Boardman and the northern Morrow County area are provided by the Boardman Health Care Center in the City of Boardman. The health center is staffed by a physician's assistant and a nurse. Ambulance service is provided by Boardman Ambulance Service, also in the City of Boardman. The ambulance service has two ambulance units and is staffed by eight trained emergency technicians.

Morrow County residents are also served by the Good Shepherd Community Hospital and the Hermiston Community Health Clinic in the City of Hermiston.

Solid Waste Disposal - One sanitary landfill exists in Morrow County and two are currently used in Umatilla County. The sanitary landfill in Morrow County is the Finely Butte Waste Disposal Area. This landfill is about 18 km (11 miles) south of the City of Boardman, off Bombing Range Road. The landfill is approximately 200 ha (500 acres) and is projected to provide service for the City of Boardman, Morrow County, and current customers for 50 years at the present rate of use. If needed, additional land is available adjacent to the facility for expansion. The landfill accepts municipal solid waste only. The facility is not equipped to receive any toxic, hazardous or liquid wastes. Discussions of other waste issues are covered in other sections of this FEIS.

4.1.4 Public Health and Safety

Power plants and transmission facilities provide electricity for heating, lighting and other services essential for public health and safety. These same facilities can potentially harm humans. Contact with transmission lines can injure birds, people and aircraft. Power plants can impact air and water, and generate noise at levels potentially injurious to public health. Also, certain amounts of toxic and hazardous substances are used which pose a risk of emergency releases (spills) and thereby health and safety risks. Expanded discussions for these health and safety issues are provided in this section.

Air Impacts to Public Health and Safety - Air pollutants from stationary sources such as the Coyote Springs Cogeneration Plant are closely regulated under the Clean Air Act. The EPA and Oregon's Department of Environmental Quality (DEQ) have established acceptable emission rates for a wide range of air pollutants and have established ambient air quality standards based on public health and safety. Section 5 reports the air pollutants generated by the Coyote Springs Plant and how these compare with regulatory standards. The Coyote Springs Plant will be equipped with continuous air monitoring equipment to assure that actual emissions do not exceed authorized levels.

Toxic and Hazardous Materials - A review and data search (*level 1*) of the cogeneration plant site and lands along the transmission line route was done to determine if toxic or hazardous materials users, and/or generators might have used or accidentally contaminated the proposed site. No hazardous material sites, hazardous material generators or transporters, or records of hazardous chemicals or accidental spills were identified.

Toxic and solid waste material expected to be generated during plant operation are listed in Tables 3-2 and 3-3. Some solid waste material is classified as hazardous and would need careful handling and disposal to protect public health and safety. Section 5 describes these materials and special handling plans for them.

Electric and Magnetic Fields - Power lines, like electrical wiring and household appliances, produce *electric fields and magnetic fields (EMF)*. Current (movement of electrons in wire) produces the magnetic field. Voltage (the force that drives the current) is the source of the electric field. The strength of these fields depends on the design of the line and distance from the line. Field strength decreases rapidly with distance. 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. However, today most concern about potential adverse health effects is focused on exposure to magnetic fields.

Electric and magnetic fields are found throughout a home. In homes the *electric field* strength from wiring and appliances is typically less than 0.01 kilovolts per meter (kV/m). However, fields of 0.1 kV/m and higher can be found *very close* to electrical appliances. Typical electric and magnetic field strengths for some common electrical appliances are listed in Table 4-4.

Average *magnetic* field strength in most homes (away from electrical appliances and home wiring, etc.) is typically less than 2 milligauss (mG). *Very close* to appliances carrying high current, fields of tens of hundreds of milligauss are present. Unlike electric fields, magnetic fields from outside power lines are not reduced in strength by trees and building material. So, power lines can be a major source of magnetic field exposure throughout a home located close to the line. Typical electric and magnetic field strengths for some BPA transmission lines are shown in Table 4-5.

**Table 4-4
Typical Electric and Magnetic Field Strengths from Common Appliances
At 0.3 Meter (1 Foot)**

Appliance	Electric Field (kV/m)	Magnetic Field * (mG)
Coffee Maker	.030	1-1.5
Electric Range	.004	4-40
Hair Dryer	.040	0.1-70
Television	.030	0.4-20
Vacuum Cleaner	.016	20-200
Electric Blanket **	.01-1.0	15-100

kV/m = kilovolts per meter mG = milligauss

* By 1 to 1.5 meters (3-5 feet), the magnetic field from appliances is usually decreased to less than 1 mG.

** Values are for distance from a blanket in normal use, not 1 foot away.

Source for appliance data: Miller 1974, Gauger 1985

Because public concern is increasing over potential health effects of electric and magnetic fields and because a clear course of action has not been determined from present scientific evidence, BPA has developed interim guidelines. These guidelines state that BPA should not increase public exposure to electric and magnetic fields where practical alternatives exist. It is BPA's practice to consider potential electric and magnetic field exposure increases in the design and location of new transmission facilities. Increases in long-term, involuntary exposures to these fields are avoided if practical alternatives exist. A description of EMF impacts is provided in Section 5.

4.1.5 Noise

Noise is commonly defined as unwanted sound that disrupts normal human activities or diminishes the quality of the human environment. Transient noise sources, such as passing aircraft or motor vehicles, produce noise that is usually brief and excluded from regulation. Stationary sources such as the proposed plant emit more long-term noise. Ambient noise is all noise generated in the vicinity of a chosen site by typical noise sources such as traffic, wind, neighboring industries, and aircraft. The total ambient noise level is a typical mix of distant and nearby sources.

**Table 4-5
Typical Electric and Magnetic Field Strengths
From BPA Overhead Transmission Lines**

Transmission Lines	Electric Field (kV/m)	Magnetic Field * (mG)	
		Maximum *	Average **
115- kV			
Maximum on Right-of-way	1.0	63	30
Edge of Right-of-way	0.5	14	7
60 m (200 ft.) from center	0.01	1	0.4
230- kV			
Maximum on Right-of-way	2.0	118	58
Edge of Right-of-way	1.5	40	20
60 m (200 ft.) from center	0.05	4	2
500- kV			
Maximum on Right-of-way	7.0	183	87
Edge of Right-of-way	3.0	62	30
60 m (200 ft.) from center	0.3	7	3
kV/m = kilovolts per meter mG = milligauss			
* Under annual peak load conditions (occurs less than 1 percent of the time)			
** Under annual average loading conditions			
Note: Above information obtained from a BPA study to characterize nearly 400 transmission lines in Pacific Northwest.			

Noise is measured as a sound pressure level exerted on the microphone of a sound meter. Sound is measured in **decibels (dB)**. Because the human ear is more sensitive to higher frequency (or higher pitched) sound, levels are adjusted by the sound meter and are reported as A-weighted decibels (**dBA**).

Local, state and Federal regulations and guidelines protect residents and workers from excessive noise. The Federal Noise Control Act of 1972 gave states the responsibility for noise control. Executive Order 12088 requires Federal agencies such as BPA to comply with state and local noise control regulations.

Noise regulations focus primarily on noise impacts on noise sensitive properties such as residences. Oregon's nighttime noise standard is 50 dBA. Oregon's daytime noise standard (55 dBA) has been equated with interrupting speech, which in some instances could impact public safety.

Noise measurements were made at the proposed plant site and at surrounding property where noise impacts are likely to occur (see Map 3). Ambient noise measurements vary. Activities that contribute to the ambient noise include existing industrial activities, traffic on I-84, and aircraft. Ambient noise levels and potential noise impacts from the project are reported in Section 5. Noise impacts to wildlife are also in Section 5.

4.1.6 Visual and Aesthetic Resources

The visual resource change introduced by the Coyote Springs Project is related to the (1) visual characteristics of the proposed facility, (2) existing visual character of the area and the degree to which the project would contrast, or be incompatible with that character, and (3) viewers exposed to this change and the degree of their exposure and sensitivity to visual change. The following discussion summarizes the visual resources and viewers potentially impacted, and the project's visual characteristics. Plant emission impacts on visibility are discussed in Section 5 (page 5-20).

The 48-km (30-mile) visual impact zone used in the analysis is defined by Oregon Siting Regulations. The visual impact area extends through parts of Morrow, Umatilla, and Gilliam counties.

Visual Characteristics of the Proposed Facility - The plant will be on the east side of Ullman Boulevard, just south of the Union Pacific Railroad corridor, within the Port of Morrow Industrial Park. The plant site is rectangular measuring about 244 m by 355 m (800 ft. by 1,100 ft.) (See Figure 3-1 and Map 2). The utility corridor is south of the property. A 3 ha (7.5 acre) irrigation pond is just outside and east of the plant site. Messner Pond is adjacent to the irrigation pond.

The facility will have three main buildings: a main turbine generator building, an auxiliary equipment building, and an administration control building. In addition, there are major structures or equipment proposed that add significantly to the visual character of the project. Table 4-6 describes the visual characteristics of proposed buildings and structures.

Figures 4-3, 4-5, and 4-7 illustrate views of the plant site from I-84. Figures 4-4, 4-6, and 4-8 are simulations of the proposed facilities as they might appear from the same view points on I-84. The views from I-84 will be the most prominent public views of the site. The simulations were prepared for PGE's site application. They do not show the 500-kV transmission line. A simulation of the proposed transmission line is in Figure 5-2.

Outdoor lighting will be controlled by a photocell. The general lighting design for the exterior of the facility will minimize any obtrusive physical features. Exterior lighting will generally point inward toward the plant rather than outward toward approaching people or passersby. Perimeter lights along the fence will simply display that a fence exists. Aircraft warning lights will be installed on the two 64 m (210 ft.) tall heat recovery boiler stacks, if required by the Federal Aviation Administration (FAA).

**Table 4-6
Visually Important Structures Located on the Plant Site**

Visually Important Structures	Structure Type	Size/Height
Main Turbine Building	One story steel structure with metal panel exterior walls.	4460 sq. m (48,000 sq. ft.) plan area, 24 m (80 ft.) high.
Auxiliary Equipment Building	One story steel structure with metal panel exterior walls and boiler exhaust stack.	2230 sq. m (24,000 sq. ft.) plan area, 14 m (45 ft.) high.
Administration/Control Building	Two story steel structure with metal panel exterior walls.	465 sq. m (5000 sq. ft.) plan area, 9 m (30 ft.) high.
Heat Recovery Steam Generators	Steel structures on concrete foundation.	24 m (80 ft.) high, Exhaust Stack 64 m (210 ft.) high.
Cooling Towers	Wood frame on concrete basin/foundation	Length=91 m (300 ft.) Width=18 m (60 ft.) Height=12 m (40 ft.)
Demineralized Water Tanks	Metal tanks on concrete foundations.	8.5 m (28 ft.) high
Raw Water Tanks	Metal tanks on concrete foundations.	6 m (20 ft.) high

Visual Resources - The visual characteristics of the area were examined using USGS topographic maps, field reconnaissance and a review of visual and aesthetic resource portions of the project site application prepared by PGE. Included in the review are areas designated "significant or important" in the comprehensive plans of the counties potentially impacted as well as "protected areas" defined by Oregon EFSC.

The project would be on a low plateau that slopes gently downward from the foothills of the Blue Mountains to the Columbia River. The area has been categorized as part of the Walla Walla Section of the Columbia Plateau physiographic province or the Columbia Basin Province (Franklin and Dyrness, 1986). Topography in this part of the province is very gently undulating covered by shrub-steppe vegetation (Franklin and Dyrness, 1986). Present land use of the region is dryland grain farming on the uplands and hay farming in areas such as stream valleys, where irrigation is possible. Irrigation development has occurred on large tracts of land adjacent to the Columbia River. There is some cattle and sheep grazing, although not as extensive as in the past.

It is possible to see long distances in this region because of the relatively flat terrain. Map 9 illustrates the area visible (viewshed) from this project. The viewshed map was constructed using BPA's geographic information system. Areas that can see project structures (30 m [98 ft.] and above) are shaded. Sweeping views along the Columbia River and across the uplands to the south of the river are visible. However, views are disrupted by stands of Russian olive, cottonwood and poplar trees. Motorists on I-84 in Oregon and State Highway 14 in Washington can see the Boardman Coal Plant 6-9 km (10-15 miles) away. Depending on the relief and vegetation adjacent to I-84, it is sometimes possible to see buildings and the stack and plume from the Boardman Coal Plant. Another predominant feature of the landscape while driving along I-84 is the extensive network of transmission towers and lines in BPA's transmission line corridor.

Such sweeping views are impossible closer to the City of Boardman because of local topography, vegetation and trees. At the Boardman interchange on I-84 there are commercial developments. Residential development has occurred on both sides of I-84. Contiguous with the commercial and residential developments in Boardman are the industrial developments in the Port of Morrow (see Figure 4-3). The visually dominant industrial developments are the Boardman Chip Company plant and potato processors, Lamb Weston and Oregon Potato Company, immediately east of the proposed plant site. The potato processing plants are visible from I-84, and from local roads and residences. Visible plumes are emitted from these facilities.

Within the impact area is the U.S. Navy's 130 sq. km (50 sq. mi.) Boardman Bombing Range. The range contains relict grassland communities. Part of the range is used for bombing practice, part is leased for grazing, and part is managed as a Natural Research Area by The Nature Conservancy.

Morrow County - There are no areas designated as "significant" or "important" in the Morrow County Comprehensive Plan (1986). Page 120 of the Plan states:

Morrow County contains a variety of landscapes, many of which may be considered to be scenic. The County has not, however, designated any sites or areas as being particularly high in scenic-resource value.

The road between Ukiah and Heppner is a scenic byway. However, this road is outside the 48-km (30-mile) impact area. (Morrow County, 1993.)

Umatilla County - Although not specifically identified in the Umatilla County Comprehensive Plan, there are several sites and vistas classified in the Comprehensive Plan Technical Report as "justifying limits to conflicting land uses" and, therefore, constitute key observation points. These sites and vistas include Hat Rock State Park, the Columbia River, and Cold Springs Reservoir. In addition to these sites, the following resources in the impact area have scenic value:

1. Umatilla County Scenic-Historic Road. This road, which is a collection of county roads, city streets, and state highways, follows the general course of early wagon roads between Umatilla and the Blue Mountains. The road is about 35 km (22 miles) east of the plant site.
2. McNary Lock and Dam. This structure on the Columbia River is at the western edge of Umatilla, approximately 32 km (20 miles) northeast of the plant site. (PGE, 1993.)

Gilliam County - There are no scenic or aesthetic resources identified in northeastern Gilliam County.

Viewer Exposure - Principal observation areas from which viewers could be exposed to visual impact are identified on Table 4-7. The locations of these areas are shown on Map 9. These areas were selected because of their designation as protected areas or designation in county or other land use plans as public recreation sites. Many of these visual observation areas are recreational sites where the visual experience is important.



Coyote Springs Cogeneration Plant - Morrow County, Oregon

**Figure 4-3
View Looking
Northeast from I-84**



Coyote Springs Cogeneration Plant - Morrow County, Oregon

**Figure 4-4
View Looking
Northeast from I-84
(With Simulation)**



Coyote Springs Cogeneration Plant - Morrow County, Oregon

**Figure 4-5
Distant View Looking
Northeast from I-84 -**



Figure 4-6
Distant View Looking
Northeast from I-84
(With Simulation)

Coyote Springs Cogeneration Plant - Morrow County, Oregon



Coyote Springs Cogeneration Plant - Morrow County, Oregon

Figure 4-7
Distant View Looking
Northwest from I-84



Coyote Springs Cogeneration Plant - Morrow County, Oregon

Figure 4-8
Distant View Looking
Northwest from I-84
(With Simulation)

**Table 4-7
Visual Observation Areas Near the Proposed Project**

Viewer Observation Areas	Activity	Designation in Land Use Plan
Boardman Marina Park	Swimming, Sailboarding, Camping & Picnicking	Designated
Boardman Research Natural Area	Viewing, Research	Protected Area
Boardman Sailboard Beach	Sailboarding	Not Designated
Cold Springs Reservoir	Boating	Designated
Cold Springs National Wildlife Refuge	Hiking, Wildlife Viewing, Hunting & Boating	Protected Area
Horn Butte BLM ACEC	Wildlife Viewing & Hiking	BLM Designated and Protected Area
Coyote Springs State Wildlife Area	Wildlife Viewing & Hunting	Not Designated but Protected Area
Hat Rock State Park	Picnicking, Hiking, Fish Viewing	Designated and Protected Area
I-84 Rest Stops (east/west bound)	Picnicking, Resting	Not Designated
Irrigon Marina Park	Boat Launching, Boating	Not Designated
Irrigon State Wildlife Area	Wildlife Viewing & Hunting	Not Designated or Protected
Lake Wallula	Boating	Designated
Lake Umatilla	Boating	Designated
Lindsay Grassland	Viewing	Designated
McNary Lock and Dam	Viewing	Designated
Messner Pond	Fishing, Boating, Wildlife Viewing	Not Designated
Oregon Trail BLM ACEC (Bucks Corner)	Viewing, Hiking & Historic Values	BLM Designated and Protected Area
Power City Wildlife Area	Viewing & Hunting	Not Designated or Protected
Riverside High School	Tennis, Baseball, Softball, Football, Track & Jogging	Not Designated
Motorists on I-84	Destination Travel	Not Designated
Umatilla County Scenic-Historic Road	Scenic Travel & Viewing	Designated
Umatilla National Wildlife Refuge	Hiking, Horseback Riding, Hunting, Boating & Wildlife Viewing	Protected Area
Willow Creek Corps of Engineers Boat Ramp/Recreation Area	Boating, Fishing, Camping	Designated
Willow Creek State Wildlife Area	Wildlife Viewing	Protected Area
Wilson's Willow Run Golf Course	Golfing	Not Designated

4.1.7 Cultural Resources

Historic, cultural, and archeological resources near the project site that might be affected by proposed project facilities were evaluated by the Museum of Natural History, Eugene, Oregon under contract to PGE. PGE hired Archaeological Investigations Northwest of Portland, Oregon to conduct an intensive cultural resource survey for the Coyote Springs Plant site and the transmission line route. Findings are reported in Exhibit T of PGE's *Application for Site Certificate*. PGT's Resource Report for FERC reports on cultural resources along the natural gas pipeline. A summary of these studies follows.

Cultural Resources Background - The project lies within the Southern Columbia Plateau culture area, which contains prehistoric sites dating from 11,000 to 200 years B.P. The earliest prehistoric period dates from 11,000 to 3,500 B.P. and is distinguished from later periods by the absence of permanent pit house dwellings. The later prehistoric period, dating from 3,500 to 200 B.P., is characterized by semi-subterranean houses and an increased reliance on fish.

Most cultural resource work in the Columbia Plateau is related to hydroelectric power projects in the Columbia River Basin. Important sites in the project vicinity include Five Mile Rapids, Wildcat Canyon, and Umatilla Rapids. The Five Mile Rapids site contains evidence of over 10,000 years of human occupation. At the time of historic contact, it was the greatest trading center and fishing area in the Northwest.

Wildcat Canyon contains a cultural sequence of comparable length, with the earliest human occupation dating to 9,000 years B.P. The most intense occupation at Wildcat Canyon was between 2,500 and 1,000 B.P. The artifact inventory from this period includes a variety of tools relating to food processing and gathering, as well as tools for making wood, leather, and textile items.

When the Lewis and Clark Expedition passed by the Umatilla Rapids site in 1805, they noted it was a village with "a great number of lodges." This important site at the confluence of the Columbia and Umatilla rivers was occupied before 7,000 B.P., with occupation extending into historic times. The remains of over 30 prehistoric houses have been excavated at the site, and over 230 burials were identified in a cemetery area.

At the time of historic contact, the project area was inhabited by Umatilla Indians. Although no single ethnography exists on the Umatilla, living patterns of these people can be reconstructed through information found in journals of trappers and early explorers. Lewis and Clark noted 34 villages between the Snake River and the Columbia River channel. The most important resource to the Umatilla was the fish species of the Columbia River.

The first commercial enterprises in the area were fur-trading companies established in the early 1810s. Umatilla, the largest town in the area, was founded during the gold rush of 1860. Umatilla served as a supply center for the region during the mining boom. As the mining-based

economy slowed in the 1870s, agriculture became increasingly important and was fueled by completion of the Central Pacific Railroad. Wheat and livestock were a focus in the area's early agricultural period. As irrigation projects were completed in the early 1900s, large tracts of land were devoted to growing peaches and melons. Today, agriculture still is a significant portion of the area's economy.

Review of Existing Information - Information on existing historic, archeological, and cultural resources in the vicinity of the proposed project was obtained through consultation with the **State of Oregon Historic Preservation Office (SHPO)** and a review of available literature. Known historic, archeological, and cultural resources in the vicinity include the following resources.

Oregon National Historic Trail - The Oregon Trail route is within 24 km (15 miles) of the main plant site. Much of the Oregon Trail has been obliterated by cultivation and other land development activities, but the trail is evident near Immigrant Road, 24 km (15 miles) south of the plant site. The SHPO and National Park Service have expressed concern over protection and preservation of remaining trail sections.

Carty Reservoir Prehistoric Sites - Two prehistoric sites were found during 1973-75 in the area now occupied by Carty Reservoir near the Boardman Coal-Fired Plant. Site 35 MW 15, the "Fourmile Canyon Site," and Site 35 MW 18, the "Canyon Four Site," were both extensive stone working/tool making sites dating from the period 6,000 to 9,000 B.P. Three other less extensive sites containing lithic flakes and fragments were also found in the area (Sites 35 MW 16, 35 MW 17, and 35 MW 19).

West Extension Irrigation Canal - The West Extension Irrigation Canal is within about 2.4 km (1.5 miles) of the main cogeneration plant site. The canal was built in 1913 and is still used. It is considered a historic engineered structure by the U.S. Bureau of Reclamation.

Lewis and Clark Historical Marker - A historical marker along Highway 730 in Irrigon represents a stopover made by the Lewis and Clark Expedition on October 19, 1805.

Columbia River South Shoreline Lithic Scatters - Elongated areas containing scattered lithic flakes and fragments are along the south shoreline of the Columbia River in the project's vicinity. These include areas just upstream and downstream of the inlet to Messner Pond about 0.8 km (0.5 mile) from the plant (Sites 35 MW 12 and 35 MW 13).

Other Nearby *Isolates* in the Vicinity - Several other small isolated and detached sites (isolates) containing prehistoric remnants have been identified in the vicinity (PGE, 1993). These include two areas about 2.4 km (1.5 miles) northeast of the main plant site (35 MW 47 and 35 MW 48), two areas between Boardman and Irrigon (35 MW 45 and 35 MW 46), and one area 3.2 km (2 miles) east of Irrigon (35 MW 12).

Other Previous Surveys in the Vicinity - Several other archeological surveys have been conducted in the vicinity. Most produced no significant or substantive historic or archeological evidence. These include:

PGT Pipeline Surveys - Extensive surveys were done along the existing PGT pipeline route in 1990. No prehistoric sites or isolates were found in the project area during these surveys. No historic sites or isolates were found, with the exception of the Oregon Trail, which crosses the existing PGT pipeline just northwest of Lone.

Northwest Pipeline Surveys - Extensive surveys were conducted during 1990-91 along the proposed route for the Northwest Pipeline Expansion Project, including the segment recently constructed near Umatilla. Four historical sites along the pipeline corridor were trash scatters determined not to be significant. In addition, historic irrigation systems were determined to be eligible for the National Register of Historic Places. Treatment plans were developed and implemented to protect the historical significance of the 12 canal crossings during construction of the natural gas pipeline. No prehistoric sites or isolates were found during these surveys.

Port of Morrow Interchange Surveys - An on-site archeological reconnaissance survey was done by the Oregon Department of Transportation (ODOT) in a limited area surrounding the Port of Morrow/Interstate 84 interchange just south of the proposed plant site. No prehistoric or historic sites, or isolates were found during this survey.

Boardman Bombing Range Survey - An on-site archeological reconnaissance survey was conducted in a limited area on the Boardman Bombing Range near the Boardman coal-fired plant. Only one prehistoric isolate was found during this survey.

On-Site Surveys - On-site surveys to assess the possible presence of historical, archeological, and cultural resources were conducted by Archaeological Investigations Northwest of Portland, Oregon. Surveys were done during April and May 1993. The surveys were conducted by a team of four archaeologists walking in unison at 30 m (100 ft.) intervals. The surveys initially checked for presence of surface materials. One projectile point, a core and a possible chopper were found on the slope of the railroad fill on the north border of the plant site. No other resources were found. Subsurface testing was not recommended by the archaeologists based on the surface reconnaissance. PGE submitted survey results to SHPO and EFSC. The survey team included Dana Schneder, a cultural resource technician from the Confederated Tribes of the Umatilla.

National Park Service - The National Park Service was contacted about any concerns relevant to their interest within the impact area. The National Park Service's primary concern was the Oregon Trail. The proposed gas pipeline and its impact will be reported in an environmental assessment issued by the FERC in fall 1994. The pipeline would cross the Oregon Trail in a location that has been previously disturbed by agriculture that has not been evaluated to determine its National Register eligibility.

4.1.8 Protected Areas

In Oregon, siting energy facilities is regulated by EFSC. One aspect of this regulation is to prohibit energy facilities from being sited within special land use areas called Protected Resources. Oregon Administrative Rules, Chapter 345, Division 22, Rule 040 (1) lists Protected Resources. In addition, design, construction and operation of a facility near these areas cannot significantly impact these areas. The proposed facility is near the Protected Resources discussed below and shown on Map 10.

The Umatilla National Wildlife Refuge is approximately 3.5 km (2.2 miles) northeast of the proposed plant site. The refuge occupies a 32-km (20-mile) portion of the mid-Columbia River and adjacent uplands, totaling 9250 ha (35 sq. miles). About half of the acreage is made up of the flowing Columbia River. The refuge is an important wildlife and recreational area. A wide variety of habitats enable the refuge to support a wide diversity of wildlife, including bald eagle, peregrine falcon, long-billed curlew, white pelican, osprey, and burrowing owl. Frequently seen mammals are coyote, badger, mule deer, beaver, and river otter. The Columbia River and its backwaters serve as migration, feeding, spawning, and rearing areas for a variety of fish.

The Coyote Springs Wildlife Area is 65 ha (160 acres) located in Morrow County north of I-84 near the junction of I-84 with U. S. Highway 730, approximately 3.2 km (2 miles) from the proposed plant site. It is a waterfowl hunting and nesting area.

Other protected areas within a 32-km (20-mile) radius of the proposed facility are: two state fish hatcheries between Irrigon and Umatilla; Hat Rock State Park; Willow Creek, Irrigon, and Power City Wildlife Areas; Boardman Research Natural Area; Lindsay Grassland; and two BLM areas of Critical Concern (part of the Oregon National Historic Trail and Horn Butte).

The City of Boardman is currently developing a wellhead protection ordinance to regulate land use inside the water capture zone for its Ranney collector well(s). Although the Coyote Springs Plant site is just outside the eastern boundary of the capture zone, the City, the Port of Morrow and PGE have agreed to discuss plant design and waste handling procedures relevant to wellhead protection.

4.2 Coyote Springs Natural Gas Pipeline Extension

PGT's Coyote Springs Extension Pipeline passes through areas with largely the same characteristics as the Coyote Springs Cogeneration Project. The preferred route of the pipeline is shown on the resource maps.

4.2.1 Land Use and Community Character

The predominant land use along the 29.8-km (18.5-mile) pipeline route is an existing joint right-of-way used by an electric transmission line and a county road. Located between the easterly fenceline of the U.S. Naval Weapons System Training Facility (known as the Boardman

Bombing Range) and Morrow County's Bombing Range Road, the pipeline route does not cross land used for any other purpose between the 4-km (2.5-mile) and 24-km (15-mile) stations. No industrial uses are crossed by the route, although several processing plants and quarrying operations are next to the route. No residences or commercial activities are located within 15 m (50 ft.) of the pipeline impact area.

The route crosses 11 roads: Wilson Road, County Road M817, I-84, Ripee Road, and seven unnamed gravel roads. Bombing Range Road initially derived its name in connection with the Naval Weapons System Training Facility located to the west. While the Navy still conducts training at the facility, no explosives are used. In addition to the roads, the route would cross one canal (West Extension Irrigation Canal) and a BPA electric transmission line. The route also runs parallel to the proposed BPA line from the cogeneration plant where the line is in the Port of Morrow utility corridor next to a water line and two sewer pipelines.

In the Port of Morrow Industrial Park, additional planned industrial development and road-way expansion is expected to occur. However, since the proposed route is within the utility corridor, the route will not affect any of these plans. No other planned development has been identified by the Morrow County Planning Department on lands crossed by the proposed pipeline.

Messner Pond Wildlife Area is east of the site of the proposed cogeneration plant, and north of the proposed pipeline route. The Oregon Trail is crossed by the pipeline route at station 6-km (3.7-mile), where the trail enters the Boardman Bombing Range. Recreational and hiking use of the trail is minimal. There are no other recreation facilities or opportunities for recreation crossed by the pipeline route. For further details on land uses in the vicinity of the project, see Section 4.1.1.

4.2.2 Natural Resources

Geology

See Section 4.1.2 for a description of area geology, soils, and water resources.

Seismicity - The potential for seismic hazards is considered to be low because the proposed route does not cross any mapped faults.

Soil Liquefaction - The potential for soil liquefaction is considered to be low because the proposed route crosses geologic units of an age considered to have low to very low liquefaction susceptibility.

Slope Instability - The terrain crossed by the route is generally flat or rolling with little slope. Landslides are not present in the area, so the potential for slope failure is considered to be low.

Subsidence - Subsidence as a result of groundwater extraction in the vicinity of the proposed route is not known to have occurred, and the potential for such subsidence is considered to be very low.

Stream Bottom Scour and Bank Erosion - The proposed route would cross only minor, intermittent streams and one irrigation canal. Significant scour or erosion of these streams at the crossings is not expected because of the low annual precipitation and resulting low intermittent flows. The canal will be crossed 1.5 m (5 ft.) below its concrete bottom.

Mineral Resources

The Mineral Resources Map of Oregon, Preliminary Geothermal Resource Map of Oregon, and data on existing, local mine permits were reviewed. The proposed route would not cross any areas identified in these references as having currently or potentially exploitable mineral resources.

Air Quality

See Section 4.1.2 for a description of area air quality.

Vegetation

Most of the natural vegetation of the Coyote Springs area has been greatly disturbed by dryland and irrigated agriculture. Throughout the 29.8-km (18.5 mile) pipeline route, agriculture and utility line and roadway maintenance operations have eliminated all parcels of native vegetation. Introduced grasses tend to dominate all areas. The Lindsay Grassland Preserve is 3.9 km (2.4 miles) southwest of the proposed route and contains one of three known remnants of the dry, deep loessial soil bluebunch wheatgrass, Sandberg's bluegrass palouse. The Preserve also contains small, but high-quality examples of three other Columbia Basin shrubland and grassland communities.

In May and July 1993, plant field surveys along the east side of the Bombing Range Road right-of-way were conducted. No undisturbed native vegetation communities were observed during the survey. In places, bitterbrush and gray and green rabbitbrush, respectively, were locally abundant with a grass understory. Areas remaining uncultivated were often grazed and almost always included invasive species, particularly cheatgrass. In scattered areas, however, some bunchgrasses, bluegrasses, Indian ricegrass, and needle-and-thread grass are present but never in large amounts. The area showed recent disking or other site disturbance. This was particularly common under the power lines. Site disturbance has opened the way for cheatgrass, tansy mustard, Russian thistle, tumble mustard, fiddleneck, blue mustard, filaree, and other species to invade and become dominant.

A focus of the plant surveys was determining if Federally or state protected plants were present. Three of these species: Thompson's sandwort (*Arenaria franklinii* var. *tompsonii*), Lawrence's milkvetch (*Astragalus collinus* var. *laurentii*), and Columbia cress (*Rorippa columbiae*) listed as possibly occurring in the area, were not found during the surveys.

In the spring of 1994, plant surveys will be repeated because part of the pipeline route has been shifted to the west side of Bombing Range Road.

Fish and Wildlife

The proposed pipeline route does not cross any wilderness study, research, natural, wildlife, or other similarly designated areas. However, many wildlife species are found within the project vicinity. Several designated wildlife refuges and other natural areas are near the terminus of the pipeline route. See Section 4.1.2, Fish and Wildlife. No fish-bearing streams are crossed by the pipeline route.

As a result of human activities, the natural plant communities and wildlife habitats are now dominated by vegetation that is characteristic of disturbed areas, with grasses prevalent in most areas of the route. In 1993, wildlife surveys were conducted to identify any significant existing wildlife resources. The scope of these surveys included wildlife and wildlife habitats, and special status and threatened and endangered species. Surveys were conducted along the pipeline route at varying distances from the centerline, ranging from 91 m (300 ft.) to 800 m (1/2 mile).

Six protected species were observed during the wildlife surveys: golden eagle, ferruginous hawk, Swainson's hawk, long-billed curlew, burrowing owl, and grasshopper sparrow. The other nine protected species were not found during the surveys. The results of the surveys are as follows:

Spotted frog - No spotted frogs were located during the surveys.

Bald eagle - No bald eagles were observed during field surveys. No bald eagle nesting or feeding habitat is within the pipeline route.

Swainson's hawk - Swainson's hawks were observed many times perched, in flight, or feeding along the pipeline route. No Swainson's hawk nest sites were found within 800 m (1/2 mile) of the pipeline route.

Ferruginous hawk - Ferruginous hawks were observed soaring and hunting in the general vicinity of the pipeline route during April. They were not observed during May. No ferruginous hawk nesting sites were found within 805 m (1/2 mile) of the pipeline route.

Golden eagle - Golden eagles were observed on one occasion, soaring approximately 1.6 km (1 mile) west of the pipeline route. No golden eagle nesting habitat was found within 800 m (1/2 mile) of the pipeline route.

American peregrine falcon - No peregrine falcons were observed during the field surveys. No peregrine falcon nesting habitat is within 800 m (1/2 mile) of the pipeline route.

Prairie falcon - No prairie falcons were observed during the field surveys. No prairie falcon nesting habitat is within 800 m (1/2 mile) of the pipeline route.

Greater sandhill crane - No sandhill cranes were observed during the field surveys.

Long-billed curlew - Long-billed curlews were found in the general area and along the pipeline route. Curlews were observed in both courtship and territorial flights, and emitting alarm and distress calls during short circling flights near observers. Both behaviors indicated active nesting territories. Nesting territories were found at fairly regular intervals along Bombing Range Road west of the Naval Weapons System Testing Ground (Boardman Bombing Range) fence line.

Ten curlew territories were found within 152 m (500 ft.) of the pipeline route. Territorial behaviors indicating active nesting were observed at these locations, which occur between stations 9.0-km (5.6-mile) and 21.7-km (13.5-mile). In the spring of 1994, curlew surveys were repeated because part of the pipeline route had been shifted to the west side of Bombing Range Road.

Burrowing owl - Burrowing owls were seen twice along the pipeline route. Both observations were of perched individuals. Nesting was not confirmed. No burrowing owl nesting areas were found within 30 m (100 ft.) of the route centerline. In the spring of 1994, burrowing owl surveys were repeated because part of the pipeline route had been shifted to the west side of Bombing Range Road.

Loggerhead shrike - No loggerhead shrikes were observed during the field surveys.

Grasshopper sparrow - Nine grasshopper sparrows were observed singing from perches near the pipeline route. Singing males indicate active territories and probable nesting. All observations occurred in grazed grassland or shrub-steppe habitats. Five individuals were observed within 152 m (500 ft.) of the pipeline route.

In the spring of 1994, grasshopper sparrow surveys were repeated because part of the pipeline route had been shifted to the west side of Bombing Range Road.

Pacific Western big-eared bat - No big-eared bats were observed during the field surveys. No bat roosts were found within 800 m (1/2 mile) of the pipeline route.

Pygmy rabbit - No pygmy rabbits were found during the field surveys. No preferred habitat for pygmy rabbit occurs within the pipeline route.

Washington ground squirrel - A few Washington ground squirrels were observed along the pipeline route during the field surveys. Rodent burrows of appropriate size for Washington ground squirrels are common in grazed grassland and shrub-steppe habitats.

In the spring of 1994, Washington ground squirrel surveys were repeated because part of the pipeline route had been shifted to the west side of Bombing Range Road.

Wetlands

Physical conditions in the project area tend to limit the extent of wetlands. Soils are sandy, generally originating as alluvial deposits, and having low water-holding capacity. The local dry climate limits surface and groundwater availability. Wetlands were identified initially from USFWS National Wetland Inventory Maps. In May 1993, a field survey to check and delineate wetlands was completed. All NWI mapped wetlands were found to contain fill within the 30-m (100-ft.) wide pipeline survey area.

One possible jurisdictional wetland was found along the proposed route. The location is a palustrine emergent wetland. The source of water to this area is runoff from surrounding irrigated cropland. As such, this wetland is considered atypical and would not normally fall under the regulatory jurisdiction of the Corps of Engineers.

In the spring or summer of 1994, a wetland survey was repeated because part of the pipeline route had been shifted to the west side of Bombing Range Road.

4.2.3 Socioeconomics and Public Services

See Section 4.1.1, Socioeconomics and Public Services for a description of the local area and the essential local government services available to area residents.

4.2.4 Public Health and Safety

The pipeline will be constructed and operated under U.S. Department of Transportation regulations and FERC guidelines.

4.2.5 Noise

Because of the remote location of most of the proposed pipeline route, ambient noise levels in the project area are expected to be low. Only one sensitive noise receptor, a residence, is located in the vicinity of the proposed route, about 60 m (200 ft.) from the boundary of the working limits. Average L_{dn} levels (day-night sound levels) in rural areas typically range from 35 to 40 dBA. Where the pipeline would cross I-84, ambient levels would be expected to be 65 to 85 dBA L_{dn} . At the terminus of the pipeline route in the Port of Morrow Industrial Park, levels would range from 60 to 70 dBA L_{dn} .

4.2.6 Visual and Aesthetic Resources

The predominant natural landscape feature of the area traversed by the proposed pipeline is a continuous cover of perennial grasses, with little variation in color or texture. Scattered groupings of small deciduous trees are found in a few locations. The visual landscape character of the study area is flat to gently rolling, with low slope gradients and little distinctive character. Because of low growth habit and sparseness of existing vegetation and terrain conditions, views often exceed 1.6 km (1 mile). There are no Federally designated lands or visual resources within the study area. There are no areas designated as "significant" or "important" scenic resource values in the Morrow County Comprehensive Plan (1986).

4.2.7 Cultural Resources

See Section 4.1.7, Cultural Resources for regional and local background on prehistoric and historic resources in the area.

In 1993 and 1994, intensive cultural resource surveys were completed along the proposed pipeline route. No prehistoric sites were found. No significant historic site was found, although the route does cross a segment of the Oregon Trail. A field review of the trail crossing concluded that no existing trace of the trail exist at that location due to previous agricultural ground-disturbing activities.

4.2.8 Protected Areas

See Section 4.1.8., Protected Areas, for a description of these special land use areas.