SECTION 3 Existing Conditions, Impacts, and Mitigation Measures



# Existing Conditions, Impacts, and Mitigation Measures

## 3.1 Earth

## 3.1.1 Existing Conditions

## 3.1.1.1 Geology

The proposed location of the generation plant is on the Columbia Plateau, a broad expanse of land in eastern Washington and the northernmost part of eastern Oregon that is underlain by a series of layered basalt flows known as the Columbia River Basalt Group. These lava flows, which cover more than 55,000 square miles in eastern Washington, northeastern Oregon, and Idaho, erupted from linear vents in the southeastern corner of Washington and adjacent areas of Oregon and Idaho between 6 and 17 million years ago.

More than 50 different major lava flow units have been identified within the Columbia River Basalt Group. Their cumulative thickness ranges from greater than 12,000 feet in the Pasco Basin to less than a few hundred feet along the margins of the Columbia Basin. Individual flows range from a few inches to more than 300 feet thick, and most flows range from about 90 to 120 feet thick. Relatively thin sedimentary interbeds occur between some of the flows as a result of fluvial deposition that occurred between eruptions. These sediments are most often thin seams of clay or silt, although in some places sand and gravel are present instead.

Most of the surface of the basalt in the eastern part of the region has a mantle of loess (winddeposited silt) known as the Palouse Formation. This loess, which is locally more than 200 feet thick, ranges in age from Pleistocene (ice age) to Holocene (recent). Much of this silt was derived from the Pasco Basin and was carried to the east and northeastward by prevailing winds. The rolling topography typical of the area south of the Snake River is largely the result of local variations in the thickness of this loess.

Glacial activity during the Pleistocene disrupted normal drainage patterns on the Columbia Plateau and resulted in the catastrophic Missoula Floods that surged southwestward across the region as recently as about 13,000 years ago. These enormous floods removed much of the loess cover and scoured the underlying basalt to form the channeled scablands that extend northward from the mouth of the Palouse River to near Spokane. River gravel deposits accumulated in these channels as the floodwaters subsided, and alluvium has subsequently been deposited along the courses of major streams. This material consists primarily of redeposited loess, basaltic sand, and gravel.

The generation plant site is located within the Palouse Slope structural subprovince of the Columbia Basin. The basaltic bedrock underlying this area is slightly deformed, with a few minor faults and broad, low-amplitude, northwesterly trending folds on an otherwise

gently westward dipping paleoslope. The closest known fault to the site is located about 2 miles to the north. This high-angle, northwest-trending fault, known as the Lyons Ferry fault, offsets the Miocene Grande Ronde Basalt but does not appear to have displaced the overlying Quaternary sediments. The closest fault with suspected Quaternary offset is the Central Ferry fault, about 12 miles to the east along the Snake River (Reidel et al., 1994). Because of the relatively old age of displacement (greater than 10,000 years) and the lack of earthquakes historically associated with the Central Ferry Fault, it is not considered capable of generating earthquakes.

The Wallula fault system (located approximately 45 miles south-southwest of the generation plant site) and the Hite fault (located approximately 40 miles southeast of the site) are the closest faults known to be active. Evidence exists of surface displacement in Holocene time along these faults, and either the Wallula or the Hite fault may have been the source of the Milton-Freewater Earthquake of 1936. This earthquake is the largest earthquake to have occurred on the Columbia Plateau in its history. The earthquake had a magnitude of 5.75, a maximum epicentral intensity of VII, and was felt over an area of more than 100,000 square miles.

Three earthquake databases managed by the U.S. Geological Survey (USGS) National Earthquake Information Center were searched to identify historical seismic events that have occurred within 100 miles of the generation plant site (USGS, 2001a). The databases included "USGS/NEIC 1973-Present," "Significant U.S. Earthquakes (1568-1989)," and "Eastern, Central, and Mountain States of U.S., 1534-1986." These searches identified 703 seismic events of all magnitudes and intensities that occurred between 1887 and 2000. Table 3.1-1 identifies only those seismic events that meet the following criteria:

- Magnitude and/or intensity data are available.
- The magnitude of the event is 3.0 or above.
- The intensity (Modified Mercalli Intensity Scale) of the event is 3 or above, or the event was actually "felt."
- The seismic event was not an aftershock associated with a larger quake at the same location.

Year	Month	Day	Latitude ( ° North)	Longitude (°West)	Magnitude	(units) <sup>b</sup>	Intensity or Felt <sup>c</sup>	Miles from Site	Direction from Site	Epicenter Reference
1887	4	29	46.10	118.30			F	33	S	1
1893	3	7	45.90	119.30	4.7	ML	6, F	70	SW	2
1906	1	3	47.70	117.40			6	86	NNE	3
1915	1	18	45.50	118.00			4	75	S	4
1917	6	1	46.10	116.40			4	92	ESE	5
1918	4	18	47.70	117.60			3	83	NNE	6
1918	11	1	46.70	119.50			5	62	W	7
1920	11	28	47.70	117.40			4	86	NNE	8

 TABLE 3.1-1

 Historical Seismic Events That Have Occurred within 100 Miles of the Generation Plant Site a

Historical Seismic Events That Have Occurred within 100 Miles of the Generation Plant Site <sup>a</sup>

Year	Month	Day	Latitude ( ° North)	Longitude (°West)	Magnitude	(units) <sup>b</sup>	Intensity or Felt <sup>c</sup>	Miles from Site	Direction from Site	Epicenter Reference
1921	9	14	46.30	118.20			3	19	S	9
1922	10	16	45.80	119.30			4	75	SW	10
1922	12	12	45.70	118.80			3	66	SSW	11
1924	1	6	45.80	119.20			5	71	SW	12
1926	12	30	47.00	118.00			5	30	NNE	13
1930	9	3	47.30	117.80			5	53	NNE	14
1936	7	16	45.97	118.21	5.8	MS	7, F	42	S	15
1937	8	11	47.70	117.40			F	86	NNE	16
1937	9	20	46.10	118.30			3, F	33	S	17
1938	5	9	46.10	118.30			3, F	33	S	18
1938	5	24	46.10	118.30			3, F	33	S	19
1938	8	11	46.00	118.30			4	40	S	20
1938	10	27	46.00	118.30			4	40	S	21
1939	1	26	46.00	118.30			4	40	S	22
1940	1	6	47.30	119.50			F	79	NW	23
1941	7	29	47.70	117.40			F	86	NNE	24
1943	4	14	46.40	117.00			5	58	ESE	25
1943	9	23	47.60	119.30			F	88	NW	26
1944	7	25	46.10	116.40			4	92	ESE	27
1944	9	2	46.10	118.30			4	33	S	28
1945	9	23	46.10	118.30			4	33	S	29
1948	8	28	47.90	117.50			4	97	NNE	30
1949	3	15	45.50	117.00	4.8	ML		94	SE	31
1949	4	14	46.80	117.20			3	50	ENE	32
1950	5	17	45.80	119.80			3	93	SW	33
1950	6	25	47.50	117.60			4	70	NNE	34
1951	1	7	45.90	119.30			5	70	SW	35
1955	2	6	47.60	119.30			4	88	NW	36
1956	2	24	47.60	119.30			5	88	NW	37
1958	4	13	47.60	119.30			F	88	NW	38
1959	1	21	45.90	118.40			5	47	S	39
1959	7	11	47.60	119.30			4, F	88	NW	40
1959	11	9	45.60	119.50			4	91	SW	41
1961	11	7	47.70	117.40			F	86	NNE	42
1964	1	15	45.90	120.00	4.2	ML		98	WSW	43
1966	7	23	47.20	119.50	4.3	mb	5	75	NW	44
1967	10	10	46.40	117.00			4	58	E	45
1969	4	19	45.89	119.74	3.1	ML		88	SW	46
1970	1	1	46.33	118.40	3.0	ML		19	SSW	47
1970	4	4	46.24	120.03	3.0	ML		90	WSW	48

#### **TABLE 3.1-1**

Historical Seismic Events That Have Occurred within 100 Miles of the Generation Plant Site a

Year	Month	Day	Latitude ( ° North)	Longitude (°West)	Magnitude (units		Intensity or Felt <sup>c</sup>	Miles from Site	Direction from Site	Epicenter Reference
1970	4	22	46.30	120.10	3.0	ML		93	W	49
1970	6	22	46.44	120.17	3.1	ML		94	W	50
1970	11	29	46.19	120.11	3.0 ML 94		94	WSW	51	
1971	1	4	46.24	119.35	3.0	ML		59	WSW	52
1973	12	20	46.90	119.30	4.8	Mb	6, F	57	WNW	53
1975	6	15	46.24	119.10	3.1	ML		48	WSW	54
1975	6	28	46.24	119.71	3.7	ML		76	WSW	55
1975	7	7	46.07	118.45	3.2	ML		37	SSW	56
1975	9	18	47.85	118.16	3.5	ML		88	Ν	57
1976	7	23	46.08	118.75	3.1	ML		43	SW	58
1976	8	20	46.46	117.29	3.1	ML		44	Е	59
1976	8	20	46.46	117.29	3.1	ML		43	Е	60
1976	10	31	45.78	119.60	3.0	ML		86	SW	61
1977	3	11	45.90	119.68	3.1	ML		85	SW	62
1978	2	20	45.90	119.67	3.2	ML		85	SW	63
1979	2	17	46.17	119.93	3.6	ML		87	WSW	64
1979	4	8	46.01	118.42	3.2	ML	5, F	40	SSW	65
1980	11	19	46.95	119.48	3.3	ML		66	WNW	66
1983	3	22	46.12	118.36	3.3	ML	4	32	S	67
1983	10	20	46.72	119.58	3.4	MD		66	W	68
1984	6	18	45.49	118.84	3.1	MD		81	SSW	69
1985	1	9	47.06	120.09	3.3	MD		96	WNW	70
1985	1	31	47.06	120.08	3.3	MD		95	WNW	71
1985	2	10	45.86	119.64	3.7	ML	4	85	SW	72
1985	3	9	46.93	118.59	3.3	MD		30	NW	73
1985	6	9	46.67	118.98	3.2	MD		37	WNW	74
1985	6	17	47.06	120.08	3.0	MD		94	WNW	75
1985	10	1	46.80	120.05	3.0	MD		89	W	76
1985	11	22	47.26	119.35	3.2	MD		72	NW	77
1986	2	4	46.04	118.81	3.2	MD		47	SW	78
1986	9	1	46.72	119.29	3.4	MD		52	W	79
1988	5	28	46.81	119.43	3.5	MD		60	WNW	80
1988	7	9	46.84	119.69	3.7	MD		73	WNW	81
1988	7	14	46.89	119.41	3.3	MD		62	WNW	82
1990	4	22	46.54	119.73	3.3	MD		73	Ν	83
1990	6	19	46.84	119.32	3.3	MD		56	WNW	84
1990	12	22	46.80	119.99	3.4	MD		86	W	85
1991	2	26	46.72	119.88	3.0	MD		80	W	86
1991	11	28	45.99	118.32	4.3	mb	4, F	40	S	87
1992	7	14	45.99	118.31	4.1	MD	4, F	40	S	88

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_	Year	Month	Day	Latitude ( <sup>°</sup> North)	Longitude (°West)	Magnitude	(units) <sup>b</sup>	Intensity or Felt <sup>c</sup>	Miles from Site	Direction from Site	Epicenter Reference
-	1992	8	7	45.86	119.59	3.9	MD	5, F	83	SW	89
	1994	1	13	46.89	118.70	3.4	MD		32	NW	90
	1994	6	25	46.87	119.31	3.0	MD		56	WNW	91
	1994	11	13	46.59	119.59	3.3	MD		66	Ν	92
	1995	6	12	46.40	119.26	3.3	MD	F	52	WSW	93
	1995	8	29	46.21	119.91	3.1	MD		85	WSW	94
	1995	11	2	46.15	119.56	3.1	MD		71	WSW	95
	1996	6	25	47.20	119.51	3.0	MD		75	NW	96
	1997	5	27	46.83	119.36	3.3	MD		58	WNW	97
	1997	7	23	45.99	118.50	3.0	ML		42	SSW	98
	1997	11	6	46.53	119.71	3.3	MD		71	W	99
	1998	6	28	46.53	116.89	3.8	MD	F	62	Е	100
	1999	3	12	47.33	117.64	3.0	MD		58	NNE	101
	1999	9	19	46.39	120.11	3.2	MD		91	W	102
	1999	9	19	46.44	119.63	3.1	MD		68	W	103
	2000	3	16	47.61	119.32	3.2	MD	F	88	NW	104
	2000	9	6	46.12	118.46	3.0	MD		34	SSW	105

TAB	LE	3.1	-1

Historical Seismic Events That Have Occurred within 100 Miles of the Generation Plant Site a

Notes:

<sup>a</sup> The generation plant site is located at 46.575 north latitude, 118.2 west longitude.

<sup>b</sup> Magnitude: ML, Local Magnitude or "Richter Magnitude"; MS, Surface-wave; mb, Body-wave; MD, Duration Magnitude.

<sup>c</sup> Intensity or Felt: numerical value indicates maximum intensity on the Modified Mercalli Scale; F indicates that the event was felt at the site, based on the Mercalli Scale.

Sources: USGS, 2001a.

Epicenters of the 105 seismic events presented in Table 3.1-1 are identified in Figure 3.1-1 (A and B), which includes an illustration of tectonic features surrounding the generation plant. Figure 3.1-1A identifies all earthquake epicenters where the magnitude was recorded within a 100-mile radius of the generation plant. Epicenters that were "felt" but did not have a recorded magnitude or intensity are included in this figure. Figure 3.1-1B identifies all earthquake epicenters where the intensity was recorded, but the magnitude was not.

Felt reports dating back to 1850 and seismograph records since 1973 indicate the site area itself has been essentially aseismic in historical time. The closest recorded seismic event with a magnitude of 3.0, or intensity of 3 or greater, had an epicenter about 19 miles south of the generation plant site. A geological and seismological review in 1982, for Lower Monumental Dam and Little Goose Dam, predicted that the maximum potential earthquake on the Wallula fault system will produce an attenuated bedrock acceleration of 0.10 g (ground acceleration) at both of these dams (U.S. Army Corps of Engineers [Corps], 1982). Because the geologic setting of these dams is similar to that of the generation plant site, and they are

at a comparable distance from the fault system, an anticipated maximum bedrock acceleration on the order of 0.10 g from this fault zone is reasonable for the generation plant site.

A Federal Emergency Management Agency (FEMA, 1997) report that presents nationally applicable guidelines for the seismic rehabilitation of buildings provides a more recent assessment of ground acceleration near the generation plant site. Maps accompanying the guidelines indicate that the spectral response acceleration in rock for earthquakes with a 10 percent chance of being exceeded in 50 years is 0.15 g at short periods. The corresponding return period for this probability of occurrence is approximately 500 years; that is, one event is expected to occur every 500 years. Additionally, the spectral response acceleration in rock for earthquakes with a 10 percent chance of being exceeded in 50 years is approximately 500 years; that is, one event is expected to occur every 500 years. Additionally, the spectral response acceleration in rock for earthquakes with a 10 percent chance of being exceeded in 50 years is approximately 0.05 g at a one-second period (FEMA, 1997).

Information provided by the National Seismic Hazard Mapping Project – U.S. Geological Survey indicates similar ground acceleration values for the generation plant site (specifically, the zip code area 99359) (USGS, 2001b). At short periods, the spectral response acceleration in rock for earthquakes with a 10 percent chance of being exceeded in 50 years is 0.16 g; and at a one-second period the spectral response acceleration in rock for earthquakes with a 10 percent chance of being exceeded in 50 years is 0.16 g; and at a one-second period the spectral response acceleration in rock for earthquakes with a 10 percent chance of being exceeded in 50 years is 0.15 g.

The generation plant site, including all of eastern Washington and eastern Oregon, is in Seismic Zone 2B according to the 1997 Uniform Building Code (UBC) (University of Washington Geophysics Department, 2001). The corresponding horizontal PGA on rock for Seismic Zone 2B is 0.20 g. Based on geotechnical studies conducted at the site, the soil profile corresponds to a site soil classification of  $S_D$  (UBC); the corresponding soil amplification factor is 1.4 for a soil profile type  $S_D$ , based on National Earthquake Hazards Reduction Program recommendations (FEMA, 1997). The resulting horizontal peak ground acceleration (PGA) on rock for this assumption is 0.28 g (CH2M HILL, 2001).

Within the state of Washington, the USGS recognizes five volcanoes as either active or potentially active: Mount Baker, Glacier Peak, Mount Rainier, Mount Adams, and Mount St. Helens. In the last 200 years, only Mount St. Helens has erupted more than once (USGS, 2000a). Data accumulated as a result of the 1980 Mount St. Helens eruption indicate that there could be ash fallout in the geographic region surrounding the generation plant site if one of the five regional volcanoes were to erupt.

Approximately two-and-a-half hours after the eruption of Mount St. Helens, the ash plume had been carried by atmospheric winds to the location of the generation plant site (USGS, 2000b). The greatest depths of ash fallout, ranging from 2 to 5 inches, were recorded near Ritzville (approximately 60 miles north of the generation plant site). Ash fallout in the immediate vicinity of the generation plant ranged from 0.5 inch to 2 inches in depth.

The proposed generation plant site is situated on a gravel bar that was deposited along the Snake River approximately 13,000 years ago (Carson and Pogue, 1996). This bar was deposited by floodwaters that backed up into the Snake River valley from the confluence of the Palouse and Snake Rivers during the last of the catastrophic Lake Missoula floods. Subsurface information from the south end of the property indicates that this deposit





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consists of two main layers: an upper 50-foot stratum of sandy gravels and cobbles with a trace to some silt and minor boulders, and an underlying 30-foot stratum that rests on basaltic bedrock, consisting of boulders, cobbles, gravel, and sand that are cemented by lime deposits (Black & Veatch, 2000). At the northwest end of the site, the bar deposit is considerably thicker. A geologic log associated with a domestic water well drilled in the area indicates that at least 193 feet of coarse gravelly sediments overlie the basalt bedrock. A geologic cross section (Figure 3.1-2) shows the relationship of the gravel bar to the Snake River valley and the underlying bedrock.

The basaltic bedrock underlying the generation plant site and forming the walls of the Snake River canyon to the north and south consists of lava flows of the Grande Ronde Basalt. This basalt is the most abundant and widespread formation of the Columbia River Basalt Group. It consists of about 120 individual flow units and makes up about 90 percent of the total volume of the Columbia River Basalt Group. The thickness of the basalt below the site is not known but may be as much as 1,000 feet.

The only other major geologic unit in the immediate site vicinity is a sand and gravel deposit that is exposed on the slope to the south of the site. As with the gravel bar deposit underlying the site, these sediments were also deposited during the Missoula Floods. They differ from the bar deposit in that they are typically finer grained and were deposited in protected places on the canyon walls.

#### 3.1.1.2 Soil

#### Near Surface Soils

Only one near-surface soil series exists at the generation plant site; the Soil Survey of Columbia County (Survey) identifies it as the Stratford soil series (USDA, 1973). The Stratford series consists of well-drained, very stony silt loams that are underlain by sand, gravel, cobblestones, and boulders at a depth of 20 to 40 inches bgs. These soils are formed in glacial outwash that contains wind-laid silts (loess) and volcanic ash in places. Test trenches excavated on the site indicate that these soils consist of well-drained, stony to very stony silt loams. A typical Stratford series soil profile consists of a surface layer of grayish brown, very stony silt loam to a depth of 6 inches bgs, underlain by a dark brown, very stony silt loam subsoil to a depth of 13 inches bgs. The substratum, to a depth of 30 inches bgs, is pale brown gravelly loam, and below this loam to a depth of 60 inches bgs is loose, coarse-sand gravel, cobblestones, and boulders.

Permeability of the Stratford soil series is dependent upon the soil texture encountered. According to the Survey, from the ground surface to approximately 30 inches bgs, the gravelly and silty loams exhibit an infiltration rate of 0.63-2.0 inches per hour. Between 30 and 60 inches bgs, the loose coarse-sand gravels exhibit an infiltration rate greater than 20 inches an hour.

Stratford soils have a moderate to moderately high water-holding capacity (4 to 6 inches of water). Runoff is slow to medium, and the erosion hazard is slight to moderate, depending upon ground surface slope.

To the north of the generation plant site and immediately adjacent to the south bank of the Snake River, near-surface soils are identified as Terrace escarpments by the Survey. This soil type consists of sandy, cobbly, and bouldery alluvium, existing on very steep, eroded fronts

of terraces. Because soil conditions vary greatly within a Terrace escarpment, it is not possible to characterize its physical properties.

#### Subsurface Soils

Borings conducted at the generation plant site indicate that subsurface conditions consist of two relatively thick layers of gravel, underlain by basalt bedrock (CH2M HILL, 2001). Figure 3.1-3 illustrates where the borings were sited. Borings completed at locations B-3 and B-6 indicate that the upper layer of gravel extends from the surface to 150 feet bgs and 115 feet bgs, respectively. This layer consists of poorly graded gravels, cobbles, and boulders with traces of sand and silt. It is classified by the Unified Soil Classification System (USCS) as GP to GP-GM. Gravel and cobbles in the samples were subangular to subrounded in shape, and showed no sign of interbedding. Samples recovered during the exploration included intact cobbles up to 6 inches in diameter. The moist unit weight of the material has been estimated to be approximately 115 pounds per cubic foot (pcf).

The lower layer starts at the bottom of the upper gravel layer and is assumed to extend down to basalt bedrock. None of the eight borings penetrated through the bottom of the lower gravel layer. This layer is distinguished from the upper layer by its higher content of fine grained material, and is classified by the USCS as GM. As in the upper layer, gravel and cobble shape is subangular to subround, and samples did not indicate interbedding. The moist unit weight of the material has been estimated to be 120 pcf.

The Columbia County Public Health District logged two test pits at the southeast end of the site. In one of the test pits, a 6-inch layer of caliche soil was identified at 4.5 to 5.0 feet bgs. Caliche soil has low permeability properties and was not detected in any of the soil borings completed by CH2M HILL at the site. The test pit where the caliche was encountered was at the lowest elevation on the site. It is possible that this layer is associated with the increased percentage of fine-grained material found in the lower gravel layer.

Preliminary infiltration testing results showed that the hydraulic conductivity of soil near the bottom of the infiltration/evaporation pond is greater than 0.030 inch per second (0.077 centimeter per second).

#### 3.1.1.3 Topography and Unique Features

The generation plant will be located in the lower Snake River canyon, about 1.5 miles upstream of the confluence of the Snake and Palouse Rivers. This area lies in the Walla Walla Plateau section of the Columbia Plateau physiographic province. This part of the plateau slopes gently northwestward, away from the Blue Mountains to the southeast. The area south and east of the site is characterized primarily by a rolling, maturely dissected upland surface, which is developed on loess. To the northwest, along the Palouse River, the gentle rolling landscape gives way to scabland topography created when the loess was stripped away during the catastrophic Missoula Floods, leaving the underlying basaltic bedrock exposed.

The Snake River and its two main tributaries, the Tucannon and Palouse Rivers, drain the region. These three rivers occupy steeply incised canyons, cut to depths of 1,000 feet or more into the Columbia River Basalt bedrock. Most of the smaller streams in the region are intermittent, flowing only during periods of rainfall or melting snow. In the vicinity of the generation plant site, the Snake River is impounded by Lower Monumental Dam,

SOUTH







Approximate Horizontal Scale 1 inch = 2000 feet

> FIGURE 3.1-2 Geologic Cross Section Application for Site Certification STARBUCK POWER PROJECT STARBUCK, WASHINGTON



approximately 20 miles downstream. This impoundment, known as Lake Herbert G. West, floods not only the Snake River canyon but also the mouths of the Palouse and Tucannon Rivers. About 8 miles upstream from the site is Little Goose Dam, which impounds Lake Bryan. This lake is about 98 feet above the normal pool elevation of Lake Herbert G. West.

The generation plant site is on a gravelly terrace about 200 feet above the south bank of the Snake River. Preconstruction elevations at the generation plant site range from about 720 feet msl on the northern portion to approximately 690 feet msl on the southeast portion. To the north, the terrace drops abruptly to the shore of Lake Herbert G. West at a pool elevation of approximately 540 feet msl. Slopes in this area typically range from 30 to 40°, but they may approach up to 70 to 90° near the toe of the slope at pool level. Field reconnaissance completed to support a geotechnical investigation for the Columbia County Grain Growers site (Budinger & Associates, 1986) discovered some small, superficial slides near the toe of the slope where wave erosion had undercut the bank.

The gravel terrace surface slopes southwestward away from the Snake River to an elevation of about 610 feet msl along its southwestern edge in the vicinity of the Union Pacific Railroad tracks. Southwest of the tracks, the terrace abuts a steep bedrock escarpment that forms the upper canyon wall of the Snake River canyon. This steep canyon wall rises to elevations of greater than 1,000 feet msl adjoining the generation plant site (see Figure 3.1-2).

The topography of the generation plant property ranges from gently sloping and undulating (on the northwestern two-thirds of the 100-acre parcel) to moderately sloping and incised (on the southeastern third). Figure 3.1-4 provides a large-scale topographic map of the generation plant site. Whereas no significant surface drainage features characterize the northwestern part of the site, several ravines drain the more steeply sloped southeastern area southward toward SR-261. The Columbia County Grain Growers grain elevators are located southeast of the plant site at an elevation of approximately 630 feet msl.

As noted previously, the terrace where the site is located is a large gravel bar, deposited by catastrophic floods released from glacial Lake Missoula. These enormous ice-age floods, resulting from repeated failures of a huge ice-dammed lake, swept across northern Idaho, through the Spokane Valley, southwestward across eastern Washington, through the Columbia Gorge, and out into the Pacific Ocean. The gravel bar underlying the site, and a larger bar along the Snake River immediately upstream of the Tucannon River confluence, are both unusual because they were deposited from sediment-laden flood waters that flowed *up* the Snake River canyon, probably during the more recent of the Missoula Floods. The topographic undulations in the northwestern part of the property are giant ripple marks whose size and asymmetrical shapes indicate that they were deposited by a tremendous volume of floodwater flowing up the Snake River canyon.

The USGS is currently considering the establishment of viewing areas on the Columbia Plateau where the public can observe Missoula Flood features. The giant ripple marks preserved on the generation plant property are not readily obvious to an untrained observer, and they are not as well developed as at other locations on the Columbia Plateau. Nevertheless, they are unusual features that are instructive in understanding the magnitude of the floods, and the site is readily accessible for viewing from the highway.

### 3.1.1.4 Erosion

Unconsolidated, coarse-grained granular deposits that are moderately vegetated with grasses underlie the generation plant site. These site soils are considered slightly to moderately erodible on the basis of their composition and lack of compaction. However, because of their relatively coarse grain size, these soils are not susceptible to wind erosion. Similarly, erosion by surface runoff is largely negligible because of the high permeability of the soils and the relatively low relief of the site. Such high permeability allows for rapid infiltration of precipitation and a general absence of surface runoff. This condition is evidenced by the lack of natural drainage channels over most of the site.

There are, however, a series of four small ravines in the southeastern part of the site that are incised in their lower reaches as much as 8 to 10 feet into the terrace surface. These ravines may be ancient landscape features that formed during the waning stages of the gravel bar deposition, or they may be modern channels that have been eroded by runoff during periods of excessive precipitation.

## 3.1.2 Environmental Impacts of the Proposed Action

#### 3.1.2.1 Construction

#### **Geology and Soils**

The impact of construction on generation plant site geology and soil conditions will be related primarily to clearing and grubbing, site grading, and foundation preparation. Site preparation will require grubbing, rough grading, excavating, filling, tile field and utility installation, and final grading. Approximately 40 acres of the southeast portion of the generation plant site will require grading to accommodate various structures. Specifically, the area around the generation plant will be graded to an elevation of approximately 708 feet above msl, using a balanced cut-and-fill operation.

Excavated soil will be screened to separate boulders. Both the soil and boulders will be used as nonstructural fill. Roadways, parking areas, facility laydown, and drainage areas will require an estimated 25,300 cubic yards of crushed gravel (Section 3.8.1.1). The rock will be imported from a permitted offsite borrow source. A commercial outlet for soil and rock is available in Dayton, and there are many quarries in Columbia and Walla Walla Counties that have been used for projects in the past.

A preliminary site grading and drainage plan for the generation plant is shown in Figure 3.1-4. This figure shows the natural topography as well as the conceptual site layout, regraded topography, surface features (including the process water infiltration/evaporation pond and the stormwater pond), and onsite septic system. According to the proposed plan, cuts of up to 12 feet will be required on the northern part of the plant site, and fills of up to 17 feet will be required near SR-261. It is estimated that 198,000 cubic yards of material will be cut, while 184,000 cubic yards of material will be used as fill. The remaining 14,000 cubic yards of surplus material will be disposed of at one of the local quarries following state and local regulations.

Absent EFSEC, the SPP might require a surface mining reclamation permit as a result of grading and excavation activities associated with the SPP's infiltration/evaporation ponds. The Applicant believes that the SPP's planned restoration activities, both in connection with completion of pond construction and following plant retirement, would satisfy otherwise applicable reclamation permit requirements and policies, or otherwise applicable requirements for a waiver from the permit requirement. The Applicant will continue to work with the Washington State Department of Natural Resources (DNR) on this process.

In addition to modifications at the 40-acre generation plant site, 10 acres on the northwest side of the 500-kV transmission line corridor will be used for parking of construction workers' vehicles and for stockpiling topsoil. After construction, these areas will be reseeded with grasses common to the area. The magnitude of these impacts will depend partially on weather conditions at the time of construction.

The use of heavy equipment for grubbing and grade changes could result in compaction of the granular soils. This could lower the permeability and increase the erodibility of site soils during construction (these impacts are addressed later in this section). Construction is not expected to produce any other adverse impacts to site geology and soil conditions.

On the basis of historical seismicity and limited information on subsurface conditions, the seismic hazard to the generation plant site appears limited to moderate levels of ground shaking. Within 100 miles of the generation plant site, only a few earthquakes have a magnitude greater than 4, and the closest known active faults (Wallula and Hite faults) are approximately 40 miles away. Seismic design of the generation plant will comply with appropriate building codes to reduce the risks associated with such ground shaking.

If a large-magnitude earthquake were to occur in the region, a landslide along the south bank of the Snake River is possible (north portion of the generation plant site). The perimeter road near the easternmost portion of the substation is the closest project facility to the top bank of the Snake River, a distance of approximately 41 feet. This road is not essential for facility operation and could be damaged if a large landslide occurred. Project facilities such as the infiltration/evaporation pond and the substation are greater distances from the riverbank 72 feet and 112 feet, respectively. These distances from the river and the unlikelihood of a large earthquake displacing a massive volume of earth along the riverbank result in minimal risk associated with landslides.

Other seismic hazards (such as fault ruptures, ground liquefaction, or lateral spreading) are unlikely to affect the generation plant because of existing conditions in the region. Fault ruptures do not appear to be a concern because of the lack of known active faults. Also, ground failure from liquefaction or lateral spreading is unlikely, given the smaller magnitude of earthquakes and the deep water table underlying the terrace.

#### **Topography and Unique Features**

Approximately 40 acres of the southeast portion of the site will be disturbed to accommodate construction (Figure 3.1-4). Cuts will be as deep as 12 feet, whereas up to about 17 feet of fill will be placed in some areas along the southern boundary of the fill pad. Embankments will be constructed on no more than 2:1 (horizontal to vertical) slopes. The four small ravines on the southeast side of the site will be partially filled for construction of a retention

pond. These changes in site topography will not result in a significant impact on topography or unique features.

The terrace where the site is located is a unique topographic feature. It was formed by backwater flooding of the Snake River canyon during a catastrophic glacial breakout flood from glacial Lake Missoula about 12,700 years ago. This terrace is one of several places on the Columbia Plateau where topographic evidence of catastrophic backwater flooding has been preserved. This evidence includes asymmetrical giant ripple marks, which are indicative of upstream movement of a vast quantity of floodwater. These ripple marks are best expressed on the northwestern region of the 100-acre site, beyond the proposed construction boundary and beyond the area that would be used as a parking/staging area or fabrication area for the generation plant.

#### Erosion

Earthwork required for construction of the generation plant will temporarily increase the erodibility of site soils. Grubbing will remove protective vegetation and disaggregate surface soils, making them more susceptible to erosion by wind, water, and gravity. Site excavation and filling will strip away topsoil, rearrange the distribution and slopes of site soils, and greatly modify drainage patterns. Construction will also increase and redirect runoff. Unchecked, all of these changes could significantly increase erosion at and near the site.

To control erosion during construction, mitigation measures presented in the Stormwater Pollution Prevention Plan (SWPPP) will provide guidance regarding the appropriate action necessary (see Appendix H). The plan provides for the use of silt fences to control runoff, stormwater drainage during and after construction, reseeding of exposed surfaces, and ongoing inspection and maintenance until all areas are stabilized. The plan specifies the order of construction activities to ensure that protective measures are in place before disruptive activities are initiated. With implementation of these measures, the increase in erosion during construction will not result in a significant impact.

### 3.1.2.2 Operation and Maintenance

During operation of the generation plant, runoff of impervious areas on the generation plant site will be routed to a stormwater infiltration/evaporation pond. The pond will interfere with a portion of one of the four ravines at the southeast portion of the site, but the interference will be minimal and should not affect potentially active drainage channels. Areas of the site that are not covered with aggregate or buildings will be seeded, primarily with native species. As a result, there will be no significant impacts on geology, soils, topography, unique features, or erosion during generation plant operation.

The boundary of the infiltration/evaporation pond is approximately 72 feet from the top bank of the Snake River. As discussed in Section 3.1.1.2, two thick layers of soil exist below the surface of the generation plant site. In the lower layer, the presence of fine-grained material could contribute to a low permeability boundary for water infiltrating from the pond. The water could become perched at the top of this layer, and lateral movement is possible. Borings conducted at the site indicate that the top surface of the lower layer may be sloped toward the Snake River and as a result, laterally moving water could create seepage along the riverbank. Seepage could increase the probability of slope instability in the localized area. If seepage occurs along the riverbank and the slope appears to become unstable, action will be taken to maintain slope stability, including the installation of slot drains or planting of vegetation. The quantity of water infiltrating from the pond is estimated to be approximately 9 gpm (without evaporation) and would not be expected to create a large area of seepage.

In the unlikely event of a volcanic eruption in the Washington Cascade mountain range, deposition of volcanic ash could have temporary adverse effects on electricity generation and the efficiency of operations at the plant. Such effects might result from decreased effectiveness of evaporation/infiltration ponds, machinery contamination, and site cleanup. Ash fallout would present short-term consequences to the generation plant that are not expected to increase the impact of operations on the surrounding environment.

As previously discussed in Section 3.1.2.1, because of existing conditions at the generation plant site, it is unlikely that a seismic hazard will affect plant operation. The risk of a large-magnitude earthquake or a massive landslide along the Snake River is relatively small. The risk is present; however, the generation plant's location away from the riverbank, as well as its seismic design to withstand moderate ground shaking, will further reduce the risk of those impacts.

## 3.1.3 Environmental Impacts of Alternatives

## 3.1.3.1 Northwest Site Alternative

Impacts to geology, soils, topography, unique features, and erosion associated with the northwest site alternative would be about the same as those associated with the proposed southeast site location. However, topography at the northwest site is more level than at the proposed southeast site, resulting in fewer cut-and-fill activities associated with construction if the alternative site were implemented.

Implementation of the northwest site alternative would increase the impact to geologic features unique to the Columbia Plateau. Construction activities at the site would destroy the giant ripples created by the Missoula Floods, where waters flooded *up* the Snake River valley. Because of this impact, the Applicant has proposed the southeast site, which would not destroy the ripples. These ripples are more distinct at other locations in the Columbia Plateau than at the generation plant site, and the Applicant will provide additional information if the northwest site alternative is implemented.

### 3.1.3.2 Wet-Cooled System Alternative

Impacts to geology, soils, topography, unique features, and erosion associated with the wetcooled system alternative would be the same as those associated with the proposed aircooled system because the amount of land developed at the generation plant site would remain the same for either cooling system.

### 3.1.3.3 Water Pipeline Alternative

As a water supply alternative to the proposed onsite well, the Applicant has secured an option to purchase up to 100 gallons per minute (gpm) (or up to 144,000 gallons per day [gpd]) of water from the Town of Starbuck under the Town's existing water right. The

Applicant would construct a water pipeline, primarily along an abandoned railroad bed, connecting the generation plant to the Town water supply system.

Impacts to geology, topography, and unique features associated with implementation of the water pipeline alternative would be the same as those associated with the proposed onsite well. However, the water pipeline could create increased impacts to soils and erosion during trench excavation. Excavated soils stockpiled during construction would be susceptible to erosion until they were returned to the excavation, spread, or hauled offsite. In addition, trench excavation could encounter contaminated soils in the railroad bed, resulting from pesticide use, track maintenance, or leaks from trains.

The Applicant will provide detailed information on the impacts of the water pipeline alternative if the Applicant seeks to implement this alternative.

## 3.1.4 Mitigation Measures

#### 3.1.4.1 Construction

The Applicant has developed a SWPPP for implementation during construction of the generation plant, providing guidance for minimizing erosion and sedimentation in stormwater (see Appendix H for a more detailed description). In addition to the SWPPP, the following mitigation measures will be implemented to reduce impacts to erosion:

- Slopes will be carefully prepared and attention given to the placement and compaction of fill in order to mitigate potential erosion in areas to be graded.
- Runoff and sedimentation and erosion control plans will be incorporated in the construction process and the generation plant design.
- Silt fences will be installed and maintained until other erosion protection measures can be implemented.
- In susceptible areas, excavated soils will be covered if rainfall is reasonably anticipated by available weather forecasts.
- Disturbed areas will be reseeded as soon as is feasible.
- Exposed slopes will be protected from rainfall and runoff by installation of erosionprotective coverings until permanent protection can be installed.
- Construction at the generation plant, and construction support activities, will be performed in a limited area. This confinement will preserve the vegetation and topsoil at the site, while also reducing the potential for erosion.

### 3.1.4.2 Operation and Maintenance

Because neither the generation plant nor the onsite well will create any significant impacts to geology, soils, topography, unique features, or erosion, no mitigation measures are necessary.

## 3.1.5 Cumulative Impacts

No cumulative impacts to geology, soils, topography, unique features, or erosion are associated with construction or operation and maintenance of the generation plant.

## 3.1.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to geology, soils, topography, unique features, or erosion are associated with construction or operation and maintenance of the generation plant.





## 3.2 Air Quality

This section provides the relevant information required per *Washington Administrative Code* (WAC) 463-42-225 – Proposal – Emission Control, and WAC 463-42-312 – Natural Environment – Air.

## 3.2.1 Existing Conditions

## 3.2.1.1 Climate

The Starbuck Power Project (SPP) is located in the southeastern part of Washington State, near the confluence of the Snake and Palouse Rivers, in an area characterized by dry, warm summers and cold winters. Climatic summary data were obtained from the Western Regional Climate Center (2001) for a site at the Little Goose Dam, about 6 miles northeast of the generation plant site. During the period of data collection, from 1963 to 1979, the annual average precipitation was approximately 12 inches, with monthly mean temperatures ranging from 34.5 degrees Fahrenheit (°F) in January to 76°F in July.

A meteorological monitoring station was installed at the proposed generation plant site in December 2000, to collect data suitable for use in an atmospheric dispersion modeling analysis. The parameters being measured include wind speed, wind direction, and temperature. The sensors are mounted on a 32-foot-tall tower designed to meet the requirements for collecting onsite data for permitting and modeling under U.S. Environmental Protection Agency (EPA) Prevention of Significant Deterioration (PSD) regulations (40 CFR 52.21). Monitoring requirements under PSD are defined in *Ambient Monitoring Guidelines for Prevention of Significant Deterioration* (EPA, 1987), and *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume IV – Meteorological Measurements* (EPA, 1994).

The dispersion modeling analysis performed for this application was for the period January 20, 2001, through July 5, 2001. As indicated in the Air Dispersion Modeling Protocol submitted to the Washington Department of Ecology (Ecology) on March 27, 2001, modeling will be performed again after collection of 1 year's worth of data to verify that the worstcase conditions have been analyzed. As indicated in Figure 3.2-1, predominant winds for the period of record are from the south-southwest.

## 3.2.1.2 Odor

The generation plant site is largely rangeland although it includes areas zoned for industrial development. There are no significant sources of odors in the area.

## 3.2.1.3 Dust

Columbia County and surrounding counties are known for dust storms, largely resulting from agricultural practices and the natural conditions in the area (soil type and precipitation amounts). There is a large grain silo near the site, which also may contribute to dust conditions.

## 3.2.1.4 Ambient Air Quality Standards

The Federal Clean Air Act (CAA) Amendments of 1970 authorized EPA to establish ambient concentration limits, National Ambient Air Quality Standards (NAAQS), for six criteria

pollutants. These pollutants are nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter less than 10 microns in diameter (PM<sub>10</sub>), and lead (Pb). All six of these pollutants have been assigned a primary standard that defines the levels of air quality determined by EPA to be necessary for protecting the public health with an adequate margin of safety. Some of the pollutants have been assigned a secondary standard that defines a level for the protection of public welfare from any known or anticipated adverse effects of a pollutant. The NAAQS established by EPA are provided in 40 CFR 50.

Ecology also has ambient air quality standards for PM, sulfur oxides, radionuclides, and fluorides, which are provided in 173-470, 173-474, 173-480, and 173-481 WAC, respectively. Ambient air quality standards for CO, O<sub>3</sub>, and nitrogen dioxide (NO<sub>2</sub>) are provided in 173-475 WAC. State ambient air quality standards must be at least as stringent as the NAAQS, but can be more stringent.

Table 3.2-1 summarizes the various ambient air quality standards established by EPA and Ecology.

173-400-141 WAC incorporates, by reference, various subparts of 40 CFR 52.21, *Prevention of Significant Deterioration of Air Quality*. EFSEC, by contracting for services using Ecology staff, administers the PSD regulations, will review and approve the PSD/NOC (notice of construction) application that is included as Appendix G in this application, and will prepare and approve a permit based on that application. EPA retains direct authority to administer certain provisions of the PSD regulations and will co-sign any PSD permit issued. PSD regulations govern sources located in those areas where the existing ambient air quality is better than the ambient air quality standards and are meant to ensure that the ambient air quality in these areas does not deteriorate significantly as a result of construction of a new source or modification of an existing source.

PSD regulations have established ambient air increments, which limit the increase in pollutant concentration over the baseline concentration for PM, SO<sub>2</sub>, and NO<sub>2</sub>. Ambient air increments have been established for three land classifications: areas designated as Class I, Class II, or Class III. The most stringent ambient air increments apply to Class I areas, which include certain specified wilderness areas and national parks. Table 3.2-2 provides ambient air increments for Class I, Class II, and Class III areas.

### 3.2.1.5 Existing Air Quality

### **Existing Emissions Sources**

Only one other major source of air emissions is currently operating within 31 miles (50 kilometers) of the generation plant. A natural gas pipeline compressor station (Station 7), consisting of two gas-fired turbines, is owned and operated by Pacific Gas Transmission-Northwest and is located 5 miles (8.2 kilometers) southwest of the generation plant. These units emit the same pollutants as the combustion turbines and heat recovery steam generators (HRSGs) for the generation plant, although in a smaller quantity. This source is under the jurisdiction of Ecology's Eastern Regional Office and is operating under an approved Title V (of the CAA) operating permit. Data about emissions from this source were obtained from Ecology for use in the competing source dispersion analysis.



WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

FIGURE 3.2-1 Wind Speed and Direction at the Generation Plant Site Application for Site Certification STARBUCK POWER PROJECT STARBUCK, WASHINGTON

Ambient Air Quality Standards a

Pollutant	National Primary	National Secondary	Ecology		
Total Suspended Particulate Matter (TSP)					
24-hour Average (µg/m³)	-	-	150		
Annual Geometric Mean (µg/m <sup>3</sup> )	-	-	60		
Particulate Matter (PM <sub>10</sub> )					
24-hour Average (µg/m³)	150	150	150		
Annual Arithmetic Mean (µg/m <sup>3</sup> )	50	50	50		
Sulfur Oxides (SO <sub>X</sub> )					
1-hour Average (ppm)	-	-	0.40 <sup>b</sup> (as SO <sub>2</sub> )		
3-hour Average (ppm)	-	0.50 (as SO <sub>2</sub> )	-		
24-hour Average (ppm)	0.14 (as SO <sub>2</sub> )	-	0.10 (as SO <sub>2</sub> )		
Annual Arithmetic Mean (ppm)	0.03 (as SO <sub>2</sub> )	-	0.02 (annual average as SO <sub>2</sub> )		
Carbon Monoxide (CO)					
1-hour Average (ppm)	35	-	35		
1-hour Average (mg/m <sup>3</sup> )	40	-	40		
8-hour Average (ppm)	9	-	9		
8-hour Average (mg/m <sup>3</sup> )	10	-	10		
Ozone (O <sub>3</sub> )					
1-hour Average (ppm)	0.12	0.12	0.12		
1-hour Average (mg/m <sup>3</sup> )	235	235	235		
8-hour Average (ppm)	0.08	0.08	0.08		
Nitrogen Dioxide (NO2)					
Annual Arithmetic Mean (ppm)	0.053	0.053	0.05		
Annual Arithmetic Mean (µg/m <sup>3</sup> )	100	100	100		
Fluorides (as HF)					
12-hour Average (µg/m³)	-	-	3.70		
24-hour Average (µg/m <sup>3</sup> )	-	-	2.90		
7-day Average (µg/m³)	-	-	1.70		
30-day Average	-	-	0.84		
March 1 – October 31 Period Average	-	-	0.50		
Lead (Pb)					
Quarterly Arithmetic Mean (µg/m <sup>3</sup> )	1.5	1.5	1.5		

µg/m<sup>3</sup>= micrograms per cubic meter

ppm = parts per million

<sup>a</sup> Annual ambient air quality standards should never be exceeded. Short-term ambient air quality standards should not

be exceeded more than once per year, unless otherwise noted. <sup>b</sup> 0.40 ppm should not be exceeded more than once per 1-year period. There is also a 1-hour average standard of 0.25 ppm for SO<sub>X</sub>, which should not be exceeded more than twice in a consecutive 7-day period.

**PSD** Ambient Air Increments

				_
Pollutant	Class I Area	Class II Area	Class III Area	
Particulate Matter (PM <sub>10</sub> )				
24-hour Maximum (µg/m <sup>3</sup> )	8	30	60	
Annual Arithmetic Mean (µg/m³)	4	17	34	
Sulfur Dioxide (SO <sub>2</sub> )				
3-hour Maximum (µg/m <sup>3</sup> )	25	512	700	
24-hour Maximum (µg/m <sup>3</sup> )	5	91	182	
Annual Arithmetic Mean (µg/m <sup>3</sup> )	2	20	40	
Nitrogen Dioxide (NO <sub>2</sub> )				
Annual Arithmetic Mean (µg/m <sup>3</sup> )	2.5	25	50	
/ 3				

 $\mu g/m^3$  = micrograms per cubic meter

#### Official Air Quality Designations for the Region and Counties

Ecology operates ambient air monitoring stations at various locations in the state. Data from these sites are used to establish whether an area is in attainment with the NAAQS. The generation plant is in an area that currently is designated as attainment for all criteria pollutants.

The generation plant will be in the eastern Washington/northern Idaho air quality control region and will be under the jurisdiction of EFSEC. Ecology's Eastern Regional Office issued a PSD permit to Pacific Gas Transmission Company for Compressor Station 7 on September 16, 1992. This is the only other source within 31 miles (50 kilometers) of the generation plant site.

Three Class I areas were evaluated in terms of impacts to air quality-related values. Two of these, the Hells Canyon and Eagle Cap Wilderness Areas, are under the jurisdiction of the U.S. Forest Service. The third, the Spokane Indian Reservation, is under the jurisdiction of the Spokane Tribe. Hells Canyon Wilderness Area is located about 82 miles (132 kilometers) from the generation plant site. Eagle Cap Wilderness Area and the Spokane Indian Reservation are located about 87 miles (140 kilometers) from the site.

#### Air Quality Data

Currently, there are no ambient pollutant monitors operated by Ecology in Columbia County, where the generation plant is located. The nearest monitoring stations to the generation plant site are  $PM_{10}$  monitors located in Walla Walla and Clarkston, Washington, which are approximately 33 miles (53 kilometers) and 52 miles (84 kilometers) from the site, respectively. Neither of these sites has measured an exceedance of the NAAQS from 1995 to 2000.

## 3.2.2 Environmental Impacts of the Proposed Action

#### 3.2.2.1 Construction

Dust may be generated by excavation and grading during the construction period. Dust from construction activities will be controlled by common construction management measures, such as spraying with water and washing vehicle wheels to mitigate dust

traveling offsite. Dust from access roads will be controlled during construction by the use of aggregate surfacing, and by watering as necessary. Dust is not expected to be generated as a routine occurrence during normal operations at the generation plant. The amounts of fugitive dust that may be emitted after all preventive measures have been taken will be insignificant and are not expected to have any impacts on the surroundings.

### 3.2.2.2 Operation and Maintenance

#### **Regulatory Requirements**

The SPP is in one of the 26 source categories (fossil-fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input) listed in 40 CFR 52.21(b)(1)(i)(a) and has the potential to emit more than 100 tons per year of a regulated air pollutant. Therefore, it is classified as a new major stationary source and is subject to the PSD regulations provided in 40 CFR 52.21. Once subject to the PSD regulations, emissions of all regulated air pollutants that exceed specific significant emission thresholds must be taken into consideration. Significant emission thresholds are provided in 40 CFR 52.21(b)(23)(i). Annual emissions of particulate matter (PM and PM<sub>10</sub>), SO<sub>2</sub>, CO, NO<sub>x</sub>, and volatile organic compounds (VOC) would exceed the significant emission thresholds that trigger PSD review. PSD regulations require application of best available control technology (BACT) for each regulated air pollutant having the potential to emit above the significant emission threshold. The source also is required to demonstrate that the allowable emission increases would not cause an exceedance of the ambient air quality standards and PSD air increments. Appendix G includes the PSD application, which addresses the various requirements associated with a PSD review as well as other CAA and new source review (NSR) requirements.

#### Hazardous Air Pollutant Regulations

173-400-075 WAC provides the emission standards for sources emitting hazardous air pollutants (HAPs). The section adopts, by reference, the National Emission Standards for Hazardous Air Pollutants (NESHAP) provided in 40 CFR 61 and the Maximum Achievable Control Technology (MACT) standards provided in 40 CFR 63. EPA has proposed to delegate authority to implement these standards to Ecology, but this proposal is not yet final, so certain federal HAP regulations shall apply directly. Maximum potential HAP emissions from various emission units at the generation plant are less than 10 tons per year for a single HAP and less than 25 tons per year for a combination of HAPs. Therefore, the plant does not meet the definition of "major source" and so does not trigger the MACT standard in 40 CFR 63. This also means that the case-by-case MACT requirements under Section 112(g) and 112(j) of the Clean Air Act and 40 CFR 63.42 do not apply to this proposal. The NESHAPs provided in 40 CFR 61 also are not applicable to the various emission units at the generation plant.

### **Toxic Air Pollutant Regulations**

New sources emitting toxic air pollutants (TAPs) are subject to the requirements of 173-460 WAC. TAPs include carcinogens and noncarcinogens listed in 173-460-150 WAC and 173-460-160 WAC. The ASILs for the various Class A and Class B TAPs also are provided in 173-460-150 WAC and 173-460-160 WAC. The risk-based ASIL for a Class A TAP is defined as an annual average concentration that may cause an increased cancer risk of 1 in 1 million. ASILs for some of the Class A TAPs are based on 24-hour average concentrations instead of

annual average concentrations. Threshold-based ASIL for a Class B TAP is determined by dividing the worker exposure limit (threshold limit value-time weighted average [TLV-TWA]) by 300. All of the ASILs for Class B TAPs are based on 24-hour average concentrations.

New sources emitting TAPs are required to use the best available control technology for toxics (T-BACT) for controlling emissions of the TAPs. In addition, the source is required to demonstrate that the TAP emissions after use of T-BACT are sufficiently low to protect human health and safety from potential carcinogenic or other toxic effects.

#### **Applicable Emission Standards**

40 CFR 60, Subpart GG provides the standards of performance for stationary gas turbines. The New Source Performance Standards (NSPS) limit the SO<sub>2</sub> emissions in the exhaust gas to less than 0.015 percent by volume at 15 percent oxygen on a dry basis. The standards also restrict burning of any fuel that contains sulfur in excess of 0.8 percent by weight, in a stationary gas turbine. The emissions of NO<sub>X</sub> also are restricted based on formulae provided in 40 CFR 60.332(a), which take into consideration the heat rate and load of the gas turbine and the NO<sub>X</sub> emission allowance for fuel-bound nitrogen. However, per 40 CFR 60.332(f), stationary gas turbines that use water or steam injection for control of NO<sub>X</sub> emissions are exempt from the requirements of 40 CFR 60.332(a) when ice fog is deemed a traffic hazard by the owner or operator of the gas turbine. The generation plant will not use water or steam injection to control emissions, but water and steam will be used to enhance turbine performance under certain atmospheric conditions.

As shown in Appendix G, the proposed emission limits for  $NO_X$  and  $SO_2$  emissions from the combustion turbines at the generation plant after the application of BACT are much lower than the emission limits allowed by the NSPS.

When the duct burners are in operation, the HRSGs are subject to the requirements of 40 CFR 60, Subpart Da, *Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978.* The duct burners burn natural gas only and do not burn any solid, liquid, or other gaseous fuel. The standards limit PM emissions to less than 13 nanograms per joule (ng/J) or 0.03 pound per million British thermal units (lb/million Btu) heat input. The standards also limit SO<sub>2</sub> and NO<sub>x</sub> emissions to less than 0.20 lb/million Btu heat input. These limits do not apply during periods of startup, shutdown, or malfunction. Emissions from the duct burners combine with the emissions from the combustion turbines and generally are controlled using the same control technology that is used for controlling emissions from the combustion turbines. As shown in Appendix G, the proposed emission limits for PM, NO<sub>x</sub>, and SO<sub>2</sub> for combined emissions from combustion turbines and duct burner after the application of BACT are much lower than the emission limits allowed by the NSPS.

Through 173-400 WAC, Ecology also has established emission limits. These emission limits apply to sources under EFSEC's jurisdiction. 173-400-040 WAC provides the general standards for maximum emissions from various sources and emission units. Visible emissions generally should be less than 20 percent opacity except for 3 minutes in any 1 hour, and SO<sub>2</sub> content in the exhaust gas should not be more than 1,000 parts per million (ppm) on a dry basis, corrected to 7 percent oxygen, and based on an hourly average. 173-400-040 WAC also establishes standards for PM fallout, fugitive emissions, and odors. 173-400-050 WAC

provides the emission standards for combustion and incineration units. The PM emissions are limited to 0.1 grain per dry standard cubic foot (gr/dscf) or 0.23 gram per dry cubic meter (g/m<sup>3</sup>) at standard conditions, corrected to 7 percent oxygen. As shown in Appendix G, the PM and SO<sub>2</sub> emissions from all emission units at the generation plant are proposed to be less than the emission limits provided in 173-400-040 WAC and 173-400-050 WAC.

#### **Air Emissions Information**

#### Criteria Pollutant Emissions

Combustion of natural gas in the combustion turbines and duct burners associated with the HRSGs will result in emissions of PM,  $PM_{10}$ ,  $NO_X$ ,  $SO_2$ , CO, and VOCs.

Combustion turbines and duct burners associated with the HRSGs will be equipped with dry, low-NO<sub>X</sub> (DLN) burners. In addition, the generation plant will periodically use steam injection for power augmentation; this will be an additional technique for controlling NO<sub>X</sub> emissions from the combustion turbines. The NO<sub>X</sub> emissions from the combustion turbines and duct burners associated with HRSGs will be further controlled through the use of SCR. However, the use of SCR will result in ammonia (NH<sub>3</sub>) emissions; this is commonly referred to as ammonia slip. The release of NH<sub>3</sub> will also result in emissions of additional PM in the form of ammonium bisulfate [2(NH<sub>4</sub>(SO<sub>4</sub>))].

CO emissions from the combustion turbines and duct burners associated with HRSGs will be controlled using an oxidation catalyst, which in turn will result in control of VOC emissions. The use of an oxidation catalyst may result in oxidation of some of the SO<sub>2</sub> to sulfur trioxide, which combines with water to form sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) mist. Using an oxidation catalyst also increases the conversion of nitric oxide to nitrogen dioxide, which will result in increased ammonia consumption and subsequently higher ammonia emissions.

Table 3.2-3 summarizes the emissions of criteria pollutants from the combustion turbines and duct burners associated with the HRSGs under different operating conditions. Table 3.2-3 identifies a total of 13 operating scenarios and also provides details of projected emission rates for  $NH_3$ ,  $H_2SO_4$  mist, unburned hydrocarbons (UHC), and PM in the form of  $2(NH_4(SO_4))$ .

The combustion turbines and the HRSGs will not be operated under a single operating scenario at all times during the year. To be conservative, the proposed annual emission rates of the various criteria pollutants are based on the maximum short-term emission rates under various operating scenarios times 8,760 hours of operation per year.

In addition, the combustion of diesel fuel in the fire pump will also result in emissions of PM,  $PM_{10}$ ,  $NO_X$ ,  $SO_2$ , CO, and VOCs. The maximum hours of operation for the diesel fire pump are 1 hour per day, with an annual limit of 10 hours per year. Table 3.2-4 summarizes the emissions of criteria pollutants resulting from combustion of diesel fuel in the fire pump.

Table 3.2-5 summarizes the maximum annual emission rates of regulated pollutants, including the criteria pollutants and  $NH_3$ ,  $H_2SO_4$  mist, UHC, and  $2(NH_4(SO_4))$  from the combustion turbines, HRSGs, and fire pump.

#### Toxic Air Pollutant and Hazardous Air Pollutant Emissions

The generation plant has the potential to emit small quantities of TAPs and HAPs that are regulated by Ecology. Benzene, toluene, xylenes, polycyclic aromatic hydrocarbons (PAHs), formaldehyde, and other organic compounds associated with the combustion of natural gas will be released into the atmosphere from the stacks associated with combustion turbines and duct burners associated with the HRSGs. In addition, the use of SCR as the BACT for controlling NO<sub>X</sub> emissions from combustion turbines and duct burners will result in ammonia emissions; this is commonly referred to as ammonia slip. Use of an oxidation catalyst for controlling CO emissions will result in oxidation of some of the SO<sub>2</sub> to sulfur trioxide, which combines with water to form  $H_2SO_4$  mist. However, using an oxidation catalyst will also result in oxidation of some of the TAPs and HAPs that are formed as a result of natural gas combustion in the CGTs and duct burners associated with the HRSGs.

HAPs will also be emitted from diesel fuel in the fire pump.

The TAP and HAP emissions calculations for the combustion turbines and duct burners associated with HRSGs are based on the assumption that the maximum heat input rate for each of the combustion turbines under any operating scenario is 2,080.28 MMBtu/hr high heat value (HHV) and the maximum heat input rate for each of the duct burners associated with HRSGs under any operating scenario is 275.9 MMBtu/hr (HHV). The maximum heat input rate for the diesel-fuel-fired fire pump has been assumed to be 1.999 MMBtu/hr. Table 3.2-6 summarizes TAP and HAP emissions from the combustion turbines and duct burners associated with the HRSGs and the diesel-fuel-fired fire pump. Emission factors have been provided and emissions have been calculated only for those HAPs for which the emission factor is not preceded with a "less than" sign.

#### **Air Quality Impacts**

An air quality impact assessment was conducted to evaluate compliance of the generation plant with applicable regulatory requirements. The assessment was done through an air quality modeling analysis and is described in detail in Appendix G.

The air quality modeling was conducted using standard EPA modeling techniques and meteorological data collected at the site. The air quality modeling was completed based on 6 months of meteorological data that were available. The air quality modeling will be repeated upon the availability of 1 year of meteorological data. Results were compared with EPA criteria, including state and federal ambient air quality standards, PSD Class I and Class II increments, and Washington acceptable source impact levels (ASILs).

The dispersion modeling analysis for a PSD permit application generally involves two phases: (1) a preliminary analysis, and (2) a full impact analysis. The preliminary analysis models only the relevant increase from the proposed new source itself. The full impact analysis expands the preliminary analysis to consider emissions from the proposed source, existing sources in the area, and consideration of background concentrations. Because there is only one source located within approximately 31 miles (50 kilometers) of the site, this source was included in the preliminary impact analysis. The full impact analysis is not required if the preliminary analysis results show that emissions of a pollutant will not increase ambient concentrations by more than prescribed screening levels called significant impact levels.

Criteria Pollutant Emissions from Combustion Turbines and Heat Recovery Steam Generators Under Different Operating Conditions

	Scenario												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Parameter						Opera	ting Cond	ition					
HRSG Duct Firing	Fired Natural Gas	Unfired	Fired Natural Gas	Fired Natural Gas	Unfired	Fired Natural Gas	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired
Ambient Temperature (°F)	101	101	51.1	51.1	51.1	-20	-20	-20	-20	51.1	51.1	101	101
Inlet Fogging Included	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No
Steam Injection Included	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No
CGT Load Level (percent of base load)	100%	100%	100%	100%	100%	100%	100%	85%	70%	85%	70%	85%	70%
Pollutant						Em	ission Ra	te					
$NO_X$ (lb/hr as $NO_2$ with SCR)	19.1	15.7	19.8	19.0	16.6	21.0	18.6	16.4	14.1	14.5	12.5	12.6	11.1
NH₃ slip (lb/hr with SCR)	28.3	23.2	29.4	28.2	24.5	31.1	27.5	24.3	20.8	21.4	18.5	18.7	16.5
CO (lb/hr with catalyst)	21.3	15.2	21.9	21.7	16.1	23.6	18.1	16.0	13.7	14.1	12.2	12.3	10.8
H <sub>2</sub> SO <sub>4</sub> mist (lb/hr)	1.18	1.05	1.24	1.23	1.12	1.36	1.25	1.12	0.97	0.99	0.86	0.87	0.77
SO <sub>2</sub> (lb/hr)	3.68	2.96	3.81	3.63	3.13	4.01	3.51	3.09	2.64	2.72	2.34	2.38	2.09
UHC (lb/hr as CH₄)	25.8	10.5	25.7	27.7	11.1	28.8	12.4	11.0	9.4	9.7	8.3	8.5	7.4
VOC (lb/hr as CH <sub>4</sub> )	8.9	2.6	8.5	9.4	2.8	9.9	3.1	2.7	2.4	2.4	2.1	2.1	1.9
PM (lb/hr) [front and back excluding 2(NH4(SO4))]	24.8	20.0	24.6	25.5	20.0	25.4	20.0	20.0	20.0	20.0	20.0	20.0	20.0
PM <sub>10</sub> (lb/hr) [front and back excluding 2(NH <sub>4</sub> (SO <sub>4</sub> ))]	24.8	20.0	23.7	24.4	20.0	25.4	20.0	20.0	20.0	20.0	20.0	20.0	20.0
2(NH₄(SO₄)) (lb/hr)	1.58	1.41	1.67	1.66	1.50	1.84	1.69	1.51	1.30	1.34	1.16	1.18	1.04

Criteria Pollutant Emissions from Diesel-Fuel-Fired Fire Pump

Parameter	Value
NO <sub>x</sub> Emission Rate (as NO <sub>2</sub> )	3.91 lb/hr
CO Emission Rate	0.17 lb/hr
SO <sub>x</sub> Emission Rate (as SO <sub>2</sub> ) <sup>a</sup>	0.10 lb/hr
PM <sub>10</sub> Emission Rate	0.04 lb/hr
PM Emission Rate	0.04 lb/hr
VOC Emission Rate <sup>b</sup>	0.13 lb/hr
UHC Emission Rate	0.13 lb/hr

Notes:

<sup>a</sup> Based on maximum fuel flow rate of 14.2 gal/hr, density of 7.1 lb/gal for diesel, 0.05% sulfur content in diesel, and conversion of all sulfur to SO<sub>2</sub>. <sup>b</sup> VOC emission rate is assumed to be the same as UHC emission rate.

#### **TABLE 3.2-5**

Maximum Short-Term and Annual Criteria Pollutant Emission Rates

Pollutant	Maximum Short-Term Emission Rate from Fire Pump (Ib/hr)	Maximum Short-Term Emission Rate per Combustion Turbine and HRSG (Ib/hr)	Maximum Annual Emission Rate for All Four Combustion Turbines and HRSGs and Fire Pump (tons/yr) <sup>*</sup>
NO <sub>X</sub> (as NO <sub>2</sub> )	3.91	21.0	368
NH <sub>3</sub>	NA	31.1	545
CO	0.17	23.6	413
H <sub>2</sub> SO <sub>4</sub> mist	NA	1.36	24
SO <sub>2</sub>	0.10	4.01	70
UHC	0.13	28.8	505
VOC	0.13	9.9	173
PM [excluding 2(NH <sub>4</sub> (SO <sub>4</sub> ))]	0.04	25.5	447
PM <sub>10</sub> [excluding 2(NH <sub>4</sub> (SO <sub>4</sub> ))]	0.04	25.4	445
2(NH <sub>4</sub> (SO <sub>4</sub> ))	NA	1.84	32

\* Based on operation of fire pump at maximum short-term emission rates for 10 hours per year and combustion turbines and HRSGs at maximum short-term emission rates for 8,760 hours per year.

Table 3.2-7 summarizes the results of the criteria pollutant air quality analysis. Impacts are below the applicable source impact levels for CO and SO<sub>2</sub>. With the addition of conservative background concentrations, impacts for 24-hour PM<sub>10</sub>, annual PM<sub>10</sub>, and NO<sub>X</sub> were well below the applicable ambient air quality standards and PSD increments.

Summary of TAP and HAP Emissions from Combustion Turbines, Duct Burners Associated with HRSGs, and Diesel-Fuel-Fired Fire Pump

Pollutant	HRSG Emission Factor (Ib/10 <sup>6</sup> scf)	Maximum Short-Term Emission Rate per HRSG (Ib/hr)	Combustion Turbine Emission Factor (Ib/MMBtu)	Maximum Short-Term Emission Rate per Combustion Turbine (lb/hr)	Fire Pump Emission Factor (Ib/MMBtu)	Maximum Short-Term Emission Rate for Fire Pump (Ib/hr)	Maximum Annual Emission Rate for All Four Combustion Turbines and HRSGs and Fire Pump (tons/yr)			
Ammonia				31.1 E+00 <sup>a</sup>			544.87			
Sulfuric Acid Mist				1.36 E+00 <sup>a</sup>			23.83			
Acetaldehyde			2.0 E-05	4.16 E-02	7.67 E-04	1.53 E-03	7.29 E-01			
Acrolein			3.2 E-06	6.66 E-03			1.17 E-01			
Ethylbenzene			1.6 E-05	3.33 E-02			5.83 E-01			
PAH	2.59 E-05	7.01 E-06	1.1 E-06	2.29 E-03	1.68 E-04	3.36 E-04	4.02 E-02			
Xylenes			3.2 E-05	6.66 E-02	2.85 E-04	5.70 E-04	1.17 E+00			
2-Methylnaphthalene b	1.2 E-05	3.25 E-06					5.69 E-05			
Anthracene <sup>b</sup>					1.87 E-06	3.74 E-06	1.87 E-08			
Benzo(a)anthracene					1.68 E-06	3.36 E-06	1.68 E-08			
Benzene	1.05 E-03	2.84 E-04	6.0 E-06	1.25 E-02	9.33 E-04	1.87 E-03	2.24 E-01			
Chrysene <sup>b</sup>					3.53 E-07	7.06 E-07	3.53 E-09			
Dichlorobenzene	6.0 E-04	1.62 E-04					2.84 E-03			
Fluoranthene <sup>b</sup>	1.5 E-06	4.06 E-07			7.61 E-06	1.52 E-05	7.18 E-06			
Fluorene <sup>b</sup>	1.4 E-06	3.79 E-07			2.92 E-05	5.84 E-05	6.93 E-06			
Formaldehyde	1.125 E-02	3.04 E-03	1.065 E-04	2.22 E-01	1.18 E-03	2.36 E-03	3.93 E+00			
Hexane	9.0 E-01	2.43 E-01					4.27 E+00			
Naphthalene	3.05 E-04	8.25 E-05	6.5 E-07	1.35 E-03	8.48 E-05	1.70 E-04	2.51 E-02			
Phenanathrene <sup>b</sup>	8.5 E-06	2.30 E-06			2.94 E-05	5.88 E-05	4.06 E-05			
Pyrene <sup>b</sup>	2.5 E-06	6.76 E-07			4.78 E-06	9.56 E-06	1.19 E-05			
Toluene	1.7 E-03	4.60 E-04	6.5 E-05	1.35 E-01	4.09 E-04	8.18 E-04	2.38 E+00			
Total HAP emissions (includes a	cetaldehyde, acrolein, ethylk	penzene, PAH, xylenes, benz	zo(a)anthracene, benzene,	dichlorobenzene, formaldehyde, hexa	ane, naphthalene, and toluene)		1.35 E+01			

<sup>a</sup> Maximum short-term emission rate for ammonia and sulfuric acid mist in lb/hr is per combustion turbine and HRSG. <sup>b</sup> Not identified as a Class A TAP in 173-460-150 WAC or as a Class B TAP in 173-460-160 WAC. Emissions of these pollutants are represented in the emission factor for PAH.

Results of Criteria Pollutant Air Quality Analysis

Pollutant	Averaging Period	Maximum Predicted Concentration (µg/m <sup>3</sup> )	Significant Impact Level (µg/m <sup>3</sup> )	Background Concentration (µg/m <sup>3</sup> )	Total Concentration (µg/m <sup>3</sup> )	Ambient Air Quality Standard (μg/m <sup>3</sup> )	PSD Class II Increment (µg/m <sup>3</sup> )
NO <sub>X</sub>	Annual	1.8	1	11	12.8	100	25
со	1-Hour	129.8	2,000	NA	NA	40,000	NA
со	8-Hour	31.6	500	NA	NA	10,000	NA
$SO_2$	3-Hour	9.3	25	NA	NA	1,300	512
$SO_2$	24-Hour	1.9	5	NA	NA	365	91
$SO_2$	Annual	0.3	1	NA	NA	80	20
$PM_{10}$	24-Hour	13.5	5	114	127.5	150	30
$PM_{10}$	Annual	2.1	1	28.8	30.9	50	17

Abbreviations:

CO = Carbon monoxide.

 $NO_X = Oxides of nitrogen.$ 

 $PM_{10} = Particulate matter.$ 

PSD = Prevention of significant deterioration.

 $SO_2 = Sulfur dioxide.$ 

 $\mu$ g/m<sup>3</sup> = Micrograms per cubic meter.

NA = Not applicable (because the maximum predicted concentration is below the significant impact level).

#### **Class I PSD Increment**

PSD requires evaluation of impacts to Class I areas. Recent guidance provided by federal land managers and state air agency staff recommends analysis of impacts to all Class I areas up to 124 miles (200 kilometers) from the source. Eagle Cap Wilderness Area, Hells Canyon Wilderness Area, and the Spokane Indian Reservation are Class I areas within 124 miles (200 kilometers) of the site, at distances of approximately 82 miles (132 kilometers), 87 miles (140 kilometers), and 87 miles (140 kilometers), respectively. The Class I analysis evaluates PSD Class I increments and visibility and sulfate and nitrate deposition.

Table 3.2-8 provides the results of the Class I PSD increment analysis. The maximum PSD increment is well below proposed Class I significance levels for all criteria pollutants in all Class I areas.

#### **TABLE 3.2-8**

Class I Ambient Air Quality Results for SPP

Area	SO₂ Annual (µg/m³)	SO₂ 24-hour (µg/m³)	SO₂ 3-hour (µg/m³)	PM₁₀ Annual (µg/m³)	PM <sub>10</sub> 24-hour (μg/m³)	NO <sub>x</sub> Annual (µg/m³)
Eagle Cap Wilderness Area	8.0E-05	2.8E-03	1.2E-02	7.8E-04	2.0E-02	8.8E-05
Hells Canyon Wilderness Area	1.2E-04	2.6E-03	1.1E-02	1.1E-03	2.0E-02	2.1E-04
Spokane Indian Reservation	2.4E-04	1.1E-02	3.6E-02	2.0E-03	9.0E-02	5.5E-04
#### **TABLE 3.2-8**

Class I Ambient Air Quality Results for SPP

Area	SO₂ Annual (µg/m³)	SO₂ 24-hour (µg/m³)	SO₂ 3-hour (µg/m³)	PM₁₀ Annual (μg/m³)	PM₁₀ 24-hour (µg/m³)	NO <sub>x</sub> Annual (µg/m³)
EPA Class I Significance Level	0.1	0.2	1.0	0.2	0.3	0.1
Class I Increment	2	5	25	4	8	2.5

Abbreviations:

EPA = U.S. Environmental Protection Agency.  $NO_X = Oxides \text{ of nitrogen.}$   $PM_{10} = Particulates less than 10 microns in diameter.$   $SO_2 = Sulfur dioxide.$  $\mu g/m^3 = Micrograms per cubic meter.$ 

#### Visibility Impacts

Table 3.2-9 presents visibility impacts for each Class I area. As shown, impacts are less than the 5 percent change in extinction coefficient guidance criteria for each Class I area.

#### **TABLE 3.2-9**

Visibility Analysis Results Maximum Percent Extinction Change

Area	Day	Year	Receptor Coordinate X (km)*	Receptor Coordinate Y (km)*	b <sub>ext</sub> Modeled (1/Mm)	b <sub>ext</sub> Background (1/Mm)	Extinction Change (%)
Eagle Cap Wilderness Area	263	1998	303.907	-78.598	0.066	16.757	0.4
Hells Canyon Wilderness Area	291	1998	332.512	-12.00	0.138	17.451	0.79
Spokane Indian Reservation	344	1998	229.7	206.983	0.313	16.662	1.88

\* Lambert conformal coordinate system with a reference north latitude of 46 degrees, a reference west longitude of 121 degrees, standard parallels of 42.5 and 48 degrees north latitude, and standard meridian of 121 degrees west longitude.

Mm = megameter

#### **Deposition Impacts**

Table 3.2-10 summarizes deposition results for nitrogen and sulfur for each Class I area. Incremental deposition rates attributable to the SPP are less than 5 grams per hectare per year (g/ha/yr) for nitrogen and 3 g/ha/yr per year for sulfur at each Class I area. These rates are considered insignificant.

#### TABLE 3.2-10

Summary of Total N and S Deposition Results

Area	Total N g/ha/yr	Total S g/ha/yr
Eagle Cap Wilderness Area	0.3	0.1
Hells Canyon Wilderness Area	0.2	0.1
Spokane Indian Reservation	0.5	0.2

g/ha/yr = grams per hectare per year

#### Toxic Air Pollutants

An acceptable source impact analysis is required for compounds with emissions more than threshold levels to demonstrate that impacts from TAP emissions from the new source for these compounds are sufficiently low to protect human health and safety from potential carcinogenic or other toxic effects (173-460-070 and -080 WAC, adopted by reference in 463-39-005(4) WAC). The TAP impact analysis conducted for the generation plant shows that all concentrations are less than the appropriate ASIL for each air toxic compound analyzed. Table 3.2-11 summarizes the results of the toxics analysis.

#### TABLE 3.2-11

Acceptable Source Impact Analysis For Toxic Pollutants

		Maximum	Acceptable	Receptor	Location	Descriter	
Pollutant	Averaging Period	Concentration (µg/m³)	Source Impact Level (µg/m³)	X (UTM) (meters)	Y (UTM) (meters)	Receptor Elevation (meters)	Percent Operating Scenario
Acetaldehyde	Annual	0.02884	0.45	405,450	5,159,550	376	100
PAH	Annual	0.00037	0.00048	405,450	5,159,550	376	100
Benzene	Annual	0.00058	0.12	405,450	5,159,550	376	100
Formaldehyde	Annual	0.06077	0.077	405,450	5,159,550	376	100
Acrolein	24 hr.	0.00382	0.02	407,950	5,156,750	389	100
Sulfuric Acid Mist	24 hr.	0.69044	3.3	407,950	5,156,750	389	100
Ammonia	24 hr.	15.78855	100	407,950	5,156,750	389	100

<sup>a</sup> Toxic dispersion modeling analysis for acetaldehyde, PAH, benzene, formaldehyde, and acrolein will be revised based on the revised emission rates provided in Table 3.2-6. The revised emission rates for acetaldehyde, PAH, formaldehyde, and acrolein are lower, whereas the revised emission rate for benzene is higher.

#### Greenhouse Gas Emissions

The principal greenhouse gases are carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), tropospheric ozone (O<sub>3</sub>), and chlorofluorocarbons (CFCs). The "greenhouse effect" refers to the trapping of solar radiation in earth's atmosphere, a consequence of the fact that these gases impede the reradiation of solar energy from the earth's surface more efficiently than they impede incoming solar radiation. CO<sub>2</sub> released as a result of coal and other fossil fuel combustion is believed to be contributing to global warming. An estimate of CO<sub>2</sub> emissions from the proposed generation plant is provided in the following sections.

40 CFR 75, Appendix G, provides a method for estimating emissions of CO<sub>2</sub> from naturalgas-fired units:

$$W_{CO_2} = \frac{Fc \ x \ H \ x \ U_f \ x \ MW_{CO_2}}{2000}$$

where  $W_{CO_2}$  is  $CO_2$  emitted from combustion in tons per hour (tons/hr),

Fc is Carbon Based F-factor – 1,040 standard cubic feet per million British thermal units (scf/MMBtu) for natural gas (40 CFR 75, §3.3.5 Appendix F), H is hourly heat input rate in million British thermal units per hour (MMBtu/hr),  $U_f$  is 1/385 standard cubic feet of CO<sub>2</sub> per pound mole (scf/lb-mole) at 14.7 pounds per square inch (psia) and 68 degrees Fahrenheit (°F), and  $MW_{CO_2}$  is 44 pounds per pound mole (lb/lb-mole).

The nominal 1,200-megawatt (MW), natural-gas-fueled, combustion turbine generation plant proposed by the Applicant will consist of two complete and separate combined-cycle power blocks. Each block will consist of two Siemens Westinghouse 501F gas combustion turbines (or equivalent turbines), two HRSGs, one steam turbine generator, and one air-cooled condenser.

The design and operating information that was used to calculate the  $CO_2$  emissions (see Table 3.2-12) is based on two conditions:

- Operation of the combustion turbines at the average ambient temperature of 51.1°F with no duct firing, no evaporative cooling, and no steam injection (Condition A)
- Operation of the combustion turbines at the average ambient temperature of 51.1°F with duct firing, no evaporative cooling, and no steam injection (Condition B)

Load Level	Base	Base				
Base Reference Condition						
Plant Equipment Condition	New and Clean	New and Clean				
Ambient Temperature (°F)	51.1	51.1				
Evaporative Cooler Status, On/Off	Off	Off				
Steam Injection Status, On/Off	Off	Off				
Duct Burner Status, On/Off	Off	On				
Estimated Performance Data						
Net Plant Power Output (kW)	1,059,428	1,178,134				
Net Plant Heat Rate (Btu/kWh) (HHV)	7,000	7,231				

#### TABLE 3.2-12

Combustion Turbine Design and Operation Information

Using the Net Plant Heat Rate in Btu per kilowatt-hour (Btu/kWh) and the Net Plant Power Output in kWh, the Heat Input Rate in million Btu per hour (MMBtu/hr) was calculated for the two conditions. Using the formula provided in 40 CFR 75, Appendix G,  $CO_2$  emissions then were calculated for each of the two conditions. Table 3.2-13 presents the results of these calculations.

#### TABLE 3.2-13

CO2 Emission Rates Based on Data Provided in Table 3.2-8

Parameter	Condition A	Condition B
Net Plant Power Output (kW)	1,059,428	1,178,134
Net Plant Heat Rate (Btu/kWh) (HHV)	7,000	7,231
Heat Input Rate (MMBtu/hr) [Net Plant Power Output * Net Plant Heat Rate]	7,416	8,519
CO <sub>2</sub> Emission Rate (tons/yr) [(1,040 * 44 * 8,760 * Heat Input Rate)/(385 * 2000)]	3,860,725	4,434,988
$CO_2$ Emission Rate in Metric tons carbon equivalent per year (MTCE/yr) [tons/yr * 0.909 Metric tons/ton * 12 C/44 $CO_2$ ]	957,109	1,099,474

kW = kilowatt.

Btu/kWh = British thermal units per kilowatt-hour. HHV = High heat value. MMBtu/hr = Million British thermal units per hour. MTCE/yr = Metric tons carton equivalent per year.

#### **Permitting Requirements**

EFSEC has adopted by reference Ecology permitting regulations in 173-400, 173-401, and 173-406 WAC (463-39-005 WAC). 173-400-110 WAC provides the NSR regulations requiring any new source to submit an NOC application and obtain an order of approval before construction begins. 173-400-113 WAC provides the requirements for new sources in attainment or unclassifiable areas and requires the new source to employ BACT for all pollutants whose emissions would increase. Because the generation plant is classified as a new major stationary source, it is subject to PSD requirements. The combined PSD/NOC application is included in Appendix G.

173-401 WAC establishes the requirements for the state air operating permit program consistent with the requirements of Title V of the CAA. As per the requirements of 173-401-500(3)(c) WAC, new sources that begin operation after EPA approval of the state operating permit program are required to file a complete application to obtain the Chapter 401 permit within 12 months after commencing operation.

173-406 WAC provides the state acid rain regulations, which are consistent with the requirements of Title IV of the CAA. In accordance with the requirements of 173-406-301(2)(b) WAC, the designated representative of the affected source is required to submit a complete acid rain permit application to the permitting authority at least 24 months before the date on which the affected source commences operation.

The air operating permit application and the acid rain permit application are not included as part of this application and will be submitted at a later date in accordance with the deadlines established in the regulations.

#### **Odor Impacts**

The generation plant will comply with the requirements of 174-400-040 (4) WAC, which states that odors may not "unreasonably interfere with any property owner's use and enjoyment of his property."

Construction at the generation plant site will include some activities that generate odors. If oil-based paints are applied to structures or equipment at the site, paint odors may be perceptible nearby. Some of the site will be paved with asphalt, and asphalt fumes may be perceptible for a short period during paving operations. Only small amounts of flammable liquids, such as fuels or solvents, will be stored onsite during construction. Construction safety procedures will be adhered to in order to minimize air emissions of this nature. These impacts are anticipated to be slight and of short duration.

Operation of the generation plant will not generate odors that are perceptible offsite. The ASIL for ammonia (NH<sub>3</sub>), used in the selective catalytic reduction (SCR) process for NO<sub>X</sub> control, is 100 micrograms/cubic meter ( $\mu$ g/m<sup>3</sup>). The ASIL is the allowable concentration offsite, and NH<sub>3</sub> emissions from the generation plant will not result in an exceedance of ASIL. Also, the ASIL for NH<sub>3</sub> is less than the odor detection threshold; therefore, ammonia attributable to the generation plant will not be perceptible offsite.

During generation plant operation, natural gas to be used as fuel will be sent to the site and burned as it is used, so that no natural gas will be stored onsite. This will eliminate any potential for accidental releases of natural gas from storage facilities that would cause potential odors. The natural gas used at the generation plant may be odorized by the pipeline company, but odors from natural gas will be perceptible only in the event of an emergency and release of natural gas into the atmosphere. The generation plant will be equipped with detectors to provide a warning of the accidental release of flammable gases and ammonia that could cause odors. The detectors will minimize the potential for odor emissions from fuels or chemical releases.

#### **Climate Impacts**

The generation plant will use a cooling system consisting of a direct air-cooled condenser. In a direct air-cooled condenser, steam is piped from the turbine exhaust directly to air-cooled steam coils. The steam condenses in the coils, with condensate draining to the bottom collection tank. This system eliminates the vapor plume typically associated with cooling towers. Therefore, the generation plant should not result in climate impacts related to plume shadows or ground-level fogging and icing.

# 3.2.3 Environmental Impacts of Alternatives

#### 3.2.3.1 Northwest Site Alternative

Impacts to air quality associated with the northwest site alternative would be the same as those associated with the proposed southeast site location because changing the location of the site on the Applicant's property would not affect modeling conclusions.

## 3.2.3.2 Wet-Cooled System Alternative

Impacts to air quality associated with the wet-cooled system alternative would be greater than those associated with the proposed air-cooled system because a wet-cooled system would result in a vapor plume and the potential for associated climate impacts.

#### 3.2.3.3 Water Pipeline Alternative

As a water supply alternative to the proposed onsite well, the Applicant has secured an option to purchase up to 100 gallons per minute (gpm) (or up to 144,000 gallons per day [gpd]) of water from the Town of Starbuck under the Town's existing water right. The Applicant would construct a water pipeline, primarily along an abandoned railroad bed, connecting the generation plant to the Town water supply system. Impacts to air quality associated with implementation of the water pipeline alternative would be greater than those associated with the proposed onsite well because excavation and grading during pipeline construction may generate dust.

## 3.2.4 Mitigation Measures

#### 3.2.4.1 Construction

Dust from construction activities will be controlled by common construction management measures, such as spraying with water and washing vehicle wheels to mitigate dust traveling offsite. Dust from access roads will be controlled during construction by aggregate surfacing, and by watering as necessary.

#### 3.2.4.2 Operation and Maintenance

#### Air Quality

Compliance with the BACT and T-BACT requirements, described above and detailed in Appendix G, will be required and could be considered mitigation.

In addition, a mitigation program for carbon dioxide gas emissions will be implemented as described in Appendix M, Attachment M-1. CO<sub>2</sub> is a by-product of complete combustion of fossil fuels. It is also the resultant pollutant from oxidizing CO, which has been determined to be BACT for CO. As such, the Applicant is proposing to offset CO<sub>2</sub> production that exceeds 0.675 pound per kilowatt-hour (lb/kWh). SPC will voluntarily commit to mitigating net  $CO_2$  emissions above 0.675 lb/kWh for baseload and above 0.7 lb/kWh for power augmentation (4,000 hours per year), at a cost of \$0.57 per ton emitted. Approximately 760,133 tons of CO<sub>2</sub> emissions per year of plant operation, over a 30-year design life, will be offset. For an anticipated 760,133 tons of  $CO_2$ , this would result in approximately \$433,276 in mitigation costs per year of operation. The mitigation will be achieved through a combination of monetary payment and implementation of emission reduction/sequestration projects. Emission reduction/sequestration projects will be a 1:1 offset of CO<sub>2</sub> emissions above the threshold levels. In the event that reduction/sequestration does not fully offset emissions in a given year, funds will be provided to an organization that commits to providing those offsets and is responsible for the management of the funds to achieve the described offset. Further details are provided in Attachment M-1.

#### Climate

No mitigation is required.

## Odor

Good operating practices and procedures will be used to minimize odors from the generation plant. No additional mitigation is required.

# 3.2.5 Cumulative Impacts

The generation plant will be located more than 31 miles (50 kilometers) from any other major sources of air emissions or major urban areas. This is at a distance where mixing of air emissions with typical industrial or urban sources would not be expected.

The air quality analysis evaluated impacts in areas near the generation plant as well as under long-range transport. The near-plant impacts took into account other sources and regional backgrounds for  $PM_{10}$  and  $NO_X$  and showed impacts to be below all regulatory criteria. For CO and SO<sub>2</sub>, impacts were shown to be below impact thresholds established by EPA and identified as insignificant.

Impacts under long-range transport were evaluated in the Class I area analysis. Generation plant impacts were found to be below thresholds established by EPA and the federal land managers and identified as insignificant.

# 3.2.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to air quality are associated with construction or operation and maintenance of the generation plant.

SECTION 3.3 Water Resources

# 3.3 Water Resources

# 3.3.1 Existing Conditions

The proposed generation plant site is located in an arid region of eastern Washington. Although no precipitation monitoring stations are located on the generation plant site, data accumulated by National Climatic Data Center monitoring stations illustrate the low relative quantity of precipitation in the surrounding region. However, most monitoring stations in the region are no longer operational.

The monitoring station at Lower Monumental Dam (approximately 17 miles west-southwest of the plant site), which operated between 1962 and 1980, recorded average annual precipitation of 9.73 inches, with a maximum annual precipitation of 12.74 inches. The maximum precipitation during a 24-hour period was 1.22 inches.

Similar data were recorded at the monitoring station at Little Goose Dam (approximately 9 miles east of the plant site), which operated between 1963 and 1979. During that period, the average annual precipitation was 11.37 inches, the maximum annual precipitation was 14.30 inches, and the maximum precipitation during a 24-hour period was 1.74 inches.

More recent data have been accumulated at monitoring station Connell 12 SE, which is located approximately 26 miles west-southwest of the plant site. Operational between 1951 and 2000, the monitoring station recorded an average annual precipitation of 9.86 inches, a maximum annual precipitation of 16.52 inches, and a maximum of 1.55 inches during a 24-hour period.

## 3.3.1.1 Surface Water

The generation plant site is located on a terrace between SR-261 to the southwest and the Snake River to the northeast (see Section 2.2.2 and Figure 2.2-1). The terrace features a downward slope from approximately 720 feet above mean sea level (msl) in the northeast region to an elevation of approximately 610 feet above msl in the southwest region (as discussed in Section 3.1.1.3). Because this downward slope progresses away from the Snake River, surface runoff does not deposit into this surface water body. The Washington State Department of Ecology (Ecology) classifies the Snake River as Class A (excellent) in the area adjoining the generation plant site. The Class A designation requires industrial use of this water to be compatible with other uses, including drinking water, wildlife, and recreation. Although the generation plant site is located within the lower Snake-Tucannon watershed, the confluence of the Snake and Tucannon Rivers is approximately 1.5 miles upstream of the site.

In the vicinity of the site, the Snake River is also known as Lake Herbert G. West, a reservoir created by the Lower Monumental Dam. The Snake River flows northwest in the vicinity of the generation plant site and joins the Columbia River approximately 50 miles downstream. No other surface water exists at the site, except possibly during storm events. During storm events, four small ravines in the southern portion of the site can direct surface runoff toward SR-261.

## 3.3.1.2 Topography and Runoff

Overall, the terrace on which the generation plant site is located is slightly to moderately sloped, generally from north to south. The highest elevations are located near the bank of the Snake River and near the north end of the site; the lowest elevations are near the south end of the site. Elevations within the generation plant property boundary vary from approximately 720 feet above msl in the north to approximately 690 feet msl in the south. To the far southern and eastern regions of the terrace, outside of the generation plant site, elevations reach 600 feet msl (Black & Veatch, 2000).

The site is currently used as a grazing pasture, and vegetation on the site consists primarily of grasses. The horizontal distance between the nearest property boundary and the Snake River is approximately 350 feet, and the vertical drop from the generation plant site to the normal river water level is approximately 170 feet. The area to be developed for the generation plant slopes away from the river. For a complete description of site topography, refer to Section 3.1.1.3.

Precipitation on the generation plant site infiltrates the soil or is directed by the sloping topography toward the south. During periods of excessive precipitation, four small ravines in the southern portion of the site direct runoff to the southeast, away from the Snake River and toward SR-261. The runoff is directed under SR-261 via a 24-inch-diameter culvert, and is allowed to disperse and infiltrate soils on the west side of SR-261. On the basis of site soil properties (see Section 3.1.1.2), runoff potential is classified as low to moderate (USDA, 1973).

Because the generation plant site does not contain surface water bodies other than during periods immediately following rainfall or snowmelt, no surface water quality data are available. As a result of erosion and soil conditions at the site, runoff during those periods of rainfall or snowmelt does typically contain suspended solids. As previously discussed, this runoff is directed away from the Snake River, toward SR-261.

## 3.3.1.3 Groundwater

Two main aquifers surround the proposed generation plant site:

- **Flood Gravel Aquifer.** The aquifer in the flood gravels below the generation plant site is at a depth of 190 feet below the ground surface (bgs), based on a geologic log of a residential well drilled near the northwest end of the site. This groundwater elevation corresponds closely to the pool elevation of Lake Herbert G. West (the Snake River), about 1,000 feet north of the well, suggesting that groundwater in the flood gravel aquifer may be hydraulically connected with the lake. This groundwater is likely to be restricted to the geographic extent of the terrace, although it could be in contact with a bedrock aquifer at essentially the same elevation. It is recharged by infiltration of precipitation through the terrace, seepage from the lake, and perhaps by groundwater flow from the adjoining bedrock.
- **Columbia Plateau Aquifer System.** The Columbia Plateau Aquifer System underlies about 50,600 square miles of Washington, Oregon, and Idaho. The thickest, most extensive, and most important geologic unit in the aquifer system is the Columbia River Basalt Group. In the vicinity of the generation plant site, the Grande Ronde Basalt

formation (of the Columbia River Basalt Group) may be as much as 1,000 feet thick and serves as the primary regional aquifer system; it is the area's only available source of large quantities of potable groundwater. Within the Grande Ronde aquifer, groundwater occurs at numerous horizons within the thick sequence of lava flows and is derived mainly from relatively thin, permeable flow-contact zones between thicker, less permeable parts of the flows. Several water-bearing zones within the Grande Ronde basalt aquifer are used for water supply in the area, with most of the wells open to more than one water-bearing zone (Black & Veatch, 2000).

The regional basalt aquifers are recharged mainly by infiltration of precipitation, both at the basalt surface and in stormwater runoff channels crossing the basalt. Most of the precipitation falls during the cooler seasons, when loss of water to evaporation and plant growth is relatively small and the opportunity for infiltration is enhanced. Groundwater flows from the aquifer system mainly to the river systems and, in lesser quantities, to springs and seeps along canyon and coulee walls (USGS, 1994). Groundwater flow direction in the vicinity of the generation plant site is toward the Snake River canyon to the north, generally indicating that the Snake River canyon is hydraulically connected to the regional aquifer.

Although the basalt aquifers are capable of yielding large quantities of water to wells, they contain relatively small volumes of groundwater per unit volume of rock. Considerable effort has been made in parts of the Columbia River basin to evaluate the impact of extraction on groundwater levels in the Columbia River Basalt Group. However, these studies have focused on areas to the north and west of the proposed generation plant site, where there is considerably greater groundwater withdrawal. No published studies have evaluated long-term effects of groundwater withdrawal in Columbia County and this project does not propose withdrawal from the basalt aquifer system.

Long-term trends for groundwater use near the generation plant site are not well documented. Water rights on file with Ecology do not provide an accurate estimate of groundwater use because it is often unknown how much of the right is exercised. Additionally, private wells that withdraw less than 5,000 gallons per day (gpd) do not require a water right, so the amount of withdrawal is also unknown. As indicated in Section 3.12, the population of the Town of Starbuck has fallen 0.6 percent since 1990, and it is likely that water use has fallen proportionally. Also, the demand for water from the flood gravel aquifer appears to have remained unchanged in recent history. As Ecology well logs indicate, no new wells have been constructed in the aquifer since 1976 (the existing wells are discussed in Section 3.3.1.5).

Groundwater quality near the generation plant site is also not well documented. The southeastern region of Washington is not heavily populated, and groundwater in the area has not been as heavily affected by pollutants as groundwater in more populated regions of the state. Over time, agricultural activities in the region may contribute to an increase in groundwater nitrate levels. However, the gravel aquifer in the vicinity of the proposed project is unlikely to be affected by agricultural activity. The predominant method is dryland farming, and there is little precipitation to drive agricultural contaminants into the subsurface. In addition, nearly 200 feet of unsaturated material overlies groundwater in the flood gravel aquifer may be hydraulically connected to the Snake River, groundwater quality is likely to reflect surface water characteristics to some degree.

## 3.3.1.4 Floodplains

According to Federal Emergency Management Agency (FEMA) maps, the generation plant site is not within the 100- or 500-year floodplains (Figure 3.3-1). Several dams control the elevation of the Snake River; river elevation normally fluctuates between 537 and 540 feet msl (Black & Veatch, 2000). The generation plant site is approximately 170 feet above normal river elevation.

## 3.3.1.5 Public and Private Water Supplies

According to water well reports on file with the Washington Department of Ecology (Ecology), three wells are present on the terrace underlying the generation plant site:

- **Bar-Z well.** This residential/irrigation well is located just outside the northwest boundary of the site and serves the Bar-Z Ranch existing at the north end of the terrace. From ground surface to a depth of 135 feet bgs the log reports a material mixture of broken rock and gravel transitioning to coarse sand and gravel. Material between 135 feet bgs in depth and the well's completion at 278 feet bgs is described as various shades of gray, and material size is not stated. The recorded static water level is 190 feet bgs. Well tests indicate a yield of 190 gallons per minute (gpm) with 70 feet of drawdown after 2 hours. The well was completed in 1963, and the well report was filed in 1974.
- U.S. Army Corps of Engineers well. This irrigation/test well is located about one mile northwest of the generation plant site. From ground surface to a depth of 77 feet bgs, the well log reports a mixture of sandy gravel and cobbles transitioning to silty sand, gravel, and cobbles. Sandy gravel and cobbles are described for the remainder of the well drilling to its depth of 137 feet bgs encountering a basalt boulder at 111 feet bgs. Well tests indicate a yield of 750 gpm with no drawdown after 8 hours. The recorded static water level is 74 feet bgs. The well was completed in 1976.
- **Port of Columbia County well.** This residential/irrigation well is located immediately southeast of the site and serves the Columbia County Grain Growers (CCGG). The log indicates that the well is 220 feet deep, but no information is available on the log to define its water-bearing zone (whether completed in flood gravels, shallow basalt, or both) or soils encountered while drilled. The well test indicates 160 gpm with no drawdown, but no time period is stated. The well report was filed in 1975, but the log is incomplete.

An inorganic chemical analysis of water from the Bar-Z and Columbia County wells was completed in March 2001. With the exception of nitrate, sulfate, cadmium, and zinc, EPAregulated inorganic chemicals were nondetectable in both wells. Table 3.3-1 presents the concentration of constituents detected in each well and compares these with Washington State Department of Health (DOH) response levels and EPA maximum contaminant levels for groundwater.



#### **TABLE 3.3-1**

Chemical Composition: Bar-Z and Columbia County Well Water

Analytes	Bar-Z Results	CCGG Results	Units	DOH Response Level	EPA Maximum Contaminant Level
EPA-Regulated					
Cadmium	nd	0.003	mg/L	0.005	0.005
Nitrate/N	1.3	2	mg/L	5	10
Sulfate	22	29	mg/L	250	250
Zinc	0.2	0.02	mg/L	5	5
State-Regulated					
Sodium	11	18	mg/L	-	-
Hardness (CaCO <sub>3</sub> )	107	146	mg/L	-	-
Conductivity	208	281	µmhos/cm	700	700
Turbidity	0.2	0.1	NTU	1	1
Color	nd	nd	Color units	15	15
Total Dissolved Solids	211	242	mg/L	500	500
State-Unregulated					
Lead	nd	nd	mg/L	0.015	-
Copper	nd	nd	mg/L	1.3	-
Other					
Orthophosphate/P	nd	nd	mg/L	-	-
Silica	16	18	mg/L	-	-
Aluminum	nd	nd	mg/L	-	-
Alkalinity as CaCO <sub>3</sub>	78	92	mg/L	-	-
Magnesium	7.7	11.3	mg/L	-	-
Calcium	29.2	38.6	mg/L	-	-
Ammonia/N	nd	nd	mg/L	-	-
Potassium	3.14	4.86	ma/L	_	-

Abbreviations:

CCGG = Columbia County Grain Growers.

DOH = Washington State Department of Health.

EPA = U.S. Environmental Protection Agency.

nd = Not detected within the sensitivity of the instrument.

mg/L = milligrams per liter.

 $CaCO_3$  = calcium carbonate.

µmhos/cm = micromhos per centimeter.

NTU = nephelometric turbidity units.

Source: Anatek Labs, 2001a and 2001b.

# 3.3.2 Environmental Impacts of the Proposed Action

## 3.3.2.1 Construction

#### Surface Water

Construction activities at the generation plant site will not adversely affect surface water because there are no surface water bodies on the site. Additionally, construction activities will occur only within the property boundaries. The distance from the nearest property boundary to the top of the bank above the Snake River is approximately 40 feet. There are no trees on the property or near the top of the bank, and the terrace slopes away from the Snake River. Because of these factors, there will be no construction-associated impacts to the Snake River.

#### Runoff

Earthwork required to construct the generation plant will include clearing, grubbing, excavating, filling, and grading. During construction, it is also expected that onsite areas adjacent to the generation plant will be used as temporary fabrication and laydown areas.

As with any construction project where excavation and fill are required for site preparation, the potential for runoff will increase as a result of construction activities. Substantial regrading will result in removal of vegetation, recontouring of the landscape, and (to some extent) compaction and a reduction in permeability of the near-surface soils. The areas with greatest potential for increased runoff will be along the southern boundary of the generation plant site (where fill placement will result in steeper slopes) and along the northern site boundary (where excavation will result in steeper slopes). To reduce the risk of runoff, the generation plant access road will be surfaced with aggregate, allowing water to infiltrate the soils.

To reduce the risk of runoff during plant construction, a stormwater pond will be one of the first structures constructed at the site (see Section 2.2.3 for stormwater pond description and location). Stormwater control measures will be implemented in accordance with the Ecology document titled *Stormwater Management Manual for the Puget Sound Basin* (Ecology, 1999). The use of silt fences and temporary swales will direct stormwater to the infiltration pond, removing sediment and retaining the water's initial quality before collection in the stormwater pond. Stormwater control measures are described in greater detail in Appendix H and Appendix M.

Sources of potential spills that could contaminate runoff during generation plant construction include lubrication oil, gasoline, diesel fuel, and chemicals for treating equipment components (quantities discussed in Appendix E and Section 3.16.1.4). To minimize the risk of contamination, the Applicant has committed to implementing construction best management practices (BMPs) that may include the following:

- Storage areas for hazardous materials will be provided with secondary containment to ensure that spills in these areas do not reach surface waters.
- All onsite vehicles will be monitored for leaks and receive regular preventive maintenance, and no "topping off" of fuel tanks will be allowed.
- Fueling and maintenance of vehicles will occur at least 150 feet from surface waters.

To further reduce potential for impacts to runoff during generation plant construction, the Applicant has committed to the implementation of spill prevention and control measures. These measures are discussed in Appendix E and are designed so that, in the unlikely event a spill occurs, there will be no impact to nearby water. Some of the procedures include:

- Containment of fuel products in a transportable, self-contained trailer
- A separate lined/bermed containment area designated for lubrication oil
- Spill prevention and control training for all construction staff

Because of adherence to stormwater control measures, BMPs, and defined spill prevention and control measures, no significant impacts to runoff will result from generation plant construction. In addition, onsite well construction is not expected to affect runoff because it will be constructed in less than 4 weeks during the fall, and precipitation during that period is likely to be low.

#### Groundwater

The Applicant currently is awaiting Ecology recommendation on its 300-gpm water right application (see Attachment A, Water Right Application). If granted, this water right will authorize the proposed onsite well that will serve as the water supply for the generation plant (Elmer, pers. comm.). The Applicant intends to propose water quantity mitigation to compensate for water withdrawn from the onsite well and used by the generation plant. The mitigation measures required to obtain an uninterruptible water right are acquisitions of existing water rights in an annual quantity equal to the annual quantity of water used by the generation plant during the low-flow period (Schlender, pers. comm.). The Applicant is in the process of acquiring water rights in the Snake River system for mitigation purposes and intends to provide a specific mitigation plan for inclusion in the environmental impact statement prepared for the SPP.

The depth to water in the gravel aquifer beneath the facility is expected to be approximately 190 feet bgs. Wells drilled to produce groundwater are expected to be located near the Snake River, to maximize induced infiltration and minimize the impacts on nearby groundwater users. The wells will be constructed as 12-inch-diameter cased wells with steel casing, a screen, and a formation-specific filter pack designed to reduce the infiltration of fines into the water supply. A conceptual diagram of the well is provided in Figure 3.3-2. In this diagram the top of the basalt is assumed to limit well depth to 250 feet. Actual constructed depths will depend on the elevation at which basalt is encountered. Wells will be drilled and constructed to fully use the available saturated thickness of the aquifer.

The initial installation will target the entire 300-gpm withdrawal for facility supply. An aquifer test will be conducted to determine production capacity, hydraulic response to pumping, and aquifer characteristics. Additional wells could be installed if permeability limits individual well production capacity or the Applicant chooses to build redundancy into the plant water supply system. Wells will be constructed in accordance with Washington State standards (WAC) for water supply wells.

As illustrated in Figure 3.3-2, the onsite well will withdraw groundwater from the flood gravel aquifer, located approximately 190 feet bgs. The greatest potential threat to groundwater during generation plant and onsite well construction will be from leaks and

spills of fuels, lubricants, and chemicals. Because the flood gravel aquifer is shallow and near-surface soils at the plant site are well drained, if an uncontrolled spill of contaminants were to occur during construction it is possible that the constituents may reach groundwater. However, adherence to stormwater control measures, BMPs, and spill prevention and control measures will reduce the possibility of significant constructionrelated impacts to groundwater.

The primary use of water during generation plant construction will be to supply dust control water trucks and provide drinking water for workers. This water will be supplied by the onsite well in compliance with public water system regulations (246-290 WAC). During 2 months of construction, peak demand for water is expected to reach approximately 252 gpm — a rate below the anticipated well groundwater right of 300 gpm. The remaining 26 months of construction each require less than 65 gpm of water (Nagori, 2001). Because this demand does not exceed the water right, construction activities will not affect groundwater.

#### Floodplains

Because the proposed onsite well and the generation plant are above the 100- and 500-year floodplains of the Snake River, construction activities will not affect any floodplain.

#### **Public and Private Water Supplies**

No impacts to public or private water supplies are expected to result from construction of the generation plant or onsite well. However, in the unlikely event of an uncontrolled spill of contaminants, the three existing wells currently located on the terrace could be adversely affected.

## 3.3.2.2 Operation and Maintenance

#### Surface Water

Prior to operation of the generation plant, hydrostatic testing will be completed using treated water from the onsite well. Such testing will require approximately 150,000 gallons of demineralized water for each HRSG, or 600,000 gallons. Hydrostatic testing of pipes and subsequent chemical cleaning of plant equipment will increase the demand for water to approximately 1 million gallons. Upon completion of chemical cleaning and before disposal, the water will be tested. If the water is acceptable for infiltration, based on Ecology's requirements in the State Waste Discharge Permit, it will be routed to the oil-water separator and to the infiltration/evaporation pond. If it cannot be sent to the pond, it will be recycled in other activities and taken offsite for disposal by licensed waste contractors.

During operation of the generation plant, process wastewater will flow at an average rate of 9 gpm into an infiltration/evaporation pond that will be 6.5 acre-feet in size. Similarly, stormwater will flow at an average yearly rate of 1 gpm (depending on weather conditions) into a stormwater pond that will be 4 acre-feet in size. Water in the ponds can infiltrate toward the flood gravel aquifer, which may be hydraulically connected to the Snake River (see Section 2.2.5.2 for pond operation and routing system). As a result of the permanent stormwater control design, infiltrating water from the stormwater pond is expected to be free of chemical contaminants. In addition, process wastewater routed to the infiltration/ evaporation pond will be chemically similar to groundwater (Black & Veatch, 2001). Because



Drawing Not to Scale

FIGURE 3.3-2 Conceptual Well Construction Diagram Application for Site Certification STARBUCK POWER PROJECT STARBUCK, WASHINGTON of these conditions, infiltrating water from each pond will not adversely affect groundwater or surface water quality.

Process wastewater in the infiltration/evaporation pond will be slightly warmer than water in the flood gravel aquifer because the water will warm up as it is exposed to piping that is subjected to surface air temperatures (groundwater is typically between 48°F and 54°F). However, while infiltrating through approximately 190 feet of soil, the process wastewater is expected to cool to the same temperature as the flood gravel aquifer, thereby not creating adverse impacts to the Snake River if water were to flow to that surface water body.

An onsite septic tank and drain field will be used to treat sanitary wastewater, and there will be no release of sanitary wastewater from the site into the Snake River.

Pond water could reemerge as surface water if a layer of fine-grained or clay-like soils were present below the ground surface. Such a layer would impede infiltration to deeper depths and disperse water laterally. However, existing conditions suggest that such a layer does not exist. Geotechnical studies will be performed at the site to analyze soil permeability, and results will be incorporated into final infiltration/evaporation pond design (the resulting geotechnical data report is discussed in Appendix L).

Design features of the infiltration/evaporation pond and stormwater pond reduce the potential for impacts to the Snake River during plant operation and maintenance. The Applicant's proposal to mitigate water quantity withdrawal further reduces the potential for impacts to the river. As a result, no impacts to surface water are expected to result from operation and maintenance of the generation plant or onsite well.

#### Runoff

Currently, site runoff is believed to be minimal owing to the high permeability of surface soils, the relatively low relief of the site, and the low amount of rainfall received in the area. The completed generation plant will result in an increase in runoff by reducing site vegetation, compacting soil, creating locally steeper slopes, and covering about 7 acres of the site with impervious surfaces.

During plant operation, potential pollutants will be onsite (quantities presented in Section 3.16 and Appendix E). These include lubrication oil, aqueous ammonia, diesel fuel, and transformer oil. However, because of adherence to the spill prevention and control measures, no contamination of runoff during generation plant operation is anticipated (see Section 2.2.5.7 and Appendix H for a more detailed description).

The generation plant site is divided into three primary drainage areas for purposes of runoff design. Drainage area 1, consisting of the substation, will have a crushed-rock base to allow stormwater infiltration. In comparison with current conditions, infiltration will be enhanced and runoff reduced because the area will be graded to a more level terrain. Drainage area 2 contains the area east and south of the Block 2 steam turbine building, including the area beneath the Block 2 air-cooled condenser. Stormwater in this area will be routed by a culvert to the stormwater pond. Drainage area 3 consists of impervious surfaces such as the generation plant and the majority of buildings and equipment. Structures in this area will have gutters and drains to direct stormwater toward the underground stormwater collection system. The water is then routed to the stormwater pond.

A fourth and fifth area, Drainage Areas 4a and 4b, will remain undeveloped but will be disturbed during construction. Both areas are intended to be returned to their preconstruction state after construction is completed, and runoff will be collected and routed to the stormwater pond. All drainage areas are described in greater detail in Section 2.2.5.6.

As a result of existing soil conditions, adherence to spill prevention and control measures, and stormwater drainage design, runoff at the site is not expected to be impacted by operation and maintenance of the generation plant or the onsite well.

#### Groundwater

Diesel fuel and ammonia will be stored in tanks that will be provided with containment facilities in compliance with applicable regulations. Adherence to spill prevention and control measures will reduce the potential for impacts from such contaminants.

If spills occur that are not contained and reach the ground surface, potential impacts to the groundwater underlying the site (the flood gravel aquifer) could result. Similarly, release of a contaminant to the subsurface through the wastewater system could affect groundwater quality.

Groundwater samples collected from the CCGG and the Bar-Z Ranch wells were analyzed for inorganic chemicals in accordance with Washington State Department of Health (DOH) practices (Section 3.3.1.5). Results from these samples may serve as background water quality data for the flood gravel aquifer, which would be the receiving body for any stormwater or process wastewater infiltrated at the site.

Operation of the infiltration/evaporation pond and stormwater pond is not expected to adversely affect groundwater near the generation plant site. As previously discussed, water from the stormwater pond is expected to be free of chemical contaminants and will not degrade groundwater quality. A state waste discharge permit is required for infiltration of the process wastewater from the infiltration/evaporation pond. For the constituents examined, preliminary analyses indicate that the water is expected to meet groundwater standards as presented in 173-200 WAC (Black & Veatch, 2001). Testing and monitoring of the process wastewater will be conducted during operation of the generation plant in accordance with requirements set during issuance of the permit. Process wastewater is expected to thermally equilibrate during its infiltration and not increase groundwater temperature.

#### Floodplains

Because the generation plant and onsite well will be above the 100- and 500-year floodplains of the Snake River, operation and maintenance activities will not affect any floodplain.

#### **Public and Private Water Supplies**

The Applicant is in the process of designing an aquifer test that is scheduled for completion before the end of 2001. The test will provide data to be used for onsite well design specifications and to determine the potential zone of influence from onsite well withdrawal of 300 gpm. Proximity suggests that the well most likely to be influenced by the withdrawal is the Bar-Z well, located approximately 1,700 feet northwest of the proposed location of the onsite well. Because data suggest that the Snake River may be hydraulically connected with the flood gravel aquifer, the hydraulic influence of the river might reduce the impacts to the

Bar-Z well. The zone of influence from onsite well withdrawal may radiate only as far out as the Snake River – a distance of approximately 1,300 feet. Access permitting, the Applicant will monitor water levels at the Bar-Z well during the planned aquifer test.

The Columbia County Grain Growers well is approximately 3,400 feet away from the proposed location of the onsite well and is not expected to be adversely affected by the onsite withdrawal. Neither the Bar-Z well nor the Columbia County Grain Growers well has permits or certificates associated with withdrawal; both wells withdraw less than 5,000 gpd and are exempt from the water rights permit requirement.

# 3.3.3 Environmental Impacts of Alternatives

## 3.3.3.1 Northwest Site Alternative

Impacts to water resources associated with the northwest site alternative would be the same as those associated with the proposed southeast site location. However, if the water pipeline alternative were to supply the generation plant with water, the water pipeline would need to be an additional few hundred feet longer to reach the northwest site.

## 3.3.3.2 Wet-Cooled System Alternative

Impacts to water resources associated with the wet-cooled system alternative would be greater than those associated with the proposed air-cooled system because of the former's greater demand for water during operation. To operate at a natural-gas-fired generation plant similar to the size proposed by the Applicant, an air-cooled system typically would require less than 430,000 gpd, while a wet-cooled system typically requires more than 8 million gallons per day (mgd).

Of the 8 million gallons, a small percentage would be lost to evaporation and the remaining water would need to be routed to an infiltration/evaporation pond or to a nearby surface water body. Because of the evaporative loss, the water would have an increased concentration of mineral constituents. After its use at the generation plant, the water also would have an elevated temperature. These two conditions would result in increased impacts to either groundwater or surface water, depending on routing system design.

The proposed air-cooled system will result in a water conservation measure that reduces the demand for groundwater required for generation plant operation. Neither the Applicant's pending water right nor the Town of Starbuck's existing water right would allow for groundwater withdrawal at the rate of 8 mgd.

#### 3.3.3.3 Water Pipeline Alternative

As a water supply alternative to the proposed onsite well, the Applicant has secured an option to purchase up to 100 gpm (or up to 144,000 gpd) of water from the Town of Starbuck under the Town's existing water right. The Applicant would construct a water pipeline, primarily along an abandoned railroad bed, connecting the generation plant to the

Town water supply system. The Applicant will provide additional detailed information on the impacts of the water pipeline alternative if the Applicant seeks to implement this alternative.

#### Surface Water and Runoff

Impacts to surface water and runoff associated with implementation of the water pipeline alternative would be greater than those associated with the proposed onsite well, although these additional impacts would be temporary. Because the water pipeline route would parallel the Tucannon River and cross seven intermittent drainage areas, water pipeline construction activities could result in sediment erosion or runoff affecting water quality.

#### Groundwater

Impacts to groundwater associated with implementation of the water pipeline alternative would be less than those associated with the proposed onsite well because the water pipeline would withdraw groundwater at a lower rate than would the proposed onsite well. However, the water pipeline alternative would also create a potential for greater impacts to groundwater because contaminated soils may be found during trench excavation and those chemical constituents could infiltrate toward shallow water-bearing zones, affecting groundwater quality.

#### Floodplains

Impacts to floodplains associated with implementation of the water pipeline alternative would be greater than those associated with the proposed onsite well because segments of the pipeline would be located on or immediately adjacent to the alluvial floodplain of the Tucannon River.

#### **Public and Private Water Supplies**

Impacts to public and private water supplies associated with implementation of the water pipeline alternative may be greater than those associated with the proposed onsite well, depending on future water demand by Town residents. Because the water pipeline alternative would withdraw water from the Town's well, this increased demand may affect water supply availability during Town growth.

## 3.3.4 Mitigation Measures

#### 3.3.4.1 Construction

Because no significant impacts to water resources are associated with generation plant or onsite well construction, no mitigation measures are necessary. Impacts to water resources are not anticipated because of adherence to stormwater control measures, best management practices (BMPs), and defined spill prevention and control measures. These measures and practices are presented below.

#### **Stormwater Pollution Prevention Plan**

Starbuck Power Company, L.L.C. (the Applicant) has developed a stormwater pollution prevention plan (SWPPP) to minimize erosion and sediment contamination of stormwater at the generation plant site during construction. Presented in Appendix H, the SWPPP presents guidelines for temporary and permanent stormwater controls, vegetation practices,

and site management of chemicals and wastes. The SWPPP also identifies specific BMPs and a stormwater management system.

Such BMPs as good housekeeping measures, inspections, containment, and spill prevention practices will be used to limit contact between stormwater and potential pollutants. In addition to the specific BMPs presented in the SWPPP, the following BMPs may also be implemented:

- Storage areas for hazardous materials will be provided with secondary containment to ensure that spills in these areas do not reach surface waters.
- All onsite construction vehicles will be monitored for leaks and receive regular preventive maintenance, and no "topping off" of fuel tanks will be allowed.
- Fueling and maintenance of vehicles will occur at least 150 feet from surface waters.
- Petroleum products will be stored in clearly labeled and tightly sealed containers or tanks, and all quantities of petroleum products greater than 55 gallons will be stored within temporary, lined containment dikes.
- Any contaminated soils affected by spills will be removed and disposed of at an approved disposal site.
- All construction or temporary sanitary wastes will be collected, and portable units will be maintained on a regular basis.
- All hazardous wastes will be disposed of according to local or state regulations, or the manufacturer's recommendation.
- Fertilizers will be applied as recommended by the manufacturer and worked into the soil to limit exposure to stormwater.
- Fertilizers will be stored in a covered area or in watertight containers.
- All paint containers will be tightly sealed and properly stored to prevent leaks or spills.
- Spray painting will not occur on windy days, and drop cloths will be used to collect and dispose of drips and overspray.
- Surplus concrete or drum wash water will not be allowed to contact stormwater.
- All construction waste material will be collected, deposited, and stored in metal dumpsters.

#### Stormwater Management System

The stormwater management system will be designed in accordance with Ecology's guidance document, *Stormwater Management Manual for the Puget Sound Basin* (Ecology, 1999). In addition to the stormwater management features identified in the SWPPP, the following measures will also be implemented:

• Temporary and permanent structural devices to divert, store, or limit runoff from disturbed areas will be used on the generation plant site. Such devices will include silt

fences, sediment traps (catch basins), straw-bale dikes, inlet protection, culvert inlet/outlet protection (rock or riprap), and stormwater ponds, as appropriate.

- Temporary stormwater controls will be installed prior to breaking ground, and permanent stormwater controls will be installed at the completion of rough grading.
- Early in the construction phase, a stormwater pond will be installed to receive runoff for the higher elevation (north) area, and perimeter silt barriers (fences) will be installed on the lower elevation (south) boundaries of the site.
- Silt barriers will ensure that runoff not captured by the stormwater pond does not result in offsite discharges of silt. Temporary swales will be used to direct and slow runoff flows to the pond.
- Fabric silt fences and temporary swales leading to the stormwater pond will be the primary methods used to control erosion and runoff during construction. Temporary swales will be seeded with grass, lined with stone or concrete, or provided with another appropriate lining system. In addition (where required), weirs, straw bales, or washboards will be used to slow stormwater velocity and allow settling of suspended soil.
- Surface ditches and swales will direct runoff from disturbed areas into the stormwater pond. Once the pond is installed, stormwater runoff from disturbed areas will be directed to permanent inlets and ditches, which will convey the water into the storm sewer system. Silt fence protection will be provided on some inlets to remove silts and help prevent erosion.

In addition to the measures proposed to control runoff, the following measures will further reduce and protect against potential impacts to water resources:

- Erosion control mats will protect freshly cut and filled slopes until permanent controls are in place.
- Soil permeabilities in this area will be evaluated to address the potential for an increase in runoff and erosion along the ravines adjoining the stormwater pond.
- The potential for increased runoff and erosion in the ravine directly downslope from the pond will be reduced by lining the pond with an impermeable membrane, if necessary.
- A spill control and cleanup plan will be prepared to specify how potential spills and leaks will be cleaned up and mitigated. (See Appendix E.)
- Soil disturbance will be limited to only the area needed for generation plant construction, to help minimize the potential for stormwater runoff.
- Periodic testing of stormwater will be conducted to confirm that contaminants are not being released to site soils from the stormwater pond.
- Existing vegetation will be preserved where reasonably feasible. Where appropriate, disturbed areas will be temporarily seeded or mulched to reduce erosion and runoff during construction.

- Stabilization practices may include temporary or permanent seeding, mulching, geotextiles, sodding, or aggregate surfacing.
- Permanent stabilization will take place no later than 7 days after construction activities have permanently ceased in any area.

#### 3.3.4.2 Operation and Maintenance

The Applicant currently is awaiting Ecology recommendation on its 300-gpm water right application (see Attachment A, Water Right Application). If granted, this water right will authorize the proposed onsite well that will serve as the water supply for the generation plant (Elmer, pers. comm.). The Applicant intends to propose water quantity mitigation to compensate for water withdrawn from the onsite well and used by the generation plant. The mitigation measures required to obtain an uninterruptible water right are acquisitions of existing water rights in an annual quantity equal to the annual quantity of water used by the generation plant during the low-flow period (Schlender, pers. comm.). The Applicant is in the process of acquiring water rights in the Snake River system for mitigation purposes and intends to provide a specific mitigation plan for inclusion in the environmental impact statement prepared for the SPP.

## 3.3.5 Cumulative Impacts

No cumulative impacts to water resources are associated with construction or operation and maintenance of the generation plant.

## 3.3.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to water resources are associated with construction or operation and maintenance of the generation plant.

# ATTACHMENT A Water Right Application

•	DEPARTMENT OF ECOLOGY						
		TO AP	REPORT OF	EXAMINATI	ION TE OF WASHINGTON		
·		Surface Water	(Issued in accordance with the provision amendments thereto, and the rules and r	is of Chapter 317, Loos of W egulations of the Department	Authiogram for F917, and of Factory, 1		
	$\boxtimes$	Ground Water	(Issued in accordance with the provision	n of Chapter 263, Loves of W	Cashington for 1945, and		
October 14	, 1993	Ô	PLICATION NUMBER	G3-29568P	(and	UFSCATE NUMBER	•
STARBUIC	K POWF	R COMPANY I	LC				
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LOCATED WITH	HIN (SMALLE)	ST LEGAL SURDIVISION)	29 & 32	13	37 E.	35	Columbia
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E.W.M., Columbia County, Washington, containing 103.19 acres more or less.

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#### BACKGROUND

Application: An application for new water right was filed with the Department of Ecology ("Ecology") by K.V.A. Resources on October 14, 1993. The application was subsequently assigned to Starbuck Power Company, L.L.C ("SPC") on NEED DATE. The application requests the right to withdraw 300 gallons per minute, continuously, for power generation and domestic supply.

Notice: A notice of application was duly published in accordance with RCW 90.03.280 in the Dayton Chronicle on June 7 and June 14, 2000. No protests or objections were received.

SEPA: This application is categorically exempt from the provisions of the State Environmental Policy Act (SEPA) of 1971, Chapter 43.21 RCW. This exemption is due to the fact that the water quantities requested for withdrawal are less than 2250 gallons per minute, the point at which SEPA requirements become mandatory.

EFSEC: The Washington State Energy Facility Site Evaluation Council (EFSEC) is responsible for siting and permitting the construction and operation of thermal energy projects greater than 250 megawatts within the State of Washington. Through legislation, EFSEC pre-empts other agencies' jurisdiction and issues all necessary state and local permits for projects that are approved. The purpose of this report is to provide a preliminary review of the proposed water withdrawal for the purpose of identification of, and potential miligation for, issues which could hamper or preclude issuance of a permit for withdrawal of the requested quantities of water.

#### /ESTIGATION

#### **Project Description**

The proposed natural gas fired power generation plant would to consist of combined cycle combustion gas turbines, heat recovery generators, steam-turbine generators and air cooled condensers. The plant will be operated as a "dry" plant, with the the condensers being air-cooled rather than water cooled. The plant is estimated to be capable of generating 1,200 MW of electrical power at maximum capacity.

The normal and maximum pumping rate from the proposed well is proposed to be 300 gallons per minute (gpm), with a maximum daily withdrawal of 432,000 gallons per day, or 1.32 acre-feet per day. It is expected that at maximum, the 300 gpm pumping rate from the well would be maintained on a continuous basis year-around, resulting an annual quantity or 483 acre-feet per year. Of the 300 gpm withdrawn, it is estimated that 290 gpm will go to the plant for production and fire protection purposes. Of that emount, approximately 268 gpm will be used for fogging and steam injection, 22 gpm will be used in the operation of a steam urbine, and 10 gpm will go to the service water system. Of this 10 gpm, 1 gpm will be used for sinks, showers and toilets, and 9 gpm will be used for general plant housekeeping purposes. Potable water for the plant will be supplied by bottled water imported to the site.

The water for plant power production purposes would be piped from the well to two 500,000-gallons storage tanks. The first 240,000 gallons in each of these tanks would be reserved for fire protection purposes. The remaining 260,000 gallons in each tank would be routed through demineralization water tanks, with a combined capacity of 1,000,000 gallons, from which the water would be piped into the plant.

While a total of 7 wells have been applied for, the intent is to drill only as many wells as necessary to obtain the desired quantity of water. It is currently anticipated that only one well will eventually be drilled and developed for use.

#### Existing Water Rights/Claims

review of Ecology records shows no existing water rights or claims appurtenant to the proposed place of use.

#### Ares Hydrology

The proposed well site is located on an old gravel bar that stretches out for approximately two miles along the southwest bank of the Snake River. The proposed source of water for this application is a well (or wells) drilled into the upper, unconsolidated gravel aquifer to a depth of approximately 150 - 200 feet below land surface.

#### Report Continued

Species	Date listed
Chinook Salmon - Fall run	April 1992
Chinook Salmon - Spring/Summer run	April 1992
Sockeye Salmon	November 1991
Steelhead	August 1997

Flows have been determined by the Federal National Marine Fisheries Service (NMFS) to be one of the limiting factors for these listed species on the Snake River. In December of 2000, NMFS issued a Biological Opinion regarding operation of the Federal Columbia River Power System (FCRPS). Included in this document are reasonable and prudent alternatives NMFS believe will avoid jeopardy of the listed species. One of these alternatives are target flows for the Columbia and Snake River. Those for the Snake are as follows:

Snake River at Lower Granite Dam			
Dates	Flow Objective		
April 3 to June 20	85-100 kcfs		
June 21 to August 31	50 -55 kcfs		

Note: The Spring (4/3 - 6/20) objectives vary according to the April final runoff volume forecast at Lower Granite Dam

In the mid-1990's NMFS contracted with the Bureau of Reclamation (BOR) to assess the cumulative effects of water withdrawals on Columbia Basin flows. This report, issued in 1997, included estimates of the natural streamflows, the streamflows with current irrigation withdrawals and reservoir operations, the streamflows with no reservoir operations, and streamflows with no irrigation withdrawals at approximately 60 sites within the Columbia Basin.

For the Snake River portion of the analysis, the BOR concluded that the summer flow objectives set forth in the FCRPS biological opinion (above) would be met every year with reservoirs operated for flow augmentation (vs. operating for irrigation diversions) and no irrigation diversions. With irrigation diversions, these flow objectives would be met less than 15% of the time. The spring flow objectives would be met 94% of the time without irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with irrigation diversions and with reservoirs operated for flow augmentation; with reservoirs operated for flow augmentation; with reservoirs operated for flow augmentation; w

FS has concluded that a continued increase in water diversions from the Snake/Columbia River system would further degrade the dvironmental baseline and jeopardize the continued existence of listed Snake River salmon, as well as alter critical habitat.

NMFS does suggests an alternative to avoid jeopardy to listed stocks on the Snake River when issuing new permits which would impact the flow of the Snake River. That is to provide mitigation for any impact a new diversion/withdrawal may have. Provided this mitigation adequately addresses issues of location, timing, quantity and enforceability, water would be available for appropriation as requested through this application.

#### FINDINGS

#### Statutory Criteria for Evaluation

When evaluating an application for a new water right permit, the following statutory (RCW 90.03.290) tests must be satisfied;

- The proposed use of water will be a beneficial one;
- There is water available for appropriation;
- There will be no impairment to existing water rights;
- The requested water right will not be detrimental to the public interest.

#### 1. Beneficial Use

The proposed uses of water, power production and domestic supply, are specifically identified as being beneficial uses of water in RCW 90.54.020(1).

#### 2. Water Availability

- d analysis of water availability must take into account not only the physical limitations on the source of supply, but the legal availability well.

While there is little existing data to which to base an analysis of the physical availability of water, given the assumed nature of the unconsolidated gravel aquifer which is proposed at the source of water, and the proximity to the Snake River, it is presumed that sufficient water is available in this aquifer for a well or wells to produce the 300 gpm requested.

#### Report Continued

The potential for this withdrawal to impact existing surface water rights must also be considered. There are no existing flow limitation rules or statutes governing instream flow limitations on the Snake River as of the date of this report. There is potential for this withdraw eventually effect flows of the Columbia River, on which instream flow limitations have been set forth through WAC 173-563. The The applicant has proposed mitigation measures (see above) which would result in no impairment to existing water rights in the form of diversions or instream flows.

#### 4. Public Interest

Significant local, state and federal and tribal resources are currently being devoted to improve fish habitat conditions on the Snake River. While many factors have contributed to the declining populations of salmon and steelhead including dams, harvest levels, reduction of habitat and pollution, maintaining adequate streamflows remains a critical component of any recovery effort. Allocation of water rights must be coordinated with existing and future efforts to restore salmon populations.

The effects of new water rights on fish habitat and water quality are fundamental public interest considerations. Preservation and enhancement of instream flows are an essential component of efforts to restore salmon populations. Economic considerations, such as an adequate power supply, are also an important public interest component.

Chapter 90.54 RCW provides and water allocation shall secure maximum net benefits to the people of the state, while also requiring that perennial rivers of the state shall be retained with base flows necessary to provide for the preservation of fish and other environmental values. The subject proposal would provide a significant economic benefit to the public, while, when coupled with the proposed mitigation measure outlined above, would not result in a negative impact on flows within the Snake River.

#### CONCLUSIONS

The following are the conclusions of this examiner regarding the proposed withdrawal and attendant mitigation measure:

The proposed use is a beneficial use of water; the proposed withdrawal, when coupled with the mitigation measure, will not impair isting water rights; that water is available for the proposed withdrawal; and that approval of this application for permit will be in the plic interest.

This application for withdrawal of water in the amount of 300 gallons per minute, 483.9 acre-feet per year, continuously, should be approved, subject to the following provisions:

# SECTION 3.4 Wetlands and Vegetation

# 3.4 Wetlands and Vegetation

# 3.4.1 Existing Conditions

This section presents information related to wetlands and vegetation on the Starbuck generation plant site. It is based on field investigations (foot surveys [CH2M HILL, May 2001a and May 2001b] and an aerial reconnaissance [CH2M HILL, May–June 2001] performed in the spring of 2001) conducted by CH2M HILL biologists, as well as on review of relevant documents.

## 3.4.1.1 Wetlands

The U.S. Army Corps of Engineers (Corps, 1987) defines wetlands as follows:

Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Several documents were reviewed before the field investigation was conducted. These include the soil survey for Columbia County (USDA, 1973), the National Wetland Inventory (NWI) map (USFWS, 1983), and the U.S. Geological Survey (USGS) topographic map (Starbuck West, WA). The purpose of this review was to evaluate the likelihood of occurrence and potential locations of wetlands within the generation plant site.

The generation plant site is located on the Starbuck West, WA NWI map. No NWI wetlands or streams are identified within the site. The USGS topographic map (Figure 3.4-1) does not identify any wetlands or streams in this area. The hydric soils list for Columbia County identifies one soil, Riverwash, as hydric. Riverwash does not exist within the generation plant site.

The generation plant site was visited during a field survey conducted on May 29-31 and June 1, 2001 (CH2M HILL, May–June 2001). In addition, an aerial reconnaissance was conducted by helicopter on May 29, 2001. No wetlands or streams were identified within the site. No hydrophytic vegetation was observed and no indicators of wetland hydrology were identified. The only soil type mapped at the site is Stratford very stony silt loam. This soil type is nonhydric and does not contain any hydric inclusions.

## 3.4.1.2 Vegetation

Vegetation community types were classified using the categories presented in *Wildlife-Habitat Relationships in Oregon and Washington* (Johnson and O'Neil, 2001). During the field and aerial surveys, the vegetative community of the entire site was classified as Modified Grasslands.

#### **Modified Grasslands**

In this category, the native diversity of vegetation is severely altered by grazing or other forms of agriculture, human habitation, or road disturbances. The resulting ground cover is dominated by non-native grasses, some forbs, and a few stands of short gray rabbitbrush.

During the field investigation, consistently obvious signs of disturbance, such as cattle feces and tracks, were observed. The majority of grasses found on the site are introduced and are dominated by cheatgrass (*Bromus tectorum*). Yellow starthistle (*Centaurea solstitialis*) and salsify (*Tragopogon dubius*) are common. Very few native bunchgrasses were observed. Also found, but not quite as common, were yarrow (*Achillea lanulosa*), small patches of gray rabbitbrush (*Chrysothamnus nauseosus*), and even smaller patches of green rabbitbrush (*C. viscidiflorus*). No woody vegetation or sagebrush (*Artemisia* sp.) was observed within the site.

It is important to note that the majority of the site is *not* vegetated with native species but with introduced invasive ones, including noxious weeds.

#### 3.4.1.3 Noxious Weeds

One of the dominant plant species found at the generation plant site is yellow starthistle (*Centaurea solstitialis*), a noxious weed. It was found in large areas within the site, making up approximately 45 percent of the areal extent of onsite vegetation.

#### 3.4.1.4 Sensitive Plant Species

The Washington Department of Natural Resources' (WDNR) Natural Heritage Program has no records of rare plants or high-quality ecosystems in the vicinity of the generation plant site (WDNR, 2001). However, the Washington Department of Fish and Wildlife (WDFW, 2001) identifies several sensitive wildlife species and habitat areas near or adjacent to the site. These include riparian and cliff habitats and are discussed in Section 3.6, Wildlife.

The U.S. Fish and Wildlife Service (January 4, 2001; updated request made July 20, 2001) identifies two sensitive plant species potentially occurring in the vicinity of the generation plant site. Ute ladies' tresses (*Spiranthes diluvialis*) is federally listed as a Threatened species, and Spalding's silene (*Silene spaldingii*) is federally listed as a Proposed Threatened species. The blooming season (late summer) for these two species does not coincide with the time of the field surveys (late May and early June), so efforts focused on searching for potential suitable habitat.

Ute ladies' tresses is a perennial orchid. It generally occurs in moist soils in mesic or wet meadows and riparian zones near springs, lakes, or perennial streams. No such habitat was found during the field survey. Because no suitable habitat is present, Ute ladies' tresses is not expected to occur within the generation plant site.

Spalding's silene is a perennial member of the carnation family. It occurs in mesic, undisturbed grasslands (prairie or steppe vegetation) in the bunchgrass habitat type of the Palouse region. Associated species include Idaho fescue (*Festuca idahoensis*), Douglas' hawthorn (*Crataegus douglasii*), snowberry (*Symphoricarpos albus*), and blue-bunch wheatgrass (*Agropyron spicatum*). Such habitat and plant associations were not observed during initial field investigations conducted May 2001 nor during additional field investigations conducted August 2001 (CH2M HILL, August 2001). Furthermore, no undisturbed grassland or prairie was encountered during either investigation. Spalding's silene, therefore, is not expected to occur within the generation plant site.





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CH2M Hill GIS Project Number 155676 \\Starbuck\Aprs\facility.apr 8-7-200

**CH2MHILL**
## 3.4.2 Environmental Impacts of the Proposed Action

#### 3.4.2.1 Construction

#### Wetlands

No wetlands occur on the generation plant site. Therefore, no wetlands will be affected by construction activities.

#### Vegetation

Impacts during construction of the generation plant will involve direct disturbance to vegetation by heavy equipment, vehicular traffic, and crew activities. Approximately 50 acres of primarily non-native grasses and forbs will be removed by plant construction. The disturbance will include clearing of vegetation, digging, filling, grading, trenching, and compaction of vegetation and soil. It is important to note that the majority of the plant site is already significantly disturbed, as is evidenced by the extensive amount of introduced species and noxious weeds. No woody vegetation is present on the site, and no woody vegetation removal will occur. The sparse rabbitbrush shrubs found are small (a diameter of 1 inch or less). They are not considered woody vegetation.

#### **Noxious Weeds**

Impacts to vegetation will include clearing of noxious weeds from some areas. This should be considered a beneficial rather than a negative impact. While the removal of noxious weeds is beneficial, it will be necessary to implement measures to prevent the spread of noxious weeds to adjacent areas or recolonization of construction areas.

#### **Sensitive Plant Species**

Because neither sensitive plant species nor suitable habitat for sensitive plant species was observed during field surveys at the generation plant site, sensitive plant species are not expected to be affected by construction activities.

#### 3.4.2.2 Operation and Maintenance

#### Wetlands

Because no wetlands occur on the generation plant site, no wetlands will be affected by operation and maintenance activities.

#### Vegetation

Areas of natural vegetation will be trimmed as required to avoid interference with operation of the plant. If areas of natural vegetation are converted to landscaped areas, those converted areas will require some regular maintenance such as mowing, trimming, and watering.

#### **Noxious Weeds**

A weed control program will include regular inspection of the site for the presence of noxious weeds, followed by removal. Some areas vegetated with noxious weeds will be converted to landscaped areas that will require regular maintenance.

## Sensitive Plant Species

Because neither sensitive plant species nor suitable habitat for sensitive plant species was observed during field surveys at the generation plant site, sensitive plant species are not expected to be affected by operation and maintenance activities.

## 3.4.3 Environmental Impacts of Alternatives

#### 3.4.3.1 Northwest Site Alternative

Impacts to wetlands and vegetation associated with the northwest site alternative would be the same as those associated with the proposed southeast site location because site conditions in the northwest are similar to those in the southeast: no wetlands and similar vegetation communities.

## 3.4.3.2 Wet-Cooled System Alternative

Impacts to wetlands and vegetation associated with the wet-cooled system alternative would be the same as those associated with the proposed air-cooled system because the generation plant footprint is the same as for the proposed action.

The Applicant will provide additional detailed information on the impacts of the water pipeline alternative if the Applicant seeks to implement this alternative.

## 3.4.4 Mitigation Measures

#### 3.4.4.1 Construction

#### Wetlands

Because no wetlands occur on the generation plant site, no mitigation measures are required.

#### Vegetation

Clearing activities will be limited to the minimum area necessary. Heavy equipment movement on the site will be minimized to the extent feasible as well.

The following mitigation measures are recommended for protection of natural native vegetation:

- Areas not targeted for cut-and-fill or grading operation will be seeded to control sediment runoff and wind erosion. The prescribed seed mix will include species native to the area.
- Portions of the site not paved or covered with structures or aggregate will be hydroseeded after construction to prevent erosion runoff. The hydro-seed mix will include native grass species.
- Plantings will consist of native vegetation compatible with or similar to naturally occurring species in the adjacent shrub-steppe areas.
- To minimize the spread of noxious weeds, construction crews will limit transport of seeds to agriculture lands or rangelands by cleaning equipment and vehicles before leaving the construction area.

- Weed-free straw bales will be used, where appropriate, for erosion control.
- The Applicant will prepare and implement a landscaping plan that includes long-term weed control measures. A control plan for yellow starthistle and medusahead will be implemented in coordination with the Columbia County Noxious Weed Control Board.

#### **Noxious Weeds**

To prevent the spread of noxious weeds, the Applicant will follow the Columbia County Weed Control Board's recommendations, which include:

- Cleaning of equipment before leaving the site
- Reseeding with a hydro-seed mixture that includes native plants

#### **Sensitive Plant Species**

Because no sensitive plant species have been observed at the generation plant site, no mitigation measures are required.

#### 3.4.4.2 Operation and Maintenance

#### Wetlands

Because no wetlands occur on the generation plant site, no mitigation measures are required.

#### Vegetation

The site should be monitored for the reestablishment and spread of noxious weeds. If they are found to occur at the site after construction, a weed control program should be implemented in coordination with the Columbia County Noxious Weed Control Board.

#### **Noxious Weeds**

A weed control program will be implemented and will include continual monitoring of the site for reestablished populations of noxious weeds. Hydro-seeded areas will be monitored as well to ensure establishment of desired native vegetation.

#### Sensitive Plant Species

Because no sensitive plant species have been observed at the generation plant site, no mitigation measures are required.

#### 3.4.5 Cumulative Impacts

#### 3.4.5.1 Wetlands

No cumulative impacts to wetlands and vegetation are associated with construction or operation and maintenance of the generation plant.

## 3.4.6 Significant Unavoidable Impacts

No significant unavoidable adverse impacts are associated with construction or operation and maintenance of the generation plant.

# SECTION 3.5 Agricultural Crops and Livestock

## 3.5 Agricultural Crops and Livestock

This section presents information related to existing conditions and impacts on agricultural crops and livestock from the construction, operation, and maintenance of the Starbuck Power Project (SPP). It also identifies and describes agricultural activities in areas within and adjacent to the generation plant site. In addition, this section includes a discussion of the possible impact of emissions on these same agricultural lands.

The 25-mile study area around the generation plant site is located within Whitman, Adams, Franklin, Garfield, Walla Walla, and Columbia Counties. These counties are predominantly agricultural, with wheat being their primary crop (Washington Agricultural Statistics Service [WASS], 1996; National Agricultural Statistics Service [NASS], 1998) (see Figure 3.5-1). The following is an overview of agricultural production within the counties that make up the 25-mile study area.

Whitman County, northeast of the generation plant site, has 1,132,001 acres in cropland and ranks first in the state in wheat production. It also produces livestock, ranking first in the state in hogs and pigs, twelfth in sheep, and seventeenth in cattle.

Adams County, north of the generation plant site, has 781,122 acres in cropland and ranks fourth in the state in wheat production. It ranks fourth in cattle and in hogs and pigs, and seventh in sheep production.

Franklin County, northwest of the site, has a total of 457,795 acres in cropland that produce wheat, barley, corn, hay, dry beans, various types of grass seeds, and vegetables including asparagus, carrots, peas, and onions. The county ranks ninth in the state in wheat production. It also produces livestock, ranking eighth in the state in sheep, ninth in hogs and pigs, and tenth in cattle. Fish hatcheries are located at the convergence of the Palouse and Snake Rivers in Franklin County.

Garfield County, east of the generation plant site, has a total of 197,054 acres in cropland that produce wheat, barley, hay, and various types of grass seeds. The county ranks 11th in the state in wheat production. It also produces livestock, ranking 23rd in the state in cattle production.

Walla Walla County, west of the generation plant site, has 604,519 acres in cropland that produce wheat, barley, corn, hay, alfalfa seed, and vegetables including potatoes, peas, onions, and sweet corn. The county ranks third in the state in wheat production. It ranks fifth in the state in the production of hogs and pigs, sixth in cattle, and eleventh in sheep. Walla Walla cherries are grown in orchards located along the Snake River near the Lower Monumental Dam.

Columbia County, the location of the generation plant site, is a small, predominantly agricultural county. It ranks 31st in size among the state's 39 counties, with a land area of 868.8 square miles. It has approximately 190 farms, with an average size of 1,596 acres each, that occupy 304,928 acres (WASS, 1996). County cropland totals 180,083 acres and produce wheat, barley, and hay, ranking seventh in the state in wheat production. Columbia County also produces some livestock, ranking 29th in the state in cattle production. Fish hatcheries are located along the Tucannon River in Columbia County.

In Columbia County, less than 10 percent of cropland is irrigated. In the area of the county that falls within the 25-mile study area, irrigated cropland exists as orchards along the Snake River. Because of low rainfall (7 to 12 inches annually), the remaining cropland is not irrigated and is designated "dry cropland." According to Paul Rogers, District Conservationist for the Natural Resources Conservation Service (NRCS), because of economics and an aging farm community, approximately 45 to 50 percent of the cropland in Columbia, Walla Walla, and Garfield Counties is under the Conservation Reserve Program (CRP). While less than 25 percent of Whitman County's cropland is in the CRP, both Adams and Franklin Counties have an average of 40 percent of their cropland in the CRP.

Begun in 1987, the CRP allows farmers to earn \$40 to \$60 per acre per year by leaving the ground fallow, which promotes benefits to wildlife and water quality. CRP involvement is a 10- to 15-year commitment by participating farmers that can be renewed when the contract expires. The fate of the CRP contracts, initiated by the aging farm community and economic changes occurring in the area is unknown, as are future impacts.

## 3.5.1 Existing Conditions

The generation plant will be located on a terrace above the Snake River, near river mile (RM) 60, on the southeast 40 acres of the 100-acre generation plant site. The site is bounded by SR-261 to the west and the river on the east. The 25-mile study area includes the 100-acre generation plant site. Although zoned heavy industrial, it is currently used as rangeland.

## 3.5.1.1 Agricultural Crops

Washington State University Cooperative Extension (WSUCE) representatives for each of the counties within the 25-mile study area were interviewed about agricultural use in their respective counties. All interviewees stated that the predominant agricultural crops produced in their counties within the 25-mile study area are dry-land agricultural crops, such as wheat, barley, and hay for local cattle operations. Based on the information provided by interviewees, between 25 and 50 percent of the cropland in the six counties of the study area is in the CRP. Irrigated cherry orchards exist along the Snake River in Walla Walla County approximately 10 miles downstream of the Lower Monumental Dam.

No native plants or roots in the 25-mile study area are considered agricultural crops by local tribes. Native roots and medicinal plants are now important to the tribes' culture rather than their economy.

The generation plant site is native rangeland that is not used for agricultural crops.

#### 3.5.1.2 Livestock

The current agricultural use of the generation plant site is native rangeland. The 100-acre site is fenced and has eight grazing head of Black Angus cattle.

## 3.5.2 Environmental Impacts of the Proposed Action

#### 3.5.2.1 Construction

Construction of the generation plant will result in a total of 100 acres of land being removed from agricultural use in Columbia County. The loss will consist entirely of fenced rangeland and will be small compared with the total amount (approximately 120,000 acres) of



agricultural land present in the county. The loss of 100 acres will amount to less than a 0.0008 percent reduction and will have no significant effect on the county's agricultural production. The generation plant site is native rangeland that is not used for agricultural crops and is not under the CRP.

#### Agricultural Crops

No agricultural cropland exists within the generation plant site. Therefore, no loss of agricultural cropland will be sustained as a result of generation plant construction activities.

#### Livestock

Construction of the generation plant will have no impact on livestock because the eight head of Black Angus cattle currently grazing on the fenced rangeland will be permanently relocated.

#### 3.5.2.2 Operation and Maintenance

Air emissions impacts from plant operations are presented in Section 3.2 and Appendix G. As shown in those sections, air quality impacts in the area (including plant operations) will be below the secondary ambient air quality standards that were promulgated to protect public welfare, including agricultural lands.

Air emissions from the generation plant that have the potential to affect agricultural areas and livestock include primary particulate matter and secondary formation of ammonium nitrate and ammonium sulfate. Emissions are low and consist of acceptable levels of invisible gases and fine particulates. There will be no noticeable fallout from plant emissions and no expected impacts to germination or production of crops.

The air quality analysis presented in Appendix G evaluated sulfate and nitrate impacts on forest resources in the nearest Class I areas (Eagle Cap Wilderness Area, Hells Canyon Wilderness Area, and the Spokane Indian Reservation). Nitrate and sulfate deposition in those areas was modeled to be less than 0.5 gram per hectare per year. As a means of comparison, the U.S. Department of Agriculture (USDA) Forest Service (1992) has established deposition rate criteria of 5 kilograms per hectare per year (kg/ha/yr) for nitrates and for sulfates in forests in the Pacific Northwest.

An additional analysis evaluated sulfate and nitrate deposition rates within 15.6 miles of the plant. This analysis showed maximum sulfate and nitrate deposition rates of 0.9 kg/ha/yr for sulfates and 0.2 kg/ha/yr for nitrates and occurring within 2 miles of the generation plant. This is below any thresholds of concern for agricultural resources and livestock.

Significant impacts from plant emissions are not expected to occur to the fish hatcheries on the Tucannon River (Tucannon Hatchery, RM-36), the Snake River (Lyons Ferry Hatchery, RM-58), or the Snake River itself. The basis of this conclusion is stated in the preceding paragraph. There will be no noticeable fallout from plant emissions and no expected impacts. The Tucannon and Lyons Ferry fish hatcheries are less than 100 miles (approximately 36 and 2 miles, respectively) from the generation plant.

Aqueous ammonia at 19 percent concentration, to be used in the operations of the generation plant, will be transported via truck to the site weekly. At any given time, a maximum of 60,000 gallons will be onsite. Aqueous ammonia at this concentration is a

common fertilizer. During planting seasons, farm supply companies ship approximately 240,000 gallons of aqueous ammonia throughout the 25-mile study area. These suppliers store this fertilizer-grade ammonia in multiple 15,000- to 30,000-gallon tanks.

The 19 percent concentration ammonia to be used at the generation plant will be stored onsite above ground in a 60,000-gallon cylindrical tank. The tank will be constructed within a 110 percent (66,000 gallons) concrete containment structure. If a total release of the solution from the tank occurs, the ammonia solution will collect within the containment structure and will remain inert. The 19 percent concentration of ammonia (common fertilizer) will pose no threat to humans, livestock, or vegetation.

Aqueous ammonia at 29 percent concentration, used for pH adjustments, will be stored in two 55-gallon drums in a containment facility onsite and will be transported to the generation plant on an infrequent and "as needed" basis. A spill of 29 percent aqueous ammonia will remain mostly inert, releasing minor amounts of gaseous ammonia (less than 5 parts per million) over several days. This is far below a minimum concentration of 300 parts per million set by the Washington State Department of Ecology at which gaseous ammonia becomes "immediately dangerous to life and health" (IDLH).

No significant impacts will occur to the river or surrounding lands in the event of an aqueous ammonia spill at the site. The 19 percent concentration will be fully contained and inert, and the 29 percent concentration can easily be reduced to common fertilizer by adding water. Any precipitation event at the generation plant site after a spill will further dilute the concentration of the spill. (See Appendix E.)

Any towers and conductors at the plant generation site will have no impact on irrigated crops, harvests, and aerial spraying associated with agricultural practices because the land surrounding the site is rangeland with no irrigated crops or harvest activities.

## **Agricultural Crops**

No loss of agricultural crops will be sustained within the study area or the generation plant site as a result of plant operations and maintenance because the plant site is not used for crop production, and the aqueous ammonia used by the generation plant is in the same concentrations as common fertilizer that is used by local farmers. Any emissions from the plant will be insignificant, as described above.

## Livestock

Operation and maintenance of the generation plant will have no impact on the study area's total cattle production, because the eight grazing head of Black Angus cattle will be relocated to another pasture, and no impacts are anticipated for other livestock within the study area.

## 3.5.3 Environmental Impacts of Alternatives

## 3.5.3.1 Northwest Site Alternative

Impacts to agricultural crops and livestock associated with the northwest site alternative would be the same as those associated with the proposed southeast site location because both locations would require that cattle grazing on the site be moved to another pasture and, therefore, would have the same minimal impact to agriculture.

## 3.5.3.2 Wet-Cooled System Alternative

Impacts to agricultural crops and livestock associated with the wet-cooled system alternative would be the same as those associated with the proposed air-cooled system because there are no such impacts with either alternative.

#### 3.5.3.3 Water Pipeline Alternative

As a water supply alternative to the proposed onsite well, the Applicant has secured an option to purchase up to 100 gallons per minute (gpm) (or up to 144,000 gallons per day [gpd]) of water from the Town of Starbuck under the Town's existing water right. The Applicant would construct a water pipeline, primarily along an abandoned railroad bed, connecting the generation plant to the Town water supply system. Impacts to agricultural crops and livestock associated with implementation of the water pipeline alternative would be greater than those associated with the proposed onsite well.

A major portion of the alternative water pipeline route follows an abandoned railroad bed, with rangeland on both sides. No agricultural cropland exists in the area adjacent to this old railroad bed, between the end of it and the plant site, or anywhere along the proposed route in the vicinity of the Tucannon River. Thus, no land along the proposed route is part of the CRP. Abandoned railroad beds are not used for agricultural purposes because they are not conducive to cultivation. A portion of this old railroad bed (located just north of and within the Town of Starbuck) adjoins 1½ to 2 acres of private gardens and pasture. Such private agricultural use is not considered part of Columbia County's agricultural cropland.

During construction of the water pipeline, the open rangeland adjacent to the abandoned railway bed (as well as the 1 ½ to 2 acres of private property within the Town) would be temporarily disturbed, primarily by equipment and trucks accessing the pipeline route. Once construction in each area was complete, normal use would resume. These adjacent land areas would not be affected during the operation and maintenance phase of the project.

The Applicant will provide additional detailed information on the impacts of the water pipeline alternative if the Applicant seeks to implement this alternative.

## 3.5.4 Mitigation Measures

Because no significant adverse impacts to agricultural crops or livestock are anticipated, no mitigation is required.

#### 3.5.4.1 Construction

Cattle that are currently grazing on the site will be relocated to a different pasture. Because the proposed generation plant site is located on land zoned for heavy industrial use, mitigation for loss of cattle pasture use is not required.

Mitigation for the proposed onsite well is unnecessary. The land is zoned for heavy industrial use; therefore, no mitigation is required for either the onsite well or loss of cattle pasture use.

## 3.5.4.2 Operation and Maintenance

No mitigation measures will be required for the operation and maintenance of the generation plant.

## 3.5.5 Cumulative Impacts

No cumulative impacts to agricultural crops or livestock are associated with construction or operation and maintenance of the generation plant.

## 3.5.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to agricultural crops or livestock are associated with construction or operation and maintenance of the generation plant.



# 3.6 Wildlife

This section describes the existing conditions, potential impacts of proposed construction and operation, and mitigation measures for potential impacts to wildlife species that are found within the vicinity of the Starbuck Power Project (SPP).

## 3.6.1 Existing Conditions

## 3.6.1.1 Methods

Information regarding habitat conditions and wildlife use of the generation plant site was obtained through the following methods:

- Review of a preliminary document prepared by CH2M HILL (1994)
- Review of a document prepared by the Energy Facility Site Evaluation Council's (EFSEC) independent consultant (Jones & Stokes, 2001)
- Review of observational information from the Washington Department of Fish and Wildlife's (WDFW) priority habitats and species (PHS) database (WDFW, 2000)
- Review of a list of federally listed and proposed threatened, endangered, and candidate species that may occur in the area (USFWS, 2001)
- Communication with the local WDFW wildlife biologist (Fowler, pers. comm.)
- Review of CH2M HILL's site-specific surveys conducted on May 7 and May 29, 2001.

Surveys conducted by CH2M HILL consisted of one (May 7) and four (May 29) surveyors walking the entire generation plant site following meander patterns. All wildlife noted by direct observation, song, call, scat, track, or other evidence was recorded. In areas where birds were observed exhibiting nesting behavior (such as continuous singing from one point, defensive behavior), additional time was spent in the area to determine whether the birds were nesting. Vegetation communities, structural conditions, and conditions of the surrounding area were noted. Habitat types were mapped in the field and later refined in the office following Johnson and O'Neil (2001).

## 3.6.1.2 Generation Plant

The physical and vegetative conditions associated with the generation plant site dictate the abundance and diversity of wildlife present in the area. Generally, the number of species and individuals that occur regularly on the site is limited by soil type, vegetation community (diversity and structure), and position on the landscape. The site is located in a relatively narrow strip of land between SR-261 and the Snake River (see Figure 2.2-4). Previous surveys of the site indicated that it was dominated by native bunchgrass communities with some non-native species present and limited woody vegetation, primarily rabbitbrush (*Chrysothamnus* spp.), generally restricted to lower draws. However, surveys conducted by CH2M HILL during the week of May 27, 2001, indicated that the site is now dominated by non-natives such as cheatgrass (*Bromus tectorum*), medusahead (*Taeniatherum caput-medusae*), yellow starthistle (*Centaurea solstitialis*), and rush skeleton weed (*Chondrilla juncea*) and other non-native grasses and forbs. The site is grazed by cattle at moderate

intensity (CH2M HILL, 1994; Pellegrin, 2001). The site is best characterized as "Agriculture: Modified Grasslands" cover type in the "Grass/Forb-Open" structural condition (after Johnson and O'Neil, 2001). There are no surface water features on the site. However, the Snake River is approximately 350 feet east of the eastern project area boundary at the bottom of a very steep slope.

These conditions provide habitat for several passerine and game bird species, small mammals, and reptiles. Larger mammals might include the site in part of their home range, with irregular occurrence onsite. Raptors probably forage over the site, but there is no nesting structure in the immediate area (CH2M HILL, 1994). There are steep basalt cliffs located to the west, somewhat north and south of the site, that are used by ferruginous hawk (*Buteo regalis*) (known nests at slightly more than 0.6 mile), red-tail hawk (*Buteo jamacinsi*) (known nest at approximately 0.5 mile), and prairie falcon (*Falco mexicanus*) (known historical nest within 0.75 mile) (Pellegrin, 2001; WDFW, 2000). Osprey (*Pandion halietus*) nest along the Snake River about 0.5 mile from the plant site.

Waterfowl use the Tucannon and Snake Rivers as foraging, resting, and nesting habitat. Geese and some ducks (that is, mallard) graze in wheat fields southwest of the area. The site itself is not known to provide important foraging or other habitat (Fowler, pers. comm.).

Direct wildlife observations at the generation plant site by CH2M HILL (1994) in 1994 and by Jones & Stokes (2001) during field visits in fall 2000 were limited to a few bird species and evidence of both large and small mammals. Bird observations included mourning dove (*Zenaida macoura*), western meadowlark (*Sturnella neglecta*), European starling (*Sturnus vulgaris*), northern rough-winged swallow (*Stelgidopteryx serripennis*), ring-billed gull (*Larus delawarensis*), American kestrel (*Falco sparverius*), and red-tailed hawk. Evidence such as tracks, scat, and excavations indicated the presence of coyote (*Canis latrans*), pocket gopher (*Thomomys* spp.), ground squirrel (*Spermophilus* sp.), and badger (*Taxidea taxus*). Horses and cattle also use the site, and whitetail jackrabbits (*Lepus townsendii*) might occur in the generation plant vicinity. Although bighorn sheep (*Ovis canadensis*) and elk (*Cervus elaphus*) might be present in the Tucannon River subbasin, these species are not expected to occur in the vicinity of the generation plant and are usually found in the foothills area 15 to 20 miles or more to the southeast.

The WDFW *Priority Habitats and Species List* (WDFW, 2000) indicates that several priority habitats/wildlife species are known to occur in the vicinity of the generation plant site. Priority species known to occur within 2.0 miles of the site are the ferruginous hawk (including nesting), prairie falcon (including nesting), the non-native upland game birds (ring-neck pheasant [*Phasianus colchicus*], chukar [*Alectoris chukar*], and the native mountain quail [*Oreortyx pictus*]), waterfowl [*Anatidae*], night snake [*Hypsiglena torquata*], and mule deer [*Odocoileus hemionus*] (WDFW, 2000). The generation plant site is in an area identified as mule deer winter range; however, the plant site is not believed to receive substantial use or be part of an important migration route (Fowler, pers. comm.). Other priority habitats near or adjacent to the site include riparian and cliff habitats.

The ferruginous hawk is a state-listed threatened species and is known to occur in the area. Records indicate that ferruginous hawk nests occur at slightly more than 0.6 and 2.0 miles northwest and southwest, respectively, of the generation plant site (WDFW, 2000). These nests are located in the cliff bluffs.

Several bird species observed or potentially occurring at the generation plant site are considered migratory birds and are protected by the Migratory Bird Treaty Act (16 USC 703). Table 3.6-1 lists migratory birds that potentially nest at the generation plant site. No specific nesting surveys were conducted. However, very few birds were observed and no territorial behavior was reported during surveys (Pellegrin, pers. comm.).

#### 3.6.1.3 Threatened and Endangered Species

A species request letter was submitted to the U.S. Fish and Wildlife Service (USFWS) for the project on July 20, 2001. The response letter, dated August 7, 2001, identified bald eagle (*Halia eetus leucocephalus*) as the only known or potentially occurring federally listed threatened or endangered wildlife species in the area. The list did include the Washington ground squirrel (*Spermophilus washingtoni*), a federally listed candidate species. Because the Washington ground squirrel is a candidate species and could potentially be listed before the project is completed, additional consideration was given to Washington ground squirrel.

WDFW confirmed that wintering bald eagles may occur at the generation plant site although use is random and the majority of use occurs in the upper reaches of the Tucannon drainage (Fowler, pers. comm.). A biological assessment addressing potential impacts to federal threatened and endangered species will be prepared concurrently with the environmental impact statement.

There are no known bald eagle roosts, nests, or foraging perches within 2.0 miles of the generation plant site (WDFW 2001; Fowler, pers. comm.). There are no structures on or near the site that would provide typical nesting or perching habitat, although waterfowl occur in the Snake River and foraging bald eagles may occasionally perch on the transmission towers during winter months; however, this has not been reported. There is no habitat that would provide winter roosting habitat within 2.0 miles of the generation plant site.

Evidence of ground squirrel activity was documented within the generation plant site (CH2M HILL, 1994) and was also observed during field reconnaissance surveys conducted in November 2000 by Jones & Stokes (2001). However, neither of these reports indicated that the activity observed was representative of Washington ground squirrel.

CH2M HILL conducted surveys for Washington ground squirrel at the generation plant site on May 7 and May 29, 2001. Surveys consisted of one (May 7) and four (May 29) surveyors walking the entire site looking and listening for evidence of Washington ground squirrel. All ground squirrel burrows were examined for signs of recent ground squirrel activity (for example, tracks, scat). No ground squirrels of any species were observed. The existing soil and vegetation conditions on the site are not believed to be conducive to Washington ground squirrel occupancy.

Washington ground squirrel habitat relationships are poorly understood. Dry grasslands (Betts, 1990; Quade, 1994), and low big sagebrush vegetation communities (Carlson et al., 1980; Quade, 1994) dominated by native species are most commonly associated with Washington ground squirrel. Soil characteristics are also considered important. Betts (1990) reported that areas occupied by Washington ground squirrel have greater soil depths and

Migratory Birds That Potentially Nest at the Generation Plant Site

Species Name	Scientific Name	Occurs <sup>a</sup>	Nests <sup>b</sup>	Breeding Period <sup>c</sup>	MBTA <sup>d</sup>	Comments
American kestrel	Falco sparverius	MG, CC, GFC. LSO, IP	RO	Late May - early August (April - August)	Х	
American robin	Turdus migratorius	MG, GFC, IP	LSO	June - August (April - August)	Х	
Bank swallow	Riparia riparia		MG <sup>e</sup> , UP, GFC, LSO, IP	May - July (April - August)	х	Would nest in these habitat types only when steep banks, cliffs are present.
Barn owl	Tyto alba	MG, CC, GFC, LSO, IP	RO	March - August	Х	
Barn swallow	Hirundo rustica	MG, CC, UP, GFC, LSO, IP		May - mid-July (April - August)	Х	
Black-billed magpie	Pica pica (= hudsonia)	MG, CC, UP, GFC, LSO, IP		March - Late July (Aug)	Х	Nesting unlikely due to lack of nesting areas.
Brewer's blackbird	Euphagus cyanocephalus	MG, CC, UP, GFC, IP,	LSO	April - Early July (April - Mid July)	Х	Only if tall enough shrubs are present.
Brewer's sparrow	Spizella breweri	MG, GFC, IP	LSO	May - July (April - August)	Х	
Brown-headed cowbird	Molothrus ater	MG, CC, UP, GFC, IP	LSO	April – August	Х	Nest parasitizer, potentially nests in other habitat types.
Burrowing owl	Athene (= Speotyto) cunicularia		MG, CC, UP, GFC, LSO, IP	March – August	Х	No nesting observed. No burrowing owls known to occur in the area.
California quail	Callipepla californica	CC, UP, IP	MG, GFC	April - July (April - August)		
Canyon wren	Catherpes mexicanus	GFC, LSO	RO	June - July (May - August)	Х	
Chipping sparrow	Spizella passerina	CC, UP, GFC	LSO	April - July (April - August)	Х	

Migratory Birds That Potentially Nest at the Generation Plant Site

Species Name	Scientific Name	Occurs <sup>a</sup>	Nests <sup>b</sup>	Breeding Period <sup>c</sup>	MBTA <sup>d</sup>	Comments
Chukar	Alectoris chukar	IP	MG, CC, UP, RO, GFC	Mid to late June - End July (May - August)		
Cliff swallow	Hirundo pyrrhonota	MG, CC, UP, GFC, LSO, IP	RO	April - July	Х	May breed in habitat types along outbanks for roads— rare in analysis area.
Common nighthawk	Chordeiles minor	CC, IP	MG, UP, RO, GFC, LSO	June – August	Х	
Common poorwill	Phalaenoptilus nuttallii	IP	MG, UP, RO, GFC, LSO	May – August	Х	
Common raven	Corvus corax	MG <sup>a</sup> , CC, UP, GFC, LSO, IP	RO	March – July	х	Very limited nesting habitat outside of RO areas.
Eastern kingbird	Tyrannus tyrannus		MG, CC UP, GFC, LSO , IP	May – June	х	Possible nester in any habitat type.
European starling	Sturnus vulgaris	MG, CC, GFC, LSO, IP		April – June		Nesting habitat very limited.
Ferruginous hawk	Buteo regalis	MG, CC, UP GFC, LSO, IP	RO	Mid April - mid July (March - August)	х	
Golden eagle	Aquila chysaetos	MG, CC, UP GFC, LSO, IP	RO	March - September	х	
Grasshopper sparrow	Ammodramus savannarum	IP	MG, GFC, LSO	May – August	х	
Great horned owl	Bubo virginianus	UP, GFC LSO, IP	MG, <sup>e</sup> CC, RO	February - May	Х	Will nest in MG and CC only if suitable nest structure is present.
Horned lark	Eremophila alpestris	LSO	MG, CC, UP, GFC, IP	March - June (March - August)	х	
Killdeer	Charadrius vociferus		MG, CC, UP, GFC, LSO, IP	March - mid August	х	
Lark sparrow	Chondestes grammacus		LSO	May - June	Х	

Migratory Birds That Potentially Nest at the Generation Plant Site

Species Name	Scientific Name	Occurs <sup>a</sup>	Nests <sup>b</sup>	Breeding Period <sup>c</sup>	MBTA <sup>d</sup>	Comments
Loggerhead shrike	Lanius Iudovicianus	MG, GFC, IP	LSO	Mid-March - July	Х	
Long-eared owl	Asio otus		MG <sup>e</sup> , UP, GFC, LSO, IP	April - Late July	Х	
Mourning dove	Zenaida macroura	MG, GFC, LSO	UP, IP	April - September	Х	
Northern harrier	Circus cyaneus	CC, LSO	MG, UP, GFC, IP	March - September	Х	
Northern rough- winged swallow	Stelgidopteryx serripennis	UP, GFC, LSO, IP		April - July	Х	
Peregrine falcon	Falco peregrinus	UP, GFC, IP	RO	March - August	Х	
Prairie falcon	Falco mexicanus	MG, CC, UP GFC, LSO, IP	RO	March - July	Х	
Red-tailed hawk	Buteo jamaicensis	MG <sup>a</sup> , CC, UP, GFC, LSO, IP	RO	March - September	Х	Other habitat types may be used for nesting, but potential sites very limited.
Ring-necked pheasant	Phasianus colchicus	MG, CC, UP, GFC, IP	LSO	April - August		
Rock wren	Salpinctes obsoletus	GFC, LSO, IP	RO	April - August	Х	
Sage grouse	Centrocercus urophasianus	CC, UP, GFC, IP	LSO	March - early July (March - early August)		
Sage sparrow	Amphispiza belli		LSO	March - August	Х	
Sage thrasher	Oreoscoptes montanus		LSO	May - mid August	Х	
Savannah sparrow	Passerculus sandwichensis		MG, UP, GFC, LSO, IP	May - July (May - August)	Х	
Say's phoebe	Sayornis saya	MG, UP, GFC, LSO, IP	RO	March - July	Х	
Sharp-tailed grouse	Tympanuchus phasianellus	GFC, LSO		April - August		
Short-eared owl	Asio flammeus		MG, CC, UP, GFC, LOM, IP	April - June (April - August)	Х	General association with wetlands presence unlikely.

Migratory Birds That Potentially Nest at the Generation Plant Site

Species Name	Scientific Name	Occurs <sup>a</sup>	Nests <sup>b</sup>	Breeding Period <sup>c</sup>	MBTA <sup>d</sup>	Comments
Swainson's hawk	Buteo swainsoni	MG, CC, UP, GFC,		April - July	Х	Nesting habitat very
		LSO, IP		(April - August)		limited—nesting in analysis area unlikely.
Tree swallow	Tachycineta bicolor	MG		April - July	Х	
Turkey vulture	Cathartes aura	MG, UP, GFC, LSO	RO	April - August	Х	
Vesper sparrow	Pooecetes gramineus		GFC, LSO, IP	April - August	Х	
Western kingbird	Tyrannus verticalis		MG, CC, UP, GFC, LSO, IP	May - June (May - August)	х	Adjacent transmission lines only available nesting habitat.
Western meadowlark	Sturnella neglecta		MG, CC, UP, GFC, LSO, IP	May - July (May - August)	Х	
White-throated swift	Aeronautes saxatalis	UP, GFC, LSO	RO	May - July	х	

Abbreviations:

LSO = Low Shrub/Open.

GFC = Grass/Forb Closed.

MG = Modified Grassland.

UP = Unimproved Pasture.

IP = Improved Pasture.

CC = Cultivated Cropland.

RO = Rocky Outcrop.

<sup>a</sup> Species uses this habitat type for foraging or resting, but not nesting.
 <sup>b</sup> Nests and forages in this habitat type.
 <sup>c</sup> Breeding period is a synthesis of information from O'Neil et al. (2001) and Csuti et al. (1997). Core breeding periods are listed first; dates in parentheses represent the earliest and latest reported breeding times.
 <sup>d</sup> Species is protected under the Migratory Bird Treaty Act.
 <sup>e</sup> Habitat elements necessary for nesting are not present at the generation plant site.

lower soil strength than unoccupied areas. Warden soils and similar soils, such as Sagehill Fine Sandy Loam, are most commonly associated with presence of Washington ground squirrel colonies. Warden soils and similar soils are believed to be important because they provide structural attributes related to burrow integrity combined with relative ease of excavation (Greene, 1999; Morgan and Nugent, 1999).

Existing onsite vegetation conditions and underlying soils (Stratford Very Stony Silt Loam) are not conducive to Washington ground squirrel occupancy (Verts and Carraway, 1998). Therefore, it is very unlikely that Washington ground squirrels would inhabit or use the site. The closest area with reported Washington ground squirrel activity is from 4 to 5 miles southeast of the generation plant site (WDFW, 2000). However, this site is no longer believed to be occupied (Fowler, pers. comm.).

## 3.6.2 Environmental Impacts of the Proposed Action

#### 3.6.2.1 Construction

## **General Wildlife Species**

Approximately 40 acres of vegetation, including native shrub-steppe habitat, rangeland, and non-native invasive species, would be permanently removed through clearing and cut and fill activities associated with construction of the generation plant. An additional 10 acres would be temporarily cleared and possibly graveled to provide construction parking and equipment and material staging areas (see Section 2, Figure 2.2-4). Within this area of disturbance, wildlife species – predominantly birds, reptiles, and small mammals – would be displaced, and the function of the remaining habitat for general wildlife species would decrease. Noise and construction activity also could disturb wildlife species using areas adjacent to the generation plant site, which could result in temporary displacement from the construction area and adjacent areas.

Although construction activities would displace individuals from the plant site and would likely result in mortality to some individuals of species with low mobility currently using the plant site and adjacent areas, it is not expected that priority species would be affected because no priority species have been documented onsite. Thus, the impact of construction on general wildlife is not expected to be significant. Generation plant construction would result in a loss of approximately 40 acres of mule deer winter range, which represents a relatively small portion of the available winter range in the generation plant vicinity and a small proportion of the average home range size (about 350 acres) of mule deer.

Generation plant construction is not expected to disturb nesting activities of osprey and prairie falcon because the nests are approximately 0. 5 and 0.75 mile away, respectively. In addition, use of the prairie falcon nest has not been observed since 1988 (WDFW, 2000; Fowler, pers. comm.). Prairie falcon are reported to generally be relatively tolerant of construction activities, and the distance between the construction zone and the nest site is greater than most reported response distances (Steenhof, 1998). Osprey appear to be very tolerant of human activity, frequently nesting on bridges and other structures immediately adjacent to regular, loud human activity. Both nest sites are separated from the construction area by intervening topography, which prevents direct line of sight and would substantially eliminate or ameliorate construction noise, making it unlikely that these birds would react. Plant construction would permanently convert approximately 40 acres of potential prairie

falcon foraging habitat to a developed condition. This represents less than 0.14 percent of the average home range core area used by nesting prairie falcons in southwestern Idaho (Marzluff et al., 1997). In addition, conditions at the site are not unique in the surrounding area; therefore, any impact to prairie falcon foraging is expected to be minimal. Osprey foraging should not be affected.

Generation plant construction would cause temporary disturbance to nesting and foraging activities of upland game birds in adjacent habitats. Construction would permanently displace upland game birds from the site and remove foraging and nesting habitat from the 40 acres of the site that would be developed. During the construction, an additional 10 acres would also be disturbed and unsuitable for foraging or nesting.

Other species potentially occurring onsite, such as coyote, ground squirrel, songbirds, and raptors, would also be displaced by construction activities. Generation plant construction would permanently convert potential habitat for these species to a developed condition.

Given the relatively small area of development and the large area of undeveloped land in the generation plant vicinity, however, no significant impacts to these species would be expected.

#### **Threatened and Endangered Species**

The bald eagle is the only federally listed threatened or endangered wildlife species reported to occur in the vicinity of the generation plant site. Eagles that occur in the plant site vicinity are transient wintering eagles. Numbers are expected to be low and occurrences random, as populations east of the Cascades are lower than on the westside and there are no roosts or trees suitable for perches in the plant site vicinity. Construction of the generation plant would not affect forage species (waterfowl) or reduce perching or roosting habitat. If bald eagles were to occur in the area during construction, they may avoid the construction area. However, because the construction area does not provide any important habitat attributes for bald eagles, no adverse impacts to bald eagles are expected from plant construction.

The ferruginous hawk is a state-listed threatened species. A known ferruginous hawk nest is located slightly more than 0.6 mile from the generation plant site. Given this distance and intervening topographic features (two ridges) between the nest site and the generation plant site, disturbance is not expected to occur. Permanent conversion of 40 acres of potential foraging habitat to a developed condition would decrease available foraging habitat for ferruginous hawks in the area; however, this represents approximately 2.3 percent of the average home range area reported for ferruginous hawks. In addition, conditions at the site are not unique in the surrounding area. Therefore, construction of the proposed generation plant is not expected to have significant adverse effects on the survival or reproductive success of ferruginous hawks in the area.

The existing soil and vegetation conditions on the site are not believed to be conducive to Washington ground squirrel occupancy.

#### Other Wildlife-Related Laws and Regulations

Several federal laws and administrative procedures must be met by the proposed action, including the Migratory Bird Treaty Act (MTBA; 16 USC 701), Bald and Golden Eagle

Protection Act (16 USC 668), and Fish and Wildlife Conservation Act (16 USC 2901). The following paragraphs list and briefly describe requirements that would apply to this Application.

#### **Migratory Bird Treaty Act**

The MBTA makes it illegal to "pursue, hunt, take, capture, kill, attempt to take, capture, or kill..." (16 USC 703) any migratory bird by any means or in any manner. Migratory birds (such as the western meadowlark [*Sturnella neglecta*]) are expected to nest in the vicinity of the generation plant.

Although adult birds are expected to be able to avoid construction activity and, thus, there would be no direct "taking" from construction, construction during the active nesting season could result in mortality to juveniles or eggs. Mitigation proposed to comply with the MBTA includes breeding bird surveys to determine whether construction noise or other activities are likely to have a significant adverse impact on protected bird species during core bird breeding and nesting periods (from April 15 to July 15). If such surveys indicate a probable significant impact, the Applicant will develop and implement a plan to avoid or mitigate such impacts. After construction is completed, disturbed areas not used for the generation plant will be restored to pre-project habitat conditions to allow continued use by wildlife. Generally nesting occurs from March through August; however, the core nesting period is mid-April through mid-July (Csuti et al., 1997; O'Neil et al., 2001).

## Bald Eagle and Golden Eagle Protection Act

16 USC 668 prohibits anyone from "knowingly" or "through wanton disregard of the consequences of his" actions "taking" bald and golden eagles. Golden eagles are not known to occur in the vicinity of the generation plant site. Bald eagles may occur in the site vicinity on a random basis during the winter. However, no action proposed for construction or operation of the generation plant would adversely affect bald eagles or their habitat. No action associated with construction of the proposed plant is expected to affect the bald eagle or golden eagle.

#### Fish and Wildlife Conservation Act

The Fish and Wildlife Conservation Act of 1980 (16 USC 2901 et seq.) encourages federal agencies to conserve and promote conservation of non-game fish and wildlife species and their habitats. In addition, the Fish and Wildlife Coordination Act (16 USC 661 et seq.) requires federal agencies undertaking projects affecting water resources to consult with the USFWS and the state agency responsible for fish and wildlife resources. Mitigation designed to conserve wildlife and their habitat is provided in Section 3.6.4.

#### **Columbia County Resource Lands and Critical Areas Ordinances**

Because the generation plant site and areas adjacent to it are not in critical areas, no conflicts with Columbia County resource lands and critical areas ordinances relative to wildlife are expected to result from the proposed generation plant.

## 3.6.2.2 Operation and Maintenance

Generation plant operation, including emissions, is not expected to significantly affect wildlife.

Periodic trimming and other mechanical methods of maintaining grassland along the natural gas pipeline and around the generation plant would temporarily disturb wildlife species that return to inhabit the site after construction. Maintenance might encourage invasive plants to become established, and wildlife that can use such habitats would become more common, while native wildlife dependent on native vegetation could be displaced. However, the area affected is relatively small, and potential impacts are not expected to be significant.

The presence of four 53-meter-tall (175-foot) stacks and the increase in night lighting could affect bird and bat flight patterns. There have been many documented occurrences of bird mortality caused by collisions with manmade structures, including stacks and towers (Kerlinger, 2000a). Structure height and lighting appear to be important factors affecting the number of bird collisions (Kerlinger, 2000b), as does tower location in relation to areas of high bird use and migration routes (Manville, 2000). The information in these studies suggests that the 175-foot stacks at the generation plant site would not result in high levels of avian mortality, although some mortality is possible. However, information regarding the impacts of towers less than 400 feet tall has not been well documented. The generation plant is not believed to be an important migration area. Bird movement in the area is expected to be similar to that in other portions of the Snake River with similar habitat structure.

## 3.6.3 Environmental Impacts of Alternatives

## 3.6.3.1 Northwest Site Alternative

The environmental impacts on wildlife associated with the northwest site alternative would be the same as those associated with the proposed southeast site alternative because the sites are adjacent to each other, have similar wildlife habitats, and have similar wildlife species, and because the same amount of habitat would be affected.

#### 3.6.3.2 Wet-Cooled System Alternative

The environmental impacts on wildlife associated with the wet-cooled system alternative would be the same as those associated with an air-cooled system. The amount of habitat affected would be the same for either alternative, and disturbance and habitat alteration would have the same magnitude relative to wildlife habitat or species, except for fisheries (addressed in Section 3.7).

#### 3.6.3.3 Water Pipeline

As a water supply alternative to the proposed onsite well, the Applicant has secured an option to purchase up to 100 gallons per minute (gpm) (or up to 144,000 gallons per day [gpd]) of water from the Town of Starbuck under the Town's existing water right. The Applicant would construct a water pipeline, primarily along an abandoned railroad bed, connecting the generation plant to the Town water supply system. Impacts to wildlife associated with the water pipeline alternative would be greater than those associated with the proposed onsite well.

Construction of the water pipeline alternative would affect a greater spatial area than the proposed onsite well and, therefore, would affect a greater number of species. In addition, the water pipeline route is within a PHS-type "Riparian Area" (WDFW, 2000). Riparian

areas receive disproportionately greater use by wildlife than do upland areas. Several PHS species are listed by WDFW as occurring near the water pipeline route, including nesting ferruginous hawk and prairie falcon, regular large concentrations of chukar, ring-necked pheasant, and mule deer (WDFW, 2000). Construction activities associated with the pipeline would not adversely affect important habitat for any of these species. However, construction activities may cause some individuals of these species and others to avoid the areas of active construction. In most cases, these species are tolerant of human activity and likely would return to normal use patterns after the disturbance ended.

If the ferruginous hawk and prairie falcon nests were being used at the time of construction, disturbances from construction activity during the nesting season (generally February through July) could result in these nests being abandoned, or in short "startle flights" that may dislodge eggs from the nest (Steenhof, 1998). Because these species are otherwise relatively tolerant of human activity, construction completed outside the nesting period likely would have no adverse impact on the survival or reproductive capability of these birds.

The Applicant will provide detailed information on the impacts of the water pipeline alternative if the Applicant seeks to implement this alternative.

## 3.6.4 Mitigation Measures

The following mitigation measures have been identified and are recommended for the generation plant.

## 3.6.4.1 Construction

The Applicant will conduct breeding bird surveys to determine whether construction noise or other activities are likely to have a significant adverse impact on protected bird species during core bird breeding and nesting periods (from April 15 to July 15). If such surveys indicate a probable significant impact, the Applicant will develop and implement a plan to avoid or mitigate such impacts. After construction is completed, disturbed areas not used for the generation plant will be restored to pre-project habitat conditions to allow continued use by wildlife.

#### 3.6.4.2 Operation and Maintenance

Diffuse exterior lighting will be minimized, and the lighting design will minimize light intrusion into surrounding areas. Landscaping will also be minimized, and native plants similar to those currently existing onsite will be used for landscaping where possible. The use of native plant material will reduce the amount of irrigation, pesticides, and herbicides needed and provide habitat for native species.

Criterion F in Section 3.6 of the *Starbuck Power Project Potential Site Study* (Jones & Stokes, 2001) requires that an assessment of "the potential of wildlife enhancement through the use of stormwater discharges" be conducted. Generally, stormwater is used in conjunction with vegetation planting and topographic grading to enhance or create open water or emergent wetland habitat and may provide or enhance nesting, resting, and foraging habitat for a variety of wildlife. In this case, this is not recommended. Creating an area desirable to wildlife (particularly to birds) in the vicinity of the proposed generation plant would result in wildlife incursions into an industrial area and encourage birds to fly into the immediate

vicinity. After construction, there would be an additional set of transmission lines, accompanying wires and guys, and other obstructions, thereby increasing the likelihood of collisions, injury, and death to species attracted to the enhanced area. Use of the stormwater to irrigate and increase forage quality and/or quantity in the area would result in unnatural concentrations of herbivores and likely create conflicts with local landowners.

## 3.6.5 Cumulative Impacts

No cumulative impacts to wildlife are associated with construction or operation and maintenance of the generation plant.

## 3.6.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to wildlife are associated with construction or operation and maintenance of the generation plant.

# SECTION 3.7 **Fisheries**

# 3.7 Fisheries Resources

This section describes the existing conditions, potential impacts of proposed construction and operation, and mitigation measures for potential impacts to fisheries resources that are found within the vicinity of the Starbuck Power Project (SPP). In addition to this impacts assessment, a biological assessment will be developed for consultation with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA). Consultation under the ESA is required when a federal action has the potential to affect listed species. There is federal involvement in various aspects of the SPP (for example, construction of the proposed BPA transmission line). In addition, an easement will be required from the Corps for access to the railroad spur, natural gas pipeline, and road access to the generation plant site. In each case the Corps has property that will need to be crossed. The Applicant is coordinating with BPA and the Energy Facility Site Evaluation Council (EFSEC) on ESA review.

Threatened, endangered, proposed, candidate, and species of concern lists were requested from the NMFS, USFWS, and WDFW. These species lists are provided in Attachment A to Section 3. In initial meetings with NMFS and USFWS, both agencies concurred with the assessment of no adverse impacts to listed species pending field survey confirmation. No additional potential impacts were identified other than those evaluated in the following subsections. Therefore, no take of listed species will occur during construction, operation, or decommissioning of the facility and, therefore, the proposed project will not require an incidental take statement or permit for any listed species. SPC will seek concurrence in writing, with a "may affect, not likely to adversely affect" impacts determination from NMFS and USFWS, during ESA consultation for the project pending field survey confirmation.

In addition to discussions with the NMFS and USFWS, and review of Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species data for the area, Glenn Mendel (pers. comm.) was contacted regarding the proposed project.

## 3.7.1 Existing Conditions

## 3.7.1.1 Generation Plant Site

The generation plant site, located within the lower Snake-Tucannon watershed, is bounded by SR-261 to the southwest and by the Snake River to the northeast. The Snake River flows northwest in the vicinity of the generation plant site and joins the Columbia River approximately 60 miles downstream. The generation plant site is located on a bluff above and southwest of the Snake River at approximately river mile (RM) 60. (In the vicinity of the generation plant site, the Snake River is also known as Lake Herbert G. West, a reservoir created by Lower Monumental Dam.) The property boundary nearest the river is approximately 350 feet horizontal distance from the river, with a vertical drop of approximately 170 feet from the generation plant site elevation to the normal river water level (Black & Veatch, 2000). The site is zoned for heavy industrial use. The site currently is used for grazing, and the vegetation consists primarily of grasses. The site slopes away from the Snake River (meaning that the highest elevations are located near the top of bank of the Snake River) and does not have any surface water features. The confluence of the Snake and Tucannon Rivers is located approximately 1.5 miles southeast (upstream) of the generation plant site.

The Snake River (Lake Herbert G. West) is the only body of water in the vicinity of the site. Chinook salmon, sockeye salmon, steelhead trout, native char (bull trout and Dolly Varden), Pacific lamprey, river lamprey, Umatilla dace, leopard dace, and margined sculpin are known or expected to occur in the lower Snake River (WDFW, 2001; Jones & Stokes, 2001) (Table 3.7-1). Migrating salmonids must negotiate numerous dams on both their upstream and their downstream migrations. A state hatchery (the Lyons Ferry Hatchery) is located approximately 2 miles downstream of the generation plant site on the Snake River. This facility produces summer steelhead trout and spring chinook, fall chinook, and coho salmon. In addition, the Tucannon River Hatchery produces summer steelhead trout and spring chinook salmon; it is located at RM 36 on the Tucannon River.

The lower Snake River currently provides poor conditions for salmonids. Limiting factors for anadromous salmonids include the following:

- High sediment deposition has resulted from construction and operation of reservoirs on the lower Snake River, such as Lake Herbert G. West, the impoundment behind Lower Monumental Dam.
- Substantial riparian areas and salmonid habitat along the lower Snake River were inundated as the reservoirs were filled. Because of the reservoirs' existence, no salmonid spawning occurs in the lower Snake River.
- Low dissolved oxygen levels, coupled with high water temperatures during the summer months, reduce the reservoirs' value as rearing habitat for salmonid juveniles.
- The reservoirs also support numerous introduced fish species that prey upon juvenile salmonids. These species include largemouth bass, smallmouth bass, and northern pike minnow.

Thus, the lower Snake River provides no usable salmonid spawning habitat and little valuable habitat for salmonid rearing; the river is used primarily as a migratory corridor.

## 3.7.2 Environmental Impacts of the Proposed Action

#### 3.7.2.1 Construction

Construction of the proposed generation plant would not require actions in flowing water or result in adverse impacts to riparian areas. The construction site's location and use of best management practices (BMPs) make it very unlikely that any construction activity would affect the Snake River. Construction of the generation plant should have no adverse impact on fish or aquatic habitat.

It is highly improbable that runoff from the construction site would be released into the Snake River, given the high permeability of the soils in the area and construction BMPs in place during construction activities. These BMPs may include (but are not limited to) silt fences, straw bales, swales, check dams, and biobags. Silt fences will be installed around the perimeter of the construction area; straw bales, swales, check dams, or biobags will be installed in topographic low areas to filter and slow runoff before it reaches the silt fence.

#### TABLE 3.7-1

Special-Status Fish Species Likely to Be Present in the Generation Plant and Water Pipeline Vicinity

Species	Status	Key Habitats of Concern	Key Habitat Present within the Generation Plant and Water Pipeline Vicinity
Chinook: fall-, spring-, and summer-run (Oncorhynchus tshawytscha)	FT, SC	Rivers/streams where present, associated riparian areas and contributing waters	Known to use the lower Snake-Tucannon watershed during migration periods
Sockeye salmon (Oncorhynchus nerka)	FE, SC	Rivers/streams where present, associated riparian areas and contributing waters	Known to use the lower Snake-Tucannon watershed during migration periods
Steelhead, summer-run (Oncorhynchus mykiss)	FT, SC	Rivers/streams where present, associated riparian areas and contributing waters	Known to use the lower Snake-Tucannon watershed during migration periods
Bull trout ( <i>Salvelinus confluentus</i> )	FT, SC	Rivers/streams where present, associated riparian areas and contributing waters	Known to use the lower Snake-Tucannon watershed
Pacific lamprey ( <i>Lampetra tridentate</i> )	FSC	Rivers/streams where present, associated riparian areas and contributing waters	Known to occur in the lower Snake- Tucannon watershed
River lamprey ( <i>Lampetra ayresi</i> )	FSC, SC	Rivers/streams where present, associated riparian areas and contributing waters	Known to occur in the lower Snake- Tucannon watershed
Umatilla dace (Rhinoichthys falcatus)	FSC, SC	Undammed riverine habitat with cobble or stone bottom and relatively warm, productive waters	Key habitat may remain within the Tucannon watershed
Leopard dace (Rhinoichthys falcatus)	FSC, SC	Slow-moving streams of the Upper Columbia	May occur in the lower Snake-Tucannon watershed
Margined sculpin (Cottus marginatus)	FSC, SC	Rivers with moderate to rapid currents over a bed of rubble or gravel	Known to occur in the Tucannon River

Abbreviations:

FE = Federal Endangered.

FT = Federal Threatened.

FSC = Federal Species of Concern.

SC = State Candidate.

SS = State Sensitive.

The stormwater infiltration/evaporation pond will be one of the first structures constructed to control sediment and erosion. In addition, because the generation plant site is located on a bluff above and away from the Snake River, the site does not support any surface water features or fisheries, and construction activities would have no direct effects on fisheries or limiting factors for anadromous salmonids in the Snake River. No impacts to migrating salmonids in the Snake River or other fish or existing aquatic habitat are expected as a result of plant construction as long as construction debris or materials are not discarded on the riverbank. To prevent this, construction specifications will specifically state that construction debris or materials will not be discarded on the riverbank.

Additionally, construction activities will occur only within the property boundaries. The distance from the closest project facility (the perimeter road) to the top of the bank above the Snake River is approximately 41 feet. There are no trees on the property or near the top of the bank, and the terrain slopes away from the Snake River. Because no disturbance will occur between the perimeter road and the top of the bank, there will be no construction impacts to the Snake River or to fisheries resources using the Snake River.

## 3.7.2.2 Operation and Maintenance

Release of generation-plant-associated water from the site directly into the Snake River is highly improbable, given the high permeability of the soil, the fact that the top of the riverbank is higher than the generation plant area, and the type of water collection and treatment system proposed for installation on the site. Therefore, generation plant operation should have no adverse effect on fisheries resources or limiting habitat in the Snake River.

Indirect effects are usually considered those effects that occur over some time but are still linked to project actions. Examples of an indirect effect would be (a) a poor drainage system design that, over time, promoted excessive erosion, or (b) a project feature built on excessively steep slopes that promote slumping or erosion. The drainage design for the generation plant incorporates a low degree of impermeable surfaces by having gravel parking lots to allow for normal percolation into the soil, a stormwater collection system for all buildings, and an infiltration/evaporation pond to eliminate excessive erosion. In addition, the equipment at the north end of the property near the substation will be gasinsulated to eliminate potential oil spills. It will be supported on small concrete foundations surrounded by crushed rock to allow normal infiltration and significantly reduce the amount of impervious surface area. Also, once operation commences, a large area of the northern portion of the property will be returned to pre-construction conditions. The generation plant or any related structures on the property will not be built on excessively sleep slopes. Areas with buildings will be leveled to assist with slowing runoff and to allow a longer time for percolation. Therefore, operation and maintenance of the generation plant are not expected to have indirect adverse impacts on fisheries or the Snake River.

The Applicant currently is awaiting Washington State Department of Ecology (Ecology) determination on its 300 gpm water right application. If granted, this water right will authorize the proposed onsite well that will serve as the non-potable water supply for the generation plant (Elmer, pers. comm.).

Of the maximum water supply available (300 gallons per minute [gpm] per year), approximately 290 gpm will go to the raw water/fire storage tank and be routed to the mobile demineralization trailer for treatment. Of that amount, 268 gpm will be used for fogging or for steam injection. The remaining 22 gpm will be used in the steam cycle to operate the steam turbine. There will be approximately 10 gpm that will go to the service water system. Of that 10 gpm, wastewaters will be distributed as follows:

- Sanitary waste (1 gpm) that will be routed to an onsite sewage disposal system (septic tank and drain field)
- The remaining washdown water (9 gpm) will be discharged into plant/equipment drains, routed to an oil-water separator, and directed to the process water infiltration/evaporation pond

The infiltration/evaporation pond will be located near the southeast corner of the generation plant site, south of the sanitary wastewater disposal area. Housekeeping water (water collected when the floor of a structure is hosed down) collected in the pond will be allowed to evaporate or naturally infiltrate into the surrounding soil. The infiltration/ evaporation pond will be 1.3 acres in size and will hold a maximum of about 6.5 acre-feet of water. Sanitary wastewater will be directed to a separate wastewater disposal system —a septic tank with a drain field in the southeast corner of the site. The tile field will cover less than one-eighth acre in area, will be engineered to accommodate the design discharge requirements, and will use a gravel filtering material.

Stormwater will be directed to an unlined stormwater pond for infiltration and evaporation. The stormwater collection and management system at the generation plant will include roof drains and piping (for buildings), area drains (for tanks and outdoor equipment), and catch basins and curb inlets (for paved areas), draining into an underground stormwater conveyance system. Stormwater falling on the generation plant's major structures will be collected in gutters and directed into the stormwater system.

The stormwater pond will be located near the southeast corner of the site and will be sized to accommodate the 25-year/24-hour storm event. The 2-acre pond will hold 4 acre-feet, will be 2 feet deep, and will have 2 feet of free board to accommodate the 25-year/24-hour storm event.

The following measures will reduce stormwater contamination and runoff:

- Transformer areas will be covered with standing seam metal roofs, exterior material of buildings will be metal wall panels, and no heating, ventilating, and air conditioning (HVAC) equipment will be placed on roofs.
- Parking lots will be gravel to allow natural percolation of water into the soil.
- Equipment in the substation area will be gas insulated to eliminate potential oil spills. It will be supported on small concrete foundations surrounded by crushed rock to allow normal infiltration and significantly reduce the amount of impervious surface area.
- The substation area will be graded level and covered with aggregate to slow runoff and allow natural soil infiltration.

Some infiltration water from the process wastewater infiltration/evaporation pond and stormwater pond would be expected to reach the flood gravel aquifer approximately 190 feet below the ground surface (bgs). This groundwater elevation corresponds closely to the pool elevation of Lake Herbert G. West, suggesting that the flood gravel aquifer is hydraulically connected with the lake. Therefore, infiltration water from the ponds will probably enter the Snake River with this groundwater. Because the infiltration water from the process wastewater will be chemically similar to groundwater and infiltrated stormwater is not expected to be contaminated, no adverse impact would be expected on groundwater quality or on surface water quality when groundwater enters the Snake River. In addition, the water in the ponds will meet water quality standards for groundwater discharge, thereby supporting the determination that water from these ponds will not adversely affect groundwater or surface water quality, fisheries, or limiting factors for anadromous salmonids in the Snake River.

Although the process wastewater will have an elevated temperature over the well water temperature (typically between 48 and 54°F), it will cool as it infiltrates 190 feet through the soil. In addition, when the process wastewater infiltrates into the flood gravel aquifer, the process wastewater would be expected to be the same temperature as the flood gravel aquifer temperature. The flood gravel aquifer has a high likelihood of being hydraulically connected to the Snake River. Therefore, there will be no impacts to Snake River water quality, fisheries resources, or limiting factors for anadromous salmonids because of infiltration of the generation plant process wastewater.

The onsite well would be completed in the flood gravel aquifer, which is likely hydrologically connected to the Snake River. Drawing water from the onsite well may result in some loss of groundwater delivery to the Snake River. However, it is unlikely that the affects of this on the Snake River would be measurable or have an adverse impact on fisheries or aquatic habitat. In addition SPC will provide mitigation by obtaining and returning sufficient water to compensate for the entire withdrawal from the onsite well for the project.

Significant impacts would not be expected to the fish hatcheries on the Tucannon River (Tucannon Hatchery, RM 36) or the Snake River (Lyons Ferry Hatchery, RM 58), or to the Snake or Tucannon rivers as a result of generation plant air emissions. Emissions from the plant are expected to be quite low – approximately100 tons per year – and composed primarily of background air particulates. However, there would be some emissions of nitrates and sulfates. Ammonium nitrate could form as a secondary reaction after the emissions leave the generation plant; given the conditions in eastern Washington , this could occur at a distance of approximately 100 miles or more away from the generation plant. Because emissions from the generation plant would be low, there would be no noticeable fallout from these emissions. For additional details regarding air emissions from the generation plant, see Section 3.2.2.2.

## 3.7.3 Environmental Impacts of Alternatives

## 3.7.3.1 Northwest Site Alternative

The environmental impacts on fisheries would be the same under both the northwest and southeast site alternatives because the sites are adjacent to each other, are similarly located with respect to the Snake and Tucannon Rivers, and would receive their water supply and discharge wastewater in the same manner.

## 3.7.3.2 Wet Cooled System Alternative

The fisheries impacts under the wet-cooled system alternative could be greater than under the preferred air-cooled system alternative because the wet-cooled system requires more water. A wet-cooled system uses more than 8 million gallons of water per day, compared with about 432,000 gallons per day for the air-cooled system.

#### 3.7.3.3 Water Pipeline Alternative

As a water supply alternative to the proposed onsite well, the Applicant has secured an option to purchase up to 100 gallons per minute (gpm) (or up to 144,000 gallons [gpd]) of water from the Town of Starbuck under the Town's existing water right. The Applicant

would construct a water pipeline, primarily along an abandoned railroad bed, connecting the generation plant to the Town water supply system. The construction-related fisheries impacts under the alternative water pipeline option could be greater than under the preferred onsite well alternative because of the approximately 6 miles of excavation required on the abandoned railroad bed that follows the Tucannon River, and the crossing of the Tucannon River via the SR-261 bridge.

The potential effect of the generation plant's groundwater consumption (for the plant's water supply) on Snake or Tucannon River flows and fisheries would be less than negligible under either the water pipeline alternative or the onsite well. The Town of Starbuck well is sealed off from groundwater that is hydraulically connected to the Tucannon River. Under the water pipeline alternative, groundwater would be withdrawn from the Town of Starbuck's municipal well (which is 424 feet deep) and sealed from the surface to 42 feet bgs, thereby not allowing infiltration of Tucannon River valley shallow aquifer water into the well. Therefore, it is unlikely that groundwater withdrawal would have any effect on the flow of the nearby Tucannon River that flows to the Snake River, given the results of a well pump test, the well's construction, and its water withdrawal depth (CH2M HILL, 2001). The proposed onsite well would be completed in the flood gravel aquifer that is likely hydraulically connected to the Snake River. Therefore, use of onsite well may affect water quantity in the Snake or Tucannon Rivers, while the Town of Starbuck well alternative would not. However, with the Applicant's proposed water quantity mitigation, there would be no measurable difference between the two alternatives.

The Applicant proposes mitigation measures for the generation plant to compensate for any potential water loss from the Snake River associated with the onsite well proposal. The mitigation would be in the form of water rights that will be purchased or leased, and relinquished to Ecology, so as to return to the Snake River directly water equal to the quantity of any water that is withdrawn.

Anadromous salmonids and bull trout are known to use the Tucannon River for spawning and rearing. However, the lower Tucannon River is used as a migratory corridor to upstream spawning and rearing grounds. Construction and operation of the water pipeline should not impact fisheries or aquatic habitat if standard BMPs are implemented.

The Applicant will provide detailed information regarding fisheries resources within the water pipeline corridor and potential impacts to fisheries resources from the water pipeline corridor if the applicant seeks to implement this alternative.

## 3.7.4 Mitigation Measures

## 3.7.4.1 Construction

The recommended mitigation measures discussed for water resources (Section 3.3) will ensure that there are no impacts on fisheries in the Snake River.

## 3.7.4.2 Operation and Maintenance

The Stormwater Pollution Prevention Plan (SWPPP) (contained in Appendix H) will be followed and onsite containment structures maintained so that there would be no release of chemicals/contaminants in the event of an onsite spill.

After construction is completed, undeveloped areas onsite will be returned to natural conditions with native vegetation.

The Applicant currently is awaiting Ecology determination on its 300-gpm water right application. If granted, this water right will authorize the proposed onsite well that will serve as the potable water supply for the generation plant (Elmer, pers. comm.). The Applicant intends to propose water quantity mitigation to compensate for water withdrawn from the onsite well and used by the generation plant. The Applicant is in the process of acquiring water rights in the Snake River system for mitigation purposes, and details are not yet available.

## 3.7.5 Cumulative Impacts

No cumulative impacts to fisheries resources are associated with construction or operation and maintenance of the generation plant.

## 3.7.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to fisheries resources are associated with construction or operation and maintenance of the generation plant.

# SECTION 3.8 Energy and Natural Resources

## 3.8 Energy and Natural Resources

This section describes the expected energy and natural resource use at the generation plant, the sources and availability of energy for the generation plant, the plant's impact on nonrenewable resources, and energy conservation measures to be used at the plant.

## 3.8.1 Energy and Natural Resource Consumption, Rate of Use, and Efficiency

This section describes the energy and natural resource consumption during both construction and operation of the proposed facilities, both as a rate of use and in terms of the efficiency that can be achieved during construction and operation.

## 3.8.1.1 Construction

Electricity, diesel fuel, and gasoline are the energy resources that will be consumed during construction of the generation plant. The generation plant will be constructed using materials (such as steel) that require energy for fabrication. Energy will also be required to transport these materials to the plant site. Cranes, trucks, mobile equipment, tools, and equipment operated during actual plant construction will also consume energy. Data regarding energy use have not been calculated for construction of the generation plant. Estimates have been provided based on consumption associated with comparable facilities.

## Natural Gas

Little or no natural gas will be consumed during construction of the generation plant (Nagori, pers. comm.).

## Electricity

Electricity consumption for the generation plant is based on the construction power demand that was estimated for Sempra Mesquite, a similar two-power-block, two-on-one, F-class combined-cycle facility. The estimate is based on a construction cycle of 29 months.

On this basis, construction of the Starbuck generation plant is estimated to use a maximum of 400,866 kilowatt-hours per month (kWh/mo), with a maximum demand of 1,090 kilowatts (kW). Minimum usage is estimated at 4,745 kWh/mo and minimum demand at 98 kW.

Figure 3.8-1 shows the estimated demand profile per month over the 29-month period of construction. Figure 3.8-2 shows the estimated energy profile per month over the 29-month construction period.
# FIGURE 3.8-1



FIGURE 3.8-2 Energy Profile per Month



# **Diesel Fuel and Gasoline**

Gasoline and diesel fuel use during construction of this type of two-power-block, two-onone, F-class combined-cycle plant is estimated to be approximately 240,000 to 280,000 gallons, which constitutes a minute quantity in relation to the total use of these fuels for all purposes in Washington State.

#### Sand and Gravel

Structural fill for the generation plant and roadway base will require gravel and aggregates.

Construction quantities have not been calculated for the specific activities described below. Nevertheless, a preliminary estimate of quantities of gravel and crushed rock was calculated using general information. For purposes of the calculations, it is assumed that all temporary roads and parking areas will have at least 6 inches of gravel and crushed rock.

Two roadways, including driveways, will be constructed for plant access and egress from SR-261. The roadways will create an entrance loop, and a parking area will be established. Roadways will also be constructed around the generation plant, with access roads to specific areas. Passenger parking will be provided at the Generation Building. Aggregate used for construction of temporary roads will be reused for construction of permanent roads. No additional aggregate will be required. The permanent roads will be paved.

The temporary road area is estimated at 20,000 square yards, which will require approximately 3,300 cubic yards of gravel and crushed rock. The parking area is estimated at 24,000 square yards, which will require approximately 4,000 cubic yards of gravel and crushed rock. The laydown area for the generation plant (the area that will need to be cleared for construction of the plant and for the construction equipment) is approximately 120,000 square yards. Assuming that 35 percent of this area will be covered with a 6-inch-thick layer of gravel and crushed rock, a total of 7,000 cubic yards will be required for the laydown area.

Approximately 5,000 cubic yards of concrete will be needed for the foundation of the generation plant; this will require approximately 3,500 cubic yards of sand and gravel to mix (Portland Cement Association, 2001).

Two drainage areas on the project site will be surfaced with a crushed-rock base, which will allow percolation into the soil below. Drainage Area 1 will consist of the substation on the northern portion of the site. Drainage Area 2 will contain the remainder of the improved site, including the power generation area. These drainage areas are small, and the quantity of crushed-rock base required will be approximately 6,000 cubic yards.

The air-cooling condensers will require approximately 1,500 yards of aggregate.

The total amount of gravel and crushed rock required for all of these purposes will be 25,300 cubic yards.

# 3.8.1.2 Operation

# Natural Gas

Assuming a load model that indicates that the plant will normally operate with supplemental firing at 51.1 degrees Fahrenheit (°F) with duct firing on, the average gas consumption for the generation plant is 7,676.72 million British thermal units per hour (Btu/hr) on a low heat value (LHV) fuel basis and 8,519.09 million Btu/hr on a high heat value (HHV) fuel basis. Converted to a 24-hour-per-day value expressed as billion cubic feet (bcf), the consumption is expressed as 0.187 bcf/day for low heat value fuel and 0.208 bcf/day for high heat value fuel.

The HHV efficiency of the Starbuck plant will be 47.19 percent and the LHV efficiency 52.36 percent.

# Electricity

The electrical operating power (house load) of the generation plant will be 2.5 percent of the gross generation. This means that with a plant load of 1,200 megawatts (MW) gross, the net power will be 30 MW less. For example, during 1 hour of operation, the plant will generate 1,200 megawatt-hours (MWh), consume 30 MWh, and sell 1,170 MWh.

# 3.8.2 Energy Sources and Availability

This section describes the sources of supply, location of use, and types, amounts, and availability of energy or resources to be used or consumed during construction and operation of the facility.

# 3.8.2.1 Sources of Supply of Energy and Resources

# Natural Gas

The generation plant will obtain its gas primarily from Pacific Gas & Electric's (PG&E) Gas Transmission-Northwest (GTN) gas transmission system, which originates at the Canadian and Idaho border at a point called Kingsgate and runs primarily southward to the Oregon/ California border at Malin, Oregon. The primary source of gas for the GTN system is the Alberta production basin, which is within the Western Canada Supply Basin (WCSB). The Alberta production basin supplies the Alberta System, the largest volume carrier of natural gas in North America (TransCanada, 2001). The Alberta System is a province-wide natural gas transmission system that collects and transports natural gas for use in Alberta and for connecting pipelines, including those to the United States. The system has 13,900 miles of pipeline up to 48 inches in diameter.

A 36-inch-diameter natural gas mainline owned by GTN is located approximately 200 feet from the southeast corner of the generation plant site. GTN plans to install a 16-inch-diameter gas lateral connecting the mainline to the proposed metering/regulatory (M/R) station that will be on the Applicant's property. PG&E supplies the gas to this mainline.

# Electricity

The Bonneville Power Administration (BPA) regional transmission system currently transmits electrical power through the generation plant site through BPA's existing 500-kilovolt (kV) transmission lines that bisect the generation plant site. The Columbia Rural Electric Association (CREA) is the public utility that will supply electrical energy to the generation plant during construction and as standby power during operation. The CREA purchases wholesale power from BPA. Power supplied by BPA to CREA is supplied from a network of resources that includes conservation and renewable resources.

# **Diesel Fuel and Gasoline**

The amount of diesel fuel and gasoline needed for construction and operation of the generation plant is minimal; that is, consumption will be a tiny fraction of a percent of the consumption of these fuels for all purposes in Washington State. Diesel fuel and gasoline will be obtained either locally in the Town of Starbuck or in the larger communities of Walla Walla, Washington (approximately 40 miles to the south), or Lewiston, Idaho (50 miles to the east).

# Sand and Gravel

There are two local quarries near the generation plant site. It is common practice in the local area to contract with private landowners from Columbia and Walla Walla Counties to obtain sand and gravel. These contracts typically are either with owners of quarries or with other landowners (Elmer, pers. comm.).

# 3.8.2.2 Capacity of Natural Gas and Electrical Facility Suppliers over the 30 Years of Plant Operation

# Natural Gas

As described above, the source of natural gas supplying the generation plant will be the WCSB. Based upon its proven reserves and rates of consumption, the 30-year capacity of the WCSB is adequate to supply this plant. Construction of all proposed gas-fired plants in the Pacific Northwest would result in additional exploration in the WCSB. This in turn would expand proven reserves of gas supplying proposed plants.

Canada has 63,900 bcf of natural gas reserves. In 1998, Canada exported 3,149 bcf of dry natural gas (approximately 0.049 percent of Canada's proven reserves) (EIA, 2001).

The Alberta System delivered 4,552 bcf of gas in 1998 (TransCanada, 2001). This represents approximately 18 percent of total annual North America gas production and about 80 percent of the natural gas produced in the WCSB. The WCSB supply has varied from approximately 13 billion cubic feet per day (bcf/d) in 1992 to nearly 16 bcf/d in 1999 (NrG, 2001a). The seasonal flows in the Alberta System have averaged 11.2 bcf/d and 12.3 bcf/d in 1999 and 2000, respectively (NrG, 2001b).

PG&E's 612-mile GTN pipeline, which receives its gas from the Alberta System, currently transports approximately 2.7 bcf/d of natural gas from Canada into northwestern U.S. markets.

PG&E also interconnects with Williams' Northwest Pipeline at the Stanfield point downstream from the generation plant site. This interconnect can facilitate the delivery of up to 0.204 bcf/d of natural gas supplies from the Rocky Mountains region to the generation plant, via displacement<sup>1</sup> (Crupi, pers. comm.). Colorado and Wyoming are the sources of the Rocky Mountains production (Crupi, pers. comm.).

# Electricity

CREA will supply standby electrical power for the generating plant during the period when the plant is not generating its own electricity. The CREA Dayton substation will supply this electricity. The nameplate transformer capacity of the Dayton substation is 7.56/ 9.4 megavolt amperes (MVA). The transformer voltage rating is 69-24.9 kV. The 1999 peak load in kilowatts was 26 percent of the nameplate capacity for the Dayton substation. Therefore, 74 percent of the capacity was unused (Husted, pers. comm.).

BPA will start the plant with 6 MW, which is a very small portion of BPA's capacity.

<sup>&</sup>lt;sup>1</sup> That is, gas normally used by the Rocky Mountain area would be displaced or rerouted to the GTN pipeline for use in the Northwest.

# 3.8.2.3 Routing of Electricity to Transmission Grid and Current and Future Capacity of Grid

Electricity will be transported from the generation plant into the BPA regional distribution system via a connection to one of BPA's existing 500-kV transmission lines that bisect the plant site. Power generated by the plant will be routed first to a substation located under the transmission lines and then into the transmission system. In analyzing the impact of the Starbuck generation plant on BPA's transmission system, BPA determined that an additional 500-kV transmission line from the Starbuck generation plant to the Lower Monumental Dam substation is needed for system reliability. It is anticipated that this transmission line will be located approximately 1,200 feet north of the existing transmission corridor.

# 3.8.2.4 Contracts for Natural Gas Supply, Availability of Gas, and Other Proposed Facilities Contracts

By approximately April 30, 2002, the Applicant plans to purchase long-term transmission capability in the gas pipeline sufficient to meet 50 percent of the SPP's needs. In addition, the Applicant has initiated negotiations with existing capacity holders who are interested in providing supply and/or capacity to the generation plant. The plant will be located in an advantageous location on the northern end of the GTN system, which is closest to the source of supply (Crupi, pers. comm.). This location is important because other power projects would also have access to the gas supply independent of the Starbuck generation plant.

#### **Natural Gas Availability**

Natural gas availability is here described by calculating the daily throughputs listed earlier in this section as annual figures. The total 1999 throughput of the WCSB was 5,840 bcf. The total throughput of the Alberta System in 1999 was 4,088 bcf.

By way of comparison, Table 3.8-1 shows the total natural gas consumption of Washington, Oregon, Idaho, and California in 1999. It is important to note that not all of this consumption was derived from the throughputs of the WCSB and the Alberta System for any of the states, particularly California.

#### **TABLE 3.8-1**

1999 Natural Gas Consumption in California, Idaho, Oregon, and Washington

State	Consumption (billion cubic feet)
Washington	263.7
Oregon	208.6
Idaho	68.9
California	2,145.9
Total Consumption	2,687.1

Source: EIA, 2001.

Converting the Starbuck plant's average daily consumption of 200,000 dekatherms per day to an annual consumption expressed in bcf yields a total of 74.5 bcf. The consumption rates matched against throughput suggest that the existing pipeline capacity and natural gas supplies are adequate to supply the generation plant. However, if this amount is combined with the projected rate of consumption of all other proposed facilities, pipeline capacity and natural gas supplies will need to be expanded to meet the combined demand.

## **Other Proposed Natural Gas Facilities**

Table 3.8-2 shows the proposed large gas-fired power projects within the BPA service area, which encompasses Idaho, Oregon, and Washington.

#### **TABLE 3.8-2**

Project Location	MW	Project Location	MW
Idaho		Washington (continued)	
Rathdrum a I	265	Everett	500
Rathdrum a II	500	Ferndale a	1,300
Rathdrum a III	500	Ferndale b I	500
Rathdrum a IV	310	Ferndale b II	500
Rathdrum b	1,300	Frederickson II	249
Oregon		Goldendale	247
Boardman	260	Grant County	1,300
Clatskanie	520	Harvalum Substation	180
Coberg	265	Longview a I	245
Hermiston	536	Longview a II	100-200
Madras	1,100	Longview b I	245
McNary	500	Mt. Vernon	600
Port Westward	330-660	Satsop I	630
St. Helens	170	Satsop II	600
Troutdale	1,100	Satsop III	600
Umatilla a	1,000	Starbuck	1,200
Umatilla b	581	Sumas	660
Washington		Tacoma	1,000
Alderdale	760	Vancouver a	100
Centralia	248	Vancouver b	600
Chehalis	680	Wallula	1,300
Cherry Point	700-1,000	Total	23,831 MW

Proposed Large Gas-Fired Power Projects within BPA Service Area

Note: The projects and capacities listed above may change as applicants are surveyed concerning their projects. New projects may be added as they apply for transmission integration. Source: BPA, 2001.

The total MW for the proposed large power projects within the BPA service area (excluding the generation plant) is 23,831. Assuming that all proposed plants use gas at the same efficiency as the generation plant, projected consumption would be 0.06205 bcf/MW annually. Thus, the annual consumption of all proposed plants would be 1,478.7 bcf of gas annually. This consumption would be well in excess of the current consumption figures described earlier and indicates either that substantial additional pipeline capacity will need to be added to the system or that not all of the plants planned within the BPA service area will be built.

In addition, the gas-fired power plants proposed for construction in California total 25,473 MW. These plants would consume 1,580.6 bcf of gas annually. As in the Pacific Northwest, some portion of this capacity will be constructed, but not all. Furthermore, California is served by gas transported through the Pacific Northwest, as well as by gas from other sources from the American Southwest. Nevertheless, the order-of-magnitude future consumption implied by construction of these plants means that additional pipeline capacity will be needed.

GTN plans to expand its pipeline's capacity by up to 1 bcf per day over the next decade. Demand from new power generation projects would provide the impetus for this pipeline expansion. GTN has indicated that it will expand its pipeline when market conditions warrant (Crupi, pers. comm.).

# 3.8.3 Nonrenewable Resources

This section describes all nonrenewable resources that will be used or made inaccessible or unusable through construction and operation of the facility.

# 3.8.3.1 Nonrenewable Resources Used in Construction and Operation

# Construction

Sand, gravel, gasoline, diesel fuel, gas, and electricity used in construction of the generation plant will be unavailable once it is consumed. The percentage of these resources that will be consumed will be minuscule in relation to total supplies and consumption of these resources.

Water consumed during construction will be provided by the onsite well. Peak demand for water will be approximately 362,500 gallons per day (gpd) (252 gallons per minute [gpm]); however, in 26 of the 28 months of construction, less than 92,900 gpd (65 gpm) will be required. Approximately 80,000 to 100,000 gallons of water will be used to fill the heat recovery boiler for testing (Nagori, pers. comm.). Approximately 175,000 gallons of water will be used in mixing cement for foundation materials, to be supplied by portable mixing trucks or local ready mix suppliers (Portland Cement Association, 2001).

Land used for construction of the generation plant will be lost to current grazing uses.

#### **Operation and Maintenance**

Once the generation plant is operational, it will consume natural gas at the rate of 74.5 bcf annually, as described above. Assuming constant operation, the plant will consume approximately 2.235 trillion cubic feet of gas in 30 years of operation. Gas consumed by the generation plant will be unavailable to other users.

Air-cooled condensers will be used at the generation plant. Total water usage, at 300 gpm, is expected to be approximately 432,000 gpd.

The small amounts of electricity used by the plant for heating and lighting will be minimal compared with overall demands on the electrical system.

Consumption of diesel fuel and gasoline will consist of the quantities consumed by the 35-person operations workforce in personal transportation to and from work; this would be a minuscule quantity.

Power plant operations will require one truckload of gravel per year for maintenance purposes.

# 3.8.3.2 Plant Effect on Availability of Natural Gas for Other Users

The overall relationships of existing throughputs and rates of gas consumption to proposed gas-fired power plants in the Pacific Northwest and California are explained earlier. Because this plant's annual gas consumption of 74.5 bcf is a small percent of both the throughput of the existing pipeline system and the total energy use that would result from construction of all the proposed plants, construction of the generation plant will have only a small impact on the availability of natural gas for future gas users.

# 3.8.3.3 Source of Water for the Proposed Project

The Applicant currently is awaiting the Washington State Department of Ecology recommendation on its 300-gpm water right application. If granted, this water right will authorize the proposed onsite well that will serve as the water supply for the generation plant (Elmer, pers. comm.).

The Applicant intends to propose water quantity mitigation to compensate for water withdrawn from the onsite well and used by the generation plant. The Applicant is in the process of acquiring water rights in the Snake River system for mitigation purposes; details are not yet available.

Two 500,000-gallon storage tanks, each holding 500,000 gallons, will supply service water for the steam cycle, general site use, and fire fighting.

# 3.8.4 Conservation and Renewable Resources

This section describes the conservation measures and renewable resources that will be used during construction and operation of the generation plant.

# 3.8.4.1 Use of Blowdown to Reduce Overall Consumption

An air-cooled system was chosen for the generation plant, a design that conserves a tremendous amount of water compared with a wet-cooled system. The plant will need 432,000 gpd, while a typical wet-cooled plant, comparable in size to the generation plant, needs more than 8 million gpd. The generation plant water consumption represents only 0.054 percent (less than 1 percent) of consumption by a typical wet-cooled system.

# 3.8.4.2 Best Management Practices for Construction and Operation to Minimize Nonrenewable Resource Use

The generation plant site minimizes resource use associated with the construction of lengthy gas pipeline and transmission line corridors because existing gas pipelines and transmission lines are located close to the generation plant site. The gas mainline is located within 200 feet of the Applicant's property, and the 500-kV transmission lines for connection into the electrical transmission grid bisect the property. This will minimize the use of all nonrenewable resources during plant construction.

The Applicant reconfigured the layout of the generation plant on the basis of plant design changes that made the plant more efficient and saved space on the site. The original design was for two separate 500-MW blocks, with each block having its own control room. That design was not as efficient in energy production as the current design and would have required more space for facilities. The current design consists of two combined-cycle power blocks, each in a two-on-one configuration, with associated support facilities. Two-on-one configuration means that two combustion gas turbines (CGT), each connected directly to an electric generator, will send hot exhaust gas to two dedicated heat recovery steam generators (HRSGs). Steam produced by the two HRSGs will be combined and directed to a common steam turbine-generator (STG).

Other examples of best management practices are the use of silt fences and temporary swales to direct the majority of stormwater runoff to a stormwater infiltration/evaporation pond, installation of perimeter silt fences to remove sediment runoff before it reaches the site boundary, and seeding and mulching for slope stabilization after grading is completed. Refer to Section 2.2.4.1 for more information.

# 3.8.4.3 Plant Maintenance and Efficiency Models

Natural gas will be used in a highly efficient manner at the Starbuck generation plant, given the state-of-the-art, advanced-technology, combined-cycle CGTs, HRGs, STGs, and air-cooled condensers that will be in use there. Existing combined-cycle plants operate at thermal efficiencies of greater than 44 percent. The Starbuck generation plant will operate at an excess of 53 percent thermal efficiency, meaning that it is expected to consume natural gas at a slower rate than would be the case with the application of existing but less efficient technologies (EFSEC, 2000).

The plant has been designed to recover waste heat in the exhaust gases of each CGT to generate additional power. The exhaust gases will exit the CGT and flow directly to the HRSGs, where the heat from the exhaust gases will be used to generate steam. The HRSGs will also be equipped with natural-gas-fired duct burners that can be used, at the discretion of plant operators, to add heat to increase the HRSG's steam-generating capability.

Each pair of HRSGs in the power block will supply steam to the STG. Each STG will be of a reheat design, meaning that exhaust steam from the high-pressure section will be returned to the HRSGs and reheated to increase steam cycle efficiency. The STG will have three pressure sections to extract the maximum energy from the CGT exhaust gases.

Advanced-technology, combined-cycle plants are the most efficient fossil-fuel-powered generation systems currently available. It takes fewer British thermal units (Btu) – meaning energy – to generate a kilowatt-hour (kWh) of electricity in an advanced-technology combined-cycle facility (6,000 to 6,700 Btu/net kWh) than in other types of thermal generating facilities (9,000 to 11,000 Btu/kWh for coal plants, 10,500 Btu/kWh for nuclear plants, and 11,500 Btu/kWh for simple-cycle combustion turbines). Although the Starbuck generation plant will consume natural gas, this will be a more efficient use of fossil fuel resources for energy generation than alternatives that use other fossil fuels.

Section 3.9 Noise

# 3.9 Noise

This section presents an evaluation of potential noise resulting from the construction and operation of the generation plant. An essential part of this assessment is a comparison of expected noise levels from the generation plant with acceptable noise levels presented in applicable regulations.

# 3.9.1 Existing Conditions

## 3.9.1.1 Fundamentals of Acoustics

Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. There are several ways to measure noise, depending on the source of the noise, the receiver, and the reason for the noise measurement. Table 3.9-1 summarizes the technical noise terms used in this subsection.

#### **TABLE 3.9-1**

Term	Definitions
Ambient noise level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	Noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, and tonal or informational content, as well as the prevailing ambient noise level.
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the reference pressure to the sound pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure.
Decibel A-weighted sound level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted unless stated otherwise.
Decibel C-weighted sound level (dBC)	The sound pressure level in decibels as measured on a sound level meter using the C-weighted filter network. The C-weighted filter does not de-emphasizes the very low and very high frequency components of the sound. It is a flatter weighting in that each frequency has an almost equal weighting. It is therefore more sensitive to low frequencies than the A-weighting.
Equivalent noise level (L <sub>eq</sub> )	The energy average A-weighted noise level during the measurement period.
Percentile noise level $(L_n)$	The A-weighted noise level exceeded during n % of the measurement period, where n is a number between 0 and 100 (e.g., $L_{90}$ )
Community noise equivalent level (CNEL)	The average A-weighted noise level during a 24-hour day, obtained after the addition of 5 decibels to sound levels from 7 p.m. to 10 p.m. and after the addition of 10 decibels to sound levels between 10 p.m. and 7 a.m.
Day-night noise level (Ldn or DNL)	The average A-weighted noise level during a 24-hour day, obtained after the addition of 10 decibels from 10 p.m. to 7 a.m.

Definitions of Acoustical Terms

Sources: Beranek, 1988; California Department of Health Services, 1977.

In this subsection, some statistical noise levels are stated in terms of decibels on the decibel A-weighted scale (dBA). Noise levels stated in terms of dBA reflect the response of the human ear by filtering out some of the noise in the low- and high-frequency ranges that the ear does not detect well. The A-weighted scale is used in most ordinances and standards. The equivalent sound pressure level ( $L_{eq}$ ) is defined as the average noise level, on an energy basis, for a stated period of time (such as hourly).

In practice, the level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighted curve. The sound level meter also performs the calculations required to determine the  $L_{eq}$  for the measurement period. The following measurements relate to the noise level distribution during the measurement period. The  $L_{90}$  is a measurement that represents the noise level exceeded during 90 percent of the measurement period. Similarly, the  $L_{10}$  represents the noise level exceeded for 10 percent of the measurement period.

The effects of noise on people fall into three general categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with such activities as speech, sleep, and learning
- Physiological effects such as startling and hearing loss

In most cases, environmental noise produces effects in the first two categories only. However, workers in industrial plants may experience noise effects in the third category. No completely satisfactory way exists to measure the subjective effects of noise, or to measure the corresponding reactions of annoyance and dissatisfaction. This lack of a common standard is primarily a result of the wide variation in individual thresholds of annoyance and habituation to noise. Thus, an important way of determining a person's subjective reaction to a new noise is by comparing it with the existing or "ambient" environment to which that person has adapted. In general, the more the level or the tonal (frequency) variations of a noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual (CEC, 2001).

With regard to increases in A-weighted noise level, knowledge of the following relationships will be helpful in understanding this subsection (Kryter, 1970):

- Except in carefully controlled laboratory experiments, the human ear cannot perceive a change of 1 decibel (dB).
- Outside the laboratory, a 3-dB change is considered a just-perceivable difference.
- A change in level of at least 5 dB is required before any noticeable change in community response can be expected.
- A 10-dB change is subjectively heard as approximately a doubling in loudness and would likely cause an adverse community response.

The referenced dB increases are for noise of similar nature (e.g., increased traffic noise compared with existing traffic noise). However, when the background consists of quiet, rural sounds, the introduction of new industrial sounds (such as construction noise or the sound of a gas turbine) can be clearly discernible and potentially annoying even if the new industrial noise is only slightly louder than the background [Jones & Stokes, 7/13/2001].

Table 3.9-2 shows the relative A-weighted noise levels of common sounds measured in the environment and in industry for various sound levels.

Typical Sound Levels Measured in the Environment and Industry

Noise Source at a Given Distance	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
	140		
Civil defense siren (100 feet)	130		
Jet takeoff (200 feet)	120		Pain threshold
	110	Rock music concert	
Pile driver (50 feet)	100		Very loud
Ambulance siren (100 feet)	—		
	90	Boiler room	
Freight cars (50 feet)	_	Printing press plant	
Pneumatic drill (50 feet)	80	In kitchen with garbage disposal running	
Freeway (100 feet)	—		
	70		Moderately loud
Vacuum cleaner (10 feet)	60	Data processing center	
Department store	_		
Light traffic (100 feet)	50	Private business office	
Large transformer (200 feet)			
	40		Quiet
Soft whisper (5 feet)	30	Quiet bedroom	
	20	Recording studio	
	10		Hearing threshold

Source: Peterson and Gross, 1974.

#### 3.9.1.2 Noise Standards

173-60 WAC provides the applicable noise standards for Washington State, including Columbia County. Columbia County has not promulgated independent state-approved noise standards pursuant to 173-60-110 WAC. 173-60 WAC establishes maximum permissible environmental noise levels. These levels are based on the environmental designation for noise abatement (EDNA) which is defined as "an area or zone (environment) within which maximum permissible noise levels are established. " There are three EDNA designations (173-60-030 WAC), which roughly correspond to residential, commercial/recreational, and industrial/agricultural uses:

- Class A: Lands where people reside and sleep (such as residential)
- Class B: Lands requiring protection against noise interference with speech (such as commercial/recreational)

1

• Class C: Lands where economic activities are of such a nature that higher noise levels are anticipated (such as industrial/agricultural)

As used in this section, "noise-sensitive areas" are equivalent to Class A EDNA areas. Table 3.9-3 summarizes the maximum permissible levels applicable to noise received at noise-sensitive areas (Class A EDNA) and at industrial/agricultural areas (Class C EDNA) from an industrial facility (Class C EDNA).

#### **TABLE 3.9-3**

	Maximum Permissible Noise Levels (dBA) from a Class C EDNA					
	Class A ED	NA Receiver	Class C EDNA Receiver			
Statistical Descriptor	Daytime Nighttime   (7 a.m. – 10 p.m.) (10 p.m. – 7 a.m.)		Anytime			
L <sub>eq</sub>	60	50	70			
L <sub>25</sub>	65	55	75			
L <sub>16.7</sub>	70	60	80			
L <sub>2.5</sub>	75	65	85			

State of Washington Noise Regulations (173-60-040 WAC)

Note: Standard applies at the property line of the receiving property. Source: WAC 173-60.

The following are exempted from the limits presented in Table 3.9-3 (per 173-60-050 WAC):

- Construction noise between the hours of 7 a.m. and 10 p.m.
- Motor vehicles when regulated by 173-62 WAC ("Motor Vehicle Noise Performance Standards" for vehicles operated on public highways)
- Motor vehicles operated off public highways, except when such noise affects residential receivers

Note that 173-60-50(6) WAC states, "Nothing in these exemptions is intended to preclude the Department from requiring installation of the best available noise abatement technology consistent with economic feasibility."

173-62 WAC, "Motor Vehicle Noise Performance Standards," regulates noise generated by vehicles traveling on public roads.

#### 3.9.1.3 Significance Criteria

The Washington noise regulations (173-60 WAC) specify permissible noise levels (summarized in Table 3.9-3). Operational noise that exceeds these levels would result in a significant impact.

The proposed turbines will operate 24 hours per day and could have an impact on the existing residence and the Lyons Ferry State Park campground, where people sleep and where nighttime noise levels are currently low. Although there are no regulatory limits in Washington regarding an allowable increase above background caused by industrial

projects, Jones & Stokes (2001) suggests comparing increases associated with the generation plant with the standards set forth in the most recent Federal Transit Administration (FTA, 1995) guidance. This detailed analysis is contained in Section 3.9.3.2.

Construction noise limits are less restrictive, given the fact that construction noise does not represent a permanent increase in noise levels. 173-60-050 WAC specifically exempts construction activity noise impacts to Class A properties during daytime hours (between 7 a.m. and 10 p.m.).

# 3.9.1.4 Existing Sound Levels

# **Generation Plant Vicinity**

The *Starbuck Power Project, Potential Siting Study* prepared for the Washington State Energy Facility Site Evaluation Council by Jones & Stokes (2001), defines "the area of potential noise effect (APNE) as the noise sensitive land uses that may be potentially affected by noise from the power plant and associated facilities." The definition of noise-sensitive land uses established in this document are virtually identical to the 173-60 WAC definition of Class A EDNA (residential). Figure 3.9-1 depicts the APNE as requested in the siting study. Existing noise levels were measured at four locations, designated M1 through M4 on Figure 3.9-2. The locations of the measurement were the generation plant site (M1); the marine boat ramp at the Lyons Ferry Marina, which contains the closest residence (M2); a fish hatchery (M3); and a nearby campground (M4).

Table 3.9-4 provides a description of each monitoring location, its EDNA classification, and existing noise sources at that location.

Noise level measurements were conducted on January 12 and 13, 2001, using Bruel & Kjaer 2236 Type I noise level meters. The daytime temperature was in the high 30s°F, skies were overcast to clearing, and the winds were very mild (lower than 5 miles per hour [mph]).

A 24-hour measurement was conducted at M1, while spot measurements were conducted at M2, M3, and M4. Continuous noise levels were recorded in 10-second increments in terms of  $L_{eq}$ ,  $L_{10}$ , and  $L_{90}$  at all locations. The existing  $L_{25}$ ,  $L_{16.7}$ , and  $L_{2.5}$  were calculated directly from the measured  $L_{eq}$  data. Table 3.9-5 presents hourly  $L_{eq}$ ,  $L_{25}$ ,  $L_{16.7}$ , and  $L_{2.5}$  for M1. Tables 3.9-6, 3.9-7, and 3.9-8 present the results from M2, M3, and M4, respectively.

Note that the monitoring was conducted before the Jones & Stokes siting study was released; therefore, the monitoring differs from that recommended in the siting study. A letter dated June 11, 2001, from James Wilder of Jones & Stokes to Mark Bastasch of CH2M HILL verified that the monitoring conducted in January 2001 was "well founded and to have satisfied the intent of the EFSEC regulations. At this time, we see no reason to obtain additional baseline measurements solely to conform to the Potential Site Study. However, our final conclusion regarding the validity of the baseline measurements clearly cannot be made until we review your noise assessment report." (Wilder, pers. comm.). The following discussion is intended to illustrate the adequacy of the measurements.

#### **TABLE 3.9-4**

Monitoring Location and Description

Map ID	Description	EDNA Classification	Dominant Noise Sources
M1	Generation plant site	Class C	Train passage, infrequent automobile traffic, tug and barge river traffic, barge loading conveyor, birds, small aircraft
M2	Boat ramp (closest residence)	Class A <sup>b</sup>	Automobile traffic, boat motors, generator, geese, gulls
M3	Hatchery	Class A or Class C <sup>a</sup>	Water pumps, automobile traffic, tug and barge river traffic, train passage, birds
M4	Campground	Class A <sup>b</sup>	Military aircraft, automobile traffic, train passage, car alarm, geese
R5 <sup>c</sup>	Columbia County Grain Growers Grain Elevator	Class C	Train passage, infrequent automobile traffic, tug and barge river traffic, barge loading conveyor, birds, small aircraft

<sup>a</sup> Note that the hatchery is an industrial use; however, there are eight residences/employee homes onsite. <sup>b</sup> While locations satisfy definition of Class A based on human habitation criteria, these areas are zoned agricultural and would typically be considered Class C. <sup>°</sup> Note that measurements were not conducted at the grain elevator because it is not an area where people

sleep. Noise sources are likely similar to M1 given their proximity.

Source: 173-60 WAC.

These measurements were conducted during a quiet time of the year and represent some of the worst-case (quietest) background levels, given that recreational and agricultural activities were minimal. It is likely that the area is subject to louder noise levels when the campground, which is frequented by boaters and jet skiers, is open. In addition, the area is likely affected by truck, barge, and train traffic and other activities that occur during the agricultural growing and harvest seasons.

The dominant sources during the measurement period at the most sensitive receivers (M2 and M4) were as follows:

#### Boat Ramp (M2)

- At 13:30: geese and gulls in the distance and one vehicle that circled the parking lot
- At 6:50 a.m.: cars starting up, vehicle traffic, boat traffic, people loading gear into boats, and boats motoring out of the marina
- At 8:30 a.m.: the fishermen/boaters were already out of the marina and the background noise was mainly from the restaurant generator/ice machine

Given the fact that fishermen are usually early risers, it is not surprising that early morning levels would be higher than the afternoon or evening.



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Hour Ending	L <sub>2.5</sub>	L <sub>16.7</sub>	L <sub>25</sub>	L <sub>eq</sub>
12:00	43	36	33	46
13:00	46	39	36	37
14:00	47	36	33	37
15:00	35	29	29	29
16:00	53	44	41	43
17:00	38	33	31	32
18:00	35	31	31	31
19:00	32	31	31	30
20:00	45	35	34	36
21:00	48	35	34	37
22:00	47	26	26	36
23:00	37	25	25	28
0:00	41	26	25	32
1:00	42	29	26	33
2:00	41	30	26	32
3:00	41	32	28	32
4:00	42	32	29	33
5:00	43	39	37	36
6:00	45	40	38	38
7:00	43	40	38	37
8:00	49	40	37	45
9:00	42	35	33	34
10:00	54	40	38	44
11:00	42	33	30	32

#### **TABLE 3.9-5**

Summary of Hourly Measurement at M1— Generation Plant Site January 12 through 13, 2001 (dBA)

#### **TABLE 3.9-6**

Summary of Measurement at M2—Boat Ramp (dBA)

Date	Start Time	Stop Time	Elapse Time	L <sub>2.5</sub>	L <sub>16.7</sub>	L <sub>25</sub>	L <sub>eq</sub>
12-Jan-01	13:32	13:49	0:17	53	37	35	43
13-Jan-01	6:55	7:19	0:24	61	43	41	52
13-Jan-01	9:43	10:01:	0:18	42	41	34	36

#### **TABLE 3.9-7**

Date	Start Time	Stop Time	Elapse Time	L <sub>2.5</sub>	L <sub>16.7</sub>	L <sub>25</sub>	L <sub>eq</sub>
12-Jan-01	11:56	12:20	0:24	53	51	51	51
13-Jan-01	6:29	6:42	0:13	61	58	54	55
13-Jan-01	8:33	8:57	0:24	76	60	51	66
	<b>Date</b> 12-Jan-01 13-Jan-01 13-Jan-01	Date Start Time   12-Jan-01 11:56   13-Jan-01 6:29   13-Jan-01 8:33	DateStart TimeStop Time12-Jan-0111:5612:2013-Jan-016:296:4213-Jan-018:338:57	DateStart TimeStop TimeElapse Time12-Jan-0111:5612:200:2413-Jan-016:296:420:1313-Jan-018:338:570:24	Date Start Time Stop Time Elapse Time L <sub>2.5</sub> 12-Jan-01 11:56 12:20 0:24 53   13-Jan-01 6:29 6:42 0:13 61   13-Jan-01 8:33 8:57 0:24 76	DateStart TimeStop TimeElapse TimeL2.5L16.712-Jan-0111:5612:200:24535113-Jan-016:296:420:13615813-Jan-018:338:570:247660	Date Start Time Stop Time Elapse Time L <sub>2.5</sub> L <sub>16.7</sub> L <sub>25</sub> 12-Jan-01 11:56 12:20 0:24 53 51 51   13-Jan-01 6:29 6:42 0:13 61 58 54   13-Jan-01 8:33 8:57 0:24 76 60 51

Summary of Measurement at M3—Hatchery (dBA)

#### **TABLE 3.9-8**

Summary of Measurement at M4—Campground (dBA)

Date	Start Time	Stop Time	Elapse Time	L <sub>2.5</sub>	L <sub>16.7</sub>	L <sub>25</sub>	L <sub>eq</sub>
12-Jan-01	12:40	13:04	0:24	54	44	40	44
13-Jan-01	6:05	6:18	0:13	49	45	44	43
13-Jan-01	9:10	9:31	0:21	61	51	47	51

#### Campground (M4)

- At 12:40 p.m.: a train repair vehicle, distant hammering, a motor boat, vehicular traffic, and a train passing across the trestle
- At 6 a.m.: a car alarm, vehicular traffic, birds, and a tugboat with barge
- At 9 a.m.: geese cackling at approximately 150 feet and a train passing from east to west

These events and sources are typical or lower than typical given the existing uses and should not represent anomalous conditions that would unduly elevate noise levels. Furthermore, the results are consistent with expectations given that "the project site and surrounding area are rural and sparsely populated, background noise levels at locations distant from traveled roadways are likely to be about 40 dBA under calm wind conditions. Noise levels at locations near roadways such as SR 261 are likely to be somewhat higher." (Jones & Stokes, 2001, p. 4-57.) Both M2 and M4 are immediately adjacent to SR-261. As stated previously, the measurements were taken in winter when the campground is closed and recreational activities are minimal.

#### Water Pipeline

The existing sound levels along the proposed water pipeline were not measured. It is expected that sound levels along the pipeline route are similar to those measured for the generation plant site.

# 3.9.2 Environmental Impacts of the Proposed Action

#### 3.9.2.1 Construction

Construction of the generation plant is expected to be typical of other power plants in terms of schedule, equipment used, and other types of activities. The noise level will vary,

depending on the construction phase. Construction of power plants generally can be divided into five phases, when different types of construction equipment are used: site preparation and excavation, concrete pouring, steel erection, mechanical, and cleanup. The typical high-pressure, steam-blow activity is assessed rarely because of high noise levels and the potential for significant short-term noise impacts.

Both the U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control and the Empire State Electric Energy Research Company have extensively studied noise from individual pieces of construction equipment as well as from construction sites of power plants and other types of facilities. Because specific data regarding the types, quantities, and operating schedules of construction equipment that will be used for the Starbuck project are not currently available, this Application for Site Certification (ASC) relies on the sources listed above for information about similarly sized industrial projects. The use of these data, which are between 21 and 26 years old, is conservative because the evolution of construction equipment has been toward quieter designs as the nation becomes more urbanized and the population becomes more aware of the adverse effects of noise.

Table 3.9-9 shows the loudest equipment types generally operating at a site during each phase of construction. The composite average or equivalent site noise level, representing noise from all equipment, also is presented in Table 3.9-9 for each phase.

Construction Phase	Loudest Construction Equipment	Equipment Noise Level at 50 feet	Composite Onsite Noise Level at 50 feet
Site clearing and excavation	Dump truck Backhoe	91 85	89
Concrete pouring	Truck Concrete mixer	91 85	78
Steel erection	Derrick crane Jackhammer	88 88	87
Mechanical	Derrick crane Pneumatic tools	88 86	87
Clean-up	Rock drill Truck	98 91	89

#### **TABLE 3.9-9**

Sources: EPA, 1971; Barnes et al., 1976.

Construction Equipment and Composite Onsite Noise Levels (dBA)

The residence closest to the site is located approximately 1 mile away, at the Lyons Ferry Marina (M2). Table 3.9-10 shows the average or equivalent construction noise levels projected to the nearest residences from the site. These results are conservative because the only attenuating mechanism considered is divergence of the sound waves in open air, and topographic or other affects are not included. Average noise levels during the construction activities are projected to be between 51 and 40 dBA at M2 (the nearest residence, located at the Lyons Ferry Marina). The construction noise may be audible at M2 but will not exceed current maximum exposure levels given that noise levels as high as 61 dBA are currently experienced(see monitoring data for site M2, Table 3.9-6). Construction noise at M2 will be

clearly audible when the background noise is low. This will likely be the case during the majority of the construction phase. The construction noise levels at the hatchery (M3) and the campground (M4), which are farther from the site than M2, will be less than those calculated for M2 and will not exceed current exposure levels (refer to monitoring data for sites M3 and M4, Tables 3.9-7 and 3.9-8, respectively).

#### **TABLE 3.9-10**

Average Construction Noise Levels at the Nearest Residential Receptor (dBA)

Construction Phase	Nearest Residential Receptor Noise Level – M2 (approx. 5,000 ft.)
Site clearing and excavation	51
Concrete pouring	40
Steel erection	49
Mechanical	49
Cleanup	51

Sources: EPA, 1971; Barnes et al., 1976.

Table 3.9-11 lists the typical maximum noise levels associated with common construction equipment at 50 feet and at receptor position M2 (the closest residence ). Table 3.9-11 also shows that unsilenced steam blows will far exceed current sound levels. Consequently, a temporary blowout silencer, such as a Fluid Kinetics Model TBS 16-AC, can be used to minimize exceedances. Such a silencer has an overall noise reduction of 40 to 45 dBA and will reduce the estimated unsilenced level at M2 from 84 to about 50 dBA, putting it in the same category as a bulldozer or front-end loader. Low-pressure steam blow techniques also are being evaluated. Because it is common practice to carry out high-pressure blows only during the day, silenced blows will produce no significant disturbance to the receptors at M1, M2, and M3.

Pile-driving noise depends on the method used and, in the case of conventional impact driving, the force of each blow. For average impacts of 20,000 foot-pounds or more, the likely noise level at receptor position M2 (the residence at the boat ramp) will be approximately 59 dBA.

Noise generated during the testing and commissioning phase of the generation plant is not expected to be substantially different from that produced during normal, full-load operation. Starts and abrupt stops are more frequent during this period, but on the whole they are usually short-lived. The steam releases associated with these starts and stops would not be problematic because they would be vented through permanent vent silencers.

#### TABLE 3.9-11

Maximum Noise Levels from Common Construction Equipment and Resultant Receptor Noise Levels (dBA)

Construction Equipment	Typical Sound Pressure Level at 50 feet	Expected Sound Pressure Level at Receptor M2, 5,000 feet
Unsilenced steam blow (4- to 8-inch line)	129	84
Silenced steam blow (4- to 8-inch line)	_	45
Unsilenced air blow (4-to 8-inch line)	125	80
Pile drivers (20,000 to 32,000 foot-pounds/blow)	104	59
Bulldozer (250 to 700 horsepower)	88	43
Front-end loader (6 to 15 cubic yards)	88	43
Truck (200 to 400 horsepower)	86	41
Grader (13- to 16-foot blade)	85	40
Shovel (2 to 5 cubic yards)	84	39
Portable generators (50 to 200 kilowatts)	84	39
Derrick crane (11 to 20 tons)	83	38
Mobile crane (11 to 20 tons)	83	38
Concrete pumps (30 to 150 cubic yards)	81	36
Tractor (3/4 to 2 cubic yards)	80	35
Unquieted paving breaker	80	35
Quieted paving breaker	73	28

Source: Barnes et al., 1977.

# 3.9.2.2 Operation and Maintenance

Black & Veatch modeled the generation plant noise emissions using its own noise model, which simulated the outdoor propagation of sound from each point source and accounted for sound wave divergence, atmospheric absorption, directivity, and attenuation from interceding barriers and terrain. The model includes prominent terrain features, such as acoustical barriers.

The location, octave band sound power levels, and directivity of each noise source were specified in the model, which then calculated the propagation of sound from each source to each receptor. The propagation calculation is based on the reduction of noise with distance (hemispherical spreading), the absorption of noise by the atmosphere, and the effect of any interceding barriers or terrain. All sound level calculations are performed in each of the nine standard octave bands ranging from 31.5 Hz to 8,000 Hz.

The proposed generation plant and equipment layout was based on Black & Veatch Drawing 96344-CSTU-S1001 Rev 3, dated January 28, 2000. Black & Veatch contends that none of the major equipment has shifted since the modeling was conducted. The modeling is representative of the latest site arrangement (June 16, 2001). The model calculated the overall A-weighted sound pressure level at each receptor location, based on the octave band

sound level contribution of each noise source. Figure 3.9-3 depicts the modeled A-weighted noise contour plot.

The modeling algorithms include conservative assumptions for atmospheric absorption and barrier effects and do not consider the effect of ground absorption or other anomalous attenuation. The results are generally considered conservative, given the modeling assumptions and the fact that the manufacturer's equipment sound level specifications are used, rather than estimated or measured values. This conservatism typically is considered a design margin. Thus, the actual sound levels may be about 2 dBA lower than the predicted sound levels. It should be noted that two common weather conditions may increase the project noise levels: light winds blowing from east to west (from turbines toward the receivers) and occasional temperature inversions (Jones & Stokes, 2001).

Temperature inversions and downwind gradients tend to cause sound waves to curve back towards the ground. This curved path causes the sound to "bend" over the top of the ground, vegetation, and interceding barriers. As such, the mitigation effects of these items are reduced. The Black & Veatch noise modeling does not incorporate mitigation resulting from ground or vegetative effects. Similarly, the Black & Veatch noise modeling includes conservative noise reduction effects for significant terrain features. Through the use of conservative propagation factors, the noise modeling inherently represents downwind and temperature inversion gradients in all directions from the generation plant. This modeling technique is consistent with modeling assumptions included in ISO 9713. During upwind conditions, the sound level is expected to be 5 to 10 dBA less than those predicted in the model. Therefore, the modeling results are considered to be indicative of downwind or temperature inversion conditions, and conservative during upwind or typical thermal gradient conditions.

Noise modeling was conducted to predict the environmental noise emissions during normal generation plant operation, which excludes intermittent activities (such as startup, shutdown, steam release, bypass operation, and any other abnormal or upset operating conditions). During generation plant startup and shutdown, plant noise may be 2 to 3 dBA higher than during normal operation. During certain upset conditions, steam vents may open. These steam vents are necessary to quickly release steam pressure from the boiler and piping. Any such noise events would be a part of an emergency event. These noises would be short-term and would occur rarely, if ever.

# **Generation Plant**

The anticipated primary noise sources are the combustion gas turbine (CGT) inlets, the heat recovery steam generator (HRSG) packages, and the air-cooled condensers. The anticipated secondary noise sources include the combustion turbine, steam turbine, and auxiliary equipment (located in the generation plant), the generator step-up transformers (GSUT), and the building ventilation systems. All equipment sound levels are based on available inhouse vendor data or data provided by the Edison Electric Institute (EEI) in the *Electric Power Plant Environmental Noise Guide* (1984).



riangle = Residence

FIGURE 3.9-3 A-Weighted Sound Pressure Levels Application for Site Certification STARBUCK POWER PROJECT STARBUCK, WASHINGTON The generation plant noise emissions are modeled on the basis of standard packaged equipment, which includes noise mitigation measures that are standard on each equipment package, at no added cost. Table 3.9-12 lists the equipment sound level specification for each equipment noise source. Table 3.9-13 lists the octave band sound power levels (referenced to 1 picowatt). These equipment sound level specifications are anticipated to be available, with standard packaged equipment. However, the available performance guarantees for each equipment component must be confirmed with the appropriate equipment suppliers.

#### TABLE 3.9-12

Equipment	Noise Source Components	Sound Level Specification
CGT package	Turbine compartment, generator compartment, ventilation fans, exhaust ductwork, and all other auxiliary equipment	Indoor
CGT inlet	CGT air inlet	42 dBA @ 400 feet <sup>a</sup>
CGT vents	CGT vent fans, blowers, ductwork, and associated components located or discharging outdoors	50 dBA @ 400 feet <sup>a</sup>
HRSG package	Transition ductwork, boiler, stack, stack exit, and all other auxiliary equipment included in the scope-of-supply	65 dBA @ 400 feet <sup>a</sup>
STG package	Compartments, ventilation fans, piping, and all other auxiliary equipment included in the STG scope-of-supply	Indoor
GSUT	Transformer with fans at maximum cooling	85 dBA @ 3 feet <sup>b</sup>
Air-cooled condenser	Fans, motors, gear boxes, and all associated equipment	65 dBA @ 400 feet <sup>a</sup>
BFP	Pump and motor assembly	85 dBA @ 3 feet <sup>b</sup>
Building	Insulated metal panel system (22 gauge outer liner, 4-inch insulation, perforated inner liner)	STC-40 (minimum)
Building louvers	Total maximum louver area = 5% of total wall area	Standard louver
Fuel gas metering station	Pumps, compressors, valves, piping, and all associated equipment	50 dBA @ 400 feet <sup>a</sup>
Steam vents	Any vents that open during startup, shutdown, or for extended periods during any potential operating condition	65 dBA @ 400 feet <sup>a</sup>

Anticipated Equipment Sound Level Specifications for Standard Packaged Equipment

<sup>a</sup> The maximum sound pressure level in any direction from the equipment envelope at the distance specified. The equipment envelope is defined as the contour that completely encompasses all equipment components at a distance of 3 feet from the equipment face or enclosure.

<sup>b</sup> Average sound pressure level along the equipment envelope.

CGT = combustion gas turbine.	GSUT = generator step-up transformers.
HRSG = heat recovery steam generator.	BFP = boiler feed pump.
STG = steam turbine-generator.	Source: Dicke, pers. comm.

#### TABLE 3.9-13

Octave Band Sound Power Levels

	Octave Band Center Frequency (Hz)									Overall		
Equipment	31.5	63	125	250	500	1,000	2,000	4,000	8,000	Sound Power Level (dBA)	No. of Units Modeled	Tonal Quality
Combustion Turbine Inlet	102	106	99	94	86	87	74	82	77	92	4 Inlets	No tonal noise emissions
HRSG Equipment	129	124	120	116	112	109	106	100	87	115	4 HRSGs	No tonal noise emissions
HRSG Exhaust Stack	111	108	113	112	107	100	92	84	68	108	4 HRSG Stacks	No tonal noise emissions
Generation Building	126	128	121	113	108	104	100	93	87	113	1 Genera- tion Building	No tonal noise emissions
Transformers	102	108	110	105	105	99	94	89	82	105	6 Trans formers	Transformers tend to radiate a 120 Hz tone. Tonal emissions will be low enough to not be audible offsite.
Air-Cooled Condenser	116	119	119	116	113	109	106	103	95	115	2- to 20- Cell Air Cooled Condensers	No tonal noise emissions

Note: All sound power levels contained in this table represent the total sound energy radiated from one individual piece of equipment.

Source: Dicke, pers. comm..

The sound levels represented in Table 3.9-13 indicate the total sound energy for each individual source. For instance, the generation building sound power level is the summation of all building noise sources included in the Black & Veatch modeling. Similarly, the air-cooled condenser sound power level is the summation of each modeled fan source, and the HRSG sound power level is the summation of the HRSG modeled source levels.

#### Modeling Results and Regulatory Compliance

The predicted generation plant noise emissions from the standard packaged equipment are detailed in Figure 3.9-2 and Table 3.9-14.

The nearest residence is at the Lyons Ferry Marina (M2), approximately 1.1 miles northwest of the generation plant site. The predicted generation plant sound level at this nearest residence is approximately 45 dBA, which is below the required nighttime level of 50 dBA for Class A EDNA (residential) receptor. Plant levels at both M3 and M4 will not exceed the Class A EDNA noise standard.

The generation plant noise emissions are required not to exceed 70 dBA at all Class C EDNA (industrial/agricultural) property boundaries. Modeling indicates that the generation plant will comply with this requirement at M1, M3, and M4.

TABLE 3.9-14
Modeling Results

Map ID	Description	EDNA Classification	173-60 WAC Standard (dBA)	Projected Plant Level (dBA)
M1	Generation plant site	Class C	70	62
M2	Boat ramp (closest residence)	Class A	50	45
M3	Hatchery	Class A or Class C	50 or 70	41
M4	Campground	Class A	50	43
R5	Columbia County Grain Growers Grain Elevator	Class C	70	<60

<sup>a</sup> Note that the hatchery is an industrial use; however, there are eight residences/employee homes onsite. <sup>b</sup> While locations satisfy definition of Class A based on human habitation criteria, these areas are zoned agricultural and would twoically be considered Class C

agricultural and would typically be considered Class C. <sup>c</sup> Note that measurements were not conducted at the grain elevator because it is not an area where people sleep. Noise sources are likely similar to M1 given their proximity.

Sources: Dicke, pers. comm.; 173-60 WAC.

Certain steam vents may open during generation plant startup and shutdown. These vents will be silenced to ensure that the sound level is fully compliant with the 50-dBA Class A EDNA (residential) requirement and the 70-dBA Class C EDNA (industrial/agricultural) property boundary requirement.

The generation plant will be located about 725 feet above sea level. The site is about 170 feet above the Snake River water elevation and can be described as a plateau above the river. Modeling simulated this terrain feature and indicated that sound pressure levels will be 53 dBA or less at all locations on the Snake River.

#### Increase in Ambient Noise Levels

As stated in Section 3.9.2, the proposed turbines will operate 24 hours per day and could have an impact on the existing residence and the Lyons Ferry State Park campground, where people sleep and where nighttime noise levels are currently low. Although there are no regulatory limits in Washington regarding an allowable increase above background caused by industrial projects, Jones & Stokes (2001) suggests comparing the project's increase with the standards set forth in the most recent Federal Transit Administration (FTA, 1995) guidance.

The Applicant believes that any potential or impacts resulting from increased noise levels that are nonetheless in compliance with the applicable state and local noise standards (as is the case for the generation plant) were taken into consideration and approved by Columbia County when the site was zoned for Heavy Industrial uses (See Columbia County Comprehensive Plan and Zoning Ordinance). The analysis is presented here for completeness and at the request of Jones & Stokes (Jones & Stokes, 2001).

The applicable FTA guidance is based on increases in the day-night noise level ( $L_{dn}$ ) given that nighttime sensitivity is rightfully considered for a continuous noise source such as a power plant. Continuous noise measurements were conducted at the project site (M1). The

1

noise levels at M1 will generally be less than those at M2 and M4 given their proximity to the existing noise sources (mainly SR-261 and the railroad tracks--measurements conducted at M2 and M4 confirm this). The existing  $L_{dn}$  at M1 is 42 dBA. The project noise will result in  $L_{dn}$ s of 51 and 49 dBA at M2 and M4, respectively. This yields a potential maximum increase of 9 and 7 dBA at M2 and M4, respectively, and (in accordance with the FTA guidance) results in "No Impact."

A more realistic existing condition at M2 is calculated by incorporating the short-term measurements in Table 3.9-7 into the 24-hour data collected at M1. Incorporating the M2  $L_{eq}$  data for the hours of 1:00 p.m. (43 dBA), 7:00 a.m. (52 dBA), 8:00 a.m. (52 dBA), and 10 a.m. (36 dBA) yields a synthesized existing  $L_{dn}$  of 49 dBA at M2 (note that the 52 dBA measurement spanned 2 hours and therefore was included twice). Comparing this level with the project  $L_{dn}$  of 51 dBA and the FTA guidance also results in "No Impact."

Similarly, at M3 the synthesized existing  $L_{dn}$  is 44 dBA. Comparing this level with the project level of 49 dBA and the FTA guidance also results in "No Impact."

In summary, in accordance with the FTA guidance, the project does not significantly increase ambient noise levels.

# Low-Frequency Noise

A phenomenon described as "infrasound vibration" has occurred in connection with combustion turbine installations, primarily combustion turbines installed in a simple cycle configuration (not what is being built here). Low-frequency noise of a high magnitude can couple with wood frame walls and windows to cause a mild but perceptible vibration. While these sound levels are virtually inaudible, the vibration may cause an adverse reaction to facility noise.

Combustion turbines are capable of producing high levels of low-frequency (40 Hz or less) noise. This noise is generated by the exhaust gas. In simple cycle configurations the exhaust gas passes through an exhaust silencer. These exhaust silencers are effective at reducing mid- and high-frequency noise but are less effective at reducing low-frequency noise emissions.

In combined-cycle configurations (as proposed for this project) the exhaust gas passes through the HRSG equipment, which is quite effective at reducing the low-frequency combustion noise associated with turbine operation. Thus, when combustion turbines are installed in a combined cycle configuration, they do not generate the same magnitude of low-frequency noise emissions asked when they are installed in a simple cycle configuration. The HRSG tubes and the cooling of the exhaust gases greatly reduce the low-frequency noise emissions.

There are several recommendations for low-frequency noise limits to ensure protection from low-frequency noise disturbance. The American National Standards Institute (ANSI) B133.8 (Gas Turbine Installation Sound Emissions, 1989) recommends limiting the noise emissions of new gas turbine facilities to 75 to 80 dBC at the nearest private residence order avoid the generation of sensible vibrations. C-weighting is used because it is more sensitive to energy in the low end of the frequency spectrum and is a more meaningful measure of lowfrequency noise than A-weighting is. A range of values is given in the standard because the threshold of perception of noise-induced vibration is not sharply defined. ANSI S12.9-1996/Part 4 (Quantities and Procedures for Description and Measurement of Environmental Sound--Part 4: Noise Assessment and Prediction of Long-term Community Response) states that "Generally, annoyance is minimal when octave-band sound pressure levels are less than 65 dB at 16, 31.5 and 63-Hz midband frequencies."

Furthermore, the State of Oregon has established octave band standards (Oregon Administrative Rule [OAR] 340-035-0035, Noise Control Regulations for Industry and Commerce), which are summarized in Table 3.9-15.

The modeled octave band, decibel A-weighted (dBA) and decibel C-weighted (dBC) sound pressure level, at M2 (the closest residence) is summarized in Table 3.9-16. Levels will be less at other, more distant locations such as M3 (the hatchery) and M4 (the campground). These levels are below the 75 dBC recommended in ANSI B133.8, below the 65 dB recommended for 31.5 and 63 Hz in ANSI S12.9-1996/Part 4, and comply with the State of Oregon's nighttime octave band requirements. Therefore, no adverse reaction to low-frequency noise is anticipated.

#### **TABLE 3.9-15**

Oregon Median Octave Band Standards for Industrial and Commercial Noise Sources (OAR 340-035-0035)

Octave Band Center Frequency (Hz)	Daytime(7 a.m 10 p.m.) (dB)	Nighttime (10 p.m 7 a.m.) dB)
31.5	68	65
63	65	62
125	61	56
250	55	50
500	52	46
1000	49	43
2000	46	40
4000	43	37
8000	40	34

Source: OAR 340-035-0035.

#### **TABLE 3.9-16**

Facility Sound Level at the Marina Location

	Octave Band Center Frequency (Hz)								A-Weighted Sound Pressure Level (dB)	C-Weighted Sound Pressure Level (dB)	
Location	31.5	63	125	250	500	1,000	2,000	4,000	8,000		
Marina	61	57	53	49	42	34	19	10	10	45	610

Source: Dicke, pers. comm.

# 3.9.3 Environmental Impacts of Alternatives

# 3.9.3.1 Northwest Site Alternative

The northwest site alternative would place the generation plant closer to the nearest residence than would the proposed southeast site. Although noise levels at the nearest residence might be somewhat higher if the generation plant were constructed at the northwest site, they would still be below state noise standard limits.

# 3.9.3.2 Wet-Cooled System Alternative

The noise produced by the generation plant would generally be the same with either a dryor a wet-cooled system. The small noise reduction that may be achieved by switching to wet cooling towers would not justify the adverse water consumption impacts associated with wet cooling towers.

# 3.9.3.3 Water Pipeline Alternative

As a water supply alternative to the proposed onsite well, the Applicant has secured an option to purchase up to 100 gallons per minute (gpm) (or up to 144,000 gallons per day [gpd]) of water from the Town of Starbuck under the Town's existing water right. The Applicant would construct a water pipeline, primarily along an abandoned railroad bed, connecting the generation plant to the Town water supply system. Impacts to noise levels associated with implementation of the water pipeline alternative would be the same as those associated with the proposed onsite well.

The primary source of noise that would be generated by the water pipeline is the pump motor at the wellhead. Because the pump already operates to provide water to the Town of Starbuck, the pipeline would create no additional noise. The pump would likely cycle on more frequently in order to provide water to the generation plant compared with supplying only the Town of Starbuck; however, the noise levels are anticipated to be similar under both modes of operation and should not exceed current levels. If this alternative were implemented, the Applicant would ensure that the noise resulting from pipeline operation was in compliance with WAC noise regulations.

The Applicant will provide detailed information on the impacts of the water pipeline alternative if the Applicant seeks to implement this alternative.

Noise resulting from pipeline construction would be similar to the levels presented in Table 3.9-11. Only a small portion of the proposed pipeline route is near residential areas. Feasible mitigation measures similar to those presented in Section 3.9.4.1 would be implemented to reduce impacts to residential receivers.

# 3.9.4 Mitigation Measures

Section 3.9.4. summarizes the planned mitigation measures for the generation plant. No further mitigation measures are anticipated to be necessary.

# 3.9.4.1 Construction

Noise associated with construction is exempted from Washington State noise standards. However, construction activities are anticipated to include the following noise mitigation features:

- Limit noisy construction activities to daytime hours (6 a.m. to 10 p.m.).
- Ensure that all construction equipment is properly muffled for noise suppression.
- Use either low-pressure steam blows or a temporary blowout silencer and limit steam blows to daytime hours (6 a.m. to 10 p.m.).

# 3.9.4.2 Operation and Maintenance

The generation plant will include the following noise mitigation features:

- The combustion turbine, steam turbine, and associated auxiliary equipment will be located within an acoustically insulated building.
- The combustion turbine inlet will be equipped with an appropriate silencer.
- The HRSG equipment does not actually generate noise and serves as an effective combustion turbine exhaust silencer. No HRSG mitigation is anticipated to be necessary beyond the inherent equipment mitigation.

# 3.9.5 Cumulative Impacts

No cumulative impacts to noise levels are associated with construction or operation and maintenance of the generation plant.

# 3.9.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to noise levels are associated with construction or operation and maintenance of the generation plant.

# SECTION 3.10

# 3.10 Land Use

# 3.10.1 Existing Conditions

The study area for this land use analysis is the acreage located within a 25-mile radius of the generation plant site as specified in 463-42-362 *Washington Administrative Code* (WAC). The generation plant site is located in the northern portion of unincorporated Columbia County. The study area also includes property in the northeast of Walla Walla County, the southeast of Franklin County, the south of Adams County, the southwest of Whitman County, and the northwest of Garfield County, all in Washington State. All of these counties are primarily rural and agricultural, with more than 85 percent of the land used for farming and range-land. The remainder consists of developed areas, including commercial and residential land in small to medium-sized towns and cities, and forestland. Cropland dominates the study area in Adams, Garfield, and Walla Walla Counties, while rangeland dominates the study area in Columbia, Franklin, and Whitman Counties. Figure 3.10-1 shows the designations presented in the land use plans and zoning ordinances for counties in the study area.

# 3.10.1.1 Existing Land Use Plans

Towns and cities within the 25-mile study area include Starbuck and Dayton (Columbia County), Prescott and Waitsburg (Walla Walla County), Washtucna (Adams County), Kahlotus (Franklin County), and La Crosse (Whitman County). The towns of Washtucna and La Crosse do not have comprehensive plans.

The following plans and ordinances were reviewed during preparation of this land use analysis:

- Columbia County Comprehensive Plan (April 1996)
- Columbia County Zoning Ordinance (January 1995)
- Columbia County Shoreline Master Program (June 1975)
- Walla Walla County Zoning Codes (2000)
- Walla Walla County Draft Comprehensive Plan, Drawings for Land Use and Zoning (2001)
- Town of Starbuck: Guide to Community Development (1995, revised 1998)
- The City of Dayton Comprehensive Plan (1999)
- The City of Dayton Uniform Codes (1997)
- The City of Waitsburg Comprehensive Plan 1998–2018 (March 18, 1998)
- The Town of Kahlotus, Land Use Drawings and Ordinance No. 409 (1989)
- The Town of Prescott Comprehensive Plan (1999)
- Walla Walla County Urban Area Comprehensive Plan (1998)
- Countywide demographic statistics from the National Agricultural Statistics Service (NASS) for Columbia, Adams, Franklin, Garfield, Whitman, and Walla Walla Counties (2001)

One copy of these plans and ordinances (bound separately) accompanies this Application for Site Certification (ASC).

Within the 25-mile study area, county acreage in Adams, Franklin, Garfield, Walla Walla, and Whitman Counties is zoned agricultural. Zoning in Columbia County is also predominantly A-1 Agricultural, except for a 730-acre industrial development site in the northern portion of the county along the Snake and Tucannon Rivers known as the "Snake River Site," which Columbia County has zoned H-I-1 Heavy Industrial.

Towns and cities within the 25-mile study area are zoned as follows:

- **Dayton**, located approximately 25 miles southeast of the site on SR-12, is the largest city in the 25-mile study area in both population and acreage. It has two residential classifications (low and urban density), two commercial classifications (central and fringe), and separate industrial, open space and recreation, and public/quasi-public classifications.
- **Waitsburg**, 25 miles south of the site on SR-12 and SR-124, has residential (60 percent), commercial, industrial, and public zoning classifications.
- **Kahlotus**, 20 miles north of the site on SR-260, is zoned commercial, public, and residential.
- **Prescott**, 25 miles southwest of the site on SR-124, is zoned residential, town commercial, industrial, and public.
- **Washtucna**, 20 miles northwest of the site on SR-260, is zoned commercial, public, and residential.
- La Crosse, 25 miles northeast of the site near SR-26, is zoned residential, with "community lots" set aside for public use.
- **Starbuck**, 6 miles southeast of the generation plant site, states the following in its land use and development guidelines:

...traditional development patterns established in the Town during the late 1800s, a rural atmosphere and a community spirit that ties people and land together, represent what is important to Starbuck residents. (Starbuck Planning Commission, 1998)

The Town of Starbuck uses a simple set of performance standards for two designated development districts. These standards regulate the impacts of any activity on the land, guiding new development in each district. The Traditional Town District is intended to protect the rural atmosphere and character of the Town. It has a maximum density of eight building sites per acre. The Floodway District maintains public safety and protects critical acres by directing development away from areas adjacent to the Tucannon River. No new buildings are allowed in this latter district. The Town of Starbuck serves mostly as a residential village. The majority of land uses in the Town are for single-family homes, mobile homes, and pasture. Many homes have pasture land attached, with small outbuildings or barns. The several commercial enterprises in Starbuck serve limited local and tourist needs.



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# 3.10.1.2 Generation Plant Site

The 100-acre generation plant site is located within the Snake River Site identified for heavy industrial development by the *Columbia County Comprehensive Plan* (Columbia County, 1996). The *Comprehensive Plan* notes that the Snake River Site has "highway, railroad, and river access" and identifies it as appropriate for "heavy industry." It applies the "heavy industry" designation to areas intended to host heavy industrial uses that are located away from normal residential development.

In accordance with the *Comprehensive Plan's* designation, Columbia County has zoned the Snake River Site as HI-1 Heavy Industrial. This zoning designation allows non-nuclear energy production facilities as conditional uses. The uses permitted with a Conditional Use Permit (CUP) are outlined in *Columbia County Zoning Ordinances* (Columbia County, 1995), under Section 15, Heavy Industrial Zone (HI-1), Part C, "Conditional Uses Permitted," as follows:

In an HI-1 Zone, the following uses and their accessory uses are permitted when authorized in accordance with the conditional use requirements of Section 33 of [the Columbia County Zoning] ordinance:

- A use permitted outright in LI-1 Zone;
- Manufacturing, repairing, compounding, fabricating, processing, packing, or storage of a use not listed in Section 14 of this ordinance;
- Automotive, wrecking, dismantling, or junk yards;
- The production of energy except for nuclear facilities and use (Posey, pers. comm.)

*Columbia County Zoning Ordinances* (1995) describes CUPs as appropriate for allowing the following land uses:

Certain uses, because of their unusual size, infrequent occurrence, special requirements, possible safety hazards, or detrimental effects on surrounding properties and other similar reasons are classified as conditional uses. These uses may be allowed in certain zones by a conditional use permit granted by the Board of Adjustment.

A strip of land (less than 50 feet wide) that lies between the generation plant site and SR-261 (see Section 2, Figure 2.2-3) belongs to the U.S. Army Corps of Engineers (Corps). The Applicant has submitted documentation to the Corps to obtain easements to construct access roads across Corps lands. Corps property is within the 730-acre Snake River Site's H-I-1 Heavy Industrial zoning. Columbia County has zoned the area surrounding the Snake River Site as A-1 Agricultural.

# 3.10.1.3 Current Land Uses

# Study Area

Within the 25-mile study area, agricultural lands are used for irrigated and dry crop production (cropland) and cattle grazing (rangeland). Broken down by county, agricultural uses in the study area are as follows:

- **Columbia County.** Rangeland is found in the northwest around the generation plant site, in the north along the Snake River, in the south around Dayton, along SR-12, and in the center of the county north and south of SR-261.
- Walla Walla County. A small area of rangeland (approximately 900 acres) is found north of Prescott, in Walla Walla County, and the remainder of county acreage is used for cropland.
- **Franklin County.** Acreage from Kahlotus to the eastern border of Franklin County is used for rangeland, and the remainder of Franklin County is used for cropland.
- Adams County. The area of Adams County within the 25-mile study area is used for dry cropland. Small areas along the southern Adams County line and a 5-mile area mostly northeast of and surrounding the town of Washtucna are used for rangeland.
- Whitman County. Small areas (less than 1 mile wide) located along the county's northern border and a 2- to 3-mile-wide section along its entire western border are used for rangeland. The remainder of Whitman County is used to grow crops.
- **Garfield County.** A 2-mile-wide section along the Snake River (the northern border of Garfield County) and a small area along Garfield County's southern border are used for rangeland. The remainder of the county is used for cropland.

Starbuck is currently a residential village. The majority of land uses in the Town are for single-family homes, mobile homes, and pasture. Commercial businesses include a restaurant, a small grocery store, a craft shop, a weaving studio, and a tack shop. Public areas include a high school, the fire district firehouse, Town parks, and a rodeo arena.

Dayton's residential land use consists of mixed housing unit types, including single-family and multifamily dwellings, and agricultural enterprises made up of commercial gardening, fruit and berries, poultry, animal husbandry, and horticultural nurseries. The districts designated for commercial uses have hotels, restaurants, stores, historic buildings, and city and county public buildings. Industrial areas have both light and heavy industry and include a major food processing plant. "Open space and recreation" is the designation given to open areas that allow outdoor activities. Public land use includes public parks, public schools, governmental buildings, cemeteries, hospitals, golf courses, and utility stations.

Waitsburg's residential acreage (60 percent) is made up of single-family and multifamily dwellings and manufactured housing. Commercial designation (less than 1 percent) covers retail and wholesale trade (offices, motels, restaurants, service outlets, and automobile service stations). Industrial (less than 1 percent) includes light manufacturing, processing, warehousing, and storage. Public land (10 percent) includes public facilities and services, schools, churches, community parks, and sport facilities.

Prescott's residential areas have single-family homes. The commercial district includes retail and service businesses, light industry, and other commercial uses that require large areas of land. Public areas include city facilities, schools, and parks.

Kahlotus has commercial land use for small restaurants, gas stations, vehicle repair, sporting supplies, and a motel along SR-260. Public areas include a Town park, schools, and city buildings. Residential areas consist of multifamily and single-family residences, mobile homes, and trailer parks.

Commercially zoned areas in Washtucna include public buildings (the town hall, school, parks, and post office), as well as such small community businesses as restaurants, bars, a motel, a service station, and a variety gardening and grocery store. Washtucna has designated two blocks of land adjacent to and south of its highways as commercial. The remainder of Washtucna is residential, consisting of multifamily and single-family homes, mobile homes, and trailer parks.

La Crosse uses "community lots" to designate the land for its post office, town hall, churches, and ambulance building. The residential areas of the town have mobile homes, trailer parks, and single-family homes.

#### **Generation Plant Site**

The entire 100-acre site is currently used for grazing cattle. Current land use in the immediate vicinity of the generation plant site (within a radius of approximately 2 miles) consists primarily of rangeland.

There are two commercial land uses in the immediate vicinity of the generation plant site. The first is the Columbia County Grain Growers grain elevators, located adjacent to the southern border of the generation plant site. The primary activities at the grain elevators consist of truck deliveries, storage of grain, and loading of river barges. The second commercial use is the Lyons Ferry Marina, operated by the Corps and the Port of Columbia, located on the Snake River approximately 1.1 miles north of the site. The Marina provides boat slips and storage, limited camping facilities, groceries, and supplies. Other land uses in the immediate vicinity of the site include the following:

- Electrical transmission line corridors, including two 500-kilovolt (kV) Bonneville Power Administration (BPA) transmission lines, which bisect the site in an east-west direction, and a 115-kV line owned by the Columbia Rural Electric Association (CREA) that traverses the approximate center of the property in a north-south direction
- Transportation corridors, including SR-261, located adjacent to and west of the property, and the Union Pacific Railroad line, located several hundred feet west of SR-261
- A natural gas mainline corridor that passes within approximately 200 feet of the southwestern site boundary, owned and operated by Gas Transmission-Northwest (GTN)
- The state-owned Lyons Ferry Fish Hatchery, located on the Snake River approximately 2.5 miles northwest of the site, downstream of the confluence of the Snake and Palouse Rivers

- Recreational use at Lyons Ferry State Park, located approximately 1.5 miles northwest of the site, on the north side of the Snake River where it is joined by the Palouse River
- The Snake River is used for recreational purposes (fishing and boating), and commerce (primarily river barging).

A renter currently occupies a residence on the generation plant site. The tenant has been informed that the property will be sold to the Applicant. The tenant will relocate and the house will be demolished after being used as an office during construction. There are few residences within a 4-mile radius of the site. The nearest residence offsite is located at the Marina, approximately 1.1 miles to the northwest.

# 3.10.2 Environmental Impacts of the Proposed Action

The generation plant will be compatible with existing land use plans and ordinances within the 25-mile study area, as well as existing land uses. The heavy industrial zoning of the generation plant site allows both grazing and non-nuclear energy production as land uses. Because of the significantly high amount of rangeland and cropland in Walla Walla, Franklin, Adams, Whitman, Garfield, and Columbia Counties, the generation plant will cause no changes or impacts to existing land use, except for the land use change from grazing to industrial use (as allowed by the zoning) at the site itself. Neither construction nor operation of the generation plant will cause towns and cities in the 25-mile study area to change their current zoning or land use. An influx of workers to the area during construction will not attract new small service businesses, such as restaurants and grocery stores, to the smaller towns along state routes (primarily Washtucna and Starbuck) because of the short-term duration of potential customers. However, there is commercially zoned acreage in these towns of which 50 percent is unused and ready for expansion, should the need develop. La Crosse is not on a state route and there will be no impacts to current land use there. Walla Walla, Prescott, Waitsburg, and Dayton currently have vacant commercial and residential zoned acreage, and they will benefit from new businesses and residents.

Land use within 2 miles of the generation plant site will not change during construction or operation of the generation plant. Some traffic congestion may occur during the construction of the plant, but this will not change operations or land use at the Lyons Ferry Fish Hatchery. Additionally, vacationers' use of Lyons Ferry State Park and the Lyons Ferry Marina will continue, as will recreational activities on the Snake, Palouse, and Tucannon Rivers. During the harvest period, when grain deliveries are made to the nearby Columbia County Grain Growers elevators, potential traffic conflicts between construction vehicles and grain deliveries will be minimized by coordinating construction truck routes and schedules, as necessary.

Local parks, such as the Lyons Ferry State Park and the Lyons Ferry Marina, are used primarily on weekends and holidays during the summer months (see Section 3.13). Increased traffic on SR-261 near the site may delay vacationers, but this will also be minimized by scheduling deliveries to the plant site on weekdays. Because the plant site is located south of local parks, it is not expected to affect park use.

The proposed generation plant site is near BPA's existing 500-kV transmission lines and GTN's natural gas transmission mainline. These facilities will be interconnected with the generation plant. They are integral to and compatible with the plant's operation. Location of

the generation plant near these regional transmission facilities minimizes the length of new interconnection facilities (electrical lines and gas pipelines) that will need to be built to support the plant's operation. Likewise, the railroad and state route (SR-261) located near the generation plant site are compatible with and supportive of industrial uses such as the generation plant.

A Certificate of Compliance, approved by Columbia County on March 5, 2001, confirms that the generation plant conforms to the County's *Comprehensive Plan* and zoning ordinances and meets County requirements for a CUP. The Washington State Energy Facility Site Evaluation Council (EFSEC) must verify that local land use codes are in compliance. The generation plant is an industrial use, and it is proposed for development on land designated for heavy industry by both the *Comprehensive Plan* and the zoning ordinance. Issuance of the Certificate of Compliance demonstrates consistency with local land use and zoning codes. This certificate, Attachment B, may be found at the conclusion of Section 3 of this Application for Site Certification (ASC).

Construction and operation of the generation plant will reduce the amount of grazing land in the area, but this reduction will pose no impact to cattle operations. Construction and operation of the generation plant will not conflict with continued use of adjacent and nearby properties for grazing. Cattle currently grazing on the site will be moved to a different pasture, west of the site. The loss of the generation plant site as rangeland will amount to less than .0008 percent of rangeland in Columbia County.

# 3.10.3 Environmental Impacts of Alternatives

# 3.10.3.1 Northwest Site Alternative

Impacts to land use associated with the northwest site alternative would be the same as those associated with the proposed southeast site location because both sites have the same existing and nearby land uses (agricultural) and the same zoning designation (heavy industrial).

# 3.10.3.2 Wet-Cooled System Alternative

Impacts to land use associated with the wet-cooled system alternative would be greater than those associated with the proposed air-cooled system because the wet-cooled system would use more of the 100-acre site for process water disposal. The air-cooled system will use 300 gallons per minute (gpm), or up to 432,000 gallons, of water per day. The wet-cooled system would require more water (8 million gallons per day [mgd]). While approximately 80 percent of the water used would evaporate, this would leave more than 1 million gallons of process water per day for wastewater disposal. Because the wet-cooled system alternative would require a larger area of the generation plant site to be designated for process water disposal, it would use a larger portion of the site.

# 3.10.3.3 Water Pipeline Alternative

As a water supply alternative to the proposed onsite well, the Applicant has secured an option to purchase up to 100 gpm (or up to 144,000 gpd) of water from the Town of Starbuck under the Town's existing water right. The Applicant would construct a water pipeline, primarily along an abandoned railroad bed, connecting the generation plant to the

Town water supply system. Impacts to land use associated with implementation of the water pipeline alternative would be greater than those associated with the proposed onsite well because pipeline construction would affect more offsite land. However, these construction impacts would be minimal because most of the pipeline route is in an abandoned railway bed that currently has existing access roads in place. Land use impacts associated with operation and maintenance of the alternative water pipeline would be no greater than those associated with the onsite well, because the water pipeline would be buried beneath the abandoned railroad bed and would not change or limit the existing land use.

The Applicant will provide detailed information on the impacts of the water pipeline alternative if the Applicant seeks to implement this alternative.

Under the existing Columbia County Zoning Ordinance (1995), the generation plant is zoned for Heavy Industrial uses. Construction and operation of an electricity generation plant on the Applicant's property is a use that is authorized upon issuance of a CUP under the Columbia Zoning Ordinance. Instead, the Applicant has obtained a Certificate of Land Use Consistency from Columbia County, showing that the county has determined that the generation plant meets the county *Comprehensive Plan* and zoning requirements and would quality for a CUP. Because the generation plant is subject to the jurisdiction of the Energy Facility Site Evaluation Council (EFSEC), the standard CUP procedure does not apply. The certificate requires continued adherence to EFSEC's regulations. The certificate is included as Attachment 3.10-1, and may be found at the conclusion of Section 3.10 of this Application for Site Certification (ASC).

Because the County has zoned the generation plant site for heavy industrial uses, land use impacts associated with construction, operation, and maintenance of the generation plant are not considered significant, and therefore will not require mitigation.

# 3.10.4 Cumulative Impacts

No cumulative impacts to land use are associated with the construction or operation and maintenance of the generation plant.

# 3.10.5 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to land use are associated with the construction or operation and maintenance of the generation plant.

# SECTION 3.11 Visual Resources/Light and Glare

# 3.11 Visual Resources/Light and Glare

This section evaluates the potential aesthetic (visual) impacts of the Starbuck Power Project (SPP) generation plant. Potential visual impacts include temporary visual changes introduced by construction of the plant and permanent visual changes resulting from the ongoing presence of the generation plant during operation. Visual resources include the natural and constructed physical features that give a particular landscape its character and value.

# 3.11.1 Evaluation Methods

Data on existing visual resources and potential impacts were collected by using U.S. Geological Survey quadrangle maps, aerial photos, project maps, photographs and visual simulations, and a site reconnaissance. Potential visual impacts were evaluated by assessing the visual quality of the project area, the viewer sensitivity, and the visibility of changes from selected viewpoints.

Analysis of existing visual resources and potential impacts follows the Bureau of Land Management (BLM) Visual Resource Management (VRM) system, which is discussed in detail below. The VRM method was developed to provide BLM managers with a means for determining visual values on BLM lands and for considering these values as part of resource management planning. Although the generation plant is not located on BLM land, the BLM methodology framework was selected because of its common and accepted use for similar projects located on western lands, such as those in the generation plant area.

# 3.11.2 Existing Conditions

The description of existing conditions for this analysis generally follows the *BLM Visual Resource Inventory* (Manual H-8410-1) (BLM, 2001a) process. The VRI method has four steps:

**1. Scenic Quality Rating.** Scenic quality is a measure of the visual appeal of a tract of land (represented in this analysis by the view from a specified point). In the visual resource inventory process, lands are given an A, B, or C rating based on the apparent scenic quality, which is determined using seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity (common or rare), and cultural modifications. The rating system assumes that areas with the most variety and the most harmonious composition have the greatest scenic value. The system also assumes that features of the human environment do not necessarily detract from the scenic value of the landscape. The rating totals are used to classify the scenic quality as:

- Class A: outstanding
- Class B: a combination of outstanding and common
- Class C: fairly common to the physiographic region

Although BLM applies a numeric scale to the classes, a qualitative approach was used for this analysis.

**2. Sensitivity Level.** Sensitivity level takes into consideration the frequency of use of an area and the user's perceived degree of concern about proposed changes in scenic quality.

Each area is rated as having high, medium, or low sensitivity based on use volume and perceived user's attitudes. Sensitivity level analysis is used as an estimate of public concern for scenic quality. Six factors are used to evaluate sensitivity: types of users, amount of use, public interest, adjacent land uses, special land use areas, and other factors (such as research or studies indicating visual sensitivity). Each factor is assigned a rating of high (H), medium (M) or low (L); then, an overall rating (H, M, L) is given based on the ratings for the six factors.

**3. Distance Zones.** Distance zones are based on the level of visibility of the proposed corridor within the landscape from major viewing routes and observation points. Distance zones allow the consideration of the proximity of the observer to the project features. A particular scene is assigned one of three ratings:

- Foreground/middle ground: Areas seen from highways, rivers, or other viewing locations to a distance of 3 to 5 miles.
- Background: Background zones are areas beyond the foreground-middle ground zone but usually less than 15 miles away.
- Seldom seen: Areas that are normally hidden from view are the seldom-seen zones.

**4. Visual Resource Classes.** Based on the combination of scenic quality rating, sensitivity level, and distance zones, the landscape units (or viewpoints in this analysis) are assigned one of five management classes. The management classes are used by the BLM to indicate the level of disturbance that is existing or that would be allowed. Class I represents the most pristine wilderness areas and is assigned based on congressional or administrative designation. Classes II, III, and IV are assigned based on a combination of scenic quality, sensitivity level, and distance zones. The classes and their associated BLM management objectives are as follows:

- Class I: Class I is a special classification assigned to congressionally designated superb features such as national wilderness areas or wild sections of national wild and scenic rivers. The management objective is to preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.
- Class II: Class II is assigned to areas of outstanding scenic quality, high visitor sensitivity, viewed as foreground or middle ground. The management objective is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low.
- Class III: Class III is assigned to areas with outstanding and common scenic qualities, with moderate viewer sensitivity. The management objective is to partially retain the existing character of the landscape. The level of change to the characteristic of the landscape should be moderate.
- Class IV: Class IV is assigned to areas with features more common to the physiographic area areas that either have low viewer sensitivity, are viewed only as background, or are seldom seen. The management objective is to provide for management activities that

require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high.

A fifth classification of rehabilitation areas is sometimes used. Rehabilitation areas are areas where the natural character of the landscape has been disturbed to a point where rehabilitation is needed to bring it up to one of the four other classifications.

The BLM VRI method has been adapted to accommodate the goals of this document, which focus on assessing the potential impacts of project alternatives. Modifications include delineating the project area by key viewpoints instead of by landscape units and using qualitative instead of quantitative analysis for scenic quality ratings. Also, given the use of key viewpoints, the relative uniformity of the project area, and the relatively low number of viewers, descriptive rather than graphical analysis was used in the assessment of scenic quality, sensitivity level, and distance zones.

# 3.11.2.1 Light and Glare

There are no light sources in the generation plant construction area. However, some light intrusion occurs from lighting associated with a single-family residence to the northwest, from the grain elevator facility immediately to the south, and from vehicles traveling SR-261.

# 3.11.2.2 Landscape Setting

The generation plant will be located in the Columbia Plateau physiographic area in Columbia County, Washington, approximately 6 miles northwest of the Town of Starbuck. The generation plant site is located at the top of a steep bluff above the Snake River, approximately 200 feet above normal river elevation, between Little Goose Dam and Lower Monumental Dam. The site boundary is approximately 350 feet (horizontal distance) from the river, and the site slopes away from the river. State Route 261 (SR-261), the main highway in the area, extends along the western side of the site. The site is located in a zone designated for heavy industrial use.

Visual resources in the area of the SPP include a mix of scenic and rural viewscapes with some elements of human development. The canyon walls, bluffs, and Snake River represent scenic features juxtaposed against the rolling hills of the surrounding area. North and south along SR-261 in the project vicinity, the viewscape consists of a scenic vista of canyon walls and bluffs, with rolling hills visible in the distance. The canyon walls and more distant hills are shades of green, brown, gray, and tan. Colors vary with the season of the year. The Snake River is visible as travelers cross the SR-261 highway bridge to the north of the plant site.

The plant site lies on the east side of SR-261, just north of the Columbia County Grain Growers elevator and south of Lyons Ferry Road. The grain elevator facility includes six round, silver and tan structures ranging from approximately 30 to 60 feet tall. These structures provide a vertical industrial/agricultural element to the area. The existing viewscape of the site consists of small hills and grassy bluffs. Two 500-kilovolt (kV) Bonneville Power Association (BPA) transmission lines cross the site from east to west, and a 115-kV Columbia Rural Electric Association (CREA) transmission line crosses the site from north to south. Rocky bluffs on the east bank of the Snake River are visible in places above

the hills of the site. West of SR-261 and across from the plant site, a raised active railroad bed is visible, with rolling hills and steep bluffs in the background.

# 3.11.2.3 Key Viewpoints

Key viewpoints were selected to represent the existing visual conditions in the area of the Starbuck Power Project (SPP) and the variety of areas from which the generation plant potentially could be viewed. Based on the results of a field reconnaissance, a review of maps and past project documents, and discussions with individuals familiar with the site, four key viewpoints were selected for analysis and development of visual simulations (see Figure 3.11-1). The viewpoints are as follows:

- Viewpoint 1 (Lyons Ferry State Park): Looks south from Lyons Ferry State Park across the Snake River toward the plant site, approximately 1.5 miles away. Primary viewers at this viewpoint would be recreational users (see Figure 3.11-2).
- **Viewpoint 2 (Snake River):** Looks north from a boat on the Snake River at the southern end of the plant site. Primary viewers at this viewpoint would be recreational users (see Figure 3.11-3).
- Viewpoint 3 (Columbia County Grain Growers Grain Elevator): Looking north from the grain elevator adjacent to the plant site. Primary viewers at this viewpoint would be workers and visitors (see Figure 3.11-4).
- **Viewpoint 4 (SR-261):** View is from SR-261 south of the plant site, looking north toward the site. Primary viewers at this viewpoint would be travelers (see Figure 3.11-5).

A fifth viewpoint identified in the preliminary environmental assessment (Jones and Stokes, 2001) for the generation plant was eliminated from further analysis. This viewpoint looks west from the bluff on the east side of the Snake River down onto the generation plant site. Field reconnaissance and conversations with the Lyons Ferry State Park Ranger and a worker at the Lyons Ferry Marina indicated that this viewpoint is located on private property, is inaccessible from the river, and has no direct road access. Public use of the viewpoint appears low to nonexistent. As a result, this viewpoint was removed from consideration and no further analysis was conducted.

# 3.11.2.4 Visual Resource Inventory

Each viewpoint was classified using the BLM VRI methodology described above. The visual resource class of each unit is summarized in Table 13.11-1 and described below. A visual resource class is assigned to each viewpoint based on the results for the other categories.



FIGURE 3.11-1 Key Viewpoints Application for Site Certification STARBUCK POWER PROJECT STARBUCK, WASHINGTON



FIGURE 3.11-2 Viewpoint 1 — Lyons Ferry State Park Application for Site Certification STARBUCK POWER PROJECT STARBUCK, WASHINGTON



FIGURE 3.11-3 Viewpoint 2 — Snake River Application for Site Certification STARBUCK POWER PROJECT STARBUCK, WASHINGTON



FIGURE 3.11-4 Viewpoint 3 — Columbia County Grain Growers Grain Elevator Application for Site Certification STARBUCK POWER PROJECT STARBUCK, WASHINGTON



FIGURE 3.11-5 Viewpoint 4 — SR-261 Application for Site Certification STARBUCK POWER PROJECT STARBUCK, WASHINGTON

#### TABLE 3.11-1

Summary of Visual Resource Inventory

Viewpoint	Scenic Quality Rating	Sensitivity Level	Distance Zone	Visual Resource Class
1. Lyons Ferry State Park	Class B (Outstand- ing and Common)	Moderate to High	Foreground/ Middleground	Class III
2. Snake River	Class C (Common)	Moderate	Foreground/ Middleground	Class IV
<ol> <li>Columbia County Grain Growers Grain Elevator</li> </ol>	Class C (Common)	Low	Foreground/ Middleground	Class IV
4. SR-261	Class C (Common)	Moderate	Foreground/ Middleground	Class IV

## Viewpoint 1 (Lyons Ferry State Park)

- Scenic Quality Rating: Class B Outstanding and Common. This view offers a variety of appealing visual elements to the viewer, including color, topography, landform and water. While not necessarily outstanding in quality, the view is more appealing than average for the area.
- Sensitivity Level: Moderate to High. Users would typically include recreational visitors to the park, including hunters, fishers, boaters, hikers and campers. The park is a relatively popular recreational destination for the area and could include a large number of viewers during a typical year. Viewer sensitivity would be tempered somewhat by the existing elements of human development, most notably the highway bridge.
- Distance Zone: Foreground/Middleground. All four viewpoints were identified within the foreground/middleground zone. No key views of the plant from more distant locations are anticipated.

#### Viewpoint 2 (Snake River)

- Scenic Quality Rating: Class C—Common. The view from the Snake River is typical of views in this area. Neither the river bluff nor the water provide views of more than common color, texture or other visual appeal.
- Sensitivity Level: Moderate. The majority of users are assumed to be river recreational users and tribal fishers. Although their numbers might be only moderate, it is assumed that they would be sensitive to new elements of the built environment being introduced.
- Distance Zone: Foreground/Middleground. All four viewpoints were identified within the foreground/middleground zone. No key views of the plant from more distant locations are anticipated.

## Viewpoint 3 (Columbia County Grain Growers Grain Elevator)

- Scenic Quality Rating: Class C Common. The view from the grain elevators is limited and not expansive, and it does not include any but the most common vegetation and landform seen in the area. The human element of the grain elevators does not add to the visual appeal.
- Sensitivity Level: Low. Most users would be workers, farmers, or others using the facility. Although the number of users could be moderate and their views could be frequent, their sensitivity to a new element of the built environment would likely be low given the general industrial setting (large trucks, buildings, pavement) of the grain elevator parking lot.
- Distance Zone: Foreground/Middleground. All four viewpoints were identified within the foreground/middleground zone. No key views of the plant from more distant locations are anticipated.

## Viewpoint 4 (SR-161)

- Scenic Quality Rating: Class C—Common. The view from SR-261 includes the roadway and the vegetated hillside beyond. While the coloration and vegetative variety could be of moderate interest to the viewer, this view is very common to highway travelers in the area.
- Sensitivity Level: Moderate. The majority of users would be highway travelers, including those traveling for work and for recreation. Local residents would also access this view. Sensitivity to a new built element in the landscape would vary by viewer and their travel purpose. Duration of views would be relatively short but could be repeated for local residents or other local highway users. However, given the generally undeveloped nature of the area, it is assumed that a new built element would be noticeable.
- Distance Zone: Foreground/Middleground. All four viewpoints were identified within the foreground/middleground zone. No key views of the plant from more distant locations are anticipated.

# 3.11.3 Environmental Impacts of the Proposed Action

This visual impact assessment examines the degree of contrast between the existing site landscape with the generation plant and without. The evaluation generally follows the methods outlined in the BLM *Visual Resource Inventory Contrast Rating* document (Manual 8431) (BLM, 2001b). The key steps in the process include describing the generation plant (see subsections below), selecting key viewpoints and preparing simulations, and conducting the visual contrast rating.

# 3.11.3.1 Key Viewpoints and Simulations

Visual simulations of the generation plant were developed for each of the key viewpoints for each of the project components as described below. The simulations were based on photographs taken at the various locations. Three computer software applications were used in the generation of the visual simulations. A Bentley Microstation 3D CAD model was used to generate an accurate representation of the generation plant, which was located in geographical reference coordinates. Next, the visualization portion of Bentley Microstation was used to take the 3D model and align it with the scanned photographs of the generation plant site. This software was also used to generate a combined rendering of the 3D model with the photos. Finally, Adobe PhotoShop was used to touch up the images and make foreground and background adjustments of the combined renderings and photographs.

Because of the lighting conditions, background coloration, and visual field of the original photographs, some of the finer existing features (such as existing transmission lines) in the viewpoint and simulation photographs blend into the background in some of the views. The simulated images are, in some cases, shown with a slightly darker coloration than they may actually have in order to make them visible for the purpose of assessing impacts.

## Contrast Rating and Comparison with Visual Resource Class Objectives

To evaluate potential visual impacts, contrast ratings are assigned to each viewpoint by considering the following factors: distance, angle of observation, length of time project is in view, relative size or scale, season of use, light conditions, recovery time, spatial relationships, and atmospheric conditions. Potential contrast is rated according to the following categories:

- Strong: The contrast demands attention, would not be overlooked by the average observer, and is dominant in the landscape.
- Moderate: The contrast begins to attract attention and begins to dominate the characteristic landscape.
- Weak: The contrast can be seen but does not attract attention.
- None: The contrast is not visible or not perceived.

The level of contrast is compared to acceptable levels of contrast for the visual resource class of the viewpoint as described in the VRI methods above. The four levels of contrast (none, weak, moderate, strong) roughly correspond to Classes I, II, III, and IV, respectively. This means that a "strong" contrast rating may be acceptable in a Class IV area but probably would not be acceptable in Class I, II, or III areas. Acceptable degrees of contrast for each visual resource class are based on BLM definitions, as follows.

- Class I: Acceptable contrasts are primarily natural ecological changes.
- Class II: Contrasts may be seen but should not attract the attention of the casual observer.
- Class III: Contrasts may attract attention but should not dominate the view of the casual observer.
- Class IV: Contrast may dominate the view and be the major focus of viewer attention.

#### Impact Levels

Impacts are classified as high, moderate, or low based on the degree of contrast compared with the acceptable level of contrast for that visual resource class. The following impact levels are used:

- High: Contrast is substantially greater than acceptable.
- Medium: Contrast is somewhat greater than acceptable for the visual resource class.
- Low: Contrast is acceptable for the visual resource class.
- No Impact: Visual contrast is not perceptible.

# 3.11.3.2 Construction

## Description

During plant construction, 40 acres to the south of the existing BPA transmission line will be cleared for the generation plant. To the north of the existing BPA transmission line, 10 acres will be cleared for temporary parking, onsite well construction, temporary topsoil storage, and the switchyard. The total acreage that will be disturbed by generation plant construction activities is illustrated in Figure 2.2-4.

Laydown and staging areas will be located on the southeast side of the existing BPA transmission line, on the site of the proposed generation plant. When generation plant construction begins, laydown and staging areas will move to the east and west of the condensers.

Heavy equipment that will be onsite during construction includes earthmovers, bulldozers, dump trucks, delivery trucks, stationary and mobile cranes, backhoes, pickup trucks, and worker vehicles. Cumulatively, these pieces of equipment, cleared areas, access roads, and staging areas will temporarily degrade the visual quality of the environment surrounding the generation plant. However, because the time that any one location on the site would be disturbed is relatively short, the number of viewers relatively small, and the impacts temporary, the visual impact of all activities combined will be low.

Dust suppression activities conducted during construction will minimize potential visual impacts from dust.

# Light and Glare

Construction lighting required by the Occupational Safety and Health Administration (OSHA) will be used for indoor locations. Under normal construction conditions, outdoor lighting is not expected to be used at the generation plant. However, if outdoor lighting is in fact used, areas may be lighted from floodlights directed toward the work area. These floodlights would be mounted on top of wood poles approximately 30 feet above the ground. Because most plant construction activities will occur during the daylight hours and outdoor construction lighting is not expected to be used, impacts of light and glare to the surrounding environment are not significant.

# 3.11.3.3 Operation and Maintenance

# **Facility Description**

Section 2 provides a complete description of the generation plant. With respect to potential visual impacts, the key components are as follows. The generation plant will be 120 feet wide. Each of the two cooling structures will be 215 feet long, 180 feet wide, and 120 feet high, with one on the southeast end of the plant and the other at the northwest end. The plant will be painted in shades of tan and beige that will blend with the existing landscape.

The plant will include four 175-foot exhaust stacks. It will be an air-cooled system that will not generate visible plumes of any kind.

#### **Visual Simulations**

The four visual simulations prepared for the generation plant are as follows:

- Simulation 1 (Lyons Ferry State Park): Looks south from Lyons Ferry State Park across the Snake River toward the plant site, approximately 1.5 miles away. Primary viewers at this viewpoint would be recreational users (see Figure 3.11-6).
- Simulation 2 (Snake River): Looks north from a boat on the Snake River at the southern end of the plant site. Primary viewers at this viewpoint would be recreational users (see Figure 3.11-7).
- Simulation 3 (Columbia County Grain Growers Grain Elevator): Looks north from the grain elevator adjacent to the plant site. Primary viewers at this viewpoint would be workers and visitors (see Figure 3.11-8).
- **Simulation 4 (SR-261):** View is from SR-261 south of the plant site, looking north toward the site. Primary viewers at this viewpoint would be travelers (see Figure 3.11-9).

#### Impacts Summary

Each simulated view of the plant was rated for contrast with the existing landscape, following the BLM contrast rating guidelines. The ratings were then compared with the visual resource classes assigned as part of the VRI process above. The results are summarized in Table 3.11-2 and discussed in detail below. As noted above, the plant will be located on a parcel zoned for heavy industrial use. The visual changes described below are consistent with that zoning designation.

#### TABLE 3.11-2

Power Plant Visual Impacts Summary

Simulation/Viewpoint	Contrast Rating	Visual Resource Class	Impact Level
1. Lyons Ferry State Park	Weak/Moderate	Class III	Low
2. Snake River	Weak/Moderate	Class IV	Low
3. Columbia County Grain Growers Grain Elevator	Weak/Moderate	Class IV	Low
4. SR-261	Moderate	Class IV	Low

# Simulation 1 (Lyons Ferry State Park)

• Contrast Rating: Weak/Moderate. The proposed plant can clearly be seen and, depending on the season and the coloration of the surrounding landscape, may or may not begin to attract attention. Because the duration of views could be long for recreational users, it is assumed that the plant would be noticeable to viewers. However, given the number of other objects (such as the grain elevator and boat dock) of the

human environment in this view and the distance of the generation plant from the viewer (about 1.5 miles), the generation plant does not dominate the landscape.

• Impact Level: Low. This level of contrast is consistent with the Class III visual resource rating given to this view. For Class III visual resources, changes may attract attention but should not dominate the view of the casual observer.

# Simulation 2 (Snake River)

- Contrast Rating: Weak/Moderate. In favorable light conditions, a portion of the plant could be seen from the Snake River. The contrast is due to the nature of the plant (an object of the human environment) rather than its size and scale, which are relatively small from this vantage point. Only part of the plant would be visible above the bluff; visibility would decrease as a river viewer approached the plant. The existing grain elevator also present in this view moderates the contrast of this added element.
- Impact Level: Low. This level of contrast is consistent with a Class III visual resource, in which contrasts may attract attention but should not dominate the view of the casual observer. Because this view is rated as a Class IV visual resource, the contrast rating presented by the generation plant would be better than acceptable using this scheme.

# Simulation 3 (Columbia County Grain Growers Grain Elevator)

- Contrast Rating: Weak/Moderate. The generation plant would present an obvious contrast to viewers looking over the bluff from this vantage point. Although it does not dominate in terms of scale, the generation plant represents a new object of the built environment in a landscape that is otherwise natural. However, the contrast with the foreground, which consists of a parking lot, large trucks, and portions of the elevator facility, is minimal. Existing transmission lines are also visible from this viewpoint.
- Impact Level: Low. This view was classified as a Class IV visual resource. The contrast rating for the background view is consistent with a Class III visual resource, in which contrasts may attract attention but do not dominate the view of the casual observer. The foreground view is more consistent with a Class IV visual resource. Thus, the simulated impacts are between acceptable and better than acceptable in terms of visual resource class.

# Simulation 4 (SR-261)

- Contrast Rating: Moderate. The generation plant would present an obvious visual contrast from this viewpoint. At this point on the highway, no other objects of the built environment are in view and the size of the plant appears relatively large because of its proximity to the road. However, because the average viewer would be in a vehicle, moving at highway speeds, the duration of the view would be relatively short. The contrast would be somewhat less during the winter season when the surrounding landscape color would be more brown than green.
- Impact Level: Low. This view was classified as a Class IV visual resource. The contrast rating for this view is consistent with a Class IV visual resource, in which contrasts may dominate the view and be the major focus of viewer attention, provided that mitigation is used to minimize the impacts. The impact in this case has been mitigated by using a color for the plant that blends in with the surrounding landscape.



FIGURE 3.11-6 Simulation 1 — Lyons Ferry State Park Application for Site Certification STARBUCK POWER PROJECT STARBUCK, WASHINGTON



FIGURE 3.11-7 Simulation 2 — Snake River Application for Site Certification STARBUCK POWER PROJECT STARBUCK, WASHINGTON



FIGURE 3.11-8 Simulation 3 — Columbia County Grain Growers Grain Elevator Application for Site Certification STARBUCK POWER PROJECT STARBUCK, WASHINGTON



FIGURE 3.11-9 Simulation 4 — SR-261 Application for Site Certification STARBUCK POWER PROJECT STARBUCK, WASHINGTON

## Light and Glare

Exterior lighting will be provided for operations and maintenance of the plant in accordance with the latest edition of the *IESNA Lighting Handbook* (IESNA, 2000) for power-generating facilities and with the ANSI/EIS RP-7 guidelines for industrial lighting. Lighting will be provided for structures and equipment operating areas, as required to meet OSHA and other safety standards. Lighting will be provided only as needed, with the goal being to keep exterior lighting to a minimum.

Material loading and unloading and gate entrance locations will be illuminated from 400-watt, high-pressure, sodium roadway luminaries, installed on 35-foot-high poles. The luminaries will be equipped with top and side visor shields to focus the light and direct it downward. Structure and equipment operating areas will be lighted by 100-watt, high-pressure sodium luminaries equipped with prismatic glass optics that produce a controlled light distribution in a downward direction. The substation will be equipped with 400-watt, high-pressure sodium floodlights installed on 35-foot poles.

On-off control of non-roadway exterior lighting will be a combination of manual on-off switches and automatic control using light-sensitive photo cells. Structure and equipment lighting (including at the substation) will be controlled by manual on-off switches. These lights will be turned on at night as needed for operation or maintenance tasks.

Roadway lighting will be from 150-watt, high-pressure sodium roadway luminaries installed on 35-foot-high poles with 6-foot-long bracket arms. Roadway lighting will be on at all times during the night and during other low-light conditions (e.g., weather events). The lights will be controlled by light-sensing photoreceptors and will turn on automatically at night. The roadway lights will include shielding to direct the light downward.

The exhaust stacks will be equipped with obstruction lighting, as required by the Federal Aviation Administration (FAA). Dull red lights will be placed on the stacks and will operate continuously during the nighttime hours – similar to what is observed on radio or television towers. The lights will be either steady or pulsing, depending on FAA regulations presented in the latest Advisory Circular guide AC 70/7460-1J, titled "Obstruction Marking and Lighting."

Some "glow" about each exterior light will be visible from some offsite locations. This "glow" will be similar to that of a front porch light from about a block away. Operating areas will have a visible light similar to that found below a light pole at a shopping mall. Given the relatively open and undeveloped nature of the project site, some of the light or glow will be visible at some distance from the facility. However, the visual impact of these lights will be reduced because only specific areas will be lighted, not the entire site. Because of the intervening topography and the relatively low number of viewers in the area, the visual impact of the lighting will be small.

The final lighting design of the SPP will include a balance between the use of light and dark surface color paints to reduce nuisance ambient lighting of offsite locations. Lighter surface colors reflect lighting for additional ambient access. In contrast, darker surface colors reflect less, but they require more lighting fixtures. Because the generation plant will be painted in earth tones using flat paint, and because it will have few windows, minimal glare will be generated.

# 3.11.4 Environmental Impacts of Alternatives

# 3.11.4.1 Northwest Site Alternative

Impacts to visual resources associated with the northwest site alternative would be the same as those associated with the proposed southeast site location. Although shifting the plant location to the northwest would slightly increase the contrast rating of the plant relative to the Lyons Ferry State Park and slightly decrease it from the Snake River and the Columbia County Grain Growers grain elevator, the overall visual impacts would be similar.

# 3.11.4.2 Wet-Cooled System Alternative

The wet-cooled system would be similar in size and bulk to the air-cooled facility, although it would also include cooling towers that would not be present with the air-cooled facility. Because the cooling towers would be shorter than the plant itself, the visual impact of the facility would be similar. However, total impacts to visual resources associated with the wet-cooled system alternative would be greater than those associated with the proposed aircooled system because of the steam plume associated with the a wet-cooled system. The plume would be visible only under certain weather conditions; however, it could extend several hundred feet in the air and would be visible from several miles away, with exact distance depending on topography. In general, the visual impacts of the wet-cooled system include those of the air-cooled system plus the additional impacts associated with the steam plume. During times when the plume is actually visible, it would present an obvious visual contrast to viewers at the four viewpoints described in Section 3.11.2.3. The plume could be seen clearly and would attract attention. The visual dominance and impact of the plume would vary with the viewpoint and would be less for those viewpoints that already include elements of the built environment. The plume might result in fogging along SR 261 and condensation on the roadway which could lead to icing conditions during winter months. There is no available mitigation for the plume. When the plume is not visible, impacts would essentially be the same as for the air-cooled system.

There would be a steam plume associated with a wet-cooled system. The plume would be visible only under certain weather conditions; however, it may extend several hundred feet in the air and would be visible from several miles away, with exact distance depending on topography. The following analysis is for those periods when the plume is actually visible. When the plume is not visible, contrast and impact would be the same for each alternative.

# Viewpoint 1 (Lyons Ferry State Park)

- Contrast Rating: Moderate/Strong. The proposed plume could clearly be seen and would attract attention. Because the duration of views could be long for recreational users, it is assumed the plant would be noticeable to viewers. However, given the number of other objects (for example, highway bridge, grain elevator, boat dock) of the human environment in this view and the distance of the generation plant from the viewer (about 1.5 miles), the generation plant and plume would not dominate the landscape.
- Impact Level: Medium. This level of contrast is consistent with the Class III visual resource rating given to this view. For Class III visual resources, changes may attract attention but should not dominate the view of the casual observer.

## Simulation 2 (Snake River)

- Contrast Rating: Moderate/Strong. When visible, the plume could be seen from the Snake River. The contrast would be due to the nature of the plant (an object of the human environment) and plume (vertical). The visual dominance of the plume would increase as a river viewer approached the plant. The existing grain elevator also present in this view moderates the contrast of this added element.
- Impact Level: Medium. This level of contrast is consistent with a Class III visual resource, in which contrasts may attract attention but should not dominate the view of the casual observer. Because this view as rated as a Class IV visual resource, the contrast rating presented by the generation plant would be better than acceptable using this scheme.

## Simulation 3 (Columbia County Grain Growers Grain Elevators)

- Contrast Rating: Moderate/Strong. The generation plant and plume would present an obvious contrast to viewers looking over the bluff from this vantage point. The plume would not dominate in terms of scale to a viewer looking over the bluff, but would represent an unmistakable intrusion of the built environment into a landscape that is otherwise natural. However, the contrast with the foreground, which consists of a parking lot, large trucks, and portions of the elevator facility, would be minimal. Existing transmission lines are also visible from this viewpoint.
- Impact Level: medium. This view was classified as a Class IV visual resource. The contrast rating for the background view is consistent with a Class III visual resource, in which contrasts may attract attention but should not dominate the view of the casual observer. The foreground view is more consistent with a Class IV visual resource. Thus, the simulated impacts would be between acceptable and better than acceptable in terms of visual resource class.

#### Simulation 4 (SR-261)

- Contrast Rating: Strong. The generation plant would present an obvious visual contrast from this viewpoint. At this point on the highway, no other objects of the built environment are in view and the size of the plant and plume appears relatively large because of its proximity to the road. Because of the height of the plume the duration of the view would be relatively long, although the view of the actual plant would be relative short. In addition, the plume might result in fogging along the highway and condensation on the highway surface that might lead to icing during winter months.
- Impact Level: Low. This view was classified as a Class IV visual resource. The contrast rating for this view is consistent with a Class IV visual resource, in which contrasts may dominate the view and be the major focus of viewer attention, provided that mitigation is used to minimize the impacts. The impact of the buildings has been mitigated by using a color for the plant that blends in with the surrounding landscape. There is no available mitigation for the plume.

# 3.11.4.3 Water Pipeline Alternative

As a water supply alternative to the proposed onsite well, the Applicant has secured an option to purchase up to 100 gallons per minute (gpm) (or up to 144,000 gallons per day

[gpd]) of water from the Town of Starbuck under the Town's existing water right. The Applicant would construct a water pipeline, primarily along an abandoned railroad bed, connecting the generation plant to the Town water supply system.

The onsite well alternative would result in fewer visual impacts than would the water pipeline alternative, although the majority of the visual impacts associated with the pipeline would be temporary and related to construction.

The water pipeline would create temporary visual impacts, resulting from excavation and the presence of heavy equipment during its construction. The clearing limit of the water pipeline is 30 feet within the abandoned railroad right-of-way. However, these impacts would be temporary because the pipeline is expected to be completed in approximately 2 months. No trees or large shrubs would be removed or killed as part of the pipeline construction or operation . No visual impacts would be present during the pipeline's operation and maintenance except in the unlikely event of pipeline failure, when equipment might be necessary for replacement. The pipeline would be attached to the underside of the SR-261 bridge and would not be visible to vehicles or foot traffic.

The Applicant will provide additional detailed information on the impacts of the water pipeline alternative if the Applicant seeks to implement this alternative.

# 3.11.5 Mitigation Measures

# 3.11.5.1 Construction

The visual impacts associated with construction will be caused primarily by the presence and operation of construction equipment. The following mitigation measures will be used to reduce potential visual impacts during construction of the generation plant:

• Dust suppression activities to minimize dust from construction sites.

# 3.11.5.2 Operation and Maintenance

Visual impacts associated with operation and maintenance of the generation plant will be related primarily to the degrees of contrast and dominance the plant presents with respect to the existing landscape from the vantage point of various viewers. The following measures will be used to reduce impacts:

- Facility color: As indicated above, the plant will be painted dark shades of tan and beige that will blend with the existing landscape. Selection of such colors will greatly reduce the potential visual impact of the generation plant.
- Lighting: As indicated above, exterior lighting will be equipped with top and side shields to direct the light downward and minimize the light visible offsite.

Mitigating visual impacts using vegetative screening is not feasible at the site, because of the need for adequate water to irrigate the trees. The capacity of the proposed well for the project is not great enough to supply the needed water.

# 3.11.6 Cumulative Impacts

No cumulative impacts to visual resources are associated with construction or operation and maintenance of the generation plant.

# 3.11.7 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to visual resources are associated with construction or operation and maintenance of the generation plant.

I

# SECTION 3.12 **Population, Housing, and Economics**

# 3.12 Population, Housing, and Economics

# 3.12.1 Introduction

This section presents an analysis of existing socioeconomic conditions in the vicinity of the Starbuck Power Project (SPP) and discusses potential impacts to the local population, workforce, property values, housing, and local economy associated with construction and operation of the generation plant.

The generation plant will be located in Columbia County in southeastern Washington. This analysis concentrates on the immediate and long-term socioeconomic impacts on Columbia County and the nearby communities of the Town of Starbuck and the City of Dayton. However, given the limited number of available workers, rental housing, and building materials in the vicinity of the generation plant, the description of the affected environment and of construction and operational impacts also includes communities beyond Starbuck and Dayton. Therefore, the study area is defined as an area extending approximately 75 miles from the generation plant and includes the towns and cities of Washtucna and Ritzville (Adams County), Kennewick and Richland (Benton County), Kahlotus and Pasco (Franklin County), Pomeroy (Garfield County), Walla Walla (Walla Walla County), and Pullman (Whitman County) (see Figure 1.1-1). Although the following towns and cities are also within the 75-mile radius, they are not expected to be affected because of their size, lack of housing, or lengthy travel time to the generation plant site, and therefore are not discussed in this section:

Adams County:	Hatton, Lind, Othello
Asotin County:	Asotin, Clarkston
Franklin County:	Connell, Mesa
Garfield County:	Albion, Colton, Pullman, Uniontown
Grant County:	Moses Lake, Warden
Lincoln County:	Davenport, Harrington, Irby, Krupp, Odessa
Spokane County:	Cheney, Latah, Medical Lake, Spangle, Waverly
Walla Walla County:	Prescott, Waitsburg
Whitman County:	Colfax, Endicott, Farmington, Garfield, La Crosse, Lamont, Malden, Rosalia, St. John, Tekoa, Thornton
Idaho State:	Genesee, Graham's Landing, Lapwai, Lewiston, Moscow, North Lapwai, Potlatch, Sweetwater, Taplin
Oregon State:	Flora, Helix, La Grande, Milton-Freewater, Pendleton, Troy, Umapine

# 3.12.2 Existing Conditions

# 3.12.2.1 Population

Population estimates for the study area and Washington State are presented in Table 3.12-1. In 2000, the population of Columbia County was 4,200 individuals, and the population of the Town of Starbuck was 160 individuals. Since 1990, the overall study area population averaged an annual growth rate of 1.7 percent and increased to approximately 308,000 persons in 2000. During the same period, the state's population increased by 1.8 percent annually. The Starbuck and Dayton populations did not keep pace with the growth of the study area or the state. Instead, Starbuck's population declined from 170 to 160 people between 1990 and 2000, and Dayton's growth rate was relatively flat, at 0.4 percent annually. The nearby Tri-Cities of Pasco, Kennewick, and Richland underwent the largest growth rate between 1990 and 2000.

Area	1990	Projected 2000 <sup>a</sup>	Average Annual Growth, 1990-2000	2020 <sup>b</sup>	Average Annual Growth, 2000-2020
Columbia County	4,024	4,200	0.4%	4,970	0.8%
Starbuck	170	160	-0.6%		
Dayton	2,468	2,495	0.1%		
Adams County	13,603	15,800	1.5%	20,997	1.4%
Ritzville	1,725	1,730	0.0%		
Washtucna	231	266	1.4%		
Asotin County	17,605	20,000	1.3%	24,766	1.1%
Asotin	981	1,105	1.2%		
Clarkston	6,753	6,890	0.2%		
Benton County	112,560	140,700	2.3%	181,806	1.3%
Kennewick	42,152	53,270	2.4%		
Richland	32,315	37,190	1.4%		
Franklin County	37,473	45,900	2.0%	65,152	1.8%
Pasco	20,337	27,370	3.0%		
Garfield County	2,248	2,300	0.2%	2,726	0.9%
Pomeroy	1,393	1,425	0.2%		
Walla Walla County	48,439	54,200	1.1%	67,519	1.1%
Walla Walla	26,482	28,940	0.9%		
Whitman County	38,775	41,300	0.6%	49,705	0.9%
Pullman	23,478	25,150	0.7%		
Total Study Area	274,727	324,400	1.7%	417,641	1.3%
State of Washington	4,866,663	5,803,400	1.8%	7,610,090	1.4%

#### TABLE 3.12-1

Historical and Projected Population Estimates

<sup>a</sup> 2000 projections from Washington State Office of Financial Management.

<sup>b</sup> 2020 Population forecast not available at city level.

Source: Washington State Office of Financial Management (2000a, 2000b).

Washington's Office of Financial Management (OFM) currently projects that the overall study area will continue to grow through the year 2020; however, the rate of growth is projected to slow to approximately 1.3 percent annually. During the same period, the state is forecast to grow at an annual rate of about 1.4 percent. Columbia County is projected to have the slowest annual growth rate in the study area, at 0.8 percent. The populations of Franklin and Benton Counties are anticipated to grow at 1.8 and 1.3 percent, respectively.

According to 1999 Census estimates displayed in Table 3.12-2, nearly 94 percent of the study area population is Caucasian ("Caucasian" includes the Hispanic population). The population of Columbia County is estimated to be approximately 99.1 percent Caucasian. The state's population is estimated to be 88.7 percent Caucasian. The study area's population has a higher percentage of persons of Hispanic origin than that of the state. Nearly 17.2 percent of the study area's residents and 22.6 percent of Columbia County residents are of Hispanic origin, compared with approximately 6.5 percent for the state.

	White/Caucasian				
Area	Not of Hispanic Origin	Hispanic Origin	African- American	American Indian, Eskimo, or Aleutian	Asian or Pacific Islander
Columbia County	76.5%	22.6%	0.3%	0.5%	0.1%
Adams County	54.1%	43.3%	0.4%	0.5%	1.7%
Asotin County	94.0%	2.6%	0.4%	2.0%	1.1%
Benton County	83.7%	11.4%	1.2%	0.9%	2.8%
Franklin County	43.7%	46.5%	3.7%	1.1%	5.0%
Garfield County	97.1%	1.5%	0.0%	1.0%	0.3%
Walla Walla County	77.7%	17.2%	1.5%	1.1%	2.5%
Whitman County	88.3%	2.0%	1.3%	0.7%	7.7%
Study Area	76.9%	17.2%	1.5%	1.0%	3.5%
Washington State	82.2%	6.5%	3.5%	1.8%	6.0%

#### TABLE 3.12-2

Demographic Breakdown of Population by Race

Source: U.S. Census Bureau, 2000 (1999 estimate).

Table 3.12-3 presents the percentages of persons below the poverty threshold for each county within the study area. In both Columbia County and the study area as a whole, more than 12 percent of the population is below the poverty threshold. This poverty rate exceeds the state average, which was 10.2 percent in 1999. Within the study area, Franklin County possessed the highest percentage of persons below the poverty threshold, at 17.7 percent. Columbia County's estimated 12.5 percent below the poverty level was near the study area's average. Only Benton County's poverty rate of 9.3 percent is below the state rate. The total number of people in the study area that fell below the poverty level was approximately 37,905, or about 6.6 percent of the state's total population.

#### TABLE 3.12-3

Poverty Status by County

Area	Number of People Below Poverty Level	1997 Population Estimate	Percent of Population Below Poverty Level
Columbia County	525	4,200	12.5%
Adams County	2,433	15,800	15.4%
Asotin County	3,073	19,700	15.6%
Benton County	12,471	134,100	9.3%
Franklin County	7,770	43,900	17.7%
Garfield County	262	2,400	10.9%
Walla Walla County	7,830	54,000	14.5%
Whitman County	5,974	41,200	14.5%
Study Area	40,339	315,300	12.8%
Washington State	571,894	5,606,800	10.2%

Sources: U.S. Census Bureau, 2000 (1997 estimate); Washington State Office of Financial Management, 2000a.

# 3.12.2.2 Housing

Table 3.12-4 displays the estimated number of housing units for each county in the study area and for the State of Washington. From 1990 to 2000, housing in the overall study area grew at an average annual rate that was slightly less than that of the state. The number of housing units in the Town of Starbuck increased from 105 in 1990 to an estimated 117 in 2000 – an annual growth rate of approximately 1.1 percent. The annual average growth rate for the City of Dayton was only 0.4 percent, which was one of the slowest rates in the study area. Columbia County's average annual growth rate was 0.8 percent, and the number of housing units increased from 2,046 in 1990 to an estimated 2,225 in 2000.

Assuming that the occupancy status of each area has remained constant since the 1990 U.S. Census, the study area has approximately 10,672 vacant housing units. The vacancy rate in the study area (8.1 percent) is slightly lower than the estimated vacancy rate for the state (8.5 percent). Columbia County has one of the higher vacancy rates in the study area, with an estimated 505 vacant housing units. Starbuck and Dayton have an estimated 29 and 163 vacant housing units, respectively. The number of housing units in the Tri-Cities area and Walla Walla accounts for approximately 40 percent of the total vacant housing units in the study area.

According to the *Columbia County Comprehensive Plan* (Columbia County, 1996), more than half of the housing units in the county are more than 50 years old and may be below standard. The housing impacts discussion later in this section assumes that substandard housing is not available as temporary housing for construction workers.
#### TABLE 3.12-4

Housing Units Estimate

	No. of Ho	using Units	% Average Annual Growth	Number of Vacant Units	
Location	1990	Projected 2000 <sup>a</sup>	1990-2000	2000 <sup>b</sup>	Percent Vacant <sup>°</sup>
Columbia County	2,046	2,225	0.8%	505	22.7
Starbuck	105	117	1.1%	29	24.8
Dayton	1,132	1,179	0.4%	163	13.9
Adams County	5,263	6,282	1.8%	930	14.8
Ritzville	883	909	0.3%	170	18.7
Washtucna	110	124	1.2%	32	25.6
Asotin County	7,519	8,949	1.8%	617	6.9
Asotin	412	428	0.4%	40	9.3
Clarkston	3,043	3,159	0.4%	196	6.2
Benton County	44,877	57,187	2.5%	3,603	6.3
Kennewick	17,207	22,088	2.5%	1,458	6.6
Richland	13,872	16,574	1.8%	845	5.1
Franklin County	13,664	16,795	2.1%	1,797	10.7
Pasco	7,698	10,547	3.2%	1,170	11.1
Garfield County	1,209	1,286	0.6%	305	23.7
Pomeroy	696	729	0.5%	78	10.7
Walla Walla County	19,032	21,660	1.3%	1,603	7.4
Walla Walla	10,652	11,554	0.8%	797	6.9
Whitman County	14,598	16,823	1.4%	1,312	7.8
Pullman	7,546	9,345	2.2%	196	2.1
Study Area	108,208	131,207	1.9%	10,672	8.1
State of Washington	2,032,306	2,516,986	2.2%	213,944	8.5

<sup>a</sup> 2000 projections from Washington State Office of Financial Management.

<sup>b</sup> Estimate assumes that the 1990 Census occupancy rate for each area has remained constant.

<sup>c</sup> Occupancy rate from 1990 Census.

Source: Washington State, Office of Financial Management, 2000b; U.S. Census Bureau, 2000.

The estimated number of people per housing unit in the study area averaged about 2.5 in 2000, which is greater than the state's average of approximately 2.4 people per housing unit. The Town of Starbuck's average of 1.4 people per housing unit was considerably lower than the averages for the study area and the state. Factors that contribute to the lower number of people per household in the Town include the number of vacant houses in the Town, the relatively large percentage of senior citizens in the area, and the lack of families moving to the area because of the poor economic climate. Columbia County and the City of Dayton average 1.9 and 2.1 people per household, respectively.

According to the Washington Center for Real Estate Research (2001), the median home price in the fourth quarter of 2000 for the counties in the study area was approximately \$94,000. By comparison, the median price for a home in Washington State was \$177,400. The 2000 estimated median home price in Dayton was \$71,000. Home prices in Dayton ranged from \$16,500 to \$225,000 (Crellin, pers. comm.).

## 3.12.2.3 Employment

Table 3.12-5 displays average employment by industry for each county in the study area. In 1999, an estimated 134,214 people were employed in the study area; this represents about 6.5 percent of all Washington jobs (approximately 2.05 million total). In 1999, an estimated 1,641 persons in Columbia County were employed; this represents approximately 1.3 percent of the total employment in the study area.

#### TABLE 3.12-5

1999 Employment by County

	Columbia Co.	Adams Co.	Asotin Co.	Benton Co.	Franklin Co.	Garfield Co.	Walla Walla Co.	Whitman Co.	Study Area
Total Employment	1,641	7,156	5,133	60,370	21,476	775	23,151	14,512	134,214
% of Total Employn	nent by Sect	tor							
Agriculture, Forestry, and Fishing	7.8%	27.7%	0.0%	9.0%	23.1%	8.4%	11.5%	3.3%	11.7%
Mining	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
Construction	3.4%	2.1%	7.6%	4.4%	5.1%	2.5%	2.9%	0.0%	3.8%
Manufacturing	0.0%	16.0%	6.4%	7.4%	7.4%	0.0%	17.4%	3.6%	9.0%
Transportation & Public Utilities	3.5%	3.2%	2.2%	12.6%	3.9%	0.0%	0.0%	2.9%	6.9%
Wholesale Trade	3.5%	8.1%	4.6%	0.0%	7.1%	18.3%	4.3%	6.6%	3.3%
Retail Trade	8.8%	12.4%	22.7%	18.0%	12.6%	6.3%	14.8%	15.5%	16.0%
FIRES	0.0%	1.7%	2.8%	3.2%	1.6%	2.3%	3.3%	3.1%	2.8%
Services	10.0%	9.2%	32.0%	27.3%	20.8%	8.0%	23.7%	12.2%	22.9%
Government	31.2%	19.6%	19.4%	16.1%	18.3%	51.2%	19.9%	50.6%	21.5%
Federal	3.6%	0.7%	1.4%	1.4%	2.2%	15.9%	3.8%	1.9%	2.1%
State	1.6%	1.1%	2.8%	1.6%	4.2%	2.7%	6.5%	35.4%	6.5%
Local	26.0%	17.7%	15.3%	13.1%	11.9%	32.6%	9.7%	13.3%	12.9%
Not Elsewhere Classified	31.7%	0.0%	2.2%	1.9%	0.0%	3.0%	2.2%	2.2%	2.0%

Sources: Washington State Employment Security Department, 2001a.

FIRES = Finance, Insurance, and Real Estate.

Employment in the study area is concentrated in the services, government, and retail sectors. The services industry accounts for approximately 22.9 percent of total employment in the study area, while government (including education) and retail account for 21.5 and 16.0 percent, respectively.

In Columbia County, the government and education sector employs the largest number of workers in classified industries, accounting for more than 31 percent of the county's total employment. The services, retail trade, and agricultural sectors combine to employ a total of 26.6 percent of the county's workers. Many of the county's workers, nearly 32 percent, are listed as "not elsewhere classified." These individuals are likely to be working in the manufacturing (that is, food processing) and mining industries, but their numbers are not displayed to protect confidential information. The "not elsewhere classified" designation is used for confidentiality reasons if fewer than three firms are displayed in a particular sector or any one firm has 80 percent or more of the employment at any level of detail in a sector.

The major employers in Columbia County are listed in Table 3.12-6. Seneca Foods Corporation, a food processing plant that cans asparagus, carrots, and green beans, employs 53 fulltime, year-round workers, as well as 1,200 to 1,400 seasonal workers between April and June, its peak season. Ski Bluewood also employs a large number of seasonal employees during its peak operating months. The number of employees at Ski Bluewood jumps from nine year-round employees to more than 150 employees during the winter months. Other major employers in the area include Dayton General Hospital, Columbia County, and Dayton Public Schools.

Company	Year-Round Employees	Seasonal Employees
Seneca Foods Corporation	53	1, 200 - 1, 400
Ski Bluewood	9	150
Dayton General Hospital	150	0
Columbia County	131	0
Dayton Public Schools	90	0
Federal Government	58	0
Columbia Cut Stock, Inc.	40	0

#### TABLE 3.12-6

Major Employers in Columbia County

Source: Dayton Chamber of Commerce, 2001.

During 2000, there was not an uncharacteristic increase or decrease in employment levels at the major employers in Columbia County. Seneca Foods' peak employment period continued to be during its asparagus harvest season, and Ski Bluewood hired seasonal employees during the winter months. Dayton General Hospital has moved its surgery and obstetrics capabilities to Walla Walla and has continued to expand its nursing care facility (Dickinson, pers. comm.).

Table 3.12-7 presents the unemployment rate for each county in the study area and for the state of Washington. In 1995, the average unemployment rate for the study area was about

the same as the state's rate – 6.8 versus 6.4 percent. By 1999, Columbia County's unemployment rate exceeded 11 percent, while both the state's and the study area's unemployment rate had decreased to 4.7 percent and 5.8 percent, respectively. From 1995 to 1999, Asotin, Garfield, and Whitman Counties each had unemployment rates below the state's rate, but Columbia County's unemployment rate was consistently more than double the state's rate.

Area	1995	1996	1997	1998	1999
Columbia County	12.8%	15.6%	11.6%	11.4%	11.3%
Adams County	11.2%	12.0%	10.1%	10.7%	10.2%
Asotin County	4.3%	4.5%	3.6%	4.1%	3.4%
Benton County	7.5%	8.5%	6.6%	6.6%	5.6%
Franklin County	9.8%	11.9%	9.3%	10.0%	9.6%
Garfield County	4.9%	4.6%	3.7%	3.6%	3.6%
Walla Walla County	6.1%	7.5%	6.3%	6.8%	6.8%
Whitman County	2.1%	2.3%	1.8%	2.0%	1.8%
Study Area	7.0%	8.0%	6.4%	6.7%	6.0%
Washington State	6.4%	6.5%	4.8%	4.7%	4.7%

TABLE 3.12-7 Unemployment Rate by County and Study Area, and for Washington State

Source: Washington State Employment Security Department, 2001b.

During the past 5 years, Columbia County has had the highest unemployment rate of all the counties in the study area, peaking in 1995 at 12.8 percent. In 1999, the unemployment rate in Columbia County had decreased to 11.3 percent. However, the unemployment rate in the county was still more than twice as high as the state's average rate. The high unemployment rate is due primarily to the high percentage of seasonal workers in the county. According to the 2000 Washington State Labor Market and Economic Report (Washington State Employment Security Department, 2001b), nearly 61 percent of the total covered workforce in Columbia County in 1999 was seasonal.

#### 3.12.2.4 Income and Local Government Revenues

Table 3.12-8 presents per capita income for the counties in the study area and Washington State. In 1998, the study area's per capita income (\$20,381) was estimated to be 71 percent of the state's average (\$28,719). From 1996 to 1998, the per capita income for the study area remained relatively constant. Over the same period, however, Columbia County's per capita income decreased by 3.1 percent annually, from \$22,202 in 1996 to \$20,211 in 1998. In 1998, the per capita income in Columbia County was approximately 70 percent of the state's average, down from nearly 88 percent of the state's average in 1996. One major factor for the decline in per capita income in Columbia County has been the low price of wheat, which has directly reduced the income of the area's farmers.

#### TABLE 3.12-8

Per Capita Income, 1996-1998

				% Average Annual increase	% of State
Area	1996	1997	1998	(1996-1998)	Total (1998)
Columbia County	22,202	19,047	20,211	-3.1%	70.4%
Adams County	20,021	19,788	20,605	1.0%	71.7%
Asotin County	19,095	20,237	20,829	2.9%	72.5%
Benton County	22,804	23,409	24,315	2.2%	84.7%
Franklin County	18,163	18,112	18,479	0.6%	64.3%
Garfield County	22,546	18,744	19,293	-5.1%	67.2%
Walla Walla County	19,755	19,996	20,845	1.8%	72.6%
Whitman County	18,233	18,196	18,696	0.8%	65.1%
Study Area (average)	20,352	19,691	20,409	0.1%	71.1%
Washington State	25,287	27,018	28,719	4.3%	100.0%

Source: U.S. Bureau of Economic Analysis, 2001.

#### Assessed Value and Property Tax Revenue

The assessed property value and estimated property tax collected within the Town of Starbuck, the City of Dayton, and Columbia County are presented in Table 3.12-9. According to the Columbia County Department of Assessments (2001), the county's assessed value was approximately \$253 million in 2001. Starbuck and Dayton had assessed values of approximately \$2.8 million and \$81.7 million, respectively. The current assessed value of the property to be used for the generation plant site, including all buildings on the property, is \$35,430.

#### TABLE 3.12-9

Assessed Property Value and Property Tax Collection in 2000

Area	2001 Valuation	Estimated Total Property Taxes Collected *	Revenues to Local City/County Government
Starbuck	\$2,821,940	\$30,098	\$5,100
Dayton	\$81,662,722	\$1,126,548	\$230,720
Columbia County	\$253,381,313	\$3,531,072	\$446,317

\* Estimate based on 2001 Consolidated Tax Levy.

Source: Columbia County Department of Assessments, 2001.

The 2001 consolidated tax rates per thousand dollars of assessed value for Starbuck and Dayton were \$10.67 and \$13.80, respectively. Revenues from property taxes are used to fund

Columbia County government, local school districts, the county fire department, the Dayton hospital, libraries, and emergency medical services.

These property tax revenues are also a major source of revenue for the local governments. Incorporated into the consolidated tax levy are local levies collected by the County Assessor and returned to the local jurisdictions as general fund revenues. Starbuck receives approximately \$1.81 per \$1,000 of the Town's assessed property value to fund day-to-day operations, totaling approximately \$5,100 in 2001. Dayton receives \$2.83 per \$1,000 of the city's assessed value for city operations. This will equal approximately \$230,720 in 2001. The county government receives property tax revenues equivalent to \$1.76 per \$1,000 of the county's total assessed value.

#### Sales and Other Tax Revenue

Taxable retail sales within the Town of Starbuck, the City of Dayton, Columbia County, and Washington state are compared in Table 3.12-10. In 1999, retail sales in the Town of Starbuck totaled approximately \$604,655. With retail sales of more than \$21 million in 1999, the City of Dayton accounted for approximately 77 percent of the county's total retail sales.

#### TABLE 3.12-10

Taxable Retail Sales, 1996-1999

Area	1996	1997	1998	1999	Avg. Annual % Change 1996-1999
Starbuck	\$315,346	\$303,962	\$486,427	\$604,655	17.7%
Dayton	\$19,265,346	\$17,186,343	\$16,937,380	\$21,657,554	3.0%
Columbia County	\$24,654,655	\$22,605,047	\$24,031,705	\$28,080,913	3.3%
Washington State	\$64,300,954,593	\$69,974,651,600	\$74,577,379,553	\$80,227,627,170	5.7%

Source: Washington State Department of Revenue, 2001.

From 1996 to 1999, the retail sales in Starbuck increased nearly 92 percent – an average annual growth rate of nearly 17.7 percent. Over the same period, retail sales in Dayton and Columbia County increased at an annual average of 3.0 and 3.3 percent, respectively. The growth rates for Starbuck and Columbia County lagged behind the state's annual average increase of 5.7 percent.

#### **General Fund Revenues**

The 2001 general fund budget for the Town of Starbuck is \$22,317. As shown in Table 3.12-11, the 2001 general fund budget for the Town indicates that 35 percent of all revenues collected for the Town will come from property and sales taxes. Other sources of revenue include a liquor excise tax, charges for services, and miscellaneous revenues.

The 2001 Current Expense Budget for Columbia County is expected to be about \$2.4 million. As shown in Table 3.12-12, more than 25 percent of the revenue is expected to come from taxes. Other sources of revenue include I-695 replacement funds, law and justice funds, law enforcement funds, payments in lieu of taxes, and federal forest yields. Real and personal property taxes are forecast to be the largest contributors to tax revenues. The County

Assessor estimates that property taxes, which account for about 19 percent of total revenues, will equal \$446,805. Sales and use taxes are expected to total approximately \$60,000 in 2001, providing approximately 2.5 percent of total revenues.

Revenue Source	2001 Budget	Percent of Total Current Revenues
Property Tax	\$5,100	22.9%
Sales Tax	\$2,640	11.8%
Liquor Excise Tax	\$537	2.4%
Liquor Profits	\$910	4.1%
Charges for Service	\$9,300	41.7%
Misc. Revenue	\$3,830	17.2%
Total Current Expense Revenue	\$22,317	100.0%

#### TABLE 3.12-11

Town of Starbuck General Fund Revenues

Source: Shantee, pers. comm.

#### TABLE 3.12-12

Columbia County Tax Revenues

Тах	2001 Budget	Percent of Total Current Revenues
Real/Personal Property Tax	\$446,805	19.0%
Real/Diverted Road	\$46,397	2.0%
Timber Harvest Tax	\$10,000	0.4%
Sales and Use Tax	\$60,000	2.5%
Distressed Sales Tax	\$15,000	0.6%
Leasehold Tax	\$2,000	0.1%
Real Estate Tax	\$800	0.0%
TVL Excise Tax	\$200	0.0%
Liquor Excise Tax	\$1,300	0.1%
Emergency 911	\$16,419	0.7%
Total Tax Revenue	\$598,921	25.4%
Total Current Expense Revenue	\$2,356,883	100.0%

Source: Columbia County Auditor's Office, 2001.

## 3.12.3 Impacts of the Proposed Action

## 3.12.3.1 Construction

This section describes the socioeconomic impacts associated with the construction of the generation plant. Construction will affect employment, temporary housing, sales tax revenues, and overall economic activity in the study area. During construction, the generation plant will have a maximum workforce of about 700 individuals for approximately 3 months. A majority of the workers are expected to commute from areas outside Columbia County, such as the Tri-Cities and Walla Walla. The workforce is expected to consist of (1) construction workers who are currently employed on existing projects that will be completed before construction of the generation facility begins, (2) unemployed workers, and (3) workers from outside the study area. Some of the workers will require temporary housing within the study area. Construction-related spending by workers will benefit the entire study area during the construction period. New jobs may be created within Columbia County and the overall study area in businesses that sell goods and services to plant workers.

Plant construction may cause temporary disruptions along State Route (SR)-261 near the generation plant site. Cars, recreational vehicles (RVs), and commercial trucks traveling along the route may have to stop periodically to allow for the delivery of supplies or for the maneuvering of construction equipment. Recreational boaters and fishers may experience delays going to and from Lyons Ferry Marina as a result of construction. However, temporary traffic delays will not have a significant impact on businesses or travelers in the study area because of the low volume of traffic on SR-261.

## **Population and Housing**

The total peak workforce is estimated to be 700 people. The peak labor force will occur approximately midway through the construction period. The total peak workforce includes 668 direct workers and approximately 32 supporting indirect craft workers (for example, security guards, equipment operators, attendants, inspectors). The average number of workers varies throughout the construction period, with approximately 235 workers for the first 9 months, 350 workers for Months 10 and 11, 640 for the next 6 months (Months 12 to 17), 500 for the next 2 months (Months 18 and 19), 320 for the next month (Month 20), 200 for the next month (Month 21) and an average of 28 workers a month for the last 4 months (Months 22 to 25).

Observation of other large construction projects in Washington State reveals that workers often are willing to commute up to 2 hours to work on a desirable, relatively long-term project. It is estimated that roughly 80 percent of the workers on the SPP will commute from within the study area, particularly from the Tri-Cities (Richland, Pasco, and Kennewick) and Walla Walla. The Tri-Cities area has workers skilled in many of the trades required for this project, in part because of the many Department of Defense projects in the area. The Tri-Cities is approximately 1.25 to 1.5 hours from the site. Spokane also has a large, skilled labor force, but it is approximately 2 to 2.5 hours from the site and may be too far for many workers. Some workers will also be likely to come from Walla Walla, about 1 hour away. A small number of employees will likely commute from smaller communities in Columbia County and the overall study area (see Figure 1.1-1).

Table 3.12-13 identifies available temporary housing units within a 1-hour drive to the project site. For this study, it was assumed that in-migrating workers would attempt to find temporary housing within a 1-hour commute of the project site. Therefore, housing units in the Tri-Cities area are not included in the table. Temporary housing units are defined to include the following:

- Hotel/motel rooms
- Spaces in RV parks and campgrounds
- Rental housing units

#### TABLE 3.12-13

Temporary Housing Within 1 Hour of the Generation Plant Site

County	Hotel/Motel	RV/Campgrounds	Rental Housing	Total
Total Temporary Hou	ising Stock			
Columbia	58	212	95	365
Walla Walla	730	53	1,000	1,783
Franklin	4	5	0	9
Adams	120	85	122	327
Garfield	20	36	800	856
Total	932	391	2,017	3,340
Peak Season Vacand	;y			
Columbia	29	193	62	285
Walla Walla	325	30	100	755
Franklin	2	5	0	7
Adams	60	48	15	123
Garfield	10	9	35	54
Totals	426	285	212	923

Note: Housing within these counties is in the following communities: **Columbia County**: Dayton, Starbuck, Lyons Ferry Marina, Lyons Ferry State Park; **Walla Walla County**: Walla Walla and Waitsburg; **Franklin County**: Kahlotus; **Adams County**: Ritzville and Lind; **Garfield County**: Pomeroy; **Whitman County**: Pullman.

Sources: AAA Washington, 2000; AAA Trailer Life Directory, 2000; U.S. Army Corps of Engineers, 2001; Travel in Washington, 2001. Information gathered from personal telephone conversations with motel employees.

The roughly 20 percent of direct workers that will come to the project from outside the region will require temporary housing. For this analysis, it is assumed that all of the indirect employment opportunities generated by the project will be filled by persons within the overall study area; therefore, these workers will not require temporary housing. During the peak of construction when a total of approximately 668 direct workers will be employed, it is estimated that housing will be required for at most 140 workers. Those workers that require housing will be likely to stay in mobile home parks, RV parks or recreational areas, and motels in the nearby communities of Washtucna, Kahlotus, Dayton, Starbuck, and Pomeroy, or in larger population centers such as Walla Walla. A small percentage of those workers (an estimated 5 to 10 percent) will rent homes and apartments. It is unlikely that a

significant number of workers will buy or build homes and move their families into the area during construction.

An Internet search and a telephone survey with employees of motels within approximately 1 hour of the site indicate that there are an estimated 3,340 temporary housing units located within a 1-hour commute to the generation plant site. During the peak summer season, it is estimated that there are approximately 923 vacant units. Vacancy rates in the temporary housing facilities included in the survey have been higher than in other areas as a result of the depressed economy in many of the rural communities. Thus, it is anticipated that there will be more than enough temporary housing available for the 140 construction workers estimated to require temporary housing.

In a worst-case scenario, assuming that all 668 direct workers during the peak construction period in-migrate, and that the identified temporary housing facilities have a vacancy rate of 15 percent, workers would probably have to expand their search for temporary housing to include the entire study area (i.e., 75-mile radius from the project site). When the Tri-Cities and other communities in the larger area are included, there is likely to be sufficient temporary housing within the overall study area for all of the direct workers during the peak construction period.

Should conditions change in the future, the Applicant and the contractor may consider adding additional housing options, such as the establishment of a work camp near the site or arranging to use Seneca Foods' established work camp during the agricultural company's off-season (from July through March). Currently, the Seneca Foods Corporation operates a temporary housing facility for a portion of its peak-season workforce from April to June; this facility includes group sleeping quarters, a dining area, and bathroom facilities.

During the summer, RV parks and campgrounds that house construction workers will have higher occupancy rates than normal. This could affect tourists and recreation seekers who usually stay at the RV parks and campground sites.

The construction workers will also affect the economy by paying for rental space, whether they stay in rental homes, apartments, motels, RV parks, or campgrounds. During the construction period, many of the proprietors of the campgrounds or motels will benefit from a more consistent revenue stream, particularly if they accommodate the construction workers with weekly rates or group discounts. The greatest impact to the rental industry is likely to occur during the off-season months, when the rooms or camp sites that otherwise would have been vacant can be rented to construction workers.

The City of Dayton and the communities surrounding it are accustomed to the influx of temporary workers. During the annual asparagus harvest from April to June, an estimated 1,200 to 1,400 seasonal workers come to the area. As discussed above, Seneca Foods has temporary housing for a portion of its workers. The remaining workers are housed in group housing in Walla Walla and Milton-Freewater, and a small number (approximately 70 dwelling units) are housed in farms and shared rental housing arrangements in Dayton and Walla Walla. One real estate agent mentioned that almost all of the rental houses and mobile homes in the Dayton area are occupied during the asparagus season (Young, pers. comm.). Very few of these workers stay in local campgrounds, RV parks, or motels because of the

relatively high cost of those accommodations compared to the other options available to them (Lindquist, pers. comm.).

Although local temporary housing is more than sufficient to house anticipated in-migrating construction workers, impacts to temporary housing may increase if the peak plant construction period coincides with the peak asparagus-harvesting season (April to June). The result of this impact will be a possible temporary increase in local rental rates and the potential for workers at the generation plant or at the food processing plant to need to commute from longer distances during the peak season.

## Employment

Construction workers will be working on the generation plant for approximately 2 years. Figure 3.12-1 displays the estimated total workers onsite during construction. The peak construction period is expected to occur during Months 15, 16, and 17, when approximately 668 direct workers and 32 supporting indirect craft workers (such as security guards, equipment operators, attendants, and inspectors) will be employed. Primary jobs will be sitework, formwork, placement, reinforcement, arch and metals, piping, balance of plant (BOP)/mechanical equipment, turbine erection, heat recovery steam generator (HRSG) erection, electrical instrumentation and control (I&C), and painting (Figure 3.12-2). The piping trade will have the largest number of workers on the construction site, with an estimated 250 workers.

Figure 3.12-3 compares average hourly wage rates for Columbia County, the study area, Washington State, and the generation plant. The actual average hourly wage by trade will depend on the contractor selected to complete the generation plant; thus, specific data by trade are unavailable at this time. However, the average hourly wage during construction is expected to be approximately \$21.63, which is nearly double the average wage of Columbia County. The employment and higher wages provided by the generation plant will have a positive impact on the overall per capita income in the study area. The peak direct construction workforce will be 668 individuals. Historical studies (Weber and Howell, 1982) indicate that a direct construction workforce of this size will generate a total of approximately 200 total indirect jobs, assuming a multiplier of 1.3. Over the 24-month construction period, the average labor force will be approximately 335 workers, resulting in a total of approximately 436 direct and indirect jobs.

The employment levels will fluctuate over the course of the construction period from about 100 employees to approximately 668 construction workers. During peak employment conditions, an additional 32 indirect craft workers will be employed. Under the current schedule, the peak construction period is expected to last approximately 3 months. If the peak period occurs in the winter, the generation plant can provide winter jobs to construction workers that generally have a harder time finding work in the winter months. If the project schedule changes so that peak employment levels occur in the summer, it will be more difficult for all construction projects in the study area to find local labor. In that scenario, more employees will need to be drawn from outside the study area, with commensurate impacts on the temporary housing supply in the area.

It will be the decision of the contractor to hire workers through the union or through local sources because currently the project is an open project. Given the number of large public

works projects that have been and are being constructed in southeast Washington, skilled non-union workers may be available in the area.

#### **FIGURE 3.12-3**

Comparison of Average Hourly Wage (2001\$) for Construction <sup>1</sup>



Source: Washington State Employment Security Department, 2001a; Washington State Department of Labor and Industries, 2001; Karita, pers. comm. Notes:

1) Average hourly wage rate does not include benefits.

2) The weighted average hourly wage for construction workers was calculated using Prevailing Wage Rates from the Washington State Employment Security Department (2001a) less benefits, and the estimated number of hours by trade (Nagori, pers. comm.). Benefits were estimated to be approximately 23 percent based on communications with two union halls (Reynolds, pers. comm.; Gier, pers. comm.).

If the project hires union labor, workers will primarily be members of unions in the Tri-Cities and Spokane, which provide labor for projects in parts of eastern Washington and Idaho. While the union leadership is located in the Tri-Cities and Spokane, many of the workers live in other locations throughout Eastern Washington. Different trades have different geographic boundaries. Table 3.12-14 shows the location of union halls for each trade.





**Total Workers Onsite Over Time** 

STARBUCK POWER PROJECT STARBUCK, WASHINGTON

#### TABLE 3.12-14

Central and Eastern Washington Union Halls for Crafts

Asbestos Workers 82, Spokane	Insulators, Insulator Foreman, Insulator Apprentice
Boilermakers 242, Spokane	Boilermaker, Boilermaker GF, Boilermaker Foreman, Boilermakers/Welders, Boilermaker Apprentice
Carpenters 1848, Pasco	Carpenters, Carpenter GF, Carpenter Foreman, Carpenter Apprentice
Cement Masons 478, Pasco	Cement Finisher
Electrical Workers 73 & 77, Spokane	Electricians, Electrician GF, Electrician Foreman, Electrician Apprentice
Iron Workers 14, Tri-Cities	Ironworker, Ironworker GF, Ironworker Foreman, Ironworker (rodbuster), Ironworker Apprentice
Laborers 348, Pasco	Laborer, Laborer GF, Laborer Foreman, Laborer Apprentice
Machinists 86, Spokane	Welder
Millwrights 1699, Pasco	Millwright, Millwright GF, Millwright Foreman, Millwright Apprentice
Operating Engineers 370, Tri-Cities	Operators, Operating Eng Apprentice
Painters 427, Pasco	Painters, Painter Foreman
Plumbers & Fitters 598, Pasco	Pipefitter, Pipefitter GF, Pipefitter Foreman, Pipefitter/Welders, Pipefitter Apprentice
Sheet Metal Workers 66, Kennewick	Sheetmetal Foreman, Sheetmetal Journeyman
Teamsters 690, Spokane	Teamsters

Sources: Spokane Labor Council, AFL-CIO, pers. comm.; Berglund, pers. comm.

#### **Construction Costs**

The cost to construct the generation plant is estimated at approximately \$572 million, which includes \$475 million in construction costs (that is, construction and materials) and \$97 million in indirect costs (for example, engineering, construction management, contingency, taxes, and insurance). Of the total construction cost, labor costs are anticipated to range from \$25 million to \$30 million. The construction cost estimate does not include costs associated with financing the generation plant (Nagori, pers. comm.).

#### Onsite Well

The Applicant currently is awaiting Washington State Department of Ecology (Ecology) determination on its 300-gpm groundwater right application. If granted, this water right will authorize the proposed onsite well that will serve as the potable water supply for the generation plant (Elmer, pers. comm.).

The well operation is expected to employ two to four workers, and the construction period is not expected to last longer than 2 months. The estimated cost of the well ranges from \$100,000 to \$120,000. The cost estimate includes mobilization, drilling, natural development, casing, screen, and pump costs.

Workers for the well will likely commute from within the study area and are not expected to affect the population of the area. The construction and operation of the well is not expected to have an impact on the existing or future housing market. The construction workers will

likely be residents within the project area who will commute to the project site from their current dwellings.

The well construction will provide temporary work for three to four construction industry employees. The wages paid to workers likely will be higher than those paid to the local average wage earner. Currently, a utilities construction worker in Columbia County earns about \$18.65 per hour, compared with \$11.23 per hour for the average wage earner.

The economy of the area will benefit from the sale of goods and services by local merchants to the water well construction workers. Such sales also will result in increased retail sales tax revenues for the Town of Starbuck, Columbia County, and other jurisdictions. The positive impact on retail sales from well construction workers purchasing goods and services (gas, meals, etc.) in the study area is expected to be negligible.

#### 3.12.3.2 Operation and Maintenance

Day-to-day operation of the generation plant will have positive impacts on employment, per capita income, sales and other tax revenues, and property taxes.

#### Population

Full-time operation of the generation plant will employ an estimated 40 people. Table 3.12-15 shows the estimated staffing needs for the generation plant.

During operations, in addition to the 40-person plant workforce, family members will also migrate into the project area. If the families of all 40 employees relocated to the area, and if there are 1.47 family members per worker (based on 2.47 persons per housing unit in the study area), a total of about 58 family members would also migrate into the study area. Thus, the operation of the generation plant could result in a total of 99 people moving into the study area.

#### TABLE 3.12-15

Estimated Staff Needs, Generation Plant

Position	Number of Employees	
Plant/Site Manager	1	
Clerk (Secretary)	1	
Plant Engineers	2	
Plant Operators/Supervisors	15	
Plant Auxiliary Operators	11	
Mechanics	4	
Electricians	4	
I&C/Lab Technicians	1	
Warehouse Clerk	1	
Total Employees	40	

Source: PPL Global (estimate from Nagori, pers. comm.).

## Housing

Housing of the permanent, full-time employees and their families is not expected to have a significant impact on area housing. Columbia County has an estimated 505 vacant housing units and one of the higher vacancy rates in the study area. The Town of Starbuck and the City of Dayton have 29 and 163 vacant housing units, respectively. Even though a number of these units are substandard, there is more than enough supply for the new workers and their families.

#### Employment

Payroll expenses will constitute approximately \$3.8 million of the estimated \$27 million in total operating costs. Figure 3.12-4 compares the average hourly wage rates for Columbia County, the study area, Washington State, and the generation plant. The average hourly wage during operation will be approximately \$28.35, which is approximately 97 percent higher than the study area average and about 152 percent higher than the county average. The higher annual wages paid by the generation plant will have a positive impact on the overall per capita income in the study area and will benefit businesses as workers spend their disposable income.

Historical studies (Weber and Howell, 1982) suggest that this construction workforce will generate an additional 12 jobs in the regional economy, for a total of 52 direct and indirect jobs, assuming a multiplier of 1.3.

#### FIGURE 3.12-4

Comparison of Average Hourly Wage (2001\$)



Sources: PPL Global; Washington State Employment Security Department, 2001a.

#### **Fiscal Impacts**

#### Sales and Use Taxes during Construction

The Applicant will be purchasing large amounts of power generation equipment from domestic and foreign contractors and vendors. The estimated cost of construction and equipment (excluding indirect costs) is \$475 million. These costs will be subject to the 7.5 percent state and local sales and use tax rate of unincorporated Columbia County. The state levies a 6.5 percent sales or use tax on products sold or used within the state, while an additional 1 percent is retained by local government: 0.85 percent is retained by the city in which the purchase is made, and 0.15 percent is retained by the county. In this case, the plant is located in unincorporated Columbia County and the county will receive the full 1 percent sales and use tax on products purchased or used within the county. For purchases made within the state that include onsite construction or installation, state and county sales tax will be charged by the contractor or seller. For out-of-state purchases that are constructed or installed at the site, local and state use tax will be assessed.

Table 3.12-16 displays the estimated state and local sales and use taxes generated by plant construction. For this analysis, it was assumed that sales and use taxes will be levied on all purchase and construction contracts at the unincorporated Columbia County rate of 7.5 percent. Under this assumption, the plant will generate an estimated \$35.7 million in sales and use tax, \$30.9 million of which will be paid to the state and \$4.8 million of which will be paid to Columbia County. The sales and use tax revenues generated from construction of the generation plant will be a one-time benefit to the state and county.

#### TABLE 3.12-16

Estimated Sales and Use Tax

Jurisdiction	Sales and Use Tax Generated			
State	\$30,903,556			
County	\$4,754,393			
TOTAL	\$35,657,949			

#### Sales and Use Taxes during Operation

During operations, the Applicant expects to spend approximately \$120 to \$200 million per year for natural gas. Washington State currently taxes the purchase of natural gas at a rate of 3.852 percent. The purchase of natural gas for the generation plant will result in estimated tax revenues to the state of approximately \$4.6 to \$7.7 million annually.

The plant will also incur annual operation and maintenance (O&M) expenses, exclusive of fuel costs, that will be subject to sales and use taxes. Average annual O&M expenses less fuel costs are estimated to be \$23.7 million (Nagori, pers. comm.). Thus, annual O&M costs, excluding fuel, are projected to result in approximately \$1.5 million in sales and use tax revenue to the state and approximately \$237,000 in revenue to the county.

During operation, it is likely that 19 percent aqueous ammonia will be purchased locally, and the plant is estimated to require 9,600 pounds of aqueous ammonia per day. The current price for aqueous ammonia is 0.1275 cents per pound (Capwell, pers. comm.), making the annual cost of this material \$428,400 (assuming 350 days per year of operations).

On the basis of these assumptions and a state sales tax rate of 6.5 percent, the sale of aqueous ammonia will generate approximately \$27,846 annually in state sales and use tax. Local sales and use tax revenues received by Columbia County for purchases of aqueous ammonia, assuming a 1.0 percent tax rate, will average \$4,284 per year.

#### Property Tax Impact

The generation plant will have a significant positive impact on the fiscal environment for Columbia County and its taxpayers. Assuming that the valuation of the generation plant property, including land and improvements, will be approximately \$500 million, the total assessed value of property in the county will increase from \$253 million to \$753 million, a 298 percent increase. The increased assessment and the accompanying taxes paid by the plant owners will allow the county to lower its levy rates. The basis for the reduction is the state's 106 percent limit on the growth of local and state levies. According to the County Assessor (Carlton, pers. comm.), the result will be an increase in the county's total property tax revenues and, eventually, a significant decrease in the amount of property taxes paid to the county by existing taxpayers. This analysis reflects tax levies approved by voters at the time of preparation of this Application for Site Certification (ASC). Future property tax levies may result in a material change to the projections provided here.

Special levies already passed by the citizens of local taxing districts would be unaffected by the project: they will continue to generate the same amount of tax revenues as approved by the voters, while at the same time the levy rate per \$1,000 will be reduced substantially.

The generation plant will be located in the county's taxing district of rural Starbuck, located outside of the Town. It is in this taxing district that there will be the greatest reduction in the levy rates of all the taxing districts in the county; the levy rate for the Starbuck area will decrease by approximately 74 percent if the generation plant is assessed at \$500 million.

This beneficial impact will be phased in over a number of years. During construction, when additional public services will be required, few or no tax dollars will be owed to the county. As an example, if construction begins in December of 2001, then the first tax assessment would occur after July 31, 2002, for the amount of new construction that has been completed at that time (25 percent, for example), and this would be added to the total county tax base for 2002. This 25 percent assessment will be due and payable in the first and second half of 2003. Assuming that the plant is 75 percent complete at the time of the July 31, 2003, assessment, property taxes will be due and payable in 2004. The 100 percent new construction assessed after July 31, 2004, will be due and payable in 2005, 1½ years after construction is complete.

The Applicant will seek an agreement with the county to advance the timing of the county's receipt of property tax payments. This will help match the timing of county receipt of such revenues with construction-related law enforcement personnel and facilities. The agreement would authorize the Applicant to prepay a portion of property taxes that would be due during commercial operation of the generation plant. As an alternative, the agreement would provide a credit against property taxes due after the plant achieves commercial operation in an amount equal to funds advanced by the Applicant to cover construction-related law enforcement personnel and facilities. To the extent that the Town of Starbuck rather than Columbia County incurs such expenses, the Applicant will encourage the

county and Town to enter into an interlocal agreement providing for payment of Town expenses from the funds advanced to the county by the Applicant.

Table 3.12-17 displays the potential impact of the estimated property tax reductions on an average household in the town once the county tax base reflects the entire plant assessment (such as in 2005). For this example, it was assumed that the median household income in Starbuck was equal to the estimated average median household income for Columbia County in 2000. In 2001, the average Starbuck household will pay an estimated \$263.44, or 1.0 percent of its household income, in property taxes on property assessed at an average of \$24,700. If the generation plant is assessed at \$500 million and total property tax revenues are held constant, the annual property tax bill for the average household will decrease about 59 percent.

#### TABLE 3.12-17

Impact of Property Tax Reduction on Average Household in Starbuck

Average Assessed Value of Home in Starbuck <sup>a</sup>		\$24,700
2000 Average Median Household Income, Columbia County $^{\rm b}$		\$29,265
	Current	Impact of \$500 million Assessment
Consolidated Levy (\$/1,000) <sup>a</sup>	\$10.66553	\$4.316407
Average Annual Property Tax Payment	\$263.44	\$106.62
Percent of Median Household Income Paid to Property Taxes	1.0%	0.36%

<sup>a</sup> From Columbia County Department of Assessment, 2001; consolidated levy for Assessor's Code C-35 (Town of Starbuck).

<sup>b</sup> Estimate from Washington State Office of Financial Management, 2000b.

#### Impacts on Community Cohesion

There can be a negative impact on community cohesion if the physical presence of the generation plant diminishes the community's access to community facilities (such as churches and public transportation) or isolates adjoining areas in the community. However, because the generation plant will be located outside the Town, negative impacts to community cohesion will not occur.

## 3.12.4 Summary of Socioeconomic Impacts

Construction and operation of the generation plant will have the following impacts:

- Employment: An average construction workforce of approximately 335 workers (including direct and indirect labor) for a period of 25 months, and 700 workers during the peak period. The construction workers will earn an average wage of \$21.63 per hour, which is nearly double the average wage of Columbia County (\$11.23 per hour). When operational, the generation plant will employ approximately 40 full-time employees who will earn an average hourly wage of approximately \$28.35 per hour.
- Sales and Use Tax Revenues: Construction of the generation plant will generate sales and use tax revenue of approximately \$30.9 million and \$4.8 million for the state and

Columbia County, respectively. Annual sales and use tax revenue will also be generated from the operation of the generation plant. During operations, the state will collect an estimated \$4.6 million to \$7.7 million in taxes per year from the sale of natural gas and \$1.5 million annually in sales and use tax. Columbia County will realize approximately \$247,000 in local sales and use tax revenue annually.

- Property Tax: The completed generation plant will increase the assessed value of Columbia County by nearly 300 percent, from \$253 million to \$753 million. The property owners of Columbia County will experience a significant decrease in the amount of property taxes paid to the county.
- Housing: The study area has an adequate supply of temporary housing for workers needing accommodations during construction of the plant, and an adequate supply of long-term housing for workers during plant operations.

## 3.12.5 Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires that federal agencies ensure that their programs, policies, and activities do not result in disproportionately adverse human health or environmental effects on minority and low-income populations. The Applicant believes that Executive Order 12898 will not apply to construction and operation of the generation plant.

Construction and operation of the generation plant are consistent with environmental justice considerations set forth in Executive Order 12898. Construction and operation of the generation plant will not otherwise result in disproportionately adverse impacts to minority or low-income populations. On the contrary, these activities may result in positive impacts to minority or low-income individuals by providing additional employment opportunities in the area.

Because construction and operation of the generation plant will not have disproportionately adverse human health or environmental impacts on minority or low-income individuals, no mitigation measures are required.

## 3.12.6 Environmental Impacts of Alternatives

## 3.12.6.1 Northwest Site Alternative

Impacts to population, housing, and economics associated with the northwest site alternative would be the same as those associated with the proposed southeast site location because the site location does not affect the number of workers or the amount of materials needed to construct and operate the generation plant.

## 3.12.6.2 Wet-Cooled System Alternative

Impacts to population, housing, and economics associated with the wet-cooled system alternative would be greater than those associated with the proposed air-cooled system because the wet-cooled system alternative would provide the Applicant with a better economic return on its investment. If the water pipeline were constructed, the wet-cooled system alternative might have a local economic impact in the form of greater water revenues to the Town of Starbuck. The local population and housing impacts would be approximately the same for either cooling system design.

## 3.12.6.3 Water Pipeline Alternative

As a water supply alternative to the proposed onsite well, the Applicant has secured an option to purchase up to 100 gallons per minute (gpm), or up to 144,000 gallons per day (gpd), of water from the Town under the Town's existing water right. The Applicant would construct a water pipeline, primarily along an abandoned railroad bed, that would connect the generation plant to the Town water supply system. Impacts to population, housing, and economics associated with implementation of the water pipeline alternative would be greater than those associated with the proposed onsite well. Upon completion, the pipeline would provide long-term benefits to the Town in the form of increased water revenues. Construction of the water pipeline would be of short-term duration, taking between 2 and 3 months to complete, and would require a workforce of about 40 persons.

The Applicant will provide detailed information on the impacts of the water pipeline alternative if the Applicant seeks to implement this alternative.

## 3.12.7 Mitigation Measures

No mitigation measures are necessary.

## 3.12.8 Cumulative Impacts

The cumulative impacts of constructing the generation plant and other potential nearby projects, such as proposed power-generating facilities in Walla Walla, Washington, and in Umatilla and Boardman, Oregon, will be to increase the demand for construction workers in the study area. If the increase in demand creates a tight labor market, wages could increase in the area where there is the greatest demand for construction workers (that is, the Tri-Cities area). Depending on the construction timetable of each project, the demand for workers in various construction trades could be affected. If the construction schedules were to coincide, there could be a tight labor market for some trades.

Construction and operation of the generation plant will increase retail sales and overall economic activity in the area. Other generation plant projects can also create employment opportunities for residents of Columbia County and the overall study area.

## 3.12.9 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to population, housing, and economics are associated with construction or operation and maintenance of the generation plant.

# SECTION 3.13 Public Services and Utilities

## 3.13 Public Services and Utilities

This section discusses public services and utilities located within requested radii of the generation plant site: a 50-mile radius for fire services, police, emergency medical services, and hospitals and clinics, and a 75-mile radius (or study area) for recreational facilities and major recreational opportunities.

Counties located within 50 miles of the project site include Columbia, Walla Walla, Benton Grant, Franklin, Adams, Whitman, Garfield, and Asotin. Although Benton, Grant, and Asotin Counties are within the 50-mile study area, they are not included in this discussion because no towns or cities exist in this portion of these counties.

Towns and cities within the 50-mile study area are Starbuck and Dayton (Columbia County), Waitsburg, Prescott, and Walla Walla (Walla Walla County), Mesa, Connell, Hatton, and Kahlotus (Franklin County), Lind, Ritzville, and Washtucna (Adams County), La Crosse, LaMont, Saint John, Endicott (Whitman County), and Pomeroy (Garfield County). Prescott, Mesa, Hatton, Lind, La Crosse, LaMont, Saint John, Endicott are small communities that have no local fire, police, or emergency medical services, except resident emergency medical technicians (EMTs), and therefore are not included in this discussion.

In addition to the area previously described in the 50-mile study area, recreational facilities within the 75-mile study area include land in Lincoln and Spokane Counties, as well as land in the states of Idaho and Oregon. However, only recreational activities in Washington are included in this discussion because the portions of Idaho and Oregon are greater distances from the Starbuck Power Plant (SPP) and are not expected to be significantly affected when in use.

## 3.13.1 Existing Conditions

## 3.13.1.1 Police Services

The Columbia, Walla Walla, Benton, Grant, Franklin, Adams, Whitman, Garfield, and Asotin County sheriff's departments and the Washington State Patrol provide law enforcement services in the 50-mile study area. Only the City of Walla Walla has a city law enforcement service. All state highway routes (SR-261, SR-260, SR-12, SR-26, SR-127, SR-125, I-395, and I-90) are patrolled by the Washington State Patrol. County sheriff's departments serve the unincorporated areas of each county and contract with the local towns and cities to provide service. Some of those contracted agreements are as follows:

- Columbia County Sheriff's Department is contracted with Dayton and the Town of Starbuck.
- Walla Walla County Sheriff's Department is contracted with Waitsburg and Prescott.
- Franklin County Sheriff's Department is contracted with Mesa, Connell, Hatton, and Kahlotus.
- Adams County Sheriff's Department is contracted with Lind, Ritzville, and Washtucna.

- Whitman County Sheriff's Department is contracted with La Crosse, LaMont, Saint John, and Endicott.
- Garfield County Sheriff's Department is contracted with Pomeroy.

The generation plant site is bounded on the west by SR-261. Traffic along this two-lane highway increases considerably in the summer because it is a regular route for grain trucks traveling to and from the Columbia County Grain Growers grain elevators during harvest, and it is used by boating and fishing enthusiasts, campers, and vacationers. Summer residents coming from the Spokane area use this route seasonally. Also, during the fall hunting season, sportsmen increase traffic in the area.

The law enforcement services provided by the county sheriff's departments include traffic control, drug enforcement, search and rescue, and civil calls. The Washington State Patrol provides traffic enforcement on state highways and drug enforcement, Hazardous Materials Team (HAZMAT) oversight, and incident response. Table 3.13-1 details current staffing, equipment, and services for the counties and state patrol divisions that are projected to be most affected by construction of the generation plant. Four jails that service the 50-mile study area, providing a total of 299 beds, are located in Dayton (Columbia County), Walla Walla (Walla Walla County), Pasco (Benton County), and Ritzville (Adams County). Law enforcement services in the City of Walla Walla and the counties of Benton, Grant, Whitman, Garfield, and Asotin are not detailed in this section because it is unlikely that roads and services in these locations will be used during plant construction or operation and maintenance.

#### **Columbia County Sheriff's Department**

Sheriff James J. LaTour, who joined the Columbia County Sheriff's Department in 1980 and became chief in 1989, now heads the department (LaTour, pers. comm.). He has nine fulltime officers and six reserve officers. Most officers have been with the department for more than 10 years. All officers are state-certified, and many have additional training for drugs, search and rescue, traffic control, and accidents. In addition to 27 regular vehicles (11 cars, 12 four-wheel vehicles, and 4 snowmobiles), the department has three fully equipped special rescue vehicles. The force also operates a K9 unit and a fully certified dive rescue unit, with one full-time and one part-time diver. The department receives approximately 17 calls per day through Columbia County's 911 service, the peak call period being between April and October. Response time varies from 2 to 30 minutes, depending on the location of the officers at the time of the call.

As indicated previously, the Columbia County Sheriff's Department is contracted to service both the City of Dayton, where the department office is located, and the Town of Starbuck. The eight-bed jail located in Dayton is used by both the department's officers and the Washington State Patrol. When the jail is full, prisoners are transferred to the Walla Walla County jail. This costs Columbia County \$80 per prisoner per day (Steeman, pers. comm.).

A county sheriff's deputy patrols the Town of Starbuck once every 24 hours, on a flexible schedule. When a deputy is not present, response time for calls from Starbuck can range anywhere from 15 minutes to 1 hour, depending on where officers are located in the county (Shantee, pers. comm.).

#### TABLE 3.13-1

Law Enforcement Staff and Equipment

Police Service	Demand	Officers	Equipment	Other Services	Comments
Columbia County Sheriff's Department	17 calls per day, peaking April to October	1 sheriff 1 under-sheriff 9 full-time, 6 reserve 1 officer per vehicle 0 support staff – 911 personnel double as clerks	11 patrol vehicles, 12 four- wheel-drive vehicles and 4 snowmobiles	3 rescue units—all types of special equipment; dive rescue unit with one full-time and one part-time driver; K9 unit	All officers are state-certified; some officers are especially trained for drugs, search & rescue, traffic control, and accidents; dive rescue unit is certified. 8-bed jail in Dayton
Walla Walla County	12 calls per day,	1 sheriff	28 patrol vehicles, cars	K9 unit; SWAT team; marine patrol; search & rescue unit; DARE officer	All officers are state-certified
Sheriff's Department	peaking in the summer months	1 under-sheriff 21 full-time officers, 7 reserves 1 officer per vehicle 3 support staff	and 4-wheel drives; boat; 2 search & rescue trucks; 2 jet skis; 1 command post SWAT vehicle		94-bed jail in Walla Walla
Franklin County	Franklin County 14 calls per day,	1 sheriff	25 patrol vehicles (22	Search & rescue team	All officers are state-certified
Sheriff's Department	peaking June to September	1 under-sheriff 21 full-time officers, 13 reserves 1 officer per vehicle 2 support staff	regular and 3 4-wheel drive); search & rescue vehicle		164-bed jail in Pasco
Adams County	19 calls per day,	1 sheriff	19 patrol vehicles	Part-time DARE officer	All officers graduates of
Sheriff's Department	peaking harvest times and summer vacation holidays	1 under-sheriff 17 officers, 4 reserve			Academy; keep cars at home; 2 reserves share 1 car
		1 officer per vehicle			33-bed jail in Ritzville
		2 support staff			
Washington State Patrol	16 calls per day, no observed peak	1 lieutenant 2 to 3 officers in Adams	1 officer per patrol vehicle (car)	Incident Response Team	State Patrol handles SR-26 in Adams County
Ritzville office— Adams, portions of Whitman and Lincoln Counties		County per shift			Currently operating at minimum levels—3 shifts/day
Washington State	15 calls per day,	te 15 calls per day, 2 lieutenants 1 officer per patrol ver peaking between 0 to 3 officers in Starbuck (car)	1 officer per patrol vehicle (car)	Emergency Response Team, Bomb Squad, and two	State Patrol handles SR-261
Walla Walla office— Columbia, Franklin, Garfield, and Walla Walla Counties		& Dayton areas per shift	Bomb squad equipment and vehicles	HAZMAT-certified officers	Solumble Soundy

Sources: Conversations with Washington State Patrol and the Columbia, Walla Walla, Benton, Grant, Franklin, Adams, Whitman, Garfield, and Asotin County sheriff's offices; the City of Walla Walla Police Department; City of Dayton, 1999; Starbuck Planning Commission, 1998.

In coordination with the Columbia County Sheriff's Department, one part-time judge and one part-time staff clerk are responsible for justice proceedings (Steeman, pers. comm.).

## Walla Walla County Sheriff's Department

The Walla Walla County Sheriff's Department, which is contracted with Waitsburg and Prescott, has 21 officers and seven reserves. The department runs a 94-bed jail in the City of Walla Walla. Its services include a K9 unit, a SWAT team, a marine patrol, a search and rescue unit, and a DARE officer. The department is equipped with 28 patrol vehicles, a boat, two search and rescue trucks, two jet skis, and a command post SWAT vehicle. This department receives an average of 12 calls per day through the Walla Walla County 911 service, with a peak number of calls during the summer months. The response time within county limits varies from 10 to 60 minutes, depending on the location of the officer.

## Franklin County Sheriff's Department

The Franklin County Sheriff's Department has 21 officers and maintains a 164-bed jail located in Pasco. The U.S. Border Patrol, the U.S. Federal Marshals, the cities of Connell and Pasco, game wardens, and the Washington State Patrol frequently use jail space there often leaving no available cells. Calls are received through Franklin County's 911 dispatch center, which serves the sheriff's department, Franklin County Fire District #3, North Franklin Hospital District, Walla Walla County Fire District #5, Pasco Fire and Ambulance, and Pasco Police. The Sheriff's Department receives an average of 14 calls per day, with a peak number of calls being received between June and September. Response within Franklin County depends on the distance the officer is from the location of the incident and can vary from 5 to 45 minutes.

Mesa, Connell, and Hatton contract with the Franklin County Sheriff's Department for law enforcement services. Near the generation plant site, Kahlotus also contracts with the department, and one or two officers patrol the Town daily (Long, pers. comm.).

## Adams County Sheriff's Department

The Adams County Sheriff's Department is based in the town of Ritzville. It has 21 full-time and four reserve officers. Adams County allocates one or two deputies to the southern Adams County area per duty shift. The county also has a 33-bed jail located in Ritzville that is used by county officers and the Washington State Patrol. An average of 19 calls per day are received through the county's 911 system, with the peak period being harvest and summer vacation holiday times. Response time varies from 5 to 45 minutes, depending on the location of the officer when a call is received.

Lind and Ritzville contract with the Adams County Sheriff's Department for law enforcement services. The Town of Washtucna, located 25 miles north of the proposed generation plant site, also contracts with the department, relying upon Adams County's 911 system and available jail space. A sheriff's deputy resides in the Town (Anderson, pers. comm.).

#### Washington State Patrol

The Washington State Patrol, which patrols all state highway routes in the region (SR-261, SR-260, SR-12, SR-26, SR-127, SR-125, I-395, and I-90) is currently operating at minimum levels of law enforcement officers within the study area. According to Lieutenant Steve Turncott of the Spokane District office, the patrol allocation model for the counties within

the 50-mile study area puts one officer for patrol in an assigned area per day, per week. If that officer is called to an accident away from the assigned area for that day, then that area is not fully patrolled again until the following week.

The Ritzville office of the Washington State Patrol provides law enforcement service on SR-261 to the Adams County line. The office currently operates three shifts per day. During each shift, two to three officers cover the Adams County area (one officer per vehicle). These officers also patrol portions of Lincoln County and Whitman County. An average of 16 calls per day are received through Adams County's 911 system, with no notable peak period for call volume. Normal response time within the service area varies from 20 minutes to 1 ½ hours. These officers would not be called to the generation plant site but would patrol the roads in Adams and Lincoln Counties that equipment transporters and workers might commute on (Brumley, pers. comm.).

The Walla Walla office of the Washington State Patrol provides service in Columbia County along SR-261. The office operates with ten troopers, one officer per vehicle. The office operates with all marked vehicles, and it has no special drug enforcement cars. However, the office has an emergency response team, a bomb squad and truck, one drug enforcement officer, and seven HAZMAT- and emergency-spill-trained officers. Per shift, there may be from zero to three officers within the 25-mile radius area of the proposed generation plant site. The area averages 15 traffic-related calls per 24-hour period. An average of 15 calls per day are received through the 911 system of the City of Yakima, with a peak call volume between June and September. The average response time to the proposed generation plant site is expected to be 20 to 30 minutes, depending on the location of the officers. At the scene of accidents or spills, the officers act as incident commanders in handling responses, communications, and notifications. HAZMAT officers are trained for emergency incident response for gas pipeline leaks and explosions (Crems, pers. comm.).

The Washington State Patrol does not have jail space at either of its offices and relies on county jails located in Dayton, Ritzville, Walla Walla, and Pasco to hold prisoners (Steeman, pers. comm.).

## 3.13.1.2 Fire Services

Fire services within the 50-mile study area are provided by rural fire districts staffed primarily by volunteers, with paid fire chiefs and paid support personnel. Only the cities of Dayton in Columbia County and Walla Walla, in Walla Walla County, maintain city fire departments.

Columbia County, where the generation plant is proposed, has three fire districts. Walla Walla County has eight (including the City of Walla Walla), Franklin County has four, Adams County has seven, Whitman County has fourteen, and Garfield County has one. Benton, Grant, and Asotin Counties are not included in this section because there are no fire departments in these counties located within the 50-mile study area. Figure 3.13-1 illustrates the area served by these fire districts.

All rural volunteer fire fighters carry pagers and are notified through each county's 911 service. About 40 percent of the calls received by city fire departments in the 50-mile study area are for structural (house) fires, primarily in the winter. Sixty percent or more of the calls

received by rural county fire districts are for summer wheat and brush fires. Most of these calls are for small wheat fires partially contained by the farmer before fire fighters arrive.

Winter calls in rural districts are predominantly for structural (house) fires. County fire departments also receive calls for vehicle, boating, and hunting accidents; emergency medical situations such as heart attacks; recreational mishaps; and propane spills and fires. Most fire districts have emergency medical equipment and ambulances, extraction equipment for auto accidents, and search and rescue equipment and personnel. All districts have bimonthly or monthly training meetings.

The volume of fire-related calls varies widely among the counties. Garfield and Columbia Counties' 911 services received from 20 to 30 fire-related calls in the year 2000, while Walla Walla's 911 service received more than 500 fire-related calls. The fire districts in the study area have the personnel and equipment to easily meet current call requirements.

The model dates of fire-fighting vehicles in all of the counties range from the 1950s to the 1990s, with most vehicles being manufactured in the late 1980s. Most pieces of fire-fighting equipment, such as self-contained breathing apparatus (SCBA) units, and extraction equipment are newer (1997 to 2000).

All rural county fire districts have mutual aid agreements with neighboring districts. A mutual aid agreement also exists between all Columbia County fire districts and the Waitsburg Fire Department, in Walla Walla County, to cover the western section of Columbia County, which includes the generation plant site.

None of Columbia County's fire districts has received special training for natural gas pipeline explosions or fires. According to Gas Transmission-Northwest (GTN), special equipment is not required for these incidences, as only SCBA units and standard fire protection helmets and suits are necessary.

## **Columbia County Fire District 1**

Columbia County Fire District 1 is based in the Town of Starbuck, and the Town contracts with this district for fire protection services. In addition to the Town of Starbuck, the fire district covers a large rural area. Fire District 1 has a paid fire chief, Tom Hawks, a paid secretary, and an all-volunteer staff of 25 who provide both fire suppression and emergency medical services. All volunteers carry pagers and are contacted through Columbia County's 911 service. Volunteers meet bimonthly for training and operations updates.

The Town has fire hydrants that are capable of providing a flow of 1,500 gallons per minute (gpm) with 20 pounds per square inch (psi) of static pressure. Fire and emergency equipment includes one 1-ton 4x4 350-gallon-capacity brush truck with medical equipment, one International 4x4 800-gallon-capacity brush truck with all-wheel drive, one 750-gallon International pump truck, one 350-gallon foam unit, one 2-ton truck with a 1,300-gallon water tank, and one 3,800-gallon tanker with all-wheel drive. The district also has a portable pump to pull water from local sources, such as rivers and streams.

The district is located approximately 6 miles from the generation plant site, and response time to the site is about 10 minutes (Hawks, pers. comm.).



#### **Columbia County Fire District 2**

Columbia County Fire District 2 operates out of Waitsburg, Washington, in Walla Walla County. It services both the City of Waitsburg and the western portion of Columbia County.

Led by Chief Jim Callahan, the fire district has 21 volunteers, two of whom are EMTs. All volunteers carry a pager and can be contacted through either Walla Walla or Columbia County's 911 service. Fourteen members of this team received training in 2000 for propane gas explosions and fires.

The district has one pump truck (1,250 gallons), three brush trucks (550, 900, and 1,100 gallons), three tank trunks (900, 1,600, and 1,800 gallons), and an ambulance that is fully equipped for basic life support. The trucks also carry basic first aid equipment, chain saws, entry and ventilation equipment, generators, and lighting systems.

As this district is approximately 45 miles from the generation plant site, estimated response time to the site would be 30 to 35 minutes (Callahan, pers. comm.).

#### **Columbia County Fire District 3**

This district fire department located just outside the City of Dayton services a 37-squaremile area beyond Dayton's city limits. It has 30 volunteers, led by Fire Chief Rick Turner, and 15 trained First Response EMTs. Volunteers meet once a month for training. All volunteers are trained to contain and suppress structural, brush, grass, and wheat fires. They all carry a pager or have home receivers, and they are contacted through Columbia County's 911 service.

The district has three brush trucks, two water trucks (1,500 gallons and 1,000 gallons), and a Class A pump truck (2,500 gpm). All vehicles are four-wheel drive.

Response time to the generation plant site, which is located approximately 25 miles away, would be about 25 minutes (Turner, pers. comm.).

#### **Dayton City Fire Department**

The City of Dayton's fire department generally serves only people within the city limits, although the department would respond to a dire emergency at the generation plant site, located approximately 25 miles away. The fire department is staffed by 26 volunteers, who meet once a week for training. No training has been provided for gas explosions or related fires. All volunteers carry a pager and are contacted through Columbia County's 911 service. Fire Chief Larry Munden stated that his team could meet the needs of many more facilities within the city limits. Normal response time within the city is 4 minutes, and response time to the proposed generation plant site is estimated at 35 minutes. Major department equipment includes three pump trucks (with capacities of 900, 1,500, and 1,800 gallons) and a van equipped with emergency rescue equipment (Munden, pers. comm.).

Table 3.13-2 lists current staff, equipment, EMTs, and response time.

## Columbia County's Emergency Response 911 System

All local fire districts, police departments, emergency medical teams, and hospitals are supported by Columbia County's enhanced 911 system, which is available countywide. This

## TABLE 3.13-2

Fire Services

District or Department	Staff	Equipment	EMTs	Response Time/Comments
Columbia County Fire District 1 (Starbuck)	Fire chief	1-ton 4x4 350-gal. brush truck	24 EMTs – all volunteer	10 minutes to site
	24 to 30 volunteers	with medical equipment		
	1 support staff	1 750-gal. pump truck		
		1 2-ton truck and 1,300-gal. tank		
		1 350-gal. foam unit		
		1 3,800-gal. tanker		
		Portable pump		
Columbia County Fire District 2 (Waitsburg)	Fire chief	1 pump 1,250-gal. pump truck 2 EMTs (volunteers)		30 to 35 minutes to site
	21 volunteers	3 brush trucks (900, 1,100, and		All trucks have basic first aid, SCBA*, chain saws, entry
	2 support staff	550 gal.)		
		3 tank trunks (1,600, 1,800 and		Ventilation equipment
		Ambulance – fully equipped for basic life support		Generators, lighting systems
Columbia County Fire	Fire chief	3 brush trucks	15 First Response EMTs (volunteers)	15 to 35 minutes (depending on location)
District 3 (Rural Dayton)	30 volunteers	2 water trucks (1,500 and 1,000		
	1 support staff	gal.)		
		Class A pump truck (2,500 gal)		
City of Dayton Fire	Fire chief	3 pump trucks—900, 1,500,	None – all EMTs associated with the city hospital	4 minutes within city
Department (Dayton)	26 volunteers	1,800 gallons		Has propane gas tank explosion training
	0 support staff	Emergency rescue equipped		
		vall		35 minutes to site, if needed

\* SCBA: Self-contained breathing apparatus

Sources: Munden, pers. comm.; Hawks, pers. comm.; Callahan, pers. comm.; Turner, pers. comm.; Starbuck Planning Commission, 1998; City of Dayton, 1999.

system employs six dispatchers and is in service 24 hours a day, 7 days a week. The 911 service receives approximately 550 calls per year for fire services. Peak calling season starts the first of April, when approximately 1,200 cannery workers migrate into the Dayton area at the beginning of canning season. A heavy volume of calls continues to the end of hunting season in the fall. All fire/medical response teams in the area can be mobilized simultaneously through this system, when necessary (Trump, pers. comm.).

## **HAZMAT** Teams

The City of Walla Walla's fire department has a HAZMAT team that would respond to hazardous spills at the proposed generation plant site or on highways during transport of construction materials. The team would require approximately 45 minutes to respond to a call at the generation plant.

The Washington State Department of Ecology in Spokane (approximately 105 miles to the northeast) also has a HAZMAT team. This team would have an approximate response time of approximately 1  $\frac{1}{2}$  hours.

Both teams are equipped with special vehicles, equipment, and personnel experienced in controlling major spills of hazardous materials. Neither team has experience with natural gas explosion containment.

All hazardous material spill response procedures require that Roger Trump, Emergency Management Director for Columbia County, be contacted at 509-382-2534. Cleanup of all commercial vehicle spills is the responsibility of the facility or transporter and must be supervised by the proper governmental agency, such as the U.S. Environmental Protection Agency (EPA) or Ecology. EPA has offices in Seattle, and Ecology offices are located in Spokane, approximately 125 miles northeast of the site (Trump, pers. comm.).

Figure 3.13-2 shows the locations of volunteer fire departments, police and sheriff's departments, ambulance services, hospitals and medical clinics, schools, and wastewater facilities in Starbuck, Dayton, Waitsburg, Prescott, Kahlotus, Washtucna, and La Crosse.

## 3.13.1.3 Hospitals

## Dayton General Hospital, Dayton

The Columbia County Hospital District has 100 full-time and 30 part-time employees at Dayton General Hospital in Dayton, approximately 25 miles from the generation plant site. Employees at this noncritical treatment facility include 37 nurses, two family practice physicians, one internal medicine physician, one doctor of osteopathics, one emergency room physician, two physician assistants, and one nurse practitioner. The hospital also has a 15-bed acute care facility and offers speech and occupational therapy, along with a bimonthly heart clinic staffed by Inland Cardiology of Spokane. On-call duties are rotated to maintain emergency room care 24 hours a day, 7 days a week, with services that include a home health agency, lab, X-ray, and physical and respiratory therapy. Dayton General has approximately 140 emergency patients per month from May to October and approximately 86 emergency patients the remainder of the year. The hospital does not have plans for future expansion. It does not handle trauma cases. When the hospital is not able to provide advanced or special care needs, patients are transported to either Sacred Heart Hospital or

Deaconess Hospital in Spokane; both hospitals are approximately 105 miles north-northeast of the generation plant site.

#### St. Mary's and Walla Walla General Hospital, Walla Walla

St. Mary's is a 142-bed Level II (critical, life threatening) trauma hospital located in Walla Walla. It maintains 950 physicians, nurses, and support personnel on staff. Under normal conditions, approximately 330 staff are on duty at any one time and 200 are on call. St. Mary's primary care physicians have a wide variety of specialties. The hospital does not have a burn unit. In 2000, St. Mary's handled about 10,000 emergencies (an average of 14 per day), with more than 100 qualifying as trauma cases. There are no seasonal peaks in emergencies.

Walla Walla General is a 94-bed Level III (critical, non-life threatening) trauma hospital also located in Walla Walla. It maintains 700 physicians and support staff. Under normal conditions the hospital has 250 personnel on duty and 175 on call. In 2000, the hospital handled more than 8,000 emergencies (an average of 11 per day), with 28 qualifying as trauma cases. There are no seasonal peaks; most emergency visits occur between 11 a.m. and 11 p.m.

Both St. Mary's and Walla Walla General have no set limit for trauma capacity, and cases are evaluated and shared between the two hospitals.

#### Sacred Heart and Deaconess, Spokane

Sacred Heart and Deaconess hospitals, which are both located in Spokane, are Level II (life threatening) trauma, full-service hospitals with more than 600 beds each. These are two of the largest hospitals in the Inland Northwest. Together, Sacred Heart and Deaconess hospitals provide the expertise and skills of more than 800 specialists and primary care doctors, employing more than 6,000 health care professionals and support staff.

Both hospitals provide full-service emergency care to more than 70,000 patients annually and offer Level II trauma centers, with services coordinated by on-staff trauma surgeons. There are no set limits for trauma capacity, and trauma cases are evaluated and shared between the two centers. There are no annual peaks; however, most emergency admittance occurs between 7 a.m. and 10 a.m. or between 4 p.m. and 2 a.m. These hospitals work in partnership with Northwest MedStar Ambulance Service, which provides emergency resources in response to critical medical needs throughout the Inland Northwest (Gerwin, pers. comm.).

#### **Optional Healthcare Providers**

Dayton also has a 12-bed, private-pay assisted living home and a 46-bed certified Medicare/ Medicaid nursing home that is staffed with skilled nursing care. In addition, a 29-bed congregate care facility operates two rural clinics in Dayton and Waitsburg, and Columbia County has a dentist, optometrist, and two chiropractors.

The town of Prescott has a day clinic with two beds, one paramedic, and one nurse. The clinic is open only during the day and deals with minor medical needs.





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## 3.13.1.4 Emergency Medical Services and Ambulances

Emergency medical services and ambulances within the 50-mile study area are located in the towns of Starbuck, La Crosse, Kahlotus, Washtucna, and Prescott and the cities of Walla Walla, Waitsburg, and Dayton. Emergency medical helicopter services, which are provided by Northwest MedStar, are based in Spokane and Moses Lake.

Given the numerous recreational facilities and assorted activities in the area (everything from fishing boats to construction projects), the hospital personnel and EMTs are experienced in treating falls, burns, fractures, lacerations, and heart attacks. In case of a catastrophic event, local EMTs have an agreement with volunteers and ambulance services in Walla Walla, Whitman, Franklin, and Adams Counties to aid and transport victims. Demand for EMT services is typically stable throughout the year. No EMTs in the area have received training for natural gas line explosions and related fires, except Walla Walla County Emergency Medical Ambulance Service. All volunteer EMTs are on call 24 hours a day. All ambulances were purchased between 1995 and 2001.

#### Starbuck

EMT volunteers are in service to the rural fire district in Starbuck. One of the EMTs lives and works in the Town of Starbuck, and a second works at the Columbia County Grain Growers, adjacent to the generation plant site. Two EMTs are on duty per shift, with all 18 on-call 24 hours per day. In 2000, the service received an average of 30 calls per month. About 60 percent of the calls occurred in the fall and winter, in response to hunting, vehicle, and ski accidents.

#### Dayton

Paid and volunteer EMTs are in service to Dayton General Hospital. They include one fulltime paid supervisor, 18 EMTs (nine volunteers, nine paid), and two trainees. The hospital also staffs seven part-time volunteer drivers for operation of two Type III ambulances, purchased in 1995 and 1999. The average response time within the city is 3 to 5 minutes; to Starbuck and the generation plant site, response time is 15 to 20 minutes.

#### La Crosse

La Crosse has two volunteer EMTs that live in the town. Services are considered adequate, and the town has no plans to recruit further volunteers.

#### Kahlotus

Kahlotus has six volunteer EMTs serving under Franklin County's Fire District #2. Services are considered adequate for current demand.

#### Washtucna

Washtucna has six volunteer EMTs serving under Adams County's Fire District #7. Services are adequate for current demand.

#### Prescott

Prescott has five volunteer EMTs serving under Walla Walla County's fire district. Because the town uses medical services in the City of Walla Walla (approximately 15 miles south), it has no plans to expand existing services.
#### Waitsburg

The City of Waitsburg has one ambulance, which was manufactured in 1986, and five volunteer EMTs who can stabilize and transport patients, primarily to Walla Walla hospitals. Because of Waitsburg's proximity to the City of Walla Walla, where emergency services are sufficient, it does not plan to expand its existing services.

#### Walla Walla County

The County of Walla Walla has emergency personnel and an emergency medical ambulance service located approximately 45 miles from the generation plant site. The service operates five fully equipped Advanced Life Support (ALS) ambulances manufactured in 1998, 1999, and 2001.

The service employs a chief of services, three shift captains, 24 EMTs, 25 paramedics, and two support staff, all as paid personnel. The team has personnel and instructors experienced with HAZMAT, confined space, and high- and low-angle rescue. Team members have been trained and are experienced with large gas explosions. They have the equipment necessary to stabilize and transport victims rescued by fire personnel.

The service receives an average of 4,600 calls annually. Response time to the generation plant site is approximately 50 minutes. According to Shift Captain Jack Pinza, ambulances and staff would be available to Columbia County and the generation plant site whenever necessary (Pinza, pers. comm.).

#### Northwest MedStar Helicopter Service

Northwest MedStar Helicopter Service has three helicopters, two based in Spokane and one based in Moses Lake. The two helicopters in Spokane can each carry two patients and two medical staff personnel (doctor and assistant); the helicopter in Moses Lake is capable of carrying one patient and two medical staff personnel.

In case of severe injuries, the service has an agreement with the Dayton General Hospital to put a helicopter in route immediately when called. Response time is 30 to 35 minutes from receipt of the call to landing at a site. Less critical victims can be transported via ambulance to Dayton General Hospital (approximately 20 minutes), Walla Walla General or St. Mary's hospitals (approximately 30 minutes), or the Walla Walla Airport. From the airport, MedStar operates a number of fixed-wing aircraft to transport critical patients.

Dayton General, Walla Walla General, St. Mary's, Sacred Heart, and Deaconess hospitals all have an agreement for services with Northwest MedStar Helicopter service. Patients with severe burns (over 25 percent of the body) must be transported via helicopter and fixedwing aircraft to Harbor View Hospital's burn center in Seattle (320 miles to the northwest) (Day, pers. comm.).

Currently, MedStar's helicopters are fully utilized during 4 percent of the year, and there are no plans for expansion.

#### 3.13.1.5 Schools

The study area defined for schools includes locations where in-migrating workforce personnel are likely to reside – including the City of Dayton and the towns of Starbuck,

Kahlotus, and Washtucna. Table 3.13-3 presents school enrollment for the year 2000 and expansion capacity for each of those municipalities.

Students relocating to these schools from other parts of Washington would effectuate transfer of funding from other school districts. Schools in Columbia County receive funding from local taxes, the Washington State general purpose fund, the Washington State special purpose fund, and federal special and general purpose funds. These monies make up 97.2 percent of the cost of new student funding.

#### **TABLE 3.13-3**

School Enrollment and Expansion Capacity

School	Grade	Year 2000 Enrollment	Maximum Capacity	Percent Available Capacity	Number of Teachers	Teacher/Student Ratio
Dayton	K-6	298	450	34%	15	1:20
Dayton	7-12	380	500+	24%	20	1:19
Starbuck	Preschool-8	17	60	72%	3.5	1:5
Kahlotus	K-12	90	180	50%	14	1:6.5
Washtucna	Preschool-12	72	225	68%	12	1:7

#### **Dayton School District**

The Dayton School District provides education for preschool through grade 12. An elementary school houses kindergarten through the sixth grade, and a high school houses grades seven through 12. The school district also operates a preschool/special education program. Administrative offices for the school district are located in the City of Dayton.

In 2000, Dayton Elementary School enrolled 298 students and the high school enrolled 380 students. There are 15 teachers in the grade school and 20 teachers in the high school, producing student-teacher ratios of 1:20 and 1:19, respectively. The school district has the capacity to accommodate an additional 270 students.

#### **Starbuck School District**

The Starbuck School District provides education for kindergarten through eighth grade and has a separate program for 4-year-old children. This district is classified rural and necessary, serving the town and a limited rural area (bounded by the Snake River and Smith Hollow Road). High school students are bused to Dayton, Prescott, or Kahlotus.

The school building contains four classrooms, a library, an administrative office, a kitchen, and a small gymnasium. A bus shelter adjacent to the school houses the school bus. Public services and utilities are provided to the school district by the Town of Starbuck (Starbuck Planning Commission, 1998).

In 2000, 17 students were enrolled, but the district can accommodate up to 60 students. There are 3.5 full-time equivalent (FTE) certified teachers, thus a student/teacher ratio of

1:5. Additionally there is a 0.5-FTE administrator, a maintenance/school bus driver, and a school cook. A five-member school board directs school policy.

#### Kahlotus School District

The Kahlotus School District provides education for grades kindergarten through 12. The district consists of one building that includes a library, offices, a lunchroom, classrooms, and administrative and teachers' offices. The facility is surrounded by a sports field for basketball, soccer, and baseball.

In 2000, the district had a capacity of 180 students, with an enrollment of 90 pupils. The 14 teachers make for a teacher/student ratio of 1:6.5. The school staff includes a principal, who also teaches, and a secretary.

#### Washtucna School District

The Washtucna School District provides education for grades preschool through 12. The school building houses the grade school, administrative offices, and student services. The school has expanded to add grades 9 through 12 by making use of temporary classrooms.

In 2000, 72 students were enrolled; capacity is 225. The district has 12 teachers and a teacher/student ratio of 1:7.

#### Other Local Educational Opportunities

Private schools in the study area include Blue Mountain Christian School and The Learning Center, an alternative school. Both are located in Dayton.

Nearby colleges and universities include Walla Walla Community College, Washington State University in Pullman, Whitman College in Walla Walla, and Lewis and Clark State College in Lewiston, Idaho (Steeman, pers. comm.).

#### 3.13.1.6 Parks and Recreation

Table 3.13-4 provides a list of facilities and activities available within 75 miles of the generation plant site. As presented in the table, this study area provides forests and wilderness areas; wildlife areas and refuges; boat launches, beaches, and other water use sites; state parks, town parks, and campgrounds; museums; and a ski area. The nearby Blue Mountains in southeastern Washington offer activities such as camping, hiking, fishing, and hunting. The Ski Bluewood Winter Activities Area, located 20 miles south of Dayton, features skiing and snowmobiling. The Tucannon area lakes, Tucannon River, Touchett River, and Snake River offer fishing and boating. Local parks and recreational opportunities where usage is most likely to increase as a result of generation plant construction are reviewed in this discussion. Other recreational opportunities that are not discussed have the capacity for additional demand in the event they are used by generation plant construction workers, or are unlikely to be used significantly enough to be adversely affected.

Campground facilities are operated by the State of Washington on a first-come, first-served basis, and state regulations that limit overnight stays to 10 days are enforced. Many of the recreational areas along the rivers and within the study area are operated by the U.S. Army Corps of Engineers (Corps). Scott Moore of the Corps stated that during the summer months the parks have a "steady flow of vacationers, and most campgrounds are filled to capacity during the summer months (May to early September), on weekends, and holidays" (Moore,

pers. comm.). The number of visitors depends on the capacity of the area. In 2000, the Lower Monumental (Lake West) area had about 160,000 visitors, who spent an average of 2.5 days each at the area, while the larger Umatilla National Forest area registered more than 4.2 million visitors who stayed an average of 5 days each.

#### TABLE 3.13-4

Parks, Recreational Facilities, and Activities within 75 Miles of the Generation Plant Site

Facility	Location	Facilities/Activities
W.T. Wooten Wildlife Area (SWRA)	Columbia County	Hunting; 16,700 acres
Lyons Ferry Marina and Recreation Area	Columbia County	Campgrounds, picnic areas, and boating marina
Camp William T. Wooten State Park	Columbia County	Campground, environmental learning center, 24 campsites; fishing, hiking and snowmobiling in vicinity
Turnbull Wildlife Refuge (NWR)	Spokane County	15,628-acre refuge, information center, tour
Lewis & Clark Trail State Park	Columbia County	Beaches, swimming, picnic shelters, 30 campsites, fishing, and park (forested area)
Mountain Home Park	Columbia County	County park
Wenaha Tucannon Wilderness	Columbia County (in Umatilla National Forest)	177,469 acres of forests and wilderness areas, 175 miles of hiking trails
Godman	Columbia County	Public campground
Ski Bluewood	Columbia County	Skiing and snowmobiling
Teal Springs	Garfield County	Public campground
Alder Thicket	Garfield County	Public campground
Wickiup	Garfield County	Public campground
Palouse Falls State Park	Franklin County	Picnic area, 190-ft. Palouse Falls viewing, 10 campsites with 10-day max. stay. Closed in winter.
Lower Monumental Dam	Snake River, Franklin County	Non-restricted boat launch
Lower Monumental Dam	Snake River, Walla Walla County	Moorage
Lyons Ferry State Park	Franklin County	1,282 acres with campgrounds and boating marina
Windust Park	Snake River, Franklin County	Non-restricted boat launch, moorage
Fishhook Park	Snake River, Walla Walla County	Non-restricted boat launch, beaches
Levey Park	Snake River, Franklin County	Non-restricted boat launch, beaches
Charbonneau Park	Snake River, Walla Walla County	Non-restricted boat launch, beaches

#### TABLE 3.13-4

Parks, Recreational Facilities, and Activities within 75 Miles of the Generation Plant Site

Facility	Location	Facilities/Activities
McNary Wildlife Refuge (NWR)	Burbank Slough, Columbia River, Walla Walla County	This refuge is 41,555 acres and offers hunting.
Whitman Mission National Historic Site	Walla Walla County	Museum, exhibits, self-guiding trails
Umatilla National Forest	Walla Walla County, Columbia County, Garfield County, and Asotin County	1.4 million acres, horseback riding, hiking, snowmobiling, snow shoeing, fishing, off- road vehicles, downhill and cross-county skiing, hunting, camping, forests, hiking, the Blue Mountain Recreation Area, and the Touchet Corral Sno-Park
McNary Wildlife Area (SWRA)	Walla Walla County, and Benton County	3,600-acre refuge, education / information center, hunting, tours
Asotin Wildlife Area (SWRA)	Asotin County	Hunting
Fields Springs State Park	Asotin County	Forested area
Chief Timothy State Park	Snake River, Asotin County	Beaches (swimming), parks
Alpowai Interpretive Center	Snake River, Asotin County	Historic sites and museum, moorage, non-restricted boat launch site
Chief Joseph Wildlife Area (SWRA)	Asotin County	Hunting
Swallows Park	Snake River, Asotin County	Beaches (swimming), non-restricted boat launch site
Chief Looking Glass Park	Snake River, Asotin County	Beaches (swimming)
Dayton Town Park & Historic District	City of Dayton, Columbia County	41.4 acres includes a swimming pool, two tennis courts, a little league baseball field, a minor's fishing pond, playground equip- ment, and picnic facilities. 30 historic preservation sites.
Grant County ORV Area	Moses Lake, Grant County	Recreational vehicles
Gloyd Seeps Wildlife Area (SWRA)	Grant County	8,000 acres of fishing, hunting, camping
Winchester Wasteway Wildlife Area (SWRA)	Grant County	Fishing, camping
Potholes Wildlife Area (SWRA)	Grant County	Fishing, camping
Columbia Wildlife Area (NWR)	Adams and Grant Counties	Fishing, hunting
Seep Lakes Wildlife Area (SWRA)	Adams and Grant Counties	Fishing, hunting, camping
Crab Creek Wildlife Area (SWRA)	Grant County	17,000 acres of fishing, hunting, camping
Wahluke Slope Wildlife Area (SWRA)	Grant, Franklin and Adams Counties	55,000 acres of fishing and camping
Saddle Mountain Wildlife Area (NWR)	Grant County	30,000 acres, with camping
Juniper Dunes Recreation Area	Benton County	Overland recreation vehicle area
Town Parks	Town of Starbuck, Columbia County	3 town parks and a rodeo arena
Town Parks	Town of Connell, Franklin County	2 town parks

#### **TABLE 3.13-4**

Parks, Recreational Facilities, and Activities within 75 Miles of the Generation Plant Site

Facility	Location	Facilities/Activities
Town Parks	Town of Pomeroy, Garfield County	2 town parks
Town Park	Town of Waitsburg, Walla Walla County	1 town park, museum, fairgrounds
Town Park	Town of Mesa, Franklin County	1 town park
Town Parks	City of Walla Walla, Walla Walla County	13 city parks, golf, museum, swimming pools, fairgrounds
Town Park	Town of Prescott, Walla Walla County	1 town park
Town Park	Town of Kahlotus, Franklin County	1 town park
Mill Creek Watershed (US Forest)	Umatilla National Forest, Walla Walla County and Columbia County	Forested area
Spangler (US Forest)	Umatilla National Forest, Columbia County	Forested area
Willow Springs (US Forest)	Umatilla National Forest, Columbia County and Garfield County	Forested area
Upper Tucannon (US Forest)	Umatilla National Forest, Columbia County and Garfield County	Forested area
Asotin Creek (US Forest)	Umatilla National Forest, Asotin County and Garfield County	Forested area
Wenatchee Creek (US Forest)	Umatilla National Forest, Asotin County and Garfield County	Forested area

SWRA = State Wildlife Refuge Area.

NWR = National Wildlife Refuge.

Sources: Washington Atlas and Gazetteer, 2001; Eastern Washington/North Idaho Panhandle Recreation Map & Guide, 4th ed., Great Pacific Recreation & Travel Maps; CenturyTel, 2000; Telefax, 2000; City of Waitsburg Planning Commission, 1998; City of Dayton, 1999; Town of Prescott, 1999.

Figure 3.13-3 illustrates all parks, recreational activities, and recreational facilities within a 75-mile radius of the proposed generation plant.

#### Lyons Ferry State Park

Located 2 miles northwest of the generation plant site on SR-261 in Franklin County, Lyons Ferry State Park is at the confluence of the Palouse and Snake Rivers. The park covers 1,282 acres, including Marmes Rock Shelter Heritage Area. The Washington State Parks and Recreation Commission has designated this shelter as a heritage site. Facilities at the park include 50 standard campsites (no hookups), 21 picnic sites, six picnic shelters, two primitive sites, a trailer dump station, a bathhouse in the day-use area, two comfort stations (one in the campground area and one in the boat launch area), two boat launch ramps, 428 feet of unguarded beach, two residences, a storage shed, and a shop. Available recreational activities in the park include boating, camping, fishing, hiking, picnicking, swimming, and water skiing.

The park has approximately 150,000 visitors during the summer months, and weekends and holidays usually bring full occupancy. However, visitors are limited to a maximum stay of 10 nights, and there are significantly fewer visitors on weekdays. The park is closed in the winter (Washington State Parks, 2001).

#### Lyons Ferry Marina and Recreation Area

Lyons Ferry Marina and Recreation Area, located approximately 1.5 miles northwest of the proposed generation plant site, offers boating, water skiing, jet skiing, and a day-use area. The Port of Columbia operates the marina.

Facilities include a one-lane boat launch ramp, a boat handling dock, a tie-up dock, a crib wall, a marine dump station, open moorage, covered moorage, boat dry storage, marine fuel and gasoline, marine accessories, and a restaurant. The day-use area has many facilities, including flush toilets, hot showers, drinking water, fire pits and grills, public phones, and a store. The camping area has 40 tent sites, 18 RV-only sites (with electric, water, and sewer), 58 additional developed sites, a trailer dump station, and fire pits and grills. Camping fees are \$10 for tents and \$14 for RVs.

This 37-acre facility is usually open year-round (except for Tuesdays), with summer hours from 7 a.m. to 7 p.m. and winter hours from 8 a.m. to 6 p.m. Both the marina and the recreation area receive between 150,000 and 175,000 visitors during the spring through fall season. Visitor numbers are steady, with peaks on holidays. Most visitors stay 4 to 5 days, which usually includes a weekend (U.S. Army Corps of Engineers, Walla Walla District, 2000).

#### Starbuck

There are three Town parks in and adjacent to Starbuck. The first is a half-acre park adjacent to the Tucannon River on West First Street. It is landscaped with grass and large deciduous shade trees and features a picnic table and small swing for children. It is maintained and is watered by an aboveground sprinkler system. There is a "swimming hole" adjacent to this park. The second park is located on the corner of Front and Baxter Streets, covering approximately 10,000 square feet. The third park is located at the east entrance to the city, at the intersection of SR-261 and Tucannon Street, just outside the Town limits and directly across from the school. It is less than 1 acre and contains a tennis court, grass, flowerbeds, and a sidewalk system. All three parks are used by residents, and no usage records are kept (Shantee, pers. comm.).



#### Dayton

The City of Dayton owns and operates a park located along the Touchet River Levee, between Oak Street and Jackson Street, covering 41.4 acres of land. A scenic path adjacent to the Touchet River is used by walkers and bikers. The park also has a swimming pool, two tennis courts, a Little League baseball field, a minor's fishing pond, playground equipment, and picnic facilities. Local parks are used by local residences, with increased usage on holidays and during special events, such as Dayton Days.

Formal recreational programs for youngsters include Little League baseball, soccer, swimming, basketball, and fun runs. Programs for adults include softball, bowling, swimming, and fun runs. The City also has a nine-hole golf course. Other recreational opportunities located near but outside the city limits are camping, fishing, hunting, backpacking, horseback riding, Nordic and alpine skiing, golfing, biking, boating, a shooting range, and junior rocketeering. Dayton's Park Board and City staff currently are completing a 6-year park and recreation plan. The City has preserved and restored many historical buildings, which enhances the cultural and economic resources of the area by generating tourism and improving downtown Dayton. The City's Register of Historic Places lists more than 30 structures.

#### Washtucna

The Town of Washtucna has no formal parks.

#### Kahlotus

The Town of Kahlotus has a town park that includes a swimming pool and baseball field. The only facility at the park is a Port-a-Potty. The park is infrequently used by residents.

#### 3.13.1.7 Public Utilities

The study area defined for public utilities is Columbia County.

Inland Power, Pacific Power and Light, and Columbia Rural Electric Association (CREA) provide electrical services within Columbia County. CREA will supply electrical power to the generation plant.

Towns and cities within the county operate primarily on electrical power and some propane gas. America Gas and Ferrell Gas, both located in Walla Walla, are regional suppliers of propane.

Two existing 500-kV transmission lines owned and operated by Bonneville Power Administration bisect the generation plant site. These lines run from Little Goose Dam to Lower Monumental Dam and will be connected to a switchyard at the generation plant site.

#### 3.13.1.8 Communications

Telephone services near the proposed generation plant site are currently supplied by Qwest Communications, Pioneer Telephone, and CenturyTel (CTI). CTI will provide service to the proposed generation plant. CTI fiber-optic lines are currently in place within the Town of Starbuck. However, the underground cable line between Starbuck and the Lyons Ferry Marina (running along the west edge of SR-261) is copper, and will be replaced by fiber-

optic cable before generation plant construction activities begin. Cellular phone service is unreliable in the area and is not explicitly supported by any providers.

Newspapers published and/or distributed in the area include the Touchet Valley Graphic Community Newspaper, Dayton Chronicle, Walla Walla Union-Bulletin Daily, and Tri-City Herald Daily.

The Touchet Valley Television Cable System, with access to 31 channels, provides television service to Columbia County. Radio transmission reception quality varies throughout Columbia County.

## 3.13.1.9 Public Water Supply

This section discusses the existing water supply serving the Town of Starbuck and area adjacent to the generation plant site.

The Town of Starbuck owns and operates a Group A public water supply system that has two wells. One is a single, 424-foot-deep well located in the Town. It has an estimated pumping capacity of 250 gpm. Water is chlorinated at the well site and then pumped to two reservoirs (50,000 and 200,000 gallons) located west of the Town limits. The second well is used by a local farmer for irrigation.

The Town's existing water right is for 270 gpm for municipal water purposes. The Town currently uses approximately 40 gpm on an annual basis, with a peak summer demand of 100 gpm.

The water distribution system has 4- and 6-inch-diameter mains, with an 8-inch-diameter line that runs from Tucannon and Sixth Streets to service the elementary school. There are a total of 88 hookups for residential and commercial uses. The system has capacity for an additional 22 hookups. If more than 22 hookups are incorporated into the system, an increase in the Town's water storage capacity would be required. All services are metered.

The Washington State Department of Health currently limits the system to no more than 99 hookups without employing a certified water system operator (Shantee, pers. comm.; Starbuck Planning Commission, 1998; City of Dayton, 1999). Thus, the Town currently may implement up to 11 new hookups before a certified water system operator is required.

Lyons Ferry Marina, located approximately 1 mile from the generation plant site, operates a single well as a public water supply system. The system serves the Marina's workers and clientele. A nonpotable private water system is located at the Columbia County Grain Growers grain elevators south of the project site.

#### 3.13.1.10 Sewage/Solid Waste Disposal

This section discusses existing stormwater, sewage, and solid waste disposal systems serving the Town of Starbuck.

The Town of Starbuck operates a treatment facility for gray water. The facility was recently upgraded and could be expanded by an additional 15 percent, if needed. All of the homes, schools, and public buildings in Starbuck have onsite septic systems for sewage disposal.

Empire Disposal of Colfax, Washington, provides solid waste collection and disposal services for Starbuck. Solid waste currently is disposed of in the Whitman County landfill, which has sufficient capacity for the next 5 years.

A solid waste transfer station owned and operated by Columbia County is located in the City of Dayton.

## 3.13.1.11 Stormwater Systems

Because the Town of Starbuck is located in an arid region of eastern Washington, where the average annual precipitation is between 9 and 13 inches, the Town does not have a stormwater system.

### 3.13.1.12 Additional Local Services

Public health services and facilities exist in the Town of Starbuck and in the City of Dayton. The services are provided through the Columbia County Health District. Current programs in the area range from providing immunizations to implementing onsite sewage disposal regulations. Administrative offices are located in the City of Dayton.

The Town of Starbuck does not have animal control services, but the City of Dayton has an animal control facility and an animal control officer. This officer handles stray pets and local wildlife that cause problems in the City. If animals picked up by the control officer cannot be placed locally, they are transferred to Walla Walla for adoption.

Residents of Starbuck use the City of Dayton's public library located on South Third Street in Dayton. The library has a large selection of fiction and nonfiction books, visual aid equipment, and periodicals. It also has a community meeting and dinner meeting place, located in the Delany Memorial Building connected to the library.

## 3.13.2 Environmental Impacts of the Proposed Action

## 3.13.2.1 Construction

Sixty to 80 percent of the construction workers may already reside or choose to reside in the Tri-Cities area, outside of the 50-mile study area. There would be no new impacts to the Tri-City area from workers who already reside there. It is also unlikely that workers who choose to temporarily locate in the Tri-Cities area would have any impact on public services and utilities because the Tri-Cities can more than adequately handle such an influx.

To gauge the impacts on emergency services within the 50-mile study area that may result from construction of the proposed generation plant, it is useful to determine the demands that would be created if particular situations were to arise. The potential impacts to police, fire, and emergency service personnel are discussed given the presentation of a hypothetical worst-case scenario.

The scenario was developed based upon the projection of Dr. Michael Luce (pers. comm.), the director of Columbia County's emergency response service, that in a worst-case scenario an industrial accident may cause injury to 15 percent of the total construction workforce. Of those injured, 15 percent may have life-threatening injuries and 20 percent may have serious but not life-threatening injuries.

Table 3.13-5 illustrates the police and emergency medical services that will be required, provided that this hypothetical industrial accident coincides with Dr. Luce's estimates and assuming a peak workforce of 700. Under this scenario, emergency medical personnel, facilities, and emergency transportation will be sufficient but police services will be inadequate.

#### TABLE 3.13.5

Emergency Services for Industrial Accident: Worst-Case Scenario, 105 injured

Service Required	Task	Number Required	Total Required	Number available
State Police	Regulate traffic/clear roads	1 (SR-260)		Need resources
		1 (SR-261)		
	Incident response	1		Need resources
County Police	Reroute traffic (county roads)	1	4	Need resources
EMTs	Coordination	1		59 EMTs (Columbia County)
	Triage (1 EMT per 10 injured)	11	12	
EMTs/paramedics	Stabilize life-threatening injuries (2 EMTs per person)	32	82	49 EMTs and paramedics (Walla Walla County)
	Minor to serious (non-life- threatening) injuries (1 EMT per 2 people)	50	94 total	108 total available (within 10-50 minutes)
Air/Ground	Transport of those with life-	16 spaces		5 spaces, MedStar
Ambulances	threatening injuries			10-15 spaces, 5 ALS ambulances (2-3 people each), 50 minutes from site
	Transport of those with serious but not life-threatening injuries (20%)	18 spaces		14-21 spaces, 7 Type III ambulances (2-3 people each), 25-35 minutes from site
Hospitals	Life-threatening (emergency rooms, acute care for 16 people)	42+ Emergency beds, 236 beds for continued care 50+ Emergency beds, 1,200 beds for continued care.		1 hour (Walla Walla)
	Serious injuries (emergency rooms for 18 people)			2 to 2.5 hours (Spokane)
Bus	Minor injuries requiring outpatient treatment (30 minutes to Dayton hospital) (total 71 people)	1		School bus/or commuter bus

1

#### **Police Services**

Construction activities associated with the generation plant will increase traffic volume on roadways surrounding the project area, as a result of both commuting construction workers and the transportation of materials. This increased volume will be in addition to current peak demands during the summer months, when crop harvesters and vacationers use the roadways. It is reasonable to assume that the number of accidents and calls for service along SR-12, SR-260, and SR-261 will increase. If workers reside locally in Starbuck, Dayton, Washtucna, or Kahlotus, or if they camp at local parks, additional needs for civil law enforcement services and jail space also may arise.

County and state police do not have staff sufficient to meet this increased demand. The following are projected law enforcement needs for the 2-year construction phase of the SPP:

• Each Washington State patrol office in Ritzville (SR-26 and SR-261) and Walla Walla (SR-261) each will require an additional officer, equipment, and possibly overtime funds to monitor increased truck and commuter traffic and maintain the ability to handle a higher incident response for spills and accidents, motorist safety checks, and transportation of individuals who are detained.

Cost: \$74,000 annually × 2 officers × 2 years = \$296,000 for term of construction (Turncott, pers. comm.)

• Columbia County's 911 service will require an additional dispatcher.

Cost: \$34,000 annually × 2 years = \$68,000 for term of construction (LaTour, pers. comm.)

• The area will also require six additional, temporary jail cells.

Cost: \$9,500 (LaTour, pers. comm.)

• The Columbia County Sheriff's Department will require additional officers for both the City of Dayton and the Town of Starbuck

Cost: \$72,000 annually × 2 officers × 2 years = \$288,000 for term of construction (LaTour, pers. comm.)

• The Columbia County Justice Department will require an additional part-time judge and a full-time staff clerk.

Cost: Judge, \$10,000 annually Staff Clerk, \$25,000 annually (Kirk, pers. comm.)

• Possible need for a temporarily police station in the Town of Starbuck for quicker response to the site.

Cost: Unknown; an existing station could be reopened.

#### **Fire Services**

Because of the number of workers and the magnitude of construction activities associated with the generation plant, there is increased potential for calls for emergency fire services. Local fire districts have sufficient staff to meet this increased demand; however, they are not trained in managing natural gas explosions or fires. Although no additional personnel needs are expected during the 2-year plant construction phase, natural gas training may be necessary.

#### **Emergency Medical Services**

Because of the number of workers and the magnitude of construction activities associated with the plant, there is increased potential for accidents and subsequent calls for emergency services. Emergency medical services such as EMTs, ambulance services, and hospital space are sufficient to meet this increased demand; they are also sufficient given the worst-case scenario.

#### Schools

It is unlikely that all construction workers and their families will relocate to the study area during construction because potential workers are already current residents of the area. However, if workers move their families to the area, it appears that the school districts in Starbuck, Dayton, Washtucna, and Kahlotus will have the capacity to accommodate the temporary increase in students.

As previously discussed (and presented in Table 3.13-3), these school districts are not operating near their capacity. The school districts of Starbuck, Dayton, Washtucna and Kahlotus could add 43, 270, 153, and 90 new students, respectively, before reaching capacity.

Additionally, because additional school funding transfers within the state for each relocated student, no additional financial needs for local schools will be necessary.

#### Parks and Recreation

Some workers may decide to camp at parks and campgrounds that allow overnight camping. These workers could displace existing recreational users. However, recreational demands typically are higher on weekends, while workers will be more likely to use the facilities on weekdays. In addition, the owner of the Lyon's Ferry Marina has indicated that she is looking forward to business the construction workers will bring (Ryan, pers. comm.).

In addition, it is possible that construction workers will take advantage of the recreational opportunities within the county and throughout the region. These areas will probably include boat launches and beaches, wildlife areas and refuges, and forest and wilderness areas, thereby increasing the number of users and again possibly displacing existing recreational users.

#### **Public Utilities**

Inland Power, Pacific Power and Light, and CREA project that they have enough capacity and power to meet future population growth and fulfill demand during the construction phase of the SPP.

According to Bonneville Power Administration's (BPA) *Starbuck Generation Project, System Facility Study Report,* (BPA, 2001) a new 15-mile 500-kilovolt (kV) transmission line must be constructed before the SPP can begin operation. The construction, operation, and maintenance of this transmission line will be managed by its owner, BPA.

#### Communications

CTI does not have sufficient copper lines to service the generation plant, nor are there existing fiber-optic lines at the proposed generation plant site. Fiber-optic lines will be installed by CTI before plant construction activities begin.

Radio and cable television may receive revenues for additional advertising directed at construction workers, and local newspaper circulation may increase.

#### **Public Water Supply**

The Applicant currently is awaiting a Washington State Department of Ecology determination on its 300-gpm water right application. If granted, this water right will authorize the proposed onsite well that will serve as the potable water supply for the generation plant (Elmer, pers. comm.).

As discussed in Section 3.3 of this ASC, potable water consumed during construction of the generation plant will be supplied by the proposed onsite well. Therefore, public water supply systems in the region will not be directly affected by construction activities.

Some construction workers are expected to relocate to the Town of Starbuck during construction of the generation plant, and there could be an impact on public water supplies within the Town. The system can provide water for up to 22 additional hookups but is limited by the available storage capacity. However, it is unlikely that such expansion of this system would be necessary because construction workers will reside in existing temporary housing where water hookups are already present (Luce, pers. comm.).

It is not anticipated that public water supply systems in the cities of Dayton, Kahlotus, and Washtucna will be affected by construction of the proposed generation plant because systems in those towns and cities have the ability to meet increased demand.

#### Sewage/Solid Waste Disposal

During construction, workers living in the Town of Starbuck and the City of Dayton will increase the demand and usage of existing wastewater disposal systems. Residents in the Town of Starbuck rely on septic systems, and expansion of the gray water system is possible; therefore, no impacts are anticipated. The City of Dayton's treatment facilities are capable of accommodating the additional demand.

#### Stormwater Systems

The proposed generation plant site is not within an area managed by an existing stormwater system, so construction activities will not affect stormwater facilities for any town or city near the generation plant site. The Applicant will implement project-specific stormwater management measures (see Section 3.3 and Appendix H).

#### Additional Local Services

Depending on the number of workers residing in Columbia County during the plant construction phase, there could be an increase in the number of requests for public health services and facilities. However, this impact to demand is not expected to be significant.

Similarly, the resulting impacts to requests for animal control and public library services will most likely be minimal.

#### 3.13.2.2 Operation and Maintenance

Because there will be 40 workers at the generation plant after conclusion of generation plant construction, there will also be fewer impacts to public services and utilities.

#### Police

The additional police officers required during generation plant construction will no longer be needed during its operation. Those officers may be retained in the area; however, relocation can occur as well.

#### **Fire Services**

Fire services are capable of meeting the demand expected during operation/maintenance of the generation plant; therefore, no significant impacts to fire services are anticipated.

#### **Emergency Medical Services**

Emergency medical services are capable of meeting the demand expected during operation and maintenance of the generation plan; therefore, no significant impacts to emergency medical services are anticipated.

#### Schools

School districts have enough capacity to meet demand during the generation plant's operation and maintenance; therefore, no significant impacts to area school districts are anticipated.

#### Parks and Recreation

Parks and recreational facilities have sufficient capacity to meet increased usage demand during the generation plant's operation and maintenance; therefore, no significant impacts are anticipated.

#### **Public Utilities**

Local utilities project that they have sufficient capacity and power to meet future population growth while also fulfilling requirements for plant operation.

#### Communications

No significant impacts to telephone, radio, cable television, and newspaper services are expected during operation and maintenance of the project.

#### **Public Water Supply**

As proposed, the onsite well will supply water for use during power generation, as well as potable drinking water; these conditions will result in no significant impact to the Town of Starbuck's water supply. Additionally, the Town of Starbuck's water system can accommodate up to 22 additional connections for new residents, if some generation plant workers choose to move there. The potential addition of new residents during the operation of the generation plant will result in no significant impacts to the Town's water supply system.

#### Sewage/Solid Waste Disposal

During operation of the generation plant, process water will be collected in an onsite infiltration/evaporation pond, and no offsite treatment will be necessary (see Section 2).

Additionally, there will be an onsite septic tank and drain field at the generation plant site. Solid waste will be collected by Empire Disposal of Colfax and disposed offsite in Whitman County. None of these activities will have a significant impact on local sewage or solid waste disposal services.

#### Stormwater Systems

During operation of the generation plant, stormwater will be routed to an onsite pond (see Section 2.2.5.6). Because the generation plant site is not within an area managed by an existing stormwater system, operation of the plant will not affect stormwater facilities in any town or city nearby.

#### **Additional Local Services**

It is unlikely that there will be significant increases in requests for animal control and public library services in the City of Dayton during the plant operation phase.

## 3.13.3 Environmental Impacts of Alternatives

#### 3.13.3.1 Northwest Site Alternative

Impacts to public services and utilities associated with the northwest site alternative would be greater than those associated with the proposed southeast site location because additional cable (although negligible amount) would be needed for wiring the northwest site (which is slightly farther away from the fiber-optic cable existing in Starbuck).

#### 3.13.3.2 Wet-Cooled System Alternative

The impacts on public services and utilities would be greater for the wet-cooled system alternative than for the air air-cooled system if the Applicant also implemented the water pipeline alternative. The 8 million gallons of water per day necessary for operation of the wet-cooled system would result in a greater demand for water from the Town of Starbuck via the water pipeline alternative. This would result in less water available to the Town of Starbuck. However, such action would also provide greater water revenues for the Town (\$52,600 annually).

#### 3.13.3.3 Water Pipeline Alternative

As an alternative to the proposed onsite well, the Applicant has secured an option to purchase up to 100 gpm (or up to 144,000 gallons per day) of water from the Town of Starbuck under the Town's existing water right. The Applicant would construct a water pipeline, primarily along an abandoned railroad bed, that would connect the generation plant to the Town water supply system.

Impacts to public services and utilities associated with implementation of the water pipeline alternative would be slightly greater than those associated with the proposed onsite well. During construction of the water pipeline, an estimated 35 workers would require temporary housing for 2 months. During operation and maintenance of the water pipeline, withdrawal of water from the Town of Starbuck's existing well would enable limited growth of the Town's population. With implementation of the water pipeline alternative, the Town's population could increase to 275 residents without exceeding its current water right (currently the population is 160).

The Applicant will provide detailed information on the impacts of the water pipeline alternative if the Applicant seeks to implement this alternative.

## 3.13.4 Mitigation Measures

Potential impacts to public services and utilities will be mitigated by tax revenues generated by the Applicant. Tax revenue generation by the generation plant, in net present value, will include the following:

- Natural gas taxes: Estimated at 3.852 percent of the broker wholesale market price, these taxes will be paid to the State of Washington in the amount of \$4.6 million annually (Solwick, pers. comm.) (see Section 3.12.3.2).
- Property taxes: If the valuation of the generation plant is \$500 million upon completion of construction in 2004, then the Applicant will begin paying property taxes in 2005, in the amount of approximately \$1.7 million (see Section 3.12.3.2). The Applicant will seek agreements as discussed in Section 3.13.4.1 to advance the time for receipt of tax revenues.
- Sales taxes: As construction workers and full-time employees purchase goods and services in the study area, retail sales in local communities will increase. Sales taxes are also expected to increase in the study area as a result of SPP-related purchases for annual operating supplies and materials within the surrounding communities.
- Water use revenues, if the water pipeline alternative used: \$52,600.

### 3.13.4.1 Construction

# Schools, Public Utilities, Communications, Water Supply, Sewage/Solid Waste Disposal, Stormwater Systems

Because construction activities at the generation plant site are not expected to result in significant impacts to schools, public utilities, communications, water supplies, sewage/solid waste disposal, or stormwater systems, no mitigation measures are necessary for those services or utilities.

The following mitigation measures will be implemented to reduce impacts to public services resulting from construction of the generation plant:

- Sales tax revenue will mitigate part of the costs of hiring two Washington State Police officers for the Ritzville office (SR-260) and the Walla Walla office (SR-261).
- Columbia County tax revenues will mitigate part of the cost of hiring additional police and justice personnel.
- Tax revenues will mitigate part of the costs of building temporary law enforcement facilities in the City of Dayton.
- The Applicant will make financial arrangements with Columbia County and the Town of Starbuck to provide a timely revenue stream that will cover increased county and town costs associated with the construction phase of the generation plant. No other mitigation is required.

- The Applicant will provide all police, fire, and emergency medical personnel with emergency response details for the generation plant site.
- Columbia County will provide gas pipeline safety training, such as GTN's "Pipeline Safety Overviews," to police, fire, and emergency medical personnel who have not yet received such training.

#### 3.13.4.2 Operation and Maintenance

During operation and maintenance of the generation plant, impacts to local services and utilities are expected to be insignificant. However, an emergency preparedness plan will be implemented (see Appendix I) to reduce potential impacts in the event of an emergency. No additional mitigation is required.

## 3.13.5 Cumulative Impacts

No cumulative impacts to public services and utilities are associated with the construction or operation and maintenance of the generation plant.

## 3.13.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to public services and utilities are associated with the construction or operation and maintenance of the generation plant.

SECTION 3.14 Cultural Resources

## 3.14 Cultural Resources

## 3.14.1 Existing Conditions

### 3.14.1.1 Introduction

This section describes the existing conditions for historic and cultural resources that might be affected by construction of the Starbuck Power Project (SPP). As described earlier, the SPP includes construction of a natural-gas-fired power generation plant, an onsite water well (or, alternatively, a water pipeline connecting the plant site to the Town of Starbuck), and a transmission line between the plant site and Lower Monumental Dam. The transmission line between the plant site and Lower Monumental Dam is being investigated by the Bonneville Power Administration (BPA), and the possible effects of transmission line construction on cultural resources will be described in a separate document.

In 1994 and again in 1999, CH2M HILL conducted cultural resource investigations to assist Northwest Power Enterprises, Inc. (NPE), in its studies associated with a generation plant in the same location that the Applicant has selected for the generation plant site. An intensive surface archaeological reconnaissance survey of the property conducted by CH2M HILL's cultural resource specialists in 1994 produced negative findings (Scott and Bard, 1994). Under contract to CH2M HILL, the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) conducted an oral history and traditional use area investigation (Moura and Minthorn, 1994). Moura and Minthorn (1994) concluded that the proposed generation plant site lies in traditional homeland of the CTUIR, that the general area contains numerous burials (which should not be disturbed), that the proposed generation plant site could adversely affect natural elements of environment important to the maintenance of Indian culture, and that additional investigations needed to be conducted (archaeological testing and oral history interviews with tribal elders). In 1999, CH2M HILL's subsurface archaeological testing of the proposed and alternative footprint of the generation plant site again produced negative findings (Bard et al., 2000). The two alternative locations of the proposed onsite well are included within the areas tested in 1999.

Archaeological investigation of the corridor associated with the alternative water supply pipeline was completed in April 2001. The archaeological survey was conducted in collaboration with representatives of the CTUIR and the Yakama Nation. The archaeological survey of the alternative water supply system corridor between the generation plant site and the Town of Starbuck resulted in negative findings.

Oral histories and literature searches are being prepared by several tribes from the Mid-Columbia Basin to assist in the determination of potential eligibility of the proposed SPP area as a Traditional Cultural Property (TCP). The CTUIR study was recently completed, and others (Yakama Nation, Nez Perce Tribe, and Colville Tribe) are pending. Wanapum elders visited the generation plant site area in April 2001, but they do not plan to conduct oral history studies at this time. The results of the tribal oral history work will be available by late summer 2001. When all of these oral histories have been completed, the Applicant will submit a summary of this information to the Energy Facility Site Evaluation Council (EFSEC).

#### 3.14.1.2 Regulatory Framework

State and federal regulations require consideration of the SPP's potential effects on historic and/or cultural resources (such as historic properties, Native American cultural resources, and archaeological sites). Major categories of cultural resources include the following:

- **Historic Properties.** Historic properties are places eligible for inclusion in the *National Register of Historic Places* (NRHP). Historic properties eligible for inclusion in the NRHP can include districts, sites, buildings, structures, objects, and landscapes that are significant in American history, prehistory, architecture, archaeology, engineering, and culture. Historic properties include so-called "traditional cultural properties." Historic properties must be given consideration under the National Environmental Policy Act (NEPA), the National Historic Preservation Act (NHPA), and their state law counterparts.
- Native American Cultural Resources. Native American cultural resources may include human skeletal remains, funerary items, sacred items, and objects of cultural patrimony. Native American cultural items must be given consideration under NEPA, NHPA, the Native American Graves Protection and Repatriation Act (NAGPRA) (if resources are in federal possession or located on federal lands), the American Indian Religious Freedom Act (AIRFA), and their state law counterparts. Native American sacred sites must be considered under AIRFA and Executive Order 13007 (if sites are located on federal lands).
- Archaeological Sites. Archaeological sites and other scientific data must be given consideration under NEPA, the Archaeological Resources Protection Act (ARPA), the Archaeological Data Preservation Act (ADPA), and to some extent under NHPA and NAGPRA (if resources are in federal possession or on federal lands), and their state law counterparts.

Because construction of the SPP requires compliance with Washington's State Environmental Policy Act (SEPA), SPP impacts to cultural resources must be considered in weighing the overall impact of the SPP on the environment. Washington's EFSEC is the lead agency with respect to SEPA compliance. EFSEC guidelines for applications provide as follows regarding assessment of potential impacts to cultural resources:

The Applicant shall list all historical and archaeological sites within the area affected by construction and operation of the facility and shall then describe how each will be impacted by construction and operation (463-42-362(6) WAC).

Before a federal "undertaking" (for example, issuing a federal permit) can be implemented, Section 106 of the NHPA requires federal agencies to consider the potential effects of the undertaking on historic properties and to allow the Advisory Council on Historic Preservation (ACHP) and the State Historic Preservation Office (SHPO) a reasonable opportunity to comment on any undertaking that would adversely affect properties eligible for listing in the NRHP.

Section 101(d)(6)(A) of the NHPA allows properties of traditional religious and cultural importance to a tribe to be determined eligible for inclusion in the NRHP where

[their] association with cultural practices or beliefs (traditions, beliefs, practices, lifeways, arts, crafts, and social institutions) of a living community that are rooted in that community's history and are important in maintaining the continuing cultural identity of the community.

For the Starbuck Power Project, BPA is initiating the Section 106 process and is coordinating with EFSEC, the Washington SHPO, the ACHP, and the affected Native American tribes. BPA actions to purchase and transport the power generated by the SPP are federal actions that require compliance with Section 106. As the lead federal agency, BPA is conducting government-to-government consultations with the tribes. EFSEC and the Applicant are assisting BPA with the consultations.

Government-to-government consultation recognizes that cultural resources are of importance to the Indian people whose ancestors used the land in prehistoric and historic times. The interests of the tribes include burial and sacred site protection and perpetuation of traditional hunting, fishing, and native plant gathering activities.

BPA hosts monthly meetings of the Infrastructure Initiative Cultural Resource Working Group that bring together BPA and tribal cultural resource technical staff. Since the inception of these Working Group meetings in January 2001, representatives of the Applicant and its consultants have attended each meeting and have used the meetings to help facilitate government-to-government consultation between BPA and the participating tribes and to foster opportunities for the tribes to participate in the cultural resource work tasks on a subcontract basis. The Applicant has used these meetings to engage the tribes as early as possible in the permitting activities associated with the proposed SPP.

#### 3.14.1.3 Regional Archaeology and Ethnohistory

This section summarizes available archaeological and ethnohistorical information regarding the general vicinity of the generation plant.

Within 2 miles of the generation plant site and within less than 0.25 mile of the alternative water supply pipeline route are located culturally sensitive sites, archaeological districts, and traditional cultural properties that document the history of Indian habitation along the banks and tributaries of the Snake River. The cliffs, caves, floodplains, and terraces flanking the Snake River preserve a significant archaeological record. Along the Palouse River, 4.2 miles north/northeast of the generation plant site, archaeological fieldwork documented dozens of sites within what is now known as the Palouse Canyon Archaeological District. The district contains rock art sites, sacred burial grounds, and pit house depressions. It has produced archaeological evidence of continued and/or sporadic occupation of the area for the past 10,000 years. This district is listed in the NRHP.

Before the disruptions caused by non-Indian settlement in the 19th century, the proposed generation plant site and surrounding areas were traditional occupation and use areas used by several Native American groups. Their descendants are now affiliated with several treaty and nontreaty Indian tribes and bands in the region. Descendants of peoples who once occupied or used the plant vicinity are present both on and off the reservations of the Confederated Tribes of the Colville Indian Reservation, the Nez Perce Indian Tribe, the Spokane Indian Tribe, the Confederated Tribes of the Confederated Tribes of the Umatilla Indian Reservation, the

Wanapum band, and the Yakama Nation. The Snake River and the larger Columbia River system were of central importance to past Indian life and culture, and they remain so today.

As summarized by Aikens (1984), and Cressman (1977), a series of cultural phases was developed for the Lower Snake River region that is broadly applicable to the generation plant site area (Leonhardy and Rice, 1970; Leonhardy, 1975):

- Windust Phase (10,000 8,000 years before present [B.P.]). Windust Phase artifacts consist of the characteristic Windust-type projectile point and projectile point forms with relatively short blades, shoulders of varying prominence, principally straight or contracting stems, and straight or slightly concave bases. Large end-scrapers, single- and multiple-faceted burins, bolas, large scraping planes, and unifacial and bifacial choppers are found in this phase. The lithic technology was well developed, producing tabular and prismatic flakes (from polyhedral cores). Bone artifacts include needles and atlatl spurs.
- **Cascade Phase (8,000 5,000 B.P.).** Two subphases of the Cascade Phase are recognized; their only difference is the presence of the side-notched point in the later as a subphase indicator. The Cascade point is now dominant and, in some components, exclusive. The lithic inventory is similar to the Windust phase except for Cascade and side-notched point types and the edge-ground cobble, which, along with the Cascade point), is a hallmark of the phase. The bone tool inventory is unchanged from the Windust. The addition of salmon as an important food resource is one major difference from the preceding Windust. Otherwise, the same foods continued to be exploited. Both flexed and extended burials occurred, and *Olivella* shell beads with the grave goods indicate long-distance trade with the Coast. A break in the chronology and the cultural tradition follows the Cascade Phase a hiatus that may be as long as 2,000 years (or considerably less). In view of the uncertainty, the Tucannon Phase is dated immediately after the ending of the Cascade Phase.
- Tucannon Phase (5,000 2,500 B.P.). The cultural inventory shows a clear break with the earlier tradition in the Tucannon Phase. Two new projectile point types replaced earlier varieties, one having a short blade with shoulders of varying prominence and a contracting stem and a second notched low on the side or corners to produce an expanding stem with short barbs (for example, types that correspond roughly to the Pinto and Elko types, respectively, of the Great Basin sequence). Added to the usual utilitarian tools are sinkers, hopper mortar bases, pestles, antler wedges, and bone shuttles for net weaving. Atlatls are absent, and the lithic technology is crude and impoverished compared with the preceding and succeeding phases. Fish and land mammals are the major foods, and river mussels appear to be a major part of the diet.
- Harder Phase (2,500 700 B.P.). Two subphases are recognized for the Harder Phase, based on differences in settlement patterns and stratigraphy: an early period with scattered house pits and a later period with a village clustering. The village house was a shallow, circular excavation covered by a conical framework of split poles, which was in turn covered by mats or thatch. The artifacts found in the two subphases are very similar, but some variation in relative proportions occurs. Projectile points are mostly corner- and basal-notched. Types include the characteristic Snake River corner-notched style and large and small basalt-notched points that correspond respectively to the Elko,

Eastgate, and Rose Spring series of the Great Basin sequence. Lanceolate and pentagonal knives occur in both subphases. Bone awls, needles, beads, and incised gaming pieces are present. Faunal remains, with the exception of the domesticated dog, approximate those of the preceding phase.

• **Piqunin Phase (700 – 300 B.P.).** Information on this phase is developed from scattered campsites with no depth and one stratified village site (45GA61) consists of circular house pits, each about 6 meters in diameter and 50 centimeters deep, with a superstructure similar to that described for the Harder Phase. Multiple floors indicate reuse of the same pit over the years. Delicate corner-notched and basal-notched projectile points characteristic of late times on the middle Columbia now predominate (Columbia Valley corner-notched and Wallula rectangular stemmed). These points are reminiscent of, though clearly different from, the Rose Spring Series of the Great Basin. A concave bitted scraper suggests a woodworking tool, and lanceolate and pentagonal knives continue to be used. Decorated pestles are added to the previous lithic inventory. Composite harpoon parts, matting needles, bone awls, and twined basketry all occur.

Schalk and Cleveland (1983) developed a chronological sequence for the plateau based, in part, on the degree of sedentism prehistoric populations exhibited:

- **Broad Spectrum Foraging (circa. 11,000 4,000 B.P.).** This pattern is characterized by relatively small, highly mobile groups whose winter subsistence consisted of hunting ungulates as opposed to relying on stored food. The tool inventory of broad spectrum foragers consists of items mostly related to hunting; these include lanceolate projectile points, burins, gravers, atlatl weights, and a wide variety of scraping tools.
- Semi-sedentary Foraging (circa 4,000 250 B.P.). This pattern is characterized by a general shift from winter hunting to food storage as the primary overwintering strategy. The appearance of house pits, increased reliance on fishing and food gathering, increased diversity in tool kits, and the presence of cemeteries all mark the emergence of semi-sedentism on the plateau. Winter settlements are located along the floodplains of major drainages and their principal tributaries.
- Equestrian Foragers (circa 250 B.P. to late historic period). This pattern is characterized by increased fall/winter reliance on hunting and the massing of relatively large numbers of people on horseback who traveled in a coordinated manner. This pattern is highly variable. Many groups did not adopt the horse and continued to travel by foot.

This somewhat simplistic model helps illustrate the evolution of human adaptation to the plateau environment and how changes in resource use influenced both the areas and the manner in which people settled.

More than 14 archaeological excavations have been conducted within 5 miles of the generation plant site, most of them on the north side of the Snake River canyon. Data collected from these excavations broadly support the model suggested by Schalk and Cleveland (1983). Brauner et al. (1990) described the general vicinity as one of the most extensively researched areas, from an archaeological perspective, in the southern plateau. Marmes Rock Shelter, one of the more important prehistoric sites on the plateau (and listed in the NRHP), is located 2 miles north of the generation plant site. This seasonally occupied rock shelter was inhabited by prehistoric people for more than 10,000 years and contained human burials predating the 7,000 B.P. eruption of Mount Mazama (Brauner et al., 1990). Mueller and Mueller (1997) provide a useful summary:

In 1968, human bones and artifacts were discovered in a cave in a basalt wall above the Palouse River....The cave site, later named the Marmes Rock Shelter, was formed when flood vortices ripped chunks of basalt from the walls of the canyon. Skeletal remains of 17 humans were found there, along with bone fragments of foxes, deer, bison, elk, pronghorn antelopes, rodents, and salmon. The charred human bones are thought to have been from a cremation hearth. Radiocarbon dating established that four of the human remains were 4,000 to 6,000 years old, but the oldest of the bone fragments was found to be about 10,000 years old, at the time, the oldest known human remains found in the Western Hemisphere. This means that scarcely 1,000 to 2,000 years after the last of the glacial Lake Missoula floods, humans were in this area. Artifacts found here and in the floodplain below, which included weapon points, bone needles, and amulets, provide insights into the people who lived here at the time.

Excavations have also occurred at the Palouse village site (45-FR-36) near Lyons Ferry State Park, approximately 2 miles north-northwest of the generation plant site. The Palouse village site was an Indian encampment, occupied from 2000 B.P. until 1940, that contained the remains of fire hearths and pit house depressions. The largest single assemblage of American Indian burials in the area was recovered from this site. More than 250 burials were discovered and removed in advance of reservoir construction along the Palouse River.

To the east of the generation plant site, across the Snake River and approximately 1½ miles distant, excavations were undertaken at site 45-WT-134, a pit house village dating back to at least 4,000 B.P. (Brauner et al., 1990). Chipped stone tools, hopper mortar fragments, pestles, net sinkers, bone and antler tools, and a variety of faunal remains (including river mussels, salmon, reptiles, antelope, deer, and elk) were all found at this site.

If it became a reality, the alternative water supply pipeline from the plant site to the Town of Starbuck would be constructed on the opposite side of the Tucannon River from archaeological site 45-CO-1. Site 45-CO-1 is approximately 1 mile from the generation plant site. As reported by Nelson (1966), site 45-CO-1 is situated at the junction of the floodplains of the Snake and Tucannon Rivers, on the southern bank of the Snake River and the eastern margin of the Tucannon River valley. Its surface deposits cover a roughly triangular area of about 20,000 square meters.

Site 45-CO-1 is flanked on the north by the Snake River, on the southwest by the floodplain of the Tucannon River, and on the southeast by an ancient gravel bar that rises about 50 meters above the surrounding floodplain and mantles the eastern wall of the Tucannon River valley. Burials occurred both in the talus apron and in the loess mantling the gravel bar. Those that occurred in the loess include unmarked burials and burials marked by cairns. Severe vandalism to the burials at 45-CO-1 prompted the U.S. Army Corps of Engineers to sponsor archaeological salvage excavations (Iverson, 1977). During the summer of 1975, the Laboratory of Anthropology at the University of Idaho salvaged the vandalized burial site located on the terrace at the confluence of the Tucannon and Snake Rivers. The site was designated 45-CO-1B, owing to its presumed association with the habitation site 45-CO-1, which was located on a lower floodplain immediately west of the Tucannon burial site. More than 130 burials were removed, studied, and reburied by June 1977, in a protected cemetery.

The mouth of the Tucannon River was a strategic point during the latter half of the 19th century (Nelson, 1966). An extension of the Mullen Road crossed the Snake River just below the mouth of the Tucannon River, and a small town—Grange City—was established at 45-CO-1 during the 1870s. Twenty-five years earlier, the same area had been the site of a temporary military fort (Fort Taylor) and was situated in a geographically important area during the Indian wars of the 1850s. Musket balls recovered from the most recent deposits at the site are thought to date from the occupation of Fort Taylor, and hundreds of historic artifacts have been recovered that date from the building of Grange City.

Colonel George Wright's 9th Infantry Regiment constructed Fort Taylor in 1858, to secure rear lines during military engagements with the Spokane, Coeur d'Alene, and Palouse Indians. Several merchants and farmers connected with the Grange movement in Columbia County constructed Grange City as a shipping point on the Snake River. It was intended to fill a need for wheat transportation facilities while also providing competition with the Oregon Railroad and Navigation Company's virtual monopoly of warehousing and shipping. Once less expensive rail transport became available, Grange City declined and disappeared. Both Fort Taylor and Grange City are now submerged by the water impounded by Lower Monumental Dam.

Two historic transportation structures cross the Snake River at the Lyons Ferry crossing approximately 2 miles from the generation plant site: the Snake River Bridge (at Lyons Ferry) and the Joso Viaduct. The Snake River Bridge was built in 1927, spanning the Columbia River at Vantage, but was relocated to its current location in 1968, as part of a new secondary state highway. This 2,040-foot-long cantilever truss is located about 1.2 miles northwest of the generation plant site. The Joso Viaduct was built in 1914, over the Snake River at Lyons Ferry, as part of an effort to reconstruct a rail line between Portland and Spokane by minimizing the line's grade and curvature and shortening the distance by about 50 miles. The Joso Viaduct (owned by Union Pacific Railroad) is the longest and one of the highest railroad viaducts remaining in Washington.

A historic building in the Town of Starbuck is listed on the NRHP. Located at the northeast corner of Main and McNeil Streets, the Bank of Starbuck is believed to have opened for business in 1904. This brick building is one of several brick commercial buildings dating from the turn of the last century that remain standing along the downtown streets, and it currently serves as Starbuck's City Hall.

## 3.14.1.4 Archaeology and Ethnohistory of the Plant Site

Scott and Bard (1994) concluded that no prehistoric or historic archaeological sites meeting the criteria for listing in the NRHP or in the Washington Register of Historic Resources (WRHR) are present in the generation plant site. Because the plant vicinity contains large numbers of important prehistoric archaeological sites, Scott and Bard (1994) recommended that an archaeologist be present to monitor (observe) ground-disturbing activities related to plant construction. An oral history and traditional use area investigation of the generation plant area was conducted by the CTUIR. The CTUIR's October 17, 1994, oral history and traditional use area investigation report to CH2M HILL (Moura and Minthorn , 1994) concluded that additional investigation work was needed. It outlined two broad recommendations if the generation plant continues to go forward:

- 1. The property be formally submitted for a determination of eligibility to the National Register of Historic Places as a Traditional Cultural Property. This would necessitate:
  - Establishing a Government to Government relationship between the CTUIR, the developers, and governmental agencies involved with the proposed action. Only in such a format can KVA, CH2M HILL, the Tribe, Columbia County and the State of Washington discuss such matters as zoning, treaty rights, and private property rights versus cultural resource laws.
  - Additional informant interviews.
  - Identification and involvement of all other concerned Native American groups.
- 2. More attention be paid to the potential for buried cultural resources. This would necessitate:
  - Subsurface archaeological reconnaissance and monitoring of earth disturbing activities during construction. Subsurface archaeological reconnaissance should take the form of systematically placed shovel tests followed by backhoe trenching. Monitoring of construction should include a Tribal monitor in addition to that of a professional archaeologist.

Although Scott and Bard (1994) recommended monitoring of construction, Moura and Minthorn (1994) recommended shovel tests and backhoe trenching (to check for any subsurface archaeological sites). To address the CTUIR testing recommendation, NPE retained CH2M HILL to conduct subsurface testing of up to 30 acres to check for the presence/absence of buried archaeological remains in the preferred plant site. CH2M HILL completed subsurface testing of both the preferred and alternative plant sites (about 60 acres) by mechanical excavation of 50 test trenches located on either side of the BPA power lines (Bard et al., 2000). CH2M HILL's field team included Mr. Toby Patrick and Mr. Jason Butler (CTUIR – Cultural Resources Protection Program).

No archaeological remains of any kind were found in the 50 trenches. Hand screening backhoe-excavated sediment yielded no indicators of prehistoric occupation or use such as flakes, artifacts, fire-cracked-rock, or faunal remains. No cultural features such as house pits, buried caches, human interments, or rock features were found.

Surface reconnaissance in 1994 and subsurface testing in 1999 both failed to identify any archaeological remains within the two generation plant site locations then under investigation. Given the high prehistoric population in the area (as attested to by the large number of recorded archaeological sites along the Snake, Palouse and Tucannon Rivers), it seems almost certain that Native Americans frequented the generation plant site area, perhaps to hunt land mammals or to collect seasonally important plant resources. Such

activities often do not leave physical traces that can be found centuries later by archaeologists. Any discarded perishable artifacts such as skin bags, wooden implements and tools, baskets, cordage nets, and the like would not survive the elements. Rather, only chipped and ground stone implements, and other imperishable debris (flakes, fire-cracked rock, charcoal, baked clay/earth, faunal remains, etc.) could be expected to survive.

While it is possible that Native American artifacts and other remains are present somewhere within the generation plant site area, the absence of any artifacts or other cultural remains in the 50 trenches indicates that any archaeological remains that might be present would be found in very low frequencies and likely would be found only as widely scattered "isolates." Subsurface testing, as was conducted here, is a means of "sampling" the subject parcel in an effort to detect any moderate to large archaeological resources that might be present. Such sampling cannot ensure that some smaller sized archaeological resources are not present. For example, one or more isolated human burials, if present, could escape detection unless the location of the backhoe trenches just happened to coincide with such burials. The subsurface testing program does, however, provide a strong measure of confidence that no large, significant, archaeological sites (large campsites, villages, pithouses, etc.) are present and that, if any archaeological remains are inadvertently discovered during construction, such remains likely would be tightly circumscribed in their location.

The CTUIR recently completed an oral history investigation of the generation plant site, alternative water supply pipeline corridor, and other associated SPP elements that will be addressed elsewhere (such as BPA's 16-mile-long transmission line from the generation plant site to the Lower Monumental Dam substation). The Yakama Nation, Nez Perce Tribe, and Confederated Tribes of the Colville Indian Reservation are in the process of beginning oral history studies or are considering beginning such studies. Wanapum elders have visited the SPP area but are not going to conduct oral history studies at this time. The results of all of the oral histories being prepared by the participating tribes will be summarized as appropriate in the BPA environmental impact statement and in a supplemental submission to EFSEC. These oral history studies are expected to be completed by late January 2002.

## 3.14.2 Environmental Impacts of the Proposed Action

#### 3.14.2.1 Construction

An adverse effect occurs when an undertaking could alter, directly or indirectly, the characteristics of a historic property that qualify the property for inclusion on the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, and association. Adverse effects may include reasonably foreseeable effects caused by an action that may occur later in time, be farther removed in distance, or be cumulative.

As described by Bard et al. (2000), CH2M HILL determined that plant construction likely would not affect any archaeological sites. This determination was made on the basis of both surface inventory (Scott and Bard, 1994) and subsurface testing (Bard et al., 2000). Moura and Minthorn (1994) recommended additional archaeological work, such as that conducted by Bard et al. in 1999. Moura and Minthorn also recommended that a tribal monitor and professional archaeologist be present during ground-disturbing construction activities.

Moura and Minthorn also indicated that the plant site locality should be subject to further ethnohistoric evaluation (oral history studies) to determine whether a traditional cultural property is present. Under contract to CH2M HILL, several tribes are conducting oral history studies in spring and summer 2001. These studies are also expected to facilitate meaningful government-to-government consultations (regarding possible generation plant effects on cultural resources) among the participating tribes and the lead federal agency (BPA).

The Applicant currently is awaiting Washington State Department of Ecology (Ecology) determination on its 300-gpm water right application. If granted, this water right will authorize the proposed onsite well that will serve as the potable water supply for the generation plant. The proposed onsite well would be constructed at a location within the generation plant site footprint that has already been subject to surface archaeological reconnaissance (in 1994 with negative findings) and subsurface backhoe test trenching (in 1999 with negative findings). These previous investigations indicate that no significant adverse impacts to cultural resources are associated with installation of an onsite well at the generation plant site.

### 3.14.2.2 Operation and Maintenance

While there are no known/recorded archaeological resources within the generation plant site or the alternative water supply pipeline route, it is possible that the ongoing tribal oral history work could result in the identification of traditional cultural properties. The results of all such oral histories will be presented in a cultural resources technical report that will be prepared later in 2002 for the entire SPP and that will address findings and implications.

For the following reasons, operation and maintenance of the generation plant likely will not have significant adverse effects on any cultural resources found to be present:

- Maximum effort will be made to avoid discovered or identified cultural resources.
- Discovered or identified cultural resources that cannot be avoided will be subject to preconstruction mitigation measures developed in consultation with all appropriate stakeholders (that is, SHPO, the tribes, and BPA).

## 3.14.3 Environmental Impacts of Alternatives

#### 3.14.3.1 Northwest Site Alternative

Impacts to cultural resources associated with the northwest site alternative would be the same as those associated with the proposed southeast site location because it is unlikely that any archaeological sites are located on either site (there were no indications of archaeological sites and no discoveries found during the investigation).

#### 3.14.3.2 Wet-Cooled System Alternative

Impacts to cultural resources associated with the wet-cooled system alternative would be the same as those associated with the proposed air-cooled system because both systems would be constructed within the footprint of ground already found to have no subsurface archaeological sites present.

### 3.14.3.3 Water Pipeline versus Onsite Well

As a water supply alternative to the proposed onsite well, the Applicant has secured an option to purchase up to 100 gallons per minute (gpm) (or up to 144,000 gallons per day [gpd]) of water from the Town of Starbuck under the Town's existing water right. The Applicant would construct a water pipeline, primarily along an abandoned railroad bed, connecting the generation plant to the Town water supply system. Impacts to cultural resources associated with implementation of the water pipeline alternative would be greater than those associated with the proposed onsite well.

The alternative water supply pipeline route was field investigated in April 2001 by an archaeological survey team composed of CH2M HILL archaeologists and cultural resource staff members from the CTUIR and Yakama Nation. The survey team attempted to locate any archaeological sites that might be present along the pipeline route. Tribes participating in the collection of oral history information from tribal elders will attempt to determine whether the impacts associated with construction of the alternative water supply system pipeline could affect any traditional cultural properties that might be present in or adjacent to the pipeline route.

The alternative water supply pipeline route lies mostly within a privately owned, abandoned railroad right-of-way from the Town of Starbuck to the end of the abandoned railroad bed near the generation plant site. Near the site, the pipeline would cross property owned by the U.S. Army Corps of Engineers. Although the underground water pipeline would terminate in the Town of Starbuck within 0.25 mile of the historic Bank of Starbuck, the pipeline would not affect that property. While there are no known or recorded cultural resources within the alternative water pipeline route, it is possible that the upcoming tribal oral history work could result in the identification of traditional cultural properties.

The possibility of encountering subsurface archaeological sites increases with greater amounts of ground disturbance. Although much of the water pipeline would be constructed in the abandoned railroad bed, over the length of the pipeline that would extend from the Town of Starbuck to the generation plant site, the potential to disturb native soils would be greater than the disturbance that would take place at the proposed onsite well. The Applicant will provide additional detailed information on the impacts to cultural resources of the water pipeline alternative if the Applicant seeks to implement this alternative.

## 3.14.4 Mitigation Measures

## 3.14.4.1 Construction

As may be required in consultation with the Washington SHPO, the tribes, the lead federal agency (BPA), and the lead state agency (EFSEC), potential impacts to cultural resources will be mitigated following procedures outlined in 36 CFR Part 800. Mitigation measures will include monitoring by one or more qualified archaeologists and representatives of the affected tribes (for areas where buried cultural deposits could be present). It is likely that any mitigation measures agreed to by the stakeholders and consulting parties will be incorporated into either (a) the final environmental documents as stipulated conditions of approval or (b) a Memorandum of Agreement that would be forwarded to the Advisory Council on Historic Preservation for review and comment.

- The Applicant has committed to retain the services of a qualified archaeologist to conduct full-time monitoring of all earth-disturbing work at the generation plant site and along the alternative water supply pipeline route (should such a pipeline route be needed). In addition, the Applicant has committed to retain the services of one or more full-time tribal monitor(s) to observe all earth-disturbing work at the generation plant site and along the alternative water supply pipeline route. The number of tribal monitors and conditions of their participation will be determined in consultation with the affected tribes.
- The Applicant will develop a cultural resources mitigation monitoring plan (CRMMP) as part of the government-to-government consultations between BPA and the affected tribes and as required by the Section 106 process. The CRMMP will be prepared in consultation with the affected tribes, BPA, and the Washington SHPO. It will provide a detailed plan to guide the archaeological and tribal monitoring of earth-disturbing construction activities and will outline specific procedures to be followed if unanticipated discoveries are made during construction. The CRMMP will include notification procedures and procedures for potentially issuing stop-work orders to construction contractors if certain discoveries are made. In addition, it will outline possible mitigation measures (treatment plans) that will be employed in the event that significant cultural resources are discovery of Native American skeletal remains consistent with all applicable state and federal laws and regulations.

### 3.14.4.2 Operation and Maintenance

Because operation and maintenance of the generation plant will not affect cultural resources, no mitigation is required.

## 3.14.5 Cumulative Impacts

No cumulative impacts to cultural resources are associated with construction or operation and maintenance of the generation plant.

## 3.14.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to cultural resources are associated with construction or operation and maintenance of the generation plant.

# SECTION 3.15 Traffic and Transportation

## 3.15 Traffic and Transportation

## 3.15.1 Existing Conditions

The Starbuck Power Project is located in a rural area in Columbia County, Washington, between the Snake River and State Route 261 (SR-261), near the Town of Starbuck, Washington. The intersections of SR-261 with SR-12 and SR-260 are to the immediate south and north of the generation plant site, respectively. Figure 3.15-1 shows the generation plant site and the surrounding roadway network within the study area (a 25-mile radius).

### 3.15.1.1 Street Network

At the generation plant site, SR-261 is a two-lane, north-south roadway with 2- to 3-footwide gravel shoulders, skirted by open drainage ditches, and no sidewalks. SR-261 is classified as a rural-collector roadway, according to the Washington State Department of Transportation (WSDOT) road classification system, with a posted speed limit of 50 miles per hour (mph). SR-261 provides a transportation connection from SR-260 (in Franklin County), through Lyons Ferry, to the Town of Starbuck. SR-261 is used for agriculture trucking to the Columbia County Grain Growers terminal site, located adjacent to the generation plant site on the Snake River, where barge transportation is available (Columbia County Comprehensive Plan, April 1996). It is also used for access to Little Goose Dam on the Snake River. SR-261 extends to and past the Town of Starbuck, approximately 6 miles southeast of the generation plant site. The junction of SR-261 and SR-12 is approximately 13 miles southeast of the generation plant site.

SR-12 is a two-lane, east-west roadway with 2- to 3-foot-wide gravel shoulders, drainage ditches, no sidewalks, and good pavement conditions. It is classified as a rural-principal arterial, according to the WSDOT road classification system, with a posted speed limit of 60 mph. SR-12 serves as the main traffic route to major concentrated population centers outside Columbia County.

The junction of SR-261 and Palouse Falls Road (an access road to a campground) is approximately 8 miles northwest of the generation plant site, and the junction of SR-261 and SR-260 is approximately 16 miles northwest of the site.

SR-260 is a two-lane, east-west roadway with 2- to 3-foot-wide gravel shoulders, drainage ditches, and no sidewalks. SR-260 is classified as a rural-collector roadway, according to the WSDOT road classification system, with a posted speed limit of 55 mph. SR-260 is used for agriculture trucking to the Columbia County Grain Growers terminal site on SR-261, provides access to Palouse Falls and Lyons Ferry State Park, provides a route to access Lower Monumental Dam and Little Goose Dam from the south side of the Snake River, and serves as the northern route to the Town of Starbuck.

## 3.15.1.2 Traffic Patterns and Volumes

Table 3.15-1 shows the average daily traffic (ADT) volumes on roadways in the study area between 1996 and 2000. These volumes are based on available traffic data from WSDOT. Year 2000 ADTs are estimated on the basis of 1996-99 WSDOT data. See Figure 3.15-2.

#### TABLE 3.15-1

Average Daily Traffic Volumes and Estimated Percent Trucks

Roadway	1996 ADT	1997 ADT	1998 ADT	1999 ADT	2000 ADT*	Estimated % Truck
SR-261 (North of SR-12)	440	450	430	430	435	26
SR-261 (South of SR-260)	N/A	N/A	N/A	440	445	26
SR-12 (West of SR-261)	2,200	2,200	2,000	2,100	2,120	19
SR-12 (East of SR-261)	2,300	2,100	1,900	1,800	1,820	19
SR-260 (West of SR-261)	690	730	740	590	600	29
SR-260 (East of SR-261)	750	800	800	660	670	26

ADT = Average daily traffic.

N/A = Not available.

\* 2000 ADT are estimated.

Source: Washington State Department of Transportation, 1999.

#### Truck Volumes and Routes, Weight and Load Limitations

Trucks are used to transport grain to the Columbia County Grain Growers grain elevators located south of and adjacent to the generation plant site. Grain harvest season is from July to September. August is the peak harvest month, with an average of 130 trucks per day. Trucks transporting grain head northbound on SR-261 from SR-12 and unload at the grain elevators. The trucks then backtrack southbound on SR-261 toward the Town of Starbuck and SR-12. Because of a gas line located near the elevator site, there are designated entry and exit lanes for truck traffic.

Approximately 1.5 miles north of the generation plant site, the SR-261 Lyons Ferry Bridge crosses the Snake River. The bridge is load restricted. Truck traffic, other than single-axle trucks, is limited to 21,500 pounds per axle or less (Jones & Stokes, 2001). WSDOT states that no loads more than 10 feet wide are allowed. According to Columbia County and WSDOT, there are no weight and load limits on any of the roads in the vicinity of the generation plant site, with the exception of the Lyons Ferry Bridge.

#### 3.15.1.3 Existing Roadway Levels of Service

To analyze the peak-hour traffic conditions, ADT data from WSDOT were used to determine a level of service (LOS) for the roadway. LOS is a qualitative measure describing operational conditions in a traffic stream, and motorists' or passengers' perceptions of those conditions. A LOS definition generally describes these conditions in terms of speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. There are six LOS classifications, each given a letter designation from A to F.



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LOS A represents the best operating conditions and LOS F represents the worst. The generic evening peak hour typically occurs between 4 p.m. and 5 p.m., and the morning peak hour is generally from 7 a.m. to 8 a.m. Peak hours are assumed to be the periods when the maximum amount of traffic is experienced. As recommended by the Transportation Research Board *National Cooperative Highway Research Program Report 187*, a conservative estimate of 10 percent of the ADT volume is used to estimate the p.m. peak hour volumes.

LOS was determined on the basis of the most current *Highway Capacity Manual* (HCM) (TRB, 1997). Daily volumes represent the estimated 2000 ADTs in both directions of travel.

To determine the LOS for selected roadways in the study area, daily traffic capacity was determined by estimating capacities obtained from the HCM. Daily traffic volumes were compared with these capacities to determine volume-to-capacity ratios, which were used to calculate the existing LOS. Table 3.15-2 summarizes the existing roadway traffic conditions in the generation plant vicinity and includes existing roadway classification, number of lanes, daily volume, design capacity, peak-hour volume, and LOS.

#### TABLE 3.15-2

2000 Conditions of Affected Roadways

Roadway	Classification	No. of Lanes	Average Daily Volume <sup>a</sup>	Hourly Design Capacity <sup>b</sup>	PM Peak Hour Volume <sup>c</sup>	PM Peak Hour LOS
SR-261 (North of SR-12)	Rural-Collector	2	435	2,800	50	А
SR-261 (South of SR-260)	Rural-Collector	2	445	2,800	50	А
SR-12 (West of SR-261)	Rural-Principal Arterial	2	2,120	2,800	210	В
SR-12 (East of SR-261)	Rural-Principal Arterial	2	1,820	2,800	180	A
SR-260 (West of SR-261)	Rural-Collector	2	600	2,800	60	А
SR-260 (East of SR-261)	Rural-Collector	2	670	2,800	60	А

<sup>a</sup> Estimated number of vehicles per day in both directions.

<sup>b</sup> Maximum number of vehicles per hour in both directions for LOS E.

<sup>c</sup> Vehicles per hour in both directions.

LOS = Level of service.

The overall LOS for the current roadways surrounding the proposed generation plant site prior to construction (with the exception of SR-12) is LOS A, which represents free-flow traffic operating conditions. Individual users are virtually unaffected by the presence of others in the traffic stream. SR-12 just west of SR-261 is operating at LOS B, which is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable.

#### 3.15.1.4 Existing Intersection Level of Services

The HCM was used to determine the appropriate LOS for the selected intersections in the study area. The accepted method of evaluating traffic conditions is to also evaluate how effective intersections operate. The operation of these intersections is also generally characterized by a letter designating an intersection's LOS. LOS is a concept developed to quantify the degree of comfort afforded to drivers as they travel through an intersection or a

roadway segment. Average stopped delay time per vehicle is the best available measure of the LOS at an intersection. The LOS scale ranges from LOS A, representing minimal delay, to LOS F, extreme delay (more than 60 seconds of average stopped delay per vehicle).

The methodology from the 2000 *Highway Capacity Manual* (TRB, 1997) was used to estimate LOS for the unsignalized intersections in the project area. Level of service, average delays, and volume-to-capacity ratios (V/C ratio) for selected intersections within the project study area are listed in Table 3.15-3. Figure 3.15-3 is a graphical representation of the study unsignalized intersections.

#### TABLE 3.15-3

Existing Unsignalized Intersection Level of Service

	P.M. Peak					
Intersection	LOS	Delay <sup>a</sup>	V/C Ratio			
SR261/SR260	А	8.5	.01			
SR261/SR12	А	9.4	.03			

<sup>a</sup> Average stopped delay per vehicle in seconds.

V/C = Volume to capacity.

Both unsignalized study intersections are expected to operate at acceptable LOS A during the average weekday p.m. peak hours for the existing traffic conditions with the intersection delays of less than 10 seconds.

#### 3.15.1.5 Accident Rates

Accidents are generally expressed in terms of accident rate, where accident occurrence is indexed to the amount of traffic using a given roadway. For roadway segments, accident rates are computed as the number of accidents per million vehicle-miles (MVM) of travel. The total number of accidents reported in the generation plant vicinity and accident rates for selected roadways are presented in Table 3.15-4, for January 1995 to April 2000.

#### **TABLE 3.15-4**

Accident History, January 1995 to April 2000

		Number o		
Roadway	Section	6-Year Total	Average per Year	Accident Rate (MVM)
SR-261	Mile Post 3 – 14	19	3.2	1.8
SR-12 <sup>ª</sup>	Mile Post 382.24 –382.28 <sup>b</sup>	0	0	0
SR-260 <sup>a</sup>	Mile Post 33.04 –33.08 <sup>b</sup>	0	0	0

<sup>a</sup> No accidents were identified by WSDOT at either state route mile posting.

<sup>b</sup> The section length (0.04 mile) indicates the road distance (0.02 mile) before and after the intersection with SR-261.

MVM = million vehicle-miles.

Source: Washington State Department of Transportation, 2000 (Accident Report).



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The 1996 Accident Data on State Highways Report (WSDOT, 1996) indicates an average statewide accident rate of 2.3 MVM for the type of roadway corresponding to SR-261. The average statewide accident rate is higher than the MVM rate of SR-261 (1.8 MVM). Therefore, based on the MVM accident rate, the above roadways fall within acceptable statewide parameters.

#### 3.15.1.6 Future Plans and Projects

No future plans or projects were identified in the *Columbia County Comprehensive Plan,* (Columbia County, 1996), either in or near the Town of Starbuck. The Applicant also examined the WSDOT Highway Construction Web site

(<u>http://www.wsdot.wa.gov/projects/</u>) and determined that no projects of significant size are planned on the state routes in the generation plant vicinity during the proposed construction period.

#### 3.15.1.7 Local Comprehensive Transportation Plans

The *Columbia County Comprehensive Plan* (Columbia County, 1996) indicates no major improvements to the transportation system in Columbia County. However, the plan states that even though the county is not growing quickly, the community realizes that change is occurring and is taking a proactive role in attracting development to meet the needs of its citizens.

#### 3.15.1.8 Pedestrian/Bicycle Facilities

Columbia County is striving to create an integrated system for this mode of transportation, yet it recognizes the need to prioritize locations where it expects heavy use, such as routes connecting residential areas to recreational facilities and schools. There are no planned pedestrian or bicycle facilities within the section of SR-261 nearest the generation plant site.

#### 3.15.1.9 Public Transportation

Columbia County is primarily a rural county where the need for public transportation in or near its towns is not a high priority. However, senior citizens use a bus or van service that shuttles between the Town of Starbuck (off of SR-261) and the City of Dayton (off of SR-12), picking up passengers from their homes at 9 a.m. and making a return trip at 4 p.m., twice a week, on Tuesdays and Thursdays.

#### 3.15.1.10 Air Traffic

There are no regional or municipal airports in the vicinity of the generation plant site. The nearest airport is near Walla Walla, approximately 35 miles to the south. Small planes may use private runways at ranches or farms in the area, but the frequency of this type of use is unknown. There is also a runway at Little Goose Dam, approximately 20 miles northeast of the Town of Starbuck.

#### 3.15.1.11 Rail Traffic

Union Pacific Railroad (UPRR) operates an active main line on the west border of the generation plant site. The UPRR right-of-way (ROW) parallels the west side of SR-261 and is used primarily for freight service.

#### 3.15.1.12 Waterborne Traffic

Immediately southeast of the generation plant site, the Port of Columbia has a marina on the Snake River and an adjacent off-water industrial site. Grain is the major commodity using barge transportation on this stretch of the river. The Snake River borders the east side of the generation plant site, and the Snake River Lyons Ferry Marina is approximately 1 mile north of the site.

#### 3.15.2 Environmental Impacts of the Proposed Action

On the basis of historical ADTs on the stated roadways, a 1 percent growth factor is assumed in establishing impacts on future background levels of traffic. This growth factor is considered reasonable because of the area's rural nature.

Local policies (both city and county) are aimed at keeping the public road service at or above an adopted LOS. As described in the *Columbia County Comprehensive Plan* (Columbia County, 1996), the county has decided that LOS C at peak hour is a reasonable and achievable standard for major arterial roadways. LOS C is a commonly adopted standard, typical of rural areas in Washington. According to Franklin County Public Works, an LOS C threshold is acceptable; however, it is also acceptable for the LOS to drop from C to D if it is only for a short duration, such as during construction. All of the roadways in the study boundaries currently provide LOS C or better.

Table 3.15-5 describes the existing and future daily peak-hour traffic volumes and LOSs without any generation plant impacts. It is estimated that during the evening peak hour in 2004, all roadways in the generation plant vicinity will function at LOS B or better, without the proposed generation plant.

	No. of	Daily		Estimated PM Peak Hour without Generation Plant			
Roadway	Lanes	2000	2004	2000	LOS	2004	LOS
SR-261 (North of SR-12)	2	435	450	50	А	50	А
SR-261 (South of SR-260)	2	445	460	50	А	50	А
SR-12 (West of SR-261)	2	2,120	2,210	210	В	220	В
SR-12 (East of SR-261)	2	1,820	1,890	180	А	190	А
SR-260 (West of SR-261)	2	600	625	60	А	60	А
SR-260 (East of SR-261)	2	670	700	70	А	70	А

#### **TABLE 3.15-5**

Existing, Future Daily, and Peak-Hour Traffic Volumes and LOS without Generation Plant

LOS = Level of service.

Source: Washington State Department of Transportation, 1999.

#### 3.15.2.1 Construction

The only impacts will be to SR-261 for construction of the two entrances to provide an exit and an entrance to the plant site from SR-261. According to WSDOT, these new driveways will be constructed in accordance with Washington State access management under Title 468 *Washington Administrative Code* (WAC) and Chapter 47.50 *Revised Code of Washington (RCW)*. These roadways will create an entrance "loop" intended to provide effective truck access to the generation plant. A parking area will be established along the entrance loop, next to the demineralization transfer and storage facilities, for trailer-mounted equipment.

The Applicant will construct a road system surrounding the generation plant, with access branch roads to specific areas, such as the generation plant and the heat recovery steam generators (HRSGs). Passenger vehicle parking during the operations phase will be located outside the control/administration area of the generation plant. Parking for workers during the construction phase will be located on the northern portion of the Applicant's property, where approximately 4 to 5 acres will be designated for temporary parking.

Connections from the generation plant site heading north to SR-260 can be made from SR-261. Southward to SR-12, connections also can be made from SR-261.

#### **Significance Criteria**

Construction of the generation plant, onsite water well, natural gas pipelines, and transmission line will take about 2 years. It is anticipated that the construction workers required to build the generation plant will be drawn from a local labor pool within a 75-mile radius.

SR-261 and SR-12 will be the primary roadways to and from the generation plant site. As primary access routes to the site, SR-12 and SR-261 will likely have the greatest impact from the construction workers. It is anticipated that 80 percent of the workforce traffic will originate from the Tri-Cities and Walla Walla areas (outside Columbia County), heading eastbound on SR-12 to the SR-261 junction, then northbound on SR-261 to the generation plant site. This is the shortest and most direct route from the major urban areas within a 75-mile radius. It is anticipated that the additional 20 percent of the workforce will come from outside the 75-mile radius.

Trucks will be used to deliver construction equipment and materials. Some of these trucks will have a gross vehicle weight of up to 105,500 pounds. Because the surface condition of the pavement near the generation plant site is a good bituminous quality, the delivery of construction materials and equipment is not expected to significantly degrade existing conditions. Trucks that exceed the load restrictions established for the Snake River Lyons Ferry Bridge, north of the generation plant site on SR-261, will be limited to accessing the site via SR-261 from the south, by way of SR-12. (The construction contractor can provide specific peak traffic times during construction, as well as sources and storage sites for material.)

Combustion turbines and other large equipment will be transported to a location near the site by railroad car, then to a low-boy transporter with many wheels pulled by a truck. The truck will deliver the equipment to the generation plant site. Movement of the transporter will have a short-term impact on traffic along SR-261 or any other roadways used.

A detailed investigation of the barge alternative was not conducted, but a preliminary review has eliminated this option for transporting heavy equipment to the site. The barge alternative was eliminated because of constraints associated with impacts to the Snake River shoreline, water quality, and fisheries; permitting requirements associated with these impacts; and other concerns, such as the cost of building a new road from the shore to the top of the bluff and constructing a dock for unloading/loading purposes.

Construction should begin with site preparation in the fall-winter of 2002. There will be an onsite peak workforce of about 700 workers during the 3-month period from June through August. During the month of August, there could be a few overlapping periods with the peak vehicular harvesting season traffic. The current roadway system capacity is adequate to carry both types of vehicle traffic. The average workforce for the remaining 21 months of construction will be about 314 workers. During the peak construction period, construction workers will generate an estimated 850 daily trips, 425 of which will occur during the evening peak hour. (This trip estimate includes trip reductions resulting from carpooling.) The workers will most likely park their vehicles on generation plant property to the north of the existing Bonneville Power Administration (BPA) transmission lines. It will be up to the generation plant contractor to make parking at that location a requirement. In terms of acreage necessary for parking, worst-case scenario (a 1:1 ratio, with 700 workers during the peak construction period driving independently), 5.2 acres will be needed. If carpooling is used, approximately 4 acres of space will be necessary. For stormwater runoff, see the Stormwater Pollution Prevention Plan in Appendix H.

Construction-related traffic increases will consist of deliveries of plant equipment and construction materials (such as concrete and steel) by truck. Truck deliveries are anticipated to occur between 8 a.m. and 4:30 p.m. on weekdays. In total, approximately 4,000 truck deliveries are expected during the 2-year period, an average of about 10 deliveries per weekday. During the month with the highest truck traffic, an average of 25 trucks per weekday is expected, resulting in an additional 50 daily trips. It is anticipated that truck deliveries will include:

- Major equipment (components of the HRSG, combustion turbine-generator, and steam turbine-generator)
- Mechanical equipment
- Electrical equipment and material
- Piping, supports, and valves
- Concrete and reinforcing steel
- Miscellaneous steel, roofing, and siding
- Administration and warehouse buildings
- Construction consumables
- Office supplies
- Contractor mobilization and demobilization
- Construction equipment delivery and pickup

The generation plant will require that approximately 58 heavy pieces of equipment be offloaded from railcars over a 5-month period and transported via heavy-haul transporters (see Figure 3.15-4) to the construction site. Components requiring special delivery and hauling are the combustion turbines, combustion turbine-generators, HRSGs, heat transfer bundles, steam turbine, steam turbine-generator, main and auxiliary transformers, and high-pressure drums.



FIGURE 3.15-4 Heavy-Haul Transporter Source: Photograph courtesy of PPL Global.

To accomplish this work, the Applicant has asked UPRR for assistance in constructing a rail spur. UPRR has agreed to this since the rail spur will have minor or no impacts on the existing railroad traffic. UPRR will construct, own, operate, and maintain the spur and loading facilities. UPRR will construct the rail spur from the existing tracks, down the abandoned railroad bed that adjoins the current tracks (see Section 2.2, Figure 2.2-10). Cranes will be used to move equipment from rail cars to the transporter, which will haul it to the construction site via the rejuvenated access road connecting to SR-261. This access road will need to be widened and the grade lessened. In addition, the transporter will cross an existing gas pipeline that is protected from heavy loads with a steel casing.

The environmental impacts of the railroad spur will be minimal because it will be located on a previously used railroad bed that lies in a rocky, barren area. The abandoned railroad bed and the land adjacent to it have little vegetation because of the rocky soils and host no threatened and endangered species. The site has no known cultural resources. Table 3.15-6 provides a summary of p.m. peak hour traffic and LOS during the construction time period of the Starbuck generation plant.

#### TABLE 3.15-6

Total P.M. Peak Hour and LOS Construction Impacts to the Roadways

			Estimated P.M. Peak Hour					
Roadway	No. of Lanes	2000 Base ADT	2000 P.M. Peak	Peak Construction Truck Traffic	Harvesting Traffic - P.M. Peak	Construction Traffic – P.M. Peak	Total P.M. Peak	LOS
SR-261 (North of SR-12)	2	435	50	25	15	425	515	D
SR-261 (South of SR-260)	2	445	50	25	15	425	515	D
SR-12 (West of SR-261)	2	2,120	210	25	15	425	675	D
SR-12 (East of SR-261)	2	1,820	180	25	15	425	645	D
SR-260 (West of SR-261)	2	600	60	25	15	425	525	D
SR-260 <i>(East of</i> SR-261)	2	670	70	25	15	425	535	D

ADT = Average daily traffic.

LOS = Level of service.

The construction LOS during the p.m. peak hour with peak harvesting season traffic indicates an LOS D quantifier, which is an acceptable LOS for the county during construction. It is anticipated that the LOS will change back to existing conditions LOS once the project is completed.

#### **Construction Accidents**

Although the additional vehicular and construction traffic attributable to the proposed action would increase the risk of accidents, it is anticipated that the overall accident rate or pattern would be similar to existing conditions.

A Traffic Management Plan will be submitted to EFSEC for review prior to the startup of construction, and that plan will include measures to minimize impacts on traffic and to minimize hazards during construction.

The Applicant is proposing construction of an onsite well that would require approximately three to four workers for the duration of approximately 1 month. Construction of this onsite well is not anticipated to affect SR-261 in any way.

#### 3.15.2.2 Operation and Maintenance

The generation plant will operate 24 hours per day, 7 days per week. It will employ approximately 40 individuals in two shifts: 30 workers for the day shift and 10 for the night shift. This equates to 60 trips for the day shift and 20 trips for the night, or an estimated

maximum total of 80 trips during the 24-hour period. It is anticipated that as many as 40 trips will occur during shift change.

During plant operation, it is anticipated that trucks periodically will deliver and pick up replacement parts, lubricants, liquid fuel, aqueous ammonia, condensed polisher waste, trash, and other consumables. Table 3.15-7 highlights expected truck deliveries to the generation plant site.

# Delivery TypeNumber and Occurrence of TrucksAqueous ammonia2 per weekCondensed polisher waste1 per monthCleaning chemicals1 per monthTrash pickup1 per weekSanitary waste1 per year

TABLE 3.15-7 Estimated Truck Traffic at the Generation Plant during Operation

Some of the materials delivered to the plant (such as aqueous ammonia) could pose an inhalation hazard if spilled. Shippers of inhalation hazardous or explosive materials must contact the WSP and apply for a Hazardous Material Transportation License. Upon receiving this license, the shipper will obtain a handbook that specifies the routes approved to ship inhalation hazardous or explosive materials. Operating convenience is not a consideration. The exact route of the inhalation hazardous or explosive material shipment will not be determined until the shipper contacts the WSP and applies for a license.

SR-12 to SR-261 is anticipated to be the most likely route for delivery once the proper licenses are acquired.

Table 3.15-8 describes current and future traffic volumes, and LOS during the operation phase of the generation plant, including traffic volumes from the generation plant site. As shown in Table 3.15-8, all roadways will operate at LOS B or better during evening peak conditions.

#### Accidents During Operations

The accident rates during generation plant operation are not anticipated to exceed the existing accident rates. However, truck traffic supporting the generation plant (shown in Table 3.15-7) may be operating at lower speeds than personal vehicles. Therefore, there could be increased risk of passing during the "no passing zones" on the state routes, which could result in an accident.

#### TABLE 3.15-8

Existing, Future Daily, and Peak-Hour Roadway Segment Traffic Volumes and LOS with and without Generation Plant Impacts

	2000 Ex P.M. F	isting Peak	2004 P.M with Gener Pla	<i>I</i> . Peak out ation nt	2004 P.M with Gene Plar	. Peak eration nt	2030 P.M with Generatio (Horizor	/I. Peak out on Plant n Year)	2030 P.M with Gen Pla (Horizor	I. Peak eration nt Year)
	Traffic	LOS	Traffic	LOS	Traffic	LOS	Traffic	LOS	Traffic	LOS
SR-261 (North of SR-12)	50	A	50	A	90	A	60	A	100	А
SR-261 (South of SR-260)	50	A	50	A	90	A	60	A	100	A
SR-12 (West of SR-261)	210	В	220	В	260	В	285	В	325	В
SR-12 (East of SR-261)	180	А	190	А	230	В	245	В	285	В
SR-260 (West of SR-261)	60	А	60	А	100	А	80	А	120	А
SR-260 (East of SR-261)	70	А	70	А	110	А	90	А	130	А

LOS = Level of service.

#### **Future Intersection Operations**

Table 3.15-8 describes current and future intersection LOS during the operational phase of the generation plant, which also includes traffic from the generation plant site. Table 3.15-9 shows that the LOS of the unsignalized intersections of SR-261 at SR-260 and SR-12 would continue to operate at acceptable levels, which is LOS A during afternoon peak traffic conditions. This means the intersections would have minimal or few delays. Both unsignalized intersections would have delays of 9.5 seconds or better.

During the peak harvest month, intersection operations will continue to operate at an acceptable LOS. This includes traffic from the generation plant and traffic generated by the harvesting trucks transporting agriculture to the grain mills.

#### 3.15.3 Environmental Impacts of Alternatives

#### 3.15.3.1 Northwest Site Alternative

Impacts on traffic and transportation associated with the northwest site alternative would be the same as those associated with the proposed southeast site location because the transportation routes to and from both sites are the same.

#### 3.15.3.2 Wet-Cooled System Alternative

Impacts on traffic and transportation associated with the wet-cooled system alternative would be the same as those associated with the proposed air-cooled system because these design alternatives do not affect transportation.

#### TABLE 3.15-9

Future Unsignalized Intersection Analysis

	P.M. Peak Existing					
Intersection	LOS	Delay <sup>a</sup>	V/C Ratio			
SR-261/SR-260	А	8.5	.01			
SR-261/SR-12	А	9.4	.03			
		P.M. Peak 2004				
Intersection	LOS	Delay	V/C Ratio			
SR-261/SR-260	А	8.5	.01			
SR-261/SR-12	А	9.4	.03			
		P.M. Peak 2030				
Intersection	LOS	Delay	V/C Ratio			
SR-261/SR-260	А	8.6	.01			
SR-261/SR-12	А	9.5	.03			

<sup>a</sup> Average stopped delay per vehicle.

V/C = volume to capacity.

LOS = Level of service.

#### 3.15.3.3 Water Pipeline Alternative

As a water supply alternative to the proposed onsite well, the Applicant has secured an option to purchase up to 100 gallons per minute (gpm) (or up to 144,000 gallons per day [gpd]) of water from the Town of Starbuck under the Town's existing water right. The Applicant would construct a water pipeline, primarily along an abandoned railroad bed, connecting the generation plant to the Town water supply system. Impacts on traffic and transportation associated with implementation of the water pipeline alternative would be greater than those associated with the proposed onsite well because of additional traffic on SR-261 and impeded access to adjacent property during pipeline construction.

#### 3.15.4 Mitigation Measures

#### 3.15.4.1 Construction

During construction, roadways and intersections in the vicinity of the generation plant will provide an acceptable level of passage for traffic, even during the evening peak periods. However, the following mitigation measures will be implemented to further reduce the impact of generation plant construction on roadway traffic in the region:

- The Applicant will provide notice to landowners when water and gas pipeline construction takes place so that access for agricultural activities can be provided or will be disrupted for only short periods of time.
- The Applicant will provide proper road signage and warnings of "Equipment on Road," "Truck Access," or "Road Crossings."

- When slow or wide loads are being hauled, advance signage and traffic diversion equipment will be used to improve traffic safety.
- The Applicant will upgrade the access road connecting the generation plant site to SR-261 to service truck movements of legal weight. This component of the generation plant will be completed early to support initial site development.
- In consultation with Columbia County, the Applicant will provide detour plans and warning signs in advance of any traffic disturbances.
- One travel lane will be maintained at all times.

#### 3.15.4.2 Operation and Maintenance

Because generation plant operation and maintenance will not significantly affect traffic and transportation, no mitigation is required.

#### 3.15.5 Cumulative Impacts

No cumulative impacts on traffic and transportation are associated with construction or operation and maintenance of the generation plant.

#### 3.15.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts on traffic and transportation are associated with construction or operation and maintenance of the generation plant.

## SECTION 3.16 Health and Safety

### 3.16 Health and Safety

#### 3.16.1 WAC Requirements

#### 3.16.1.1 Spillage Prevention and Control

Appendix E discusses planned spillage prevention and control measures to be used during construction, operation, and maintenance of the generation plant, water pipeline alternative, access roads, and wastewater facilities associated with the Starbuck Power Project (SPP).

The Applicant will prepare a Spill Prevention Countermeasure and Control Plan (SPCC Plan) in accordance with 40 CFR 112.7 and 173-180D WAC. This plan will be submitted to EFSEC at least 65 calendar days before operation begins. This SPCC Plan will be fully implemented before the facility begins operations.

#### Construction

Fuel and oil are the materials most likely to be released during construction of any of these facilities. Fuel and oil can leak from construction equipment during operation, refueling, or maintenance. Construction equipment will be monitored for leaks and receive preventive maintenance to ensure proper operation and reduce the chance of leaks. Refueling will generally be by fuel tanker truck specifically equipped for fueling operations. Refueling will be supervised to minimize the potential for spills. Topping off of fuel tanks will be discouraged. Any spills that occur during refueling will be reported, if required, and will be cleaned up at the time of the spill by the general contractor. The Washington Department of Ecology (WDOE) requires that spills that affect soil, water, and/or groundwater, or that are greater than what immediately evaporates, be reported. Any spill will be addressed as specified in 173-340 WAC (Model Toxics Control Act, MTCA).

An estimated 280,000 gallons each of alkaline, acid, and passivation solutions will be used during construction to clean the heat recovery steam generators (HRSGs) and related process piping prior to startup. Special work of this nature will be contracted to firms experienced with the particular processes involved. These firms will be required to provide an approved spill prevention plan and the required chemicals, perform the work, provide spill protection, and ultimately dispose of the waste solutions in accordance with local, state, and federal regulations.

#### **Operation and Maintenance**

An estimated 84,000 gallons of transformer oil is expected to be used in the combustion turbine, steam turbine, and auxiliary transformers. This equipment will be located within the turbine building. The turbine building will have a concrete floor. Floor drains in this building will be plumbed to an oil/water separator prior to reaching the plant infiltration/ evaporation pond.

Should a transformer oil spill occur, typical spill response procedures will include covering the floor drains to prevent any oil from reaching the infiltration/evaporation basin and either collecting the leaking oil directly or placing berms near the leak to contain the spill at the source. These actions will be followed by repair of the leak and cleanup. Any oil that escapes through the floor drains prior to spill response will be recovered in the oil-water separator. Spill kits will be placed in plant locations where spills are possible. The spill will be reported and contaminated materials will be disposed of offsite in accordance with local, state, and federal regulations. In addition to these engineering and procedural safeguards, the generation plant staff will be trained in spill prevention and spill response.

An estimated 60,000 gallons of aqueous ammonia is expected to be stored in an aboveground, vertical cylindrical tank. This tank will be located on the south/southwest side of the generation plant and will have a secondary containment capability of holding 110 percent of the tank's 60,000-gallon capacity.

Small quantities of aqueous ammonia, hydrazine, and trisodium phosphate will be stored in a water treatment trailer that will be self contained. This trailer will have its own secondary containment to ensure that the chemicals used and stored inside are not released to the environment.

All conveyance (piping) systems will be routinely inspected visually and with a gas meter designed to detect the products of concern (natural gas, ammonia, etc.). These systems will also be subjected to routine pressure tests to ensure that they continue to be air tight. These inspections will also be conducted should there be an incident around or involving the pipelines. Should a leak be detected, the location of the breach will be identified, the line will be shut down on both sides of the breach, and a licensed contractor will be retained to perform the repair work.

Any spills or releases along the access roads would most likely be from a transport truck hauling product onto the facility. The trucking company carrying the hazardous material would be responsible for any spill or response while the product is in its possession (173-303-145(1) WAC). SPP will have spill response equipment that could be quickly mobilized to assist in containing and removing any potential spills along the site's access roads.

#### 3.16.1.2 Built Environment—Environmental Health

#### Noise

A complete assessment of noise generation and mitigation is presented in Section 3.9.1, which discusses existing conditions, the impacts of the proposed action, the impacts of alternatives, mitigation measures, cumulative impacts, and significant unavoidable adverse impacts.

#### Construction

Construction of the generation plant is expected to result in noise levels typical of other power plants in terms of schedule, equipment used, and types of activities. Average noise levels during the construction are projected to be between 51 and 40 decibel A-weighted sound levels (dBA) at the nearest residence (at the Lyons Ferry Marina). Construction noise may be audible at this location but is not expected to exceed current maximum exposure levels. Construction noise will be audible at this location when background noise levels are low, which is expected to be the majority of the construction period.

Mitigation measures that will be incorporated into construction of the generation plant include limiting construction activities to certain hours of the day, requiring construction

equipment to be properly muffled, and using either low-pressure steam blows or a temporary blowout silencer. In addition, steam blows will be limited to certain times of the day.

#### Operation

Noise from generation plant operations was modeled by Black and Veatch assuming standard packaged equipment. Sound levels at the nearest residence in Lyons Ferry are predicted to be below the required nighttime level of 50 dBA for a Class A residential receptor. Noise modeling analysis also indicated that there would be no impact at the Lyons Ferry State Park campground, where people sleep and nighttime noise levels are low. Modeling data also indicate that no adverse effect is expected as a result of low-frequency noise.

Noise mitigation measures that will be incorporated into the generation plant include housing the combustion turbine, steam turbine, and associated auxiliary equipment in an acoustically insulated building; equipping the combustion turbine inlet with a silencer; and using heat recovery steam generators, which serve as an effective combustion turbine exhaust silencer as well as increase plant operating efficiency.

#### 3.16.1.3 Risk of Fire or Explosion

This section presents a general overview of the risks of fire or explosion for this project. These risks are discussed with regard to construction, operation, standby or nonuse, and dismantling or restoration of the facilities discussed in this Application for Site Certification (ASC). Information is provided in each of these categories for the generation plant.

This project will be built by contractors experienced with the construction of gas-fired electrical generation plants. The construction specifications will require that contractors prepare and implement a safety program that will address the management, prevention, and control of possible fire or explosion.

#### Construction

#### **General Information**

The issues of fire and explosion during construction of the generation plant are similar to those in most general construction projects. The fact that this is a natural gas-fired power plant is primarily an issue during startup and operation; this is discussed in the operation section below.

Accidental grass or crop fires may result from construction vehicles in dry grass or sparks thrown from a welding or cutting torch. Steps for preventing accidental grass or crop fires during construction will include establishing roads before accessing the site to remove dry grasses from potential points of ignition. A perimeter road will be built to provide access and act as a firebreak should a fire start in the plant area. Should a grass fire occur, the contractor will call 911 and fire crews will be dispatched.

Use and storage of small quantities of flammable liquids and compressed gases, including construction equipment fuels, paints, and cleaning solvents, also may present the potential for fire. Hazards associated with these materials will be mitigated by good housekeeping practices and by following construction safety requirements found in 296-155 WAC and 29

*Code of Federal Regulations* (CFR) 1926 (Occupational Safety and Health Administration, or OSHA).

A hot work permitting system will be administered by the site foreman. Through this system, all hot work (welding, torch cutting, and metal grinding) will be assessed to ensure that the safety of the worker performing the work and workers around the individual are not inadvertently placed at greater risk. This is primarily accomplished by ensuring that all fire prevention issues have been addressed before any high-risk activities commence.

To reduce the risk of fires, smoking is restricted to designated smoking areas only.

#### **Compressed Gases**

The compressed gases listed in Table 3.16-1 will all be present during construction of the generation plant. These gases will be properly stored when not in use, in accordance with all applicable local, state, and federal regulations.

#### TABLE 3.16-1

Gas	Estimated Quantity	Volume	Storage	Use
Argon Gas	20-30	244-cu-ft bottles	Temporary warehouse	Welding & HRSG components
Acetylene	20-30	300-cu-ft bottles	Temporary warehouse	Cutting torches
Helium	5-6	244-cu-ft bottles	Temporary warehouse	Welding aluminum ducts
Nitrogen	20-30	244-cu-ft bottles	Temporary warehouse	Welding
Oxygen	20-30	244-cu-ft bottles	Temporary warehouse	Cutting torches

Compressed Gases Present during Construction

Source: Black & Veatch, 2001.

#### Detection and Prevention of Fire or Explosion during Construction

During construction, fire detection will be the responsibility of the various contractors and individuals working at the site. Heat and smoke detectors will be provided in all buildings and temporary warehouse areas as required by federal, state, and local regulations.

Safe working practices will be exercised. These will include, but are not limited to, maintaining appropriate fire extinguishers within easy access of any work being done, restricting smoking to designated areas, and using a permit system for all hot work (welding, cutting, grinding).

#### Fire Fighting Training and Responsibilities

During construction, work crews will address small fires that can be controlled with extinguishers. If a larger fire is encountered, the local fire department will be summoned. During mobilization the contractor will coordinate with the local fire marshal and Hooper Fire Department regarding activities that will be occurring at the construction site.

#### **Medical Emergencies**

All permanent employees will receive training in first aid and cardiopulmonary resuscitation (CPR). Construction staff will address all minor injuries and provide initial

first aid on more serious situations. Onsite treatment will be provided in medical situations that require first aid treatment only or stabilization of the victim(s) until professional medical attention is obtained. Any injury or illness that requires treatment beyond first aid will be deferred to a local medical facility.

#### Operation

#### **General Information**

Operation of the generation plant will require the use of natural gas as a fuel and a number of other flammable solutions for plant maintenance and upkeep. The mere presence of these substances presents a risk of fire and explosion. Historically, however, there have been very few fires or explosions at the many gas-powered generation plants around the country that use similar substances. In response to the incidents that have occurred, codes, regulations, and standards have been updated to reduce the likelihood of recurrences. These codes and standards will be complied with during all phases of generation plant operation. In addition, a number of engineered safeguards will be used to reduce the potential for a fire or explosion at the generation plant site.

#### **Compressed Gases Used During Operation**

The compressed gases listed in Table 3.16-2 will be present during operation of the generation plant. These gases will be properly stored when not in use, in accordance with all applicable local, state, and federal regulations.

#### TABLE 3.16-2

Compressed Gases Present during Operation and Maintenance

Gas	Volume	Storage	Use
Nitrogen	44,000 scf	2 Tube banks	Combined cycle units
Hydrogen	40,000 scf	2 Tube banks	Combined cycle units
Carbon Dioxide	35,040 scf	428 scf bottles	Combined cycle units
Compressed air	500 scf	250 scf tanks	Combined cycle units

Source: Black & Veatch, 2001.

#### Seismic Design Information

All equipment and structures shall be designed to resist earthquake forces in accordance with Uniform Building Code (UBC) and American Society of Civil Engineers (ASCE) 7-98 requirements, assuming Zone 2B for a Category I building. Design forces shall be applied to the center of gravity and to transmit such forces to the equipment or structure foundation.

#### Prevention of Fire and Explosion during Operation

Prevention is the first consideration in any fire protection program. All employees will be responsible for contributing to prevention by using good housekeeping practices. The following elements of fire prevention will be implemented during plant operations:

- Containment around all permanent storage areas
- Protective materials used for equipment and pipelines
- Ability to gauge the contents of materials contained in storage vessels
- Spill kits

- Signs
- Preventive maintenance program
- Visual inspections
- Good housekeeping
- Procedures for handling flammable liquids
- Mandatory HAZCOM written procedures and training program
- Designated flammable storage areas
- Employee training
- Regular safety and environmental audits

Employees will use general good housekeeping practices to control the accumulation of flammable and combustible waste materials and residues so that they do not contribute to a fire emergency.

Proper storage and use of chemicals is also important for fire prevention. Material safety data sheets (MSDSs) will be consulted to aid in determining the correct storage for incompatible chemicals.

Subcontractors may be retained to perform maintenance or repair work at the facility that entails hot work (welding, torch cutting, metal griding, etc.). In these instances, the shift supervisor will administer a hot work permitting system. Through this system, all hot work will be assessed to ensure that the safety of the worker performing the work and workers around the individual are not inadvertently placed at greater risk. This is primarily accomplished by ensuring that all fire prevention issues have been addressed before any high-risk activities commence.

To reduce the risk of fires and comply with the Clean Air Act, smoking will be restricted to designated smoking areas only.

All state and local fire codes will be adhered to during operation and maintenance. All areas of high risk will have engineered safeguards and automatic fire suppression systems in place. For a more thorough discussion of the detection and protection system, see Appendix I, Emergency Plan.

#### Fire Detection and Protection System

During plant operation fire detection will include smoke and heat detectors located throughout the site as required by federal, state, and local codes. There are also a number of specific fire suppression systems for the plant's various components.

Wet standpipe systems with sprinklers will be provided in the areas below the turbine operation floor in the generation building. Deluge fire protection systems will be provided for the step-up transformers. Both the sprinkler and the deluge systems will operate automatically. In addition, hose stations will be provided throughout the enclosed buildings in accordance with code requirements and standard practice recommendations. An underground fire water supply loop will encircle the main site area inside the perimeter road, with branch lines as required. Hydrants will be provided along this loop for fire protection outside the buildings. The hydrants and hose stations will be operated manually.

Water for these systems will be supplied via two service/fire fighting water storage tanks. These storage tanks will hold approximately 500,000 gallons of water each, with

240,000 gallons in each tank reserved for fire protection. Two redundant pumps located in the Fire Water Pump Building will provide pressure for the fire fighting water system. One pump will be powered by an electric motor; the second will have a diesel engine drive so that fire fighting water can be provided in the event that electric power is lost. A pressure maintenance pump will maintain system fire fighting water pressure at all times. The common fire fighting water pumps and water storage system will provide fire fighting capability throughout the site.

Total flooding gaseous systems will be used within the enclosures surrounding the combustion gas turbines (CGT). These systems, which will operate automatically with backup manual initiation, will be the CGT manufacturer's standard clean-agent fire extinguishing system to avoid stratospheric ozone depletion. Portable dry chemical fire extinguishers will be located throughout the generation plant in accordance with code requirements and recommenced practices. Each extinguisher will be selected as appropriate for the type of fire expected and the equipment or area being protected.

An integrated fire detection system will be provided in the main structures of the generation plant. This system will use heat or smoke detectors, as appropriate for the equipment in the area being protected, and will trip alarms automatically. The fire detection system will be interconnected throughout the plant to provide both local alarms and alarms in the central control room.

#### Natural Gas System Inspections

The natural gas systems throughout the plant will be inspected weekly or as recommended by the equipment manufacturer. Additional inspections will be conducted should conditions indicate the need. These conditions or trigger events would include but are not limited to the following:

- Detection of a gas leak
- An accident involving the gas system
- Loss of pressure
- Abnormal system control readings
- Warning signals activated in the control room
- Ground movement
- Vandalism
- Damage to or corrosion of exposed piping/components, construction activities

All routine and unanticipated inspections will be conducted by the plant safety manager and/or operator. Inspections will be conducted immediately following a trigger event.

#### Natural Gas System Leak Detection

All routine and unanticipated inspections will entail a thorough inspection of the entire system.

Natural gas is lighter than air, thus it rises when it escapes. Because natural gas is odorless, a breach in the natural gas system at the generation plant site would be detected by a drop in the pressure of the gas line, routine inspections with a combustible gas indicator that measures the percentage of oxygen and concentrations of explosive gases in the ambient air, and/or through routine pressure tests. Should a leak be detected, the system would be shut down until the situation is resolved.

Once a leak is detected, the system will be isolated by closing the shutoff valves. The leaking section will be repaired or replaced by a licensed contractor. Upon completion of the repair work, the system will be pressure tested to ensure that the leak has been appropriately addressed.

#### Fire Fighting Training and Responsibilities

Plant staff will receive basic fire suppression training. This will cover only small fires that can be controlled and/or extinguished with hose rack hoses and fire extinguishers. If a fire exceeds the resources available, assistance from the local fire department will be requested. All structural and range fires will be reported to the local fire department and all plant personnel will evacuate the affected area.

The Applicant will coordinate with the local fire departments to provide fire crews with a tour of the plant, so that they can familiarize themselves with the plant layout, equipment locations, and complexity of the structures.

The Applicant sees the procurement of an agreement between the Applicant and the Hooper Fire Department, as specified in 173-303-340 WAC, as a relationship-building step and will work with the fire marshal to create a strong working relationship once the plant personnel who will be working with the fire department are selected. At this time, the fire department is aware of the proposed facility and is open to working with the future facility's personnel.

A fire box with a key will be provided at the entrance gate for access to the plant by the local fire department should it need to access the plant.

#### **Medical Emergencies**

All key employees will receive first aid and CPR training. Construction staff will address all minor injuries and provide initial first aid on more serious situations. Onsite treatment will be provided in medical situations that require only first aid treatment or stabilization of the victim(s) until professional medical attention is attained. Any injury or illness that requires treatment beyond first aid will be deferred to a local medical facility.

The Applicant sees the procurement of an agreement between the Applicant and the local medical facility, as specified in 173-303-340 WAC, as a relationship-building step and will work with Dayton General Hospital to create a strong working relationship once the plant personnel who will be working with the medical staff are selected.

#### Standby or Non-Use

Risks during standby are the same as the risks during operation. Power plants are complex and must be properly maintained to remain useful. A plant occasionally is put on standby when power demand is low. The plant must be capable of operation when required, so all systems will be kept in operation-ready status during standby.

#### **Dismantling or Restoration**

The risks of fire or explosion associated with dismantling or restoring a power plant are the same as those associated with dismantling and restoring any industrial facility. All gases and liquids must be removed from the site and all electrical systems decommissioned. Fuel tanks must be drained and purged with nitrogen. Once these critical activities are completed, the plant can generally be dismantled using conventional means. Fire or

explosion during generation plant demolition will be controlled by using best available construction techniques.

# 3.16.1.4 Releases or Potential Releases of Toxic or Hazardous Materials to the Environment Construction

During construction, use of hazardous materials is limited primarily to chemicals associated with chemical cleaning of the heat recovery steam generators and process piping before these items are placed in service. This work is performed by specialized contractors qualified to handle the materials. The contractor is responsible for obtaining, using, and properly disposing of the chemicals. Because a contractor has not been selected at this time, the specific chemicals to be used and their quantities are not known. However, Table 3.16-3 lists the chemicals expected to be used in constructing the generation plant (all quantities listed are approximate).

Chemical	Estimated Quantity	Storage	Volume
Alkaline solutions (surfactant, caustic or ammonia solution)	280,000 gallons	Not known at this time	Not known at this time
Acid solutions (3-4% citric acid)	280,000 gallons	Not known at this time	Not known at this time
Passivation solutions	280,000 gallons	Not known at this time	Not known at this time
Epoxy coatings	Not known at this time	Not known at this time	Not known at this time
Epoxy glass ampoules	Not known at this time	Not known at this time	Not known at this time
Epoxy grout	Not known at this time	Not known at this time	Not known at this time
PVC cement	Not known at this time	Not known at this time	Not known at this time
Cleaning solvents (i.e., acetone)	Not known at this time	Not known at this time	Not known at this time
Dye penetrant kits	Not known at this time	Not known at this time	Not known at this time
Paint	Not known at this time	Not known at this time	Not known at this time
Lube oils	Not known at this time	Not known at this time	Not known at this time
Batteries (i.e., lead acid, alkaline)	Not known at this time	Not known at this time	Not known at this time
Waste oil from oil/water separator	Not known at this time	Not known at this time	Not known at this time
Gasoline	500 gallons	Fuel tanker truck	500 gallons
Diesel fuel	500 gallons	Fuel tanker truck	500 gallons

#### **TABLE 3.16-3**

Hazardous or Toxic Materials to Be Used during Construction

Source: Black & Veatch, 2001.

#### Paint

All paint containers will be tightly sealed and properly stored to prevent leaks or spills. Paint will not enter the stormwater management system. Unused paints will be disposed of in accordance with applicable local and state regulations. Spray painting will not be done on windy days, and a drop cloth will be used to collect and dispose of drips and over-spray associated with all painting activities.

#### **Petroleum Products**

Construction equipment will be monitored for leaks and receive regular preventive maintenance to ensure proper operation and reduce the chance of leaks. Aboveground fuel tanks will be located in designated areas for vehicle refueling. The fuel tanks will be located within an earthen berm with an oil-proof liner sized to contain the volume that would be released as a result of failure of the largest tank within the berm. The actual refueling area will be immediately adjacent to the berm and will be graded to simplify cleanup of small spills that may occur during vehicle refueling. No topping off of fuel tanks will be allowed, to further reduce the possibility of spills. Petroleum products will be stored in clearly labeled and tightly sealed containers or tanks. All petroleum products stored in quantities greater than 55 gallons will be stored within temporary lined containment dikes to capture and hold accidental spills. Asphalt used onsite will be applied according to the manufacturer's recommendations. If fuel or oil spills do occur, the resultant soil contamination will be removed and disposed of at an approved disposal site in accordance with applicable regulations.

#### Hazardous Wastes Produced during Construction

The exact hazardous wastes that may be produced during construction of the generation plant are uncertain at this time. However, Table 3.16-4 lists typical wastes that may be generated at a construction project of this type. Estimated quantities and the planned method of disposal are provided.

#### **TABLE 3.16-4**

Hazardous Wastes That May Be Produced during Construction

Waste Stream	Estimated Quantity	Planned Method of Disposal	Reportable Quantities
Used solvents, paints, adhesives	100 gallons/month	Hazardous waste disposal facility	1 lb
Used lube oil from turbine flushes	100 gallons/flush period	Hazardous waste disposal facility	1 lb
Oily rags and oil absorbent from turbine flushes	100 gallons/flush period	Hazardous waste disposal facility	1 lb
Oily rags and oil absorbent from equipment maintenance	100 gallons/month	Hazardous waste disposal facility	1 lb
Spent batteries (lead acid)	4 batteries/year	Recycle	10 lb
Spent batteries (alkaline)	60 batteries/month	Hazardous waste disposal facility	10 lb
HRSG cleaning waste	280,000 gallons/ cleaning	Hazardous waste disposal facility or recycle	10 lb
Waste oil from oil-water separator	40 gallons/month	Hazardous waste disposal facility	1 lb

Source: Black & Veatch, 2001.

Hazardous waste materials could also be generated through spillage of chemicals used during construction and remediation of that spill. A full discussion of risks and steps to mitigate those risks is presented in Appendix E, Spill Prevention and Control. A licensed waste contractor will be responsible for treating or disposing of the waste in compliance with all federal, state, and local regulations.

To minimize the potential release of hazardous materials during construction, best management practices will be employed. These will include good housekeeping measures, inspections, containment facilities, and spill prevention practices. Construction personnel will be instructed regarding the management requirements, and the Applicant's onsite project manager will be responsible for their implementation (see Appendix F).

Concrete trucks will discharge surplus concrete or drum washwater on the site. Dikes or barriers will be constructed around these areas to contain these materials until they are stable, at which time the materials will be disposed of in a manner acceptable to the onsite project engineer and in compliance with all local and state regulations.

Portable sanitation units will be used during construction of both the power plant and the alternative water pipeline. These units will be maintained on a regular basis, and a licensed sanitary waste management contractor will collect waste from the units for disposal in accordance with applicable regulations.

All construction waste materials will be collected, deposited, and stored in metal containers provided by a licensed solid waste management contractor; the waste management contractor will remove the containers and recycle or dispose of the material in accordance with applicable regulations. No construction waste material will be buried onsite. Burning will be conducted in accordance with local and state regulations. The onsite project engineer will instruct all site personnel regarding proper waste disposal procedures.

#### Worst-case Scenario during Construction

During construction the worst-case scenario would be a major leak during chemical cleaning of the heat recovery steam generators and associated piping. This method of cleaning consists of an alkaline degreasing step (in which surfactant, caustic, or ammonia solution is used), a 3 to 4 percent citric acid cleaning step, and a passivation step. Most of the solution would be contained in permanent plant piping and equipment (specifically the HRSGs). The point that would be most likely to leak would be the temporary chemical cleaning piping, pump skids, and transport trailers.

Impacts to the public are very unlikely. All these chemicals are liquid, and the likelihood of a spill reaching or affecting SR-261 is very low. The next closest receptor, a residence, is approximately 1.1 miles away.

The chemical cleaning contractor will be responsible for supplying neutralization chemicals and the technical expertise to address any spill or release. To mitigate the risks, the plant's primary contractor will provide temporary berms around the temporary chemical cleaning equipment and chemicals.

#### Operation

The chemicals and hazardous substances that will be used and stored at the generation plant during operation are listed in Table 3.16-5.

#### **TABLE 3.16-5**

Hazardous or Toxic Materials to Be Used during Operation and Maintenance

Chemical	Estimated Quantity	Storage	Volume
Lubrication oil	10,000 gallons	Steam turbine casing	5,000 gallons/steam turbine
Lubrication oil	18,000 gallons	Combustion turbine mechanical package	4,500 gallons/combustion turbine
Transformer oil	48,000 gallons	Combustion turbine transformers	12,000 gallons/ combustion turbine
Transformer oil	30,000 gallons	Steam turbine transformers	15,000 gallons/ steam turbine
Transformer oil	6,000 gallons	Auxiliary transformers	3,000 gallons/ auxiliary transformer
Aqueous Ammonia	60,000 gallons	Above grade vertical cylindrical tank	60,000 gallons
Diesel	500 gallons	Fire Control Building	500 gallons
Aqueous Ammonia	100 gallons	Chemical Feed Area	55 gallon
Hydrazine	55 gallons	Chemical Feed Area	55 gallon
Tri-sodium Phosphate	500 pounds (dry)	Chemical Feed Area	50-pound bags

Source: Black & Veatch, 2001.

#### Hazardous Wastes Produced during Operation and Maintenance

Very little waste will be produced during the operation and maintenance of the generation plant. Used lube oil and transformer oil and small quantities of used paints, thinners, and solvents used during operation will be disposed of in accordance with federal, state, and local regulations.

#### Worst-case Scenario during Operation

During plant operation the worst-case scenario would be a failure of the aqueous ammonia system. This system will be housed in bermed secondary containment.

The greatest potential risk to the public would be to individuals traveling along SR-261 at the time of release. Such individuals could smell ammonia, similar to the smell of household cleaning solvents. The wind velocity and direction would dictate the pungency and duration of the odor. The closest permanent receptor is a residence located about 1.1 miles away from the generation plant. At this distance the ammonia would have dissipated to the point that individuals at the residence would smell very little ammonia, if any.

The greatest risk would be to employees at the generation plant during the release. These individuals would be notified via the public announcement system and directed to proceed to an upwind assembly area where further directions would be given. Once all plant personnel were accounted for, resources would be assessed and spill response operations would begin. A detailed response is presented in Appendix I, Emergency Plan.

A number of safeguards will be incorporated to mitigate the risks. These include but are not limited to bermed secondary containment, tank overfill protection, routine maintenance,

safe handling practices, supervision of all loading/unloading by plant personnel and the truck driver, and appropriate training of operation and maintenance staff.

#### Compliance with Applicable Regulations and Statutes

Any dangerous wastes generated by the plant will be managed to ensure compliance with the Washington Dangerous Waste Regulations (173-303 WAC). These dangerous wastes will be limited to solvents and paint wastes generated during maintenance activities. A generator number has not yet been assigned.

Title III of the Superfund Amendments and Reauthorization Act (SARA Title III) and OSHA's Hazard Communications Standard mandate that information be communicated to local agencies to assist in response to emergency situations. Material safety data sheets, which provide specified information on each toxic or hazardous material stored and used onsite, will be maintained on file. A listing of MSDSs will be provided to local emergency response agencies. The MSDSs describe the potential health effects of each substance under different types of exposure and appropriate handling and emergency treatment measures. In accordance with Tier 2 reporting requirements, the Applicant will provide the fire marshal with an annual inventory of the toxic and hazardous materials used and stored onsite.

If, during operation of the generation plant, any substance listed in 40 CFR 302 is released to the environment, the Applicant will notify the National Response Center and Washington Community Right to Know Unit as required under Section 101(14) of the Comprehensive Environmental Response Compensation Liability Act (CERCLA) and the Model Toxics Control Act (MTCA), Ch. 70.105D, RCW, Ch. 173-340 WAC.

The Applicant will follow the waste management procedures presented in 173-303 WAC.

#### 3.16.1.5 Safety Standards Compliance

The Applicant will comply with all applicable local, state, and federal rules and regulations as they apply to the safety, health, and well-being of the workers, neighboring populations, and surrounding environment. The following primary standards will be adhered to in design, construction, and operation of the generation plant:

- Federal, state and local regulations
- Applicable industrial design codes and standards
- Applicable design standards that apply to the systems used

The most current codes approved by the local authority shall be used as the design basis of this project. Table 3.16-6 provides a list of general codes and standards that will apply to the project.

All equipment and structures shall be designed to resist earthquake forces in accordance with the Uniform Building Code, assuming Zone 2B. A complete description of the seismic conditions of the site is presented in Section 3.1.1.

#### TABLE 3.16-6

General Codes and Standards

Subject	Code/Standard
Piping	ANSI/ASME B31.1
	National Plumbing Code ASA-A80.8
Radiation Source Control	Occupational Safety and Health Administration (OSHA)
	246-243 WAC
Boilers and Pressure vessels	ASME Boiler and Pressure Vessel Code
	American Boiler Manufacturers Association (ABMA), "Boiler Water Limits and Steam Parity Recommendations for Watertube Boilers"
Heat Exchangers	Standards of the Heat Exchange Institute (HEI)
	Tubular Exchanger Manufacturers Association (TEMA)
Water Quality	ASME Handbook on Water Technology for Thermal Power Systems
Protection Against Steam Turbine Water Damage	ASME Standard No. TDP-1
Structural/Civil Design	American Institute of Steel Construction (AISC) "Specification for the structural Steel Building, Allowable Stress and Plastic Design,"
	Building Officials and Code Administrations (BOCA) National Building Code, 1990
	National Plumbing Code
	American Concrete Institute (ACI)
	American Society of Civil Engineers (ASCE)
	American National Standards Institute (ANSI)
	American Society for Testing and Materials (ASTM)
	Occupational Safety and Health Administration (OSHA)
	Americans with Disabilities Act (ADA)
Electrical Design, Furnishing	Institute of Electrical and Electronic and Installation Engineers (IEEE)
	National Electric Code (NEC)
	ANSI/ISE RP-7, Industrial Lighting
	ANSI/IES PR-8, Roadway Lighting
	National Electrical Manufacturers Association (NEMA)
	Underwriters Laboratory (UL)
Fire Protection	National Fire Protection Association (NFPA)
HVAC	American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
Instrumentation	Instrument Society of America (ISA)
	Scientific Apparatus Manufacturers Assoc. (SAMA)

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All systems shall be designed to provide a safe working environment for all plant operating personnel. Such provisions shall consist of, but not be limited to, the following:

- Safe egress from all confined areas
- Adequate ventilation of all enclosed work areas
- Fire protection
- Pressure relief of all pressurized equipment to a safe location
- Isolation of all hazardous substances to a confined and restricted location

These provisions will also comply with OSHA (29 CFR 1910 Occupational Safety and Health Standards).

Also, all occupied building structures and facilities shall conform to standards of the Americans with Disabilities Act (ADA).

#### 3.16.1.6 Radiation Levels

In the construction phase of the generation plant there will be minor use of radiation in the form of X-rays, which are used for quality control and quality assurance in the welds and pipe construction of the natural gas line and high-pressure steam lines. X-rays will be performed by experienced technicians in a controlled setting, consistent with common industry practice and in compliance with 246-243 WAC.

The generation plant is not expected to use or release any radioactive materials during operation.

#### 3.16.2 Emergency Plan

The Emergency Plan was developed to mitigate the impacts to public health and safety and the environment in the event of a natural disaster or major incident relating to or affecting the project. This addresses a wide variety of scenarios, including the following:

- Safety issues that could arise during construction
- Project evacuation procedures
- Risks associated with fire and explosion, and mitigation of those risks
- Natural gas releases on and off the site
- Chemical and oil spills or releases
- Abnormal weather (such as icing conditions)
- Earthquakes and volcanic eruptions
- Medical emergencies
- Facility blackouts
- Bomb threats

The plan discuses procedures to be implemented, people to be notified, key telephone numbers, and actions that will be taken to mitigate the risks that could be encountered for each scenario. Generation plant management, supervisors, and employees will receive regular training to ensure that effective and safe actions will be taken to limit the risks discussed in the Emergency Plan.

For a complete discussion of these issues, see Appendix I, Emergency Plan. A detailed emergency response and preparedness plan will be submitted once the contractors are

selected and they have supplied an approved detailed emergency response and preparedness plan. These plans will comply with 173-303 WAC.

#### 3.16.3 Other Requirements

#### 3.16.3.1 Environmental Assessment

The property that the generation plant will be built on currently is – and historically has been – agricultural land. There has been no commercial development of this property beyond ranching and agriculture. There is one residence on the site. A Phase I Environmental Site Assessment and Preliminary Environmental/Land Use Evaluation conducted in November 2000 did not recommend that a Phase II investigation be performed. The land owner was contacted and stated that there has been no development of the land or buildings in the last 35 years. All information obtained at this time indicates that the land use has been consistent with residential/agriculture. Thus the potential to find contamination at this site is exceptionally low. Given this fact, no Phase II Environmental Assessment has been conducted on this site.

The greatest health risks on this site involve environmental factors such as heat-related hazards (heat stroke, heat stress, heat exhaustion), sunburn, and wildlife (ticks, spiders, and rattlesnakes).

#### **Alternative Water Pipeline**

The Applicant will provide detailed information concerning the health and safety issues associated with the water pipeline alternative if the Applicant seeks to implement this alternative.

#### **Electric and Magnetic Field (EMF)**

The peak electric field around the existing 500-kV transmission lines on the right-of-way is 8.5 kilovolts per meter (kV/m). The average level around the right-of-way is 4.9 kV/m. The peak magnetic field at 3.28 feet (1 meter) above ground is 128 milliGauss (mG). The average level along the edge of the right-of-way is 48 mG.

The health risks associated with EMF fall into two categories: long-term and short-term.

#### Long-term Risks

Over the last 20 years, research has been conducted in the United States and around the world to examine whether exposures to electric and magnetic fields (EMF) at 60 hertz (Hz) from electric power lines are a cause of cancer or adversely affect human health. The research has included epidemiological studies that suggest a link with childhood leukemia for some types of exposures, as well as other epidemiological studies that do not; research has also included lifetime animal studies, which show no evidence of adverse health effects.

Conclusions from a report prepared by the National Radiological Protection Board (NRPB) of Great Britain's Advisory Group on Non-Ionising Radiation (AGNIR) regarding extremely low frequency (ELF) EMF and the risk of cancer are consistent with conclusions in previous reviews. Members from universities, medical schools, and cancer research institutes reviewed the reports of experimental and epidemiological studies, including reports in the literature in 2000. Their general conclusions are as follows:

- Laboratory experiments have provided no good evidence that ELF electromagnetic fields are capable of producing cancer, nor do human epidemiological studies suggest that they cause cancer in general. There is, however, some epidemiological evidence that prolonged exposure to higher levels of power frequency magnetic fields is associated with a small risk of leukemia in children. In practice, such levels of exposure are seldom encountered by the general public in the United Kingdom (or in the U.S.) (NRPB, 2001: 164).
- The group further recognizes that the scientific evidence suggesting that exposure to power/transmission line electromagnetic fields poses an increased risk of cancer is very weak. Virtually all of the cellular, animal, and human laboratory evidence provides no support for an increased risk of cancer incidence following such exposure to electromagnetic fields. Further studies of animal reproductive performance, behavior, melatonin production, immune function, and navigation have found minimal or no adverse effects attributable to EMF.

#### Short-term Risks

Short-term effects from transmission-line electric fields are associated with induced currents and voltages or perception of the field. Induced current or sparks can be experienced under certain conditions when a person contacts objects in an electric field and receives a mild shock.

Induced currents are always present in electric fields under transmission lines. However, during construction, all metal structures near the right-of-way will be grounded, which will eliminate these objects as sources of induced current and voltage shocks. Multiple grounding points are used to provide redundant paths for induced current flow.

# ATTACHMENT A Listed Fish and Wildlife Species



NGCE. NOV 8 0 2000 NOM HILL / .

#### State of Washington DEPARTMENT OF FISH AND WILDLIFE

Region 1 Office: North 8702 Division Street - Spokane, Washington 99218-1199 - (509) 456-4082

November 17, 2000

CH2M HILL ATTENTION: Marlena Guhlke, Project Manager 9 South Washington St., Suite 400 Spokane, WA 99201-3709

Dear Mrs. Guhlke:

#### SUBJECT: Request for information from Kevin Robinette on October 30, 2000; for threatened, endangered, proposed, and candidate species, including species of concern in area of proposed power plant, Starbuck, WA.; Section 29 and 32, Township 13 North, Range 37 East, Columbia County.

Thank you for your request for listed fish and wildlife species. For an official response to your request, please contact Lori Guggenmos at (360) 902-2543. Ms. Guggenmos maintains all Priority Habitat and Species information for the Washington Dept of Fish and Wildlife, and will be able to give the official information from existing information in the database.

In reviewing the data available to me on listed fish or wildlife species that may be present at the proposed power plant site near Starbuck, WA., I could find no terrestrial species found in the immediate area that are listed. There are raptors (Ferruginous Hawks) that utilize adjacent areas including one nesting location nearby. Some of the fish species present in the Snake River are listed, including: Sockeye Salmon - Endangered, Spring and Fall Chinook Salmon -Threatened, Steelhead - Threatened, and Bull Trout - Threatened. Species that may be present in the area, and are in the watershed, include: River Lamprey - State Specie of Concern, Federal Specie of Concern; Umatilla dace - State Specie of Concern; Leopard Dace - State Specie of Concern, and Margined Sculpin - State Sensitive Specie, Federal Specie of Concern.

We appreciate your concern on listed species, but would also encourage you to consider all fish and wildlife species present in the area. In this light, we would urge you to undertake biological assessments and surveys of the area to confirm the existing data, and have current data for that location. Also, mitigation for the power plant is strongly encouraged. It is in the best interest of all involved, and the local residents, if you would adopt a no net-loss of habitat approach. As I am sure you are aware, cumulative impacts to species and their habitats can adversely affect all existing species and drive them towards threatened or endangered status. We would strongly encourage extreme environmental awareness in this area of many listed salmonid species, and a rural population that is environmentally sensitive and lives close to the land.

The Washington Department of Fish and Wildlife (WDFW) is also concerned about water withdrawals (amounts and impacts), how waste water will be discharged, and screening of intakes or outflows, if needed.

Thank you for the opportunity to provide this information, but for an official answer to your request for listed species, etc.contact Lori Guggenmos at (360) 902-2543.

Sincerely,

Glemmar & Sel-

Thomas B. Schirm Area Habitat Biologist

TBS:tbs

cc: Kevin Robinette WDFW Glen Mendel WDFW Mark Grandstaff WDFW Pat Fowler WDFW



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CH2M HILL 825 NE Multhomah Suite 1300 Portland, OR 97232-2146 Tel 503.235.5000 Fax 503.736.2000

July 20, 2001

155676.T3.02.11

Suzanne Audet Interior Department of U.S. Fish and Wildlife Service 11103 E. Montgomery Dr. Spokane, WA 99206

#### Subject: Request for Updated Threatened and Endangered Species List, Reference Number 1-9-01-SP-81

Dear Suzanne:

Starbuck Power Project (SPP) is proposing a 1200 MW gas-fired combustion turbine power plant near Starbuck, Washington. The facility site is located about 6 miles northwest of the Town of Starbuck near the Snake River. The property is adjacent to, and is accessed from State Highway 261. In addition, transmission lines will be constructed from the site extending west approximately 16 miles to Lower Monumental Dam. As an alternate water supply option, a water pipeline may be constructed from the Town of Starbuck northwest approximately 6 miles to the facility site. The project area is contained in Columbia and Walla Walla counties.

The facility site, transmission line, and alternate water pipeline locations are:

Sections 3, 4, 10, 11, 13, 14, Township 12N, Range 37E

Sections 27, 28, 29, 31, 32, Township 13N, Range 37E

Sections 27, 28, 29, 31, 35, 36, Township 136N, Range 36E

Sections 31, 32, 33, 34, 35, 36, Township 13N, Range 35E

Section 36, Township 13N, Range 34E

Sections 1, 2, 3, Township 12N, Range 34E

A map showing the approximate location of the facility site, alternate water pipeline option, and transmission line is attached.

Previously, a threatened and endangered species list was provided for this project by your office (letter dated December 29, 2000). However, this list is now beyond its 180 day statutory period. Therefore, SPP is requesting updated information on threatened, endangered, proposed, and candidate species including species of concern that may be in
Suzanne Audet Page 2 July 20, 2001 155676.T3.02.11

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the project area. Please provide information as it pertains to the proposed power plant, alternative water pipeline, and transmission line. This information is needed for the Application for Site Certification required by the Energy Facility Site Evaluation Council (EFSEC).

As we continue to proceed through the permitting process if you have any questions or concerns, please do not hesitate to contact me at (503) 235-5022 ext. 4409. We welcome your input.

Sincerely,

CH2M HILL

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Greg White Senior Fisheries and Aquatic Biologist

c: Suki Cupp, CH2M HILL Marlena Guhlke, CH2M HILL



# United States Department of the Interior

FISH AND WILDLIFE SERVICE Upper Columbia Fish and Wildlife Office 11103 East Montgomery Drive Spokane, Washington 99206 RECEIVED

JAN - 4 2001

CH2M HILL / SPK

December 29, 2000

Ms. Marlena Guhlke, Project Manager CH2M Hill 9 South Washington Street, Suite 400 Spokane, Washington 99201-3709

Subject: Species List for the NPE Gas-fired Power-Plant Project

#### Reference Number: 1-9-01-SP-81

Dear Ms. Guhlke:

This is in response to your October 30, 2000, request for a list of threatened and endangered species that may occur in the area of the proposed NPE Gas-fired Power Plant Project, adjacent to State Highway 261, northwest of Starbuck, Washington. We understand that the project involves the development of a 1200 MW gas-fired combustion turbine power plant. We apologize for the delay in our response to your request. Please find the enclosed species list (Enclosure A), which fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7 of the Endangered Species Act of 1973, as amended (Act). Please use the above reference number in all subsequent correspondence regarding this project.

If there is federal agency involvement in this project (funding, authorization, or other action), the federal agency must meet its responsibilities under section 7 of the Act, as outlined in Enclosure B. Enclosure B includes a discussion of the contents of a Biological Assessment (BA), which provides an analysis of the impacts of the project on listed and proposed species, and designated and proposed critical habitat. Preparation of a BA is required for all major construction projects. Even if a BA is not prepared, potential project effects on listed and proposed species should be addressed in the environmental documentation for this project. A federal agency may designate, in writing, a non-federal representative to prepare a BA. However, the involved federal agency retains responsibility for the BA, its adequacy, and ultimate compliance with section 7 of the Act.

Preparation of a BA would be prudent when listed or proposed species or critical habitat may occur in the project area. Should the BA determine that a listed species is likely to be affected by the project, the involved federal agency should request section 7 consultation through this office. If a proposed species is likely to be jeopardized by the project, regulations require conferencing between the involved federal agency and the Service. If the BA concludes that the project will have no effect on any listed species, we would appreciate receiving a copy for our information.

Candidate species receive no protection under the Act, but are included for early planning consideration. These species could potentially be proposed for listing or listed during the time frame of the project, thereby falling within the scope of section 7 of the Act. Protection provided to these species now may preclude their possible listing in the future. If evaluation of the project indicates that it is likely to adversely impact any of these species, we encourage you to modify the project to avoid or minimize the impacts.

Several species of anadromous fishes that have been listed by the National Marine Fisheries Service (NMFS) may occur in the project area. Please contact NMFS in Seattle, Washington, at (206) 526-6150, or in Portland, Oregon, at (503) 231-2319 to request a list of these species.

Thank you for your efforts to protect our nation's species and their habitats. If you have any questions concerning the information provided or your responsibilities under the Act, please contact Chris Warren at (509) 893-8020.

Sincerely,

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Supervisor

Enclosures

cc: WDFW (Region 1)

## ENCLOSURE A

## Listed Species, Proposed Species, Critical Habitat, and Candidate Species That May Occur in the Vicinity of the

## NPE Gas-fired Power Plant Project, Columbia County, Washington

As Identified by the U.S. Fish and Wildlife Service - December 29, 2000 Reference Number: 1-9-01-SP-81

#### Listed Species

<u>Threatened:</u> Bull trout (Salvelinus confluentus) Ute ladies'-tresses (Spiranthes diluvialis)<sup>1</sup>

#### **Proposed Species**

Spalding's silene (Silene spaldingii)

### **Caudidate Species**

Washington ground squirrel (Spermophilus washingtoni)

<sup>1</sup> Recent biological information concerning this species is provided in Enclosure C.

#### ENCLOSURE B

#### Responsibility of Federal Agencies under Section 7 of the Endangered Species Act

#### Section 7(a) - Consultation/Conferencing

Requires: 1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;

- 2) Consultation with the U.S. Fish and Wildlife Service (Service) when a federal action may affect a listed species to ensure that any action authorized, funded, or carried out by a federal agency will not jeopardize the continued existence of listed species, or result in destruction or adverse modification of critical habitat. The process is initiated by the federal agency after determining that the action may affect a listed species; and
- Conferencing with the Service when a federal action may jeopardize the continued existence of a proposed species, or result in destruction or adverse modification of proposed critical habitat.

## Section 7(c) - Biological Assessment for Major Construction Activities

Requires federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities<sup>1</sup>. The BA analyzes the effects of the action, including indirect effects and effects of interrelated or interdependent activities, on listed and proposed species, and designated and proposed critical habitat. The process begins with a request to the Service for a species list. If the BA is not initiated within 90 days of receipt of the species list, the accuracy of the list should be verified with the Service. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable between the Service and the involved federal agency). No irreversible commitment of resources is to be made during the BA process that forecloses reasonable and prudent alternatives for the project that could protect listed and proposed species. Project planning, design, and administrative actions may proceed, however, no construction may begin.

We recommend the following for inclusion in a BA: an onsite inspection of the area to be affected by the proposal, which may include a detailed survey of the area to determine if listed or proposed species are present; a review of pertinent literature and scientific data to determine the species' distribution, habitat needs, and other biological requirements; interviews with experts, including these within the Service, state conservation departments, universities, and other swho may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of cumulative effects of the proposal on the species and its habitat; and an analysis of alternative actions considered. The BA should document the results of the impacts analysis, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not any listed species may be affected, proposed species may be jeopardized, or critical habitat may be adversely modified by the project. Upon completion, the BA should be forwarded to the Service.

Major concerns that should be addressed in a BA for listed and proposed animal species include:

1. Level of use of the project area by the species, and amount or location of critical habitat;

#### ENCLOSURE B

#### Responsibility of Federal Agencies under Section 7 of the Endangered Species Act

#### Section 7(a) - Consultation/Conferencing

Requires: 1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;

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- Conferencing with the Service when a federal action may jeopardize the continued existence of a proposed species, or result in destruction or adverse modification of proposed critical habitat.

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We recommend the following for inclusion in a BA: an onsite inspection of the area to be affected by the proposal, which may include a detailed survey of the area to determine if listed or proposed species are present; a review of pertinent literature and scientific data to determine the species' distribution, habitat needs, and other biological requirements; interviews with experts, including these within the Service, state conservation departments, universities, and other swho may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of cumulative effects of the proposal on the species and its habitat; and an analysis of alternative actions considered. The BA should document the results of the impacts analysis, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not any listed species may be affected, proposed species may be jeopardized, or critical habitat may be adversely modified by the project. Upon completion, the BA should be forwarded to the Service.

Major concerns that should be addressed in a BA for listed and proposed animal species include:

1. Level of use of the project area by the species, and amount or location of critical habitat;

#### ENCLOSURE C

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#### Additional Information for Spiranthes diluvialis - Ute Ladies'-tresses Federal Status: Threatened

Spiranthes diluvialis was first described in 1984 (Sheviak 1984), and it is not yet included in many of the dichotomous keys commonly used by botanists in the northwest or Great Basin regions. It is found up to about 6,000 feet in elevation throughout much of its range in the western United States, below the lower margin of montane forests or in the transition zone. It generally occurs in wetland and riparian areas of open shrub or grassland habitats, including springs, mesic to wet meadows, river meanders, and flood plains. This species has only recently been recorded on a few sites in central Washington, where it can occur at relatively low elevations (down to roughly 700 feet in Chelan County). It is possible that the species occurs in other appropriate wetland and riparian areas in central and eastern Washington.

Ute ladies'-tresses is a perennial, terrestrial orchid (family Orchidaceae) with stems 20 to 50 centimeters (cm) (8 to 20 inches [in]) tall, arising from tuberously thickened roots. Its narrow (0.5 to 1 cm; 0.2 to 0.4 in) leaves are about 28 cm (11 in) long at the base of the stem, and become reduced in size going up the stem. The flowers consist of 7 to 32 small (0.8 to 1.5 cm; 0.3 to 0.6 in) white or ivory flowers clustered into a spike arrangement at the top of the stem. The species is characterized by whitish, stout, ringent (gaping at the mouth) flowers. The sepals and petals, except for the lip, are rather straight, although the lateral sepals are variably oriented, often spreading abruptly from the base of the flower. Sepals are sometimes free to the base.

The non-blooming plants of Ute ladies'-tresses are very similar to those of the widespread, congeneric species *S. romanzoffiana* - hooded ladies' tresses. Usually, it is only possible to positively identify Ute ladies'-tresses when it is flowering. *S. romanzoffiana* has a tight helix of inflated ascending flowers around the spike and lateral appressed sepals. *S. diluvialis* has flowers facing directly away from the stalk, neither ascending nor nodding, and appressed or free lateral sepals (please refer to the attached drawings). Ute ladies'- tresses generally blooms from late July through September, depending on location and climatic conditions. However, in some areas, including central Washington, this species may bloom in early July or as late as early October. Bumblebees are apparently required for pollination.

Mature plants may not produce above ground shoots for one or more growing seasons, or may exhibit vegetative shoots only. Orchids generally require symbiotic associations with mycorrhizal fungi for seed germination. In addition, many plants of some *Spiranthes* species are initially saprophytic, and persist underground for several years before emerging (USFWS 1995). Therefore, it may require multiple years of surveys to document the presence or absence of Ute ladies'-tresses in a given area.

This species may be adversely affected by alterations of its habitat due to livestock grazing, vegetation removal, excavation, construction, stream channelization, and actions that alter local hydrology.

#### References Cited

- Sheviak, C.J. 1984. Spiranthes diluvialis (Orchidaceae), a new species from the western United States. Brittonia 36(1):8-14.
- USFWS. 1995. Ute Ladies'-tresses (Spiranthes diluvialis): Agency Review Draft Recovery Plan. Prepared by the U.S. Fish and Wildlife Service Ute Ladies'-tresses Recovery Team for Region 6, Denver, Colorado.

# ENCLOSURE C (drawing 1)





Spiranthes romansoffiana (x1)

Spiranthes diluvialis (x1

# Endangered Species Act Status of West Coast Salmon & Steelhead

Species/ESU* St	atus	(E = Endangered, T = Threatened, mo./yr.)	Next Steps
Dink Salman	Listed:	None	
Fink Sumon	Not Warranted:	1) Even-year ESU (10/95)	
	l interde	2) Odd-year ESU (10/95)	
	Listen:	1) Central CA ESU (1 - 10/96) 2) Southern OP/Nothern CA Coasts ESU (T. 5/07)	
Coho Salmo		2) Southern Ordinorni CA Coasts ESU (1 - 5/37) 3) OP Coast ESU (T - 8/98)	
Cono Banno	Candidates:	1) Puget Sound/Strait of Georgia ESU (7/95)	> Complete listing assessments for candidate ESUs.
		2) Lower Columbia River/Southwest WA ESU (7/95)	
	Not Warranted:	1) Olympic Peninsula ESU (7/95)	1
	Listed:	1) Sacramento River Winter-run ESU (E - 1/94)	
		2) Snake River Fall-run ESU (T - 4/92)	
		3) Snake River Spring/Summer-run ESU (T - 4/92)	
		4) Puget Sound ESU (T - 3/99)	
Chinook		5) Lower Columbia River ESU (T - 3/99)	
Salmon		6) Upper Willamette Kiver ESU (1 - 3/99) 7) Upper Columbia River Spring-run ESU (E - 3/99)	
		8) Central Valley Spring-run ESU (T - 9/99)	> Develop 4(d) rules for Central Valley Spring-run &
		9) CA Coastal ESU (T - 9/99)	CA Coastal ESUs.
	Candidates:	1) Central Valley Fall and Late Fall-run ESU (9/99)	> Complete listing assessments for candidate ESU.
	Not Warranted:	1) Upper Klamath-Trinity Rivers ESU (3/98)	
		2) OR Coast ESU (3/98)	
		3) WA Coast ESU (3/98)	
		4) Mid-Columbia River Spring-run ESU (3/98)	
		5) Upper Columbia River Summer/Fall-run ESU (3/98)	
		6) Southern OR and Northern CA Coastal ESU (9/99)	
	L letad-	Deschutes Kiver summer/Fail-run ESU (9/99)	
	LISIOU.	1) Hood Canal Summer-run ESU (1 - 3/99)	
Chum Salmor	1	2) Columbia River ESU (1 - 3/99)	
	Not warranted:	1) Puget Sound/Strait of Georgia ESU (3/98)	
		2) Pacific Coast ESU (3/98)	
	Listed:	1) Snake River ESU (E - 11/91)	
Sockeye	Not Warranted	2) Ozette Lake ESU (T - 3/99)	4
Salmon	HOL Warranteu.	1) Baker River ESU (3/99) 2) Okanogan River ESU (3/98)	
-		3) Lake Wenatchee ESU (3/98)	
		4) Quinault Lake ESU (3/98)	
		5) Lake Pleasant ESU (3/98)	
	Listed:	1) Southern CA ESU (E - 8/97)	
		2) South-Central CA Coast ESU (T - 8/97)	
		3) Central CA Coast ESU (T - 8/97)	
		4) Upper Columbia River ESU (E - 6/97) 5) Spake Diver Basin ESU (T - 8/97)	
Steelhead		6) Lower Columbia River ESU (T - 3/98)	
-		7) CA Central Valley ESU (T - 3/98)	> Develop 4(d) rule for Northern CA ESU.
		8) Upper Willamette ESU (T - 3/99)	> Complete listing assessment for candidate ESU.
		9) Middle Columbia River ESU (T - 3/99)	
		10) Northern CA ESU (T - 6/00)	
	Candidates:	1) OR Coast ESU (3/98)	
	Not Warranted:	1) Southwest WA ESU (8/96)	
		2) Olympic Pennisula ESO (0/90) 3) Puget Sound ESU (8/96)	
		4) Klamath Mountains Province ESU (4/01)	
	Proposed Listings:	1) Southwestern WA/Columbia River ESU (T - 4/99)	
Coastal	Candidates:	1) Oregon Coast ESU (4/99)	l
Cuthroat	Not Warranted:	1) Puget Sound ESU (4/99)	NOTE: This species is now under the jurisdiction of the
Trout		2) Olympic Peninsula ESU (4/99)	U.S. Fish and Wildlife Service.
11000	1	3) Upper Willamette River ESU (4/99)	
		4) Southern OR/CA Coasts ESU (4/99)	

\* An Evolutionarily Significant Unit or "ESU" is a distinctive group of Pacific salmon or steelhead.

ATTACHMENT B Certificate of Compliance—Land Use Plans and Zoning Ordinances

**Columbia County** Certificate of Compliance

RECEIVED MAY 14 2001 CH2M HILL / SPK

## NAME OF APPLICANT: STARBUCK POWER COMPANY L.L.C. ADDRESS: 10500 NE 8th Street, Suite 2026 Bellevue, Washington 98004

## PROJECT: STARBUCK POWER PROJECT

PROJECT DESCRIPTION: The Applicant seeks to construct an approximately 1200 megawatt, natural gas-fired, combined-cycle combustion turbine electrical generating facility with associated accessory uses.

CERTIFICATION AND CONDITIONS: Pursuant to RCW 80.50, the Washington State Energy Facility Site Evaluation Counsel ("EFSEC") coordinates all of the evaluation and licensing steps for siting major energy facilities in Washington. Accordingly, a Conditional Use Permit is not necessary for this project.

This Certificate of Compliance certifies that the Starbuck Power Project, as described in the Applicant's Request For Certification of Compliance, is consistent and in compliance with Columbia County land use plans and zoning ordinances and but for EFSEC's exclusive permitting authority would be granted a Conditional Use Permit based upon the following conditions:

1) Construction and operation of the project consistent with the project description contained in the Request for Certification of Compliance dated February 8, 2001, and

2) Continued compliance with applicable provisions of Chapter 80.50 of the Revised Code of Washington and Title 463 of the Washington Administrative Code.

After due deliberation and based upon findings of fact adopted by the Board of Adjustment, this Certificate of Compliance is hereby approved subject only to the conditions stated herein:

Certificate of Compliance:

XX approved/certified

denied

APPROVED THIS <u>5th</u> DAY OF <u>MARCH</u> 2001. COLUMBIA COUNTY PLANNING DEPARTMENT