3.2 Air Quality

3.2.1 Existing Conditions

3.2.1.1 Climate

The project site is located in a semiarid region of southeastern Washington, within the southeastern part of the Columbia Basin. The Columbia Basin is bounded on the south by the high country of central Oregon, on the north by the mountains of western Canada, on the west by the Cascade Range, and on the east by the Blue Mountains and the North Idaho Plateau. Two predominant mountain ranges, the Cascade Mountain Range to the west and the Bitterroot Mountain Range to the east, influence the climate of the project area.

The temperatures in the area are generally hot in the summer and cold in the winter. The mean maximum and minimum temperatures at the Pasco Municipal Airport during the month of July are 92^{o}F and 59^{o}F, respectively, and the mean maximum and minimum temperatures recorded during the month of January are 39^{o}F and 24^{o}F, respectively. The mean monthly relative humidity varies from a low of 30% in the month of July to a high of 83% in the month of December. The annual average relative humidity is 56%.

Prevailing winds from the south-southwest occur about 22.4% of the time. During the spring and the summer the frequency of south-southwesterly winds is the greatest. The annual average wind speed is 9.8 miles per hour (mph). Winds are lowest during the fall, averaging 8.0 to 8.9 mph, and highest in the summer, averaging 9.4 to 11.7 mph. Wind speeds that are well above average are usually associated with southwesterly winds.

3.2.1.2 Odor

The project area includes three existing industrial facilities that occasionally generate various types of odors: the Boise Cascade Corporation Wallula Mill; the Iowa Beef Processors slaughterhouse; and the J.R. Simplot Company cattle feedlots. Odors include methyl mercaptan odors from the mill, digesting offal wastes in fields from the slaughterhouse, and manure odors from more than 50,000 cattle in the feedlots.

3.2.1.3 Air Quality Standards

Ambient Air Quality Standards

The Clean Air Act of 1970 empowered the U.S. Environmental Protection Agency (EPA) to promulgate air quality standards for six common air pollutants: ozone, carbon monoxide (CO), lead, nitrogen dioxide (NO2), particulates and sulfur dioxide (SO2). These standards include primary standards designed to protect health and secondary standards (primarily visibility) to protect public welfare. These National Ambient Air

Quality Standards (NAAQS) reflect the relationship between pollutant concentrations and health and welfare effects. The Washington Department of Ecology adopted standards similar to the NAAQS and included standards for total suspended particulate matter.

Table 3.2-1 summarizes the federal and state primary and secondary standards for the six pollutants, and the averaging time for determining compliance with the standards. It also presents the increments under the EPA's Prevention of Significant Deterioration (PSD) program and the EPA PSD Class II significance levels for air quality that are applicable to the proposed project.

State and Local Emission Limits

As part of the PSD process, EFSEC is reviewing the applicant's evaluation of alternative emission control technologies. The determination of which control technology best protects ambient air quality is made by the regulatory agency on a case-by-case basis and considers the associated economic, energy, and environmental costs. The analysis for Best Available Control Technology (BACT) identifies pollutant-specific alternatives for emission control, and the costs and benefits of each alternative technology. BACT would be used to reduce emissions of toxic air pollutants, along with criteria pollutants. For example, natural gas is BACT for fuel because of its lower emissions of criteria and toxic air pollutants over other fuels, such as fuel oil or coal. Combustion controls also reduce criteria pollutants by optimizing combustion and reducing pollutants emitted in the exhaust stream.

The determination of BACT at the time of the final air emissions permit review would define the emission limits for the project. BACT for nitrogen oxides (NOx) typically consists of dry low-NOx technology, or selective catalytic reduction (SCR), which is a post-combustion control that uses ammonia and a catalyst to reduce NOx emissions. However, any unreacted ammonia is emitted as a toxic air pollutant and is regulated by Washington state.

Prevention of Significant Deterioration

PSD review regulations apply to proposed new or modified sources located in an attainment area that have the potential to emit criteria pollutants in excess of predetermined de minimus values (Code of Federal Regulations, 40 CFR Part 51). For new generation facilities, these values are 100 tons per year of criteria pollutants for 28 specific source categories, including power generating facilities; and 250 tons per year for all others. The Wallula Power Project would be a PSD source because it would emit in excess of 100 tons per year of NOx, CO, PM10, and VOC. The PSD review process evaluates existing ambient air quality, the potential impacts of the proposed source on ambient air quality, whether the source would contribute to a violation of the NAAQS, and a review of the BACT. PSD restricts the degree of ambient air quality deterioration that would be allowed. Increments for criteria pollutants are based on the PSD classification of the area. Class I areas are assigned to federally protected wilderness areas, such as national parks, and allow the lowest increment of permissible deterioration.

This essentially precludes development near these areas. Class II areas are designed to allow for moderate, controlled growth, and Class III areas allow for heavy industrial use.

The Class I area nearest the project site is the Eagle Cap Wilderness located about 115 kilometers (71.5 miles) southeast of the proposed project. The area around the proposed project is designated Class II where less stringent PSD increments apply. Class I and Class II increments are shown with the ambient standards in Table 3.2-1.

Nonattainment Area Requirements for PM10

New Source Review (NSR) permitting is required for major emission sources locating or expanding in nonattainment areas. Emission levels associated with designating a facility as major for NSR depend on the nonattainment area classification. The only nonattainment designation applicable to the proposed project is for PM10, because the proposed location for the project is in a serious PM10 nonattainment area. (PM10 refers to particulate matter less than 10 microns in diameter.)

As part of the Notice of Construction (NOC) permit application process, the requirements of Chapter 173-400-112 WAC for permitting new or modified sources located in a nonattainment area specify the conditions that must be met for a new source to receive approval to construct and operate. These requirements include the use of Lowest Achievable Emission Reduction (LAER) for the nonattainment pollutant (PM10), emission offsets for the nonattainment pollutant (i.e., the applicant must find a way to reduce PM10 emissions in the area enough to provide a net air quality benefit), and demonstration that the new source would not cause or create any new exceedance of the ambient air quality standard and that it would not violate the requirements for reasonable further progress established by the state implementation plan.

Hazardous Air Pollutant Regulations

The Clean Air Act Amendments of 1990, under revisions to Section 112, required the EPA to list and promulgate National Emission Standards for Hazardous Air Pollutants (NESHAPS) in order to control, reduce, or otherwise limit the emissions of hazardous air pollutants from categories of major and area sources. As these standards are promulgated they are published in Title 40 of the Code of Federal Regulations, Part 63 (40 CFR 63). Stationary combustion gas turbines are on the list of 174 categories of major and area sources that would be henceforth subject to emission standards. The project combustion gas turbines may therefore be subject to 40 CFR Part 63, which would require the Maximum Achievable Control Technology (MACT). Standards for stationary combustion gas turbines were scheduled for promulgation by November 15, 2000, but have not yet been proposed. MACT standards are intended to reduce emissions of air toxics through the installation of control equipment rather than through risk-based emission limits.

Table 3.2-1. Ambient Air Quality Standards

	Increments								
	National Primary[a]	National Secondary[a]		State of Washington[a]		Class I PSD	Class II PSD		EPA Class II Significance Levels
	Pollutant Concentrations								
	ppm	µg/m^3	ppm	µg/m^3	ppm	µg/m^3	µg/m^3	µg/m^3	µg/m^3
Total Particulate Matter (TSP)									
Annual Geometric Mean	-	-	-	-	-	60	-	-	-
24-hour Average	-	-	-	-	-	150	-	-	-
Particulate Matter (PM10)									
Annual Arithmetic Mean	-	50	-	50	-	50	4	17	1
24-hour Average	-	150	-	150	-	150	8	30	5
Inhalable Particulate Matter (PM2.5)									
Annual Arithmetic Mean	-	15	-	15	-	-	-	-	-
24-hour Average	-	65	-	65	-	-	-	-	-
Sulfur Dioxide (SO2)									
Annual Average	0.03	80	-	-	0.02	52[b]	2	20	1
24-hour Average	0.14	365	-	-	0.10	262[b]	5	91	5
3-hour Average	0.14	-	0.5	1300	-	-	25	512	25
1-hour Average	-	-	-	-	0.40 [c]	1050[b]	-	-	-
Carbon Monoxide (CO)									
8-hour Average	9	10,000	-	-	9	10,000[b]	-	-	500
1-hour Average	35	40,000	-	-	35	40,000[b]	-	-	2,000
Ozone (O3)[d]									
1-hour Average	0.12	235	0.12	235	0.12	235[b]	-	-	-
8-hour Average	0.08	176	0.08	176	-	-	-	-	-
Nitrogen Dioxide (NO2)									
Annual Average	0.053	100	0.053	100	0.05	100	2.5	25	1
Lead (Pb)									
Quarterly Average	-	1.5	-	1.5	-	-	-	-	-

µg/m^3 = micrograms per cubic meter; ppm = parts per million by volume, dry basis

[a] Annual standards never to be exceeded; short-term standards not to be exceeded more than once per year unless otherwise noted.

[b] Values are calculated equivalent to regulated value.

[c] Then 0.40 ppm standard is not to be exceeded more than once per year, additionally, the 0.25 ppm standard is not to be exceeded more than twice in 7 days.

[d] The ozone 1-hour standard applies only to areas that were designated nonattainment when the ozone 8-hour standard was proposed in July 1997. This provision would allow a smooth, legal, and practical transition to the 8-hour standard. Currently, the 1-hour standard applies while the 8-hour standard is in litigation. The ozone 8-hour standard is included for information only. A 1999 federal court ruling blocked implementation of the standards, and EPA has asked the U.S. Supreme Court to reconsider that decision.

Source: Wallula Generation (2001).

EPA is in the process of establishing toxics emission standards for combustion gas turbines. This regulation would apply to new or modified major sources of hazardous air pollutants (as listed in Section 112 of the Clean Air Act). The Wallula Power Project would be a major source of hazardous air pollutants, with total emissions greater than 25 tons per year. Thus, it would be subject to the above requirements for combustion gas turbines. The NESHAP requirements for combustion gas turbines are not applicable until after promulgation by the EPA.

EPA recently ruled that combined-cycle gas power plants such as the Wallula Power Project must conduct a case-by-case analysis to demonstrate that hazardous air pollutant emissions are reduced using MACT. EPA guidance indicated that oxidation catalysts typically required on gas turbine power plants (and included in the proposed emission controls for the Wallula Power Plant) satisfy MACT for volatile organic hazardous air pollutants such as formaldehyde.

3.2.1.4 Existing Air Quality

Because of the rural nature of Walla Walla County and the lack of large industrial sources of pollutants, Walla Walla County has been classified by EPA and Ecology as an attainment area for all criteria pollutants except particulate matter (PM10). There are no monitoring stations in southeastern Washington for those criteria pollutants that are in attainment, and therefore there is no local source available that characterizes existing concentrations of these pollutants. Such information is normally not required for an impact analysis when the concentrations of criteria pollutants that are generated by a new major source do not exceed EPA's significant impact levels.

EPA made a finding that the Wallula area did not meet the 24-hour national air quality standard for PM10 by December 31, 1997 as required by the federal Clean Air Act. As a result of that finding, the Wallula area has been reclassified from a moderate to a serious PM10 nonattainment area.

The Washington Department of Ecology maintains a network of air quality monitoring stations throughout the Eastern Regional Office territory. There are currently two PM10 monitoring stations in Walla Walla, Washington (Monitor I.D. 530710005-1) and the site located at Nedrow Farm, Wallula Junction, Walla Walla County, Washington (Monitor I.D. 530711001-2). The Nedrow Farm site is located closest to the Wallula Power Project. During the most recent 5 years for which data are available from the EPA, the Nedrow Farm site has recorded two maximum readings, one in 1997 and one in 2000, that were in excess of the 24-hour PM10 standard of 150 micrograms per cubic meter ($\mu g/m^3$). Both the maximum 24-hour average and the annual average readings taken at the Nedrow Farm monitoring station are presented in Table 3.2-2.

Reclassification of Wallula from moderate to serious requires the Washington Department of Ecology to begin an 18-month planning process to develop a plan to improve air quality to meet the standard. The additional actions and control measures needed to bring the Wallula area into attainment of the 24-hour PM10 standard would depend on what is learned during the planning process.

Table 3.2-2. Maximum 24-Hour and Annual Average PM10 Concentrations, Wallula PM10 Monitoring Station

	NAAQS ($\mu g/m^3$)	Year				
		1996	1997	1998	1999	2000
Maximum 24 Hour Average ($\mu g/m^3$)	150	148	210	136	90	211
Annual Average ($\mu g/m^3$)	50	32.7	35.5	39.7	35.0	32.6
Source: Wallula Generation (2001).						

3.2.2 Impacts of the Proposed Action

3.2.2.1 Construction

Generation Plant

Emissions during the approximately 24-month construction process would consist of fugitive dust and combustion exhaust emissions from construction equipment and vehicles. Fugitive dust emissions would result from dust entrained during project site preparation, on-site travel on paved and unpaved surfaces, and aggregate and soil loading and unloading operations. Wind erosion of disturbed areas would also contribute to fugitive dust.

Combustion emissions would result from diesel construction equipment, various diesel-fueled trucks, diesel-powered equipment (welding machines, electric generators, air compressors, water pumps, etc.), locomotives delivering equipment, and vehicle emissions from workers commuting to the construction site. The applicant evaluated on-site emissions during construction on a monthly basis over the 24-month construction schedule for both fugitive dust and construction equipment emissions. Table 3.2-3 shows the estimated average annual heavy equipment exhaust and fugitive dust emissions for on-site construction activities over the 24-month construction schedule.

Table 3.2-3. Annual Emissions During On-Site Construction (Tons Per Year)

	PM10	NOx	CO	VOC	SOx
Construction Equipment	1.4	20.2	7.0	1.64	0.66
Fugitive Dust	39.6				
Total Emissions	41.0	20.2	7.0	1.64	0.66
Source: Wallula Generation (2001).					

Water Supply Pipeline, Natural Gas Pipeline, and Transmission Line

The construction of the pipelines and transmission line would generate short-term emissions including fugitive dust and construction equipment exhaust emissions. Fugitive dust would be controlled by conventional construction practices (e.g., road watering, covering of dust piles, etc.) to comply with state regulations.

3.2.2.2 Operation and Maintenance

Generation Plant

Emission Sources and Emission Controls

The principal sources of emissions from the Wallula Power Project during startup and operation would occur from four General Electric (GE) Model 7241 FA combustion gas turbines rated at 167 MW and fired by natural gas, and four HRSGs. Each HRSG would be equipped with low-NOx duct burners rated at 640 million British thermal units per hour (MM Btu/hr), and with SCR and oxidation catalyst systems for the removal of NOx and CO, respectively.

Additional plant equipment would include two nine-cell cooling tower units equipped with special mist eliminators to reduce cooling tower drift emissions; one auxiliary boiler rated at 45,000 pounds/hour (lb/hr) of steam; one 300-horsepower diesel fire pump; and one 910-kilowatt (kW) emergency diesel generator.

The four combustion gas turbines would be equipped with dry low NOx combustors that minimize the formation of NOx and CO. GE would guarantee exhaust concentrations from the combustion gas turbine of 9 parts per million (ppm) for both NOx and CO. The four HRSGs would be equipped with low-NOx duct burners, designed to minimize NOx formation. Because natural gas is a clean burning fuel, there would be inherently low amounts of PM10 and SOx formed as a result of the combustion process. To further reduce combustion gas turbine and duct burner NOx and CO, SCR and oxidation catalyst control systems would be provided. It is expected that the equipment suppliers would guarantee NOx emissions of 3.0 ppm and CO emissions of 3.5 ppm. Aqueous ammonia would be used in the SCR control system and some unreacted ammonia would exit the plant stack as ammonia "slip." However this ammonia slip would be limited to 10 ppm.

The Wallula Power Project would have a 45,000 lb/hr auxiliary boiler that is gas fired and provides steam for cold plant startups. The steam would also be used for "soaking" or "heating" of the HRSGs and catalyst during short periods of unit downtime. This would maintain heat and facilitate a quick plant startup. There would also be an emergency diesel generator and a diesel fire pump that would typically be test run for about an hour each month.

A cooling water system would condense the steam coming from the steam turbine. Cooling water would itself be cooled within two 9-cell mechanical-draft cooling towers (one for each power block) each with a circulating water flow rate of 168,000 gpm. The cooling towers would be designed with a very efficient drift elimination system to minimize the formation of PM10. In mechanical-draft cooling towers there is always a certain amount of water in the form of mist ("drift") containing dissolved solids that would exit through the cooling tower stacks. As the drift evaporates, the dissolved solids would form particulates, thereby adding to the PM10 emissions. Typically cooling towers are designed to maintain drift at 0.008% of the amount of circulating water flow. The Wallula Power Project would incorporate ultra-low drift elimination devices in the cooling towers, which would maintain drift at a level of 0.0002% of the amount of circulating water flow.

Cooling tower PM10 emissions were calculated based on the total dissolved solids in the circulating water and drift rate. EPA's AP-42 emission factors (EPA-CHIEF) as provided by the EPA Clearinghouse for Inventory and Emission Factors were used for developing a particulate emission factor for wet cooling towers. These guidelines state that "*a conservatively high* PM10 emission factor can be obtained by (a) multiplying the total liquid drift factor by the TDS fraction in the circulating water, and (b) assuming that once the water evaporates, all remaining solid particulates are within the PM10 range." (Italics per EPA).

The features listed below, which are incorporated into the Wallula Power Project, represent BACT:

- combined cycle technology that provides energy conversion from natural gas to electricity with efficiencies that exceed 50%;
- dry low NOx combustion technology on the combustion gas turbines which limits NOx and CO emissions from the combustion gas turbines to 9.0 ppm;
- SCR technology incorporated into the HRSGs that further reduces total NOx emissions to a 3.0 parts per million volume dry (ppmvd) basis;
- oxidation catalyst controls incorporated into the HRSGs that reduce CO emissions to 3.5 ppmvd and volatile organic compounds (VOCs) to 5 ppmvd; and
- use of low-NOx burners for the auxiliary boiler.

With respect to PM10, the Wallula Power Project has adopted LAER controls, as follows:

- natural gas firing of the combustion gas turbines and duct burners;
- combustion technology on the combustion gas turbines that limits particulate emissions to 12 lb/hr; and
- a drift elimination design on the cooling towers that reduces drift to 0.0002% of the amount of the circulating water flow.

Emission Rates

Emissions of Criteria Pollutants. The annual emissions for the combustion gas turbines were calculated based on a capacity factor of 100%, with 420 hours in startup mode. For some pollutants, turbine emissions vary based on ambient temperatures. Annual emissions have been calculated assuming an average ambient temperature of 54^{o}F. Combustion gas turbine operation without duct firing was assumed to occur for

3,960 hours per year, and combustion turbine operation with duct firing was assumed to occur for 4,380 hours per year. The auxiliary boiler was assumed to operate for a maximum of 4,000 hours per year. The emergency diesel generator and diesel fire pump were assumed to operate for a maximum of 200 and 100 hours per year, respectively. Cooling tower emissions were calculated from maximum total dissolved solids level and assuming 8,760 hours of operation per year. The proposed annual and hourly emissions for the Wallula Power Project are shown in Table 3.2-4. Note that the emission rates listed in Table 3.2-4 are based on the applicant's proposal for BACT and LAER. EFSEC could stipulate lower emission limits based on their own BACT and LAER analyses.

Table 3.2-4. Wallula Power Project – Facility Criteria Pollutant Emissions Summary

Maximum Hourly Emissions (lb/hr)[a]	**NOx**	**CO**	**PM10**	**SO2**	**VOC**
Turbines and Duct Burners	93	45	83	18	64.6
Cooling Towers	-	-	3.7	-	-
Auxiliary Boiler	2.0	4.5	0.4	0.1	0.3
Emergency Generator[b]	12.7	7.4	0.6	0.4	0.8
Diesel Fire Pump[b]	-	-	-	-	-
Total Project (lb/hr)	108	57	88	18.4	65.7
Annual Emissions (ton/yr)[c]	**NOx**	**CO**	**PM10**	**SO2**	**VOC**
Turbines and Duct Burners	424	388	285.9	21.4	266.9
Cooling Towers	-	-	16.2	-	-
Auxiliary Boiler	2.9	6.6	0.6	0.1	0.4
Emergency Generator	1.3	0.7	0.06	0.04	0.08
Diesel Fire Pump	0.2	0.1	0.01	0.00	0.02
Total Project (ton/yr)	430	396	302.8	21.5	267.4

[a] Excludes startup emissions and assumes an ambient temperature of 11°F.
[b] Emergency diesel generator and diesel fire pump would not be tested on the same day.
[c] Includes startup emissions
Source: Wallula Generation (2001).

Toxic Air Pollutant Emission Rates. This section presents the emission factors and emission rates used in the analysis of toxic air pollutants. The Wallula Power Project has the potential to emit small quantities of toxic air pollutants regulated by the Washington Department of Ecology. Formaldehyde, benzene, and other organic compounds associated with the combustion of fossil fuels would be released. In addition, post-combustion control with SCR results in ammonia emissions or "slip" that passes through the process unreacted. Ammonia is not a federal hazardous air pollutant, but it is identified as a Washington State Toxic Air Pollutant and would be the largest noncriteria pollutant emitted from the project.

Emissions of toxic air pollutants would result from the combustion of natural gas in the combustion gas turbines, HRSG duct burners, and auxiliary boiler, as well as from the use of the emergency diesel generator and diesel fire pump. Toxic air pollutant emission rates from these sources were estimated using EPA AP-42 emission factors. Emissions were computed on both a short-term and annual average basis. For short-term emission rates, the hourly fuel use or heat input was used to estimate emissions on a pounds per hour basis. For the annual average emission rates (tons per year), total annual fuel use or heat inputs were computed and used with the emission factors in estimating the emissions. With the exception of ammonia and sulfuric acid mist, the toxic air pollutant emission factors are based on AP-42 data.

Ammonia emissions are based on a 10 ppmvd (at 15% oxygen) slip associated with the use of SCR for NOx control. Sulfuric acid mist emissions depend on the amount of sulfur in the fuel and amount of sulfur dioxide converted to sulfur trioxide. Based on engineering estimates, up to 5% of the total sulfur in the fuel may be converted to sulfuric acid from the combustion gas turbine and HRSG duct burners.

The toxic air pollutants and their pollutant class, emission factors, and emission rates for the gas turbines, HRSG duct burners, the auxiliary boiler, the emergency diesel generator, and the diesel fire pump are listed in Table 3.2-5. The toxic air pollutant classes refer to Type A, for annual-averaged risk-based carcinogens; and Type B for noncarcinogens.

The Wallula Power Project would adopt BACT for toxics (T-BACT) for controlling toxic emissions pursuant to Chapter 173-460-040 WAC, including

- combustion gas turbine technology that is over 50% efficient that would minimize the amount of toxics formed relative to less efficient technologies;
- use of clean natural gas as the only fuel for the combustion gas turbines and HRSG duct burners which helps minimize formation of toxics; and
- use of oxidation catalyst unit on each HRSG duct burner that would reduce the emissions of certain volatile organic toxic compounds (e.g., formaldehyde).

Nonattainment Area Emission Offsets

The Wallula Power Project is located in a nonattainment area for one pollutant, PM10. This means that the Wallula Power Project is subject to Chapter 173-400-112 WAC, Requirements for New Sources in Nonattainment Areas; Chapter 173-400 131 WAC, Issuance of Emission Reduction Credits; and Chapter 173-400-136 WAC, The Use of Emission Reduction Credits.

The Wallula Power Project would generate particulates at a number of sources:

- particulates, mostly carbon, are produced when combustion gas turbines are fired;
- the HRSGs create a small amount of carbon particulates when duct firing occurs and a small amount of ammonium sulfate particulates in the SCR unit; and
- the two 9-cell cooling tower units would have some drift (small water droplets exiting the cooling towers) that would evaporate, causing the dissolved solids in the drift to form particulates.

Table 3.2-5 Wallula Power Project Toxic Air Pollutant Emissions Summary

Pollutant	Washington Toxic Air Pollutant Class[1]	Federal Hazardous Air Pollutant	Total Project Emissions[2]		Chapter 173-460 WAC Small Quantity Emission Rates		Above Small Quantity Emission Rates
			(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	
1,3-Butadiene	A	Yes	4.41E-03	31	-	0.5	Yes
2-Methylnapthalene	-	Yes	1.31E-06	0.00383	-	-	-
3-Methylchloranthrene	-	Yes	9.84E-08	0.00029	-	-	-
7,12-Dimethylbenz(a)anthracene	-	Yes	8.75E-08	0.00026	-	-	-
Acenaphthene	-	Yes	4.38E-05	0.00872	-	-	-
Acenaphthylene	-	Yes	9.10E-05	0.02	-	-	-
Acetaldehyde	A	Yes	4.05E-01	2,878	-	50	Yes
Acrolein	B	Yes	6.47E-02	461	0.02	175	Yes
Ammonia	B	No	137.4	1,145,808	2.0	17,500	Yes
Benzene	A	Yes	1.30E-01	865	-	20	Yes
Butane	B	No	6.56E-08	0.00019	5.0	43,748	No
Dichlorobenzene	A	Yes	6.56E-05	0.19	-	500	No
Ethylbenzene	B	Yes	3.22E-01	2,303	5.0	43,748	No
Fluoranthene	-	Yes	1.69E-04	0.021	-	-	-
Fluorene	-	Yes	1.73E-04	0.03	-	-	-
Formaldehyde (Assumes 80% reduction by proposed oxidation catalyst)	A	Yes	1.4	10,218	-	20	Yes
Hexane	B	Yes	9.84E-02	287	2.6	22,750	No
Naphthalene	B	Yes	1.44E-02	94	2.6	22,750	No
PAHs							
Benzo(a)anthracene	A	Yes	3.59E-05	7.09E-03	-	-	No
Benzo(b)fluoranthene	A	Yes	9.95E-06	2.24E-03	-	-	No
Benzo(k)fluoranthene	A	Yes	2.32E-06	6.99E-04	-	-	No
Benzo(a)pyrene	A	Yes	2.70E-06	6.78E-04	0	0	Yes
Benzo(g,h,i)perylene	A	Yes	5.93E-06	1.26E-03	-	-	No
Chysene	A	Yes	1.41E-05	3.02E-03	-	-	No
Dibenzo(a,h)anthracene	A	Yes	4.30E-06	9.16E-04	-	-	No
Indeno(1,2,3-cd)pyrene	A	Yes	4.49E-06	1.09E-03	-	-	No
Total PAHs	A	Yes	2.22E-02	158	0	0	Yes
Pentane	B	No	1.42E-01	415	5	43,748	No
Propylene Oxide	A	Yes	2.92E-01	2,087	-	50	Yes
Sulfuric Acid	B	Yes	6.80E-01	5,606	0.02	175	Yes
Toluene	B	Yes	1.33E+00	9,357	5	43,748	No
Xylenes	B	Yes	6.47E-01	4,606	5	43,748	No

[1] The toxic air pollutant classes refer to Type A, for annual-averaged risk-based carcinogens; and Type B for noncarcinogens.

[2] Exponent notation is used to show quantities less than 1. For example, 4.41E-03 indicates 4.41×10^{-3} or 0.00441.

Source: Wallula Generation (2001).

To minimize the emissions of particulates, the applicant proposes the following LAER controls:

- efficient combustion gas turbine technology that limits the amount of particulates formed to 12 lb/hr;
- use of clean natural gas as the only fuel for the combustion gas turbines and duct burners which helps minimize formation of particulates; and

- a drift elimination design on the cooling towers that reduces drift to an ultra-low 0.0002% of the amount of the circulating water flow.

Table 3.2-6 shows the total estimated annual emissions for PM10.

Table 3.2-6. Annual PM10 Emissions

Source	Tons/yr
Four Combustion Gas Turbines	285.9
Cooling Towers	16.2
Other Equipment	0.7
Total	302.8
Source: Wallula Generation (2001).	

Over 95% of the PM10 emissions in the Wallula nonattainment area are from windblown dust due to agricultural operations. Reductions in these emissions are proposed as the source of emission reduction credits (ERCs) that are required by federal and state regulation to offset pollutants from major new sources in nonattainment areas. For PM10 the ratio of actual emissions from the Wallula Power Project (tons per year) to the applicant's proposed ERCs (tons per year) is one to one.

As LAER to offset the production of 303 tons per year of particulates, the applicant proposes to purchase or lease up to 1,300 acres of active farmland and convert it to cultivated dryland grasses or dryland grasses and shrubs. Based upon the qualified acreage of active farmland currently available in the market for lease or purchase, the applicant has options on sufficient agricultural land to generate the necessary ERCs for PM10. However, neither EFSEC nor EPA has accepted the applicant's proposal for LAER or ERCs, and it is not certain that EPA will accept the use of agricultural crop reductions as offsets for the Wallula Power Project's stack emissions. If EPA rejected the applicant's LAER and ERC proposal, then the applicant would have to obtain other offsets before it could receive an air quality permit.

As part of the air quality impact analysis for short-term (24-hour average) PM10 impacts, the offsetting effects of retiring 175.48 acres of land at the project site (which is currently subject to particulate emissions from wind erosion) was assessed. Of the 175.48 acres to be retired, 130 acres is currently in agricultural production. Prior to use of this acreage by the Wallula Power Project, the estimated PM10 emissions from wind erosion were estimated at 59.4 tons per year. After the Wallula Power Project goes into commercial operation, the PM10 emissions from this area would be 9.2 tons per year, or a reduction of 50.2 tons per year of PM10. Thus, the total required additional PM10 offsets from off-site sources are 252.6 tons per year. As stated earlier, the applicant has submitted an offset plan to purchase land use rights to regional farmland, and to retire the farmland from agricultural operations to reduce fugitive dust emissions within the Wallula nonattainment area.

The use of the agricultural offset emission sources would decrease the Wallula Power Project's ambient PM10 impacts to less than the significance levels. Thus, the offsets would ensure that the project would not have any significant impact on the nonattainment area.

Local Air Quality Impact Assessment

The assessment of impacts on local and regional ambient air quality from the proposed facility was conducted using EPA-approved air quality dispersion models. These models are based on fundamental mathematical descriptions of atmospheric processes in which a pollutant source can be related to a receptor area. The assessment of local impacts from the Wallula Power Project covered an area with a radius of approximately 15 kilometers (9.3 miles) from the project site. It evaluated compliance with state and federal ambient air quality standards; significant impact levels; Class II area increments for NO2 and SO2; and PM10 impacts on the Wallula PM10 nonattainment area. The regional impact assessment evaluated potential impacts to Class I areas within about 200 kilometers (124.3 miles) of the project site including impacts on visibility, Class I increments for NO2, SO2, and PM10, and impacts to soil and vegetation from deposition of nitrogen and sulfur compounds.

The Industrial Source Complex Short-Term Model ISCST3 (EPA SCRAM) was used except when assessing impacts in complex terrain to the southwest of the project site. In the latter case, the Complex Terrain Screening Model CTSCREEN (EPA SCRAM) was adopted. Both models are EPA-approved air quality dispersion models.

The modeling analysis revealed that the project PM10 emissions would not result in a significant impact within the PM10 nonattainment area. Therefore, the project would not significantly affect the ambient air quality of the area, nor have a significant effect on the 3-hour or 24-hour SO2 Class II increments or the 24-hour PM10 Class II increment outside the PM10 nonattainment area. Table 3.2-7 compares maximum concentrations to the PSD Significant Impact Level (SIL) and Ambient Air Quality Standards.

Table 3.2-7. Maximum Modeled Short-Term Criteria Pollutant Concentrations

Pollutant	Averaging Period	Ambient Air Quality Standard (μg/m^3)	Significant Impact Level (μg/m^3)	Maximum Concentration (μg/m^3)
PM10	24-Hour	150	5	4.85
SO2	1-Hour	1,050	-	7.1
	3-Hour	1,300	25	5.6
	24-Hour	262	5	1.1
CO	1-Hour	40,000	2000	425.3
	8-Hour	10,000	500	111

Table 3.2-8 shows the results of the long-term criteria pollutant modeling. The maximum long-term (annual average) ground-level concentrations for criteria pollutants (NO2, SO2, and PM10) were modeled using the ISCST3 model and the CTSCREEN model.

Table 3.2-8. Maximum Modeled Annual Average Criteria Pollutant Concentrations

Pollutant	Averaging Period	Ambient Air Quality Standard (µg/m^3)	Significant Impact Level (µg/m^3)	Maximum Concentration (µg/m^3)
NO2	Annual	100	1	0.71
PM10	Annual	50	1	0.93
SO2	Annual	80	1	0.06

PSD Class II Increment Consumption Analysis. Maximum modeled concentrations of SO2, NO2, and PM10 are below the SILs. Proposed project generation of these pollutants has an insignificant impact on Class II increments, so further analysis is not required. The project would comply with the PSD Class II increment limits.

Toxic Air Pollutant Analysis. Air quality dispersion modeling was used to assess compliance with the State's toxic air pollutant regulations (Chapter 173-460 WAC). Those toxic air pollutants that are emitted in quantities above the "small quantity emission rate" require calculation of potential impacts that are then compared with the Acceptable Source Impact Levels (ASILs) to assess compliance. Ten compounds were identified as being emitted in amounts greater than the small quantity emission rate and required modeling. Depending on the compound, either the 24-hour or annual average concentrations were used for comparison with the ASILs.

The maximum modeled 24-hour and annual average toxic air pollutant concentrations resulting from the Wallula Power Plant emissions are compared to the appropriate ASILs in Table 3.2-9. For all toxic air pollutants evaluated the maximum modeled concentrations are less than the ASILs. Maximum short-term sulfuric acid mist concentrations are also below the 24-hour ASIL. Based on these modeling results, the Wallula Power Project is not expected to create any significant impacts due to its toxic air pollutant emissions.

Table 3.2-9. Maximum Modeled Toxic Air Pollutant Concentrations

Pollutant	Washington Toxic Air Pollutant Class	Modeled Averaging Period	Modeled[a] Concentration (µg/m^3)	ASIL (µg/m^3)	Concentration Less Than ASIL?
1,3-Butadiene	A	Annual	0.00005	0.0036	Yes
Acetaldehyde	A	Annual	0.0042	0.45	Yes
Acrolein	B	24-Hour	0.0071	0.02	Yes
Ammonia	B	24-Hour	15.1	100	Yes
Benzene	A	Annual	0.0013	0.12	Yes
Benzo(a)pyrene	A	Annual	-[b]	0.00048	Yes
Formaldehyde	A	Annual	0.015	0.077	Yes
Total PAHs	A	Annual	0.00023	0.00048	Yes
Propylene Oxide	A	Annual	0.0031	0.27	Yes
Sulfuric Acid	B	24-hour	0.074	3.3	Yes

[a] Concentrations modeled using ISCST3 model.
[b] Benzo(a)pyrene concentration is included in the Total PAH modeled concentration.
Source: Wallula Generation (2001).

Regional Air Quality Impact Assessment

PSD regulations require an assessment of the project's impact on Air Quality Related Values (AQRV) in Class I areas. AQRVs include regional visibility or haze; the effects of primary and secondary pollutants on sensitive plants; the effects of pollutant deposition on soils and water bodies; and effects associated with secondary aerosol formation. These requirements provide special protection for Class I areas. The federal land managers for Class I areas include the National Park Service and U.S. Forest Service.

The Eagle Cap Wilderness, the closest Class I area to the project, is 115 kilometers (71.5 miles) southeast of the project site. Additional Class I areas included in the modeling were Mt. Rainier National Park, Glacier Peak Wilderness, Alpine Lakes Wilderness, Goat Rocks Wilderness, Mt. Adams Wilderness, Mt. Hood Wilderness, Strawberry Mountain Wilderness, and the Spokane Indian Reservation. The Columbia River Gorge National Scenic Area was also included for informational purposes, even though it is not afforded special protection under the Clean Air Act.

Class I Area Increment Consumption. The EPA-approved CALPUFF modeling system was used for the regional air quality impact assessment. The effect of emissions from the facility on Class I area increment consumption was assessed by comparing predicted pollutant concentrations to Class I modeling significance levels proposed by the EPA (Federal Register, Vol. 61, No. 142, page 38292). Concentration predictions were obtained for SO2, NOx, and PM10 using the CALPUFF modeling system. Predictions were made within the Columbia River Gorge National Scenic Area to provide information to the federal land managers for this Class II area of interest.

Table 3.2-10 lists EPA's proposed SILs for Class I areas. When predicted concentrations are less than the Class I area SILs, pollutant impacts are considered insignificant, and a comprehensive Class I increment analysis is not required for a given pollutant. However, these levels of significance have not yet been adopted, and the federal land managers have recommended SILs that are more restrictive than those proposed by the EPA (see Table 3.2-10).

As shown in Table 3.2-10, all maximum predictions are several orders of magnitude less than the EPA's proposed criteria, and also are well below the criteria recommended by the federal land managers. While these are not adopted regulatory criteria, they are used here to provide a measure of assurance that the Wallula Power Project's contributions predicted by the model are insignificant.

Table 3.2-10. Results of Class I Increment Analysis

Area	Maximum Concentration Predictions (μg/m³)					
	NO2	SO2			PM10	
	Annual	Annual	24-hr	3-hr	Annual	24-hr
Class I Area						
Mt. Rainier National Park	0.00004	0.00001	0.00032	0.00146	0.00049	0.01365
Goat Rocks Wilderness	0.00006	0.00002	0.00046	0.00163	0.00071	0.02576
Mt. Adams Wilderness	0.00009	0.00002	0.00080	0.00252	0.00090	0.03694
Mt. Hood Wilderness	0.00024	0.00004	0.00157	0.00472	0.00151	0.05609
Alpine Lakes Wilderness	0.00020	0.00003	0.00092	0.00438	0.00081	0.02976
Glacier Peak Wilderness	0.00008	0.00001	0.00037	0.00189	0.00044	0.01283
Eagle Cap Wilderness	0.00052	0.00006	0.00308	0.00720	0.00160	0.07449
Hells Canyon Wilderness	0.00041	0.00005	0.00102	0.00442	0.00137	0.01954
Strawberry Mtn. Wilderness	0.00004	0.00001	0.00049	0.00250	0.00042	0.01694
Spokane Indian Reservation	0.00160	0.00015	0.00301	0.01146	0.00359	0.05691
EPA Proposed Class I SIL	0.10000	0.10000	0.20000	1.00000	0.20000	0.30000
Fed. Land Mgr. Proposed Class I SIL	0.03000	0.03000	0.07000	0.48000	0.08000	0.27000
Class II Area of Interest						
Columbia River Gorge National Scenic Area	0.00063	0.00009	0.00299	0.00938	0.00295	0.11750
EPA Class II SIL	1.0	1.0	5.0	25.0	1.0	5.0

Notes:
All NO_x conservatively assumed to be converted to NO_2.
PM_{10} concentrations include sulfates and nitrates.
Emissions based on continuous operation with supplemental duct firing and auxiliary boiler.
EPA and federal land manager proposed Class I area Significant Impact Levels from the Federal Register, Vol. 61, No. 142, page 38292.
Source: Wallula Generation (2001).

Pollutant Concentrations Effects on Plants. The federal land managers have the responsibility of ensuring AQRVs in the Class I areas are not adversely affected, regardless of whether the Class I increments are maintained. In order to protect plant species, the U.S. Forest Service recommends maximum SO2 concentrations not exceed 40 to 50 parts per billion (ppb) (105 to 130 μg/m³), and annual SO2 concentrations should not exceed 8 to 12 ppb (21 to 31 μg/m³). Lichens and bryophytes are found in the subalpine and alpine regions of several of the Class I areas. Some of these species may be sensitive to SO2 concentrations in the range of 5 to 15 ppb (13 to 39 μg/m³). The Forest Service also indicates that no significant injury to plant species in the Pacific Northwest is expected for annual NO2 concentrations less than 15 ppb (28 μg/m³).

The 24-hour maximum and annual results displayed in Table 3.2-10 are several orders of magnitude less than Forest Service criteria established to protect vegetation in Pacific Northwest Class I areas. While the cumulative effects of other existing sources were not considered in this analysis, the magnitude of the predictions from the Wallula Power Project are insignificant and are not expected to cause or contribute to the injury of plant species within the Class I areas.

Nitrogen and Sulfur Deposition at Class I Areas. The CALPUFF modeling system was used to estimate the Wallula Power Project's potential contribution to total nitrogen and sulfur deposition in the Class I areas. Soils, vegetation, and aquatic resources in Class I areas are potentially influenced by nitrogen and sulfur deposition. For several Pacific Northwest Class I areas, the background deposition of nitrogen and sulfur is already above federal land manager levels of concern.

Maximum annual deposition fluxes predicted by the CALPUFF modeling system are presented in Table 3.2-11. The highest predicted deposition fluxes are in the Spokane Indian Reservation, followed by the Eagle Cap and Hells Canyon Wilderness Areas. However, the deposition fluxes predicted are more than a thousand times lower than the Forest Service criteria and many times less than estimated existing deposition fluxes. For PSD review of proposed power plants within Washington, the Washington Department of Ecology suggests 0.01 kilogram per hectare per year (kg/ha/yr) and 0.006 kg/ha/yr as significance criteria for nitrogen and sulfur deposition, respectively. Predicted deposition fluxes are much lower than Ecology's suggested criteria for all areas of interest in the study.

Table 3.2-11. CALPUFF Annual Deposition Analysis Results (Total Annual Wet Plus Dry Deposition)

	Nitrogen Deposition (kg/ha/yr)				Sulfur Deposition (kg/ha/yr)			
Area	**Project**	**Back-ground**	**Total**	**Change**	**Project**	**Back-ground**	**Total**	**Change**
Class I Area								
Mt. Rainier National Park	0.00010	2.4	2.40010	0.0041%	0.00002	3.1	3.10002	0.0006%
Goat Rocks Wilderness	0.00012	9.0	9.00012	0.0014%	0.00002	11.8	11.80002	0.0002%
Mt. Adams Wilderness	0.00016	9.0	9.00016	0.0018%	0.00003	10.8	10.80003	0.0003%
Mt. Hood Wilderness	0.00027	5.4	5.40027	0.0049%	0.00005	8.6	8.60005	0.0006%
Alpine Lakes Wilderness	0.00037	5.2	5.20037	0.0072%	0.00006	7.2	7.20006	0.0009%
Glacier Peak Wilderness	0.00022	5.8	5.80022	0.0039%	0.00004	8.0	8.00004	0.0005%
Eagle Cap Wilderness	0.00048	1.6	1.60048	0.0302%	0.00009	1.6	1.60009	0.0054%
Hells Canyon Wilderness	0.00049	1.2	1.20049	0.0404%	0.00009	1.4	1.40009	0.0064%
Strawberry Mtn. Wilderness	0.00012	1.2	1.20012	0.0096%	0.00002	1.4	1.40002	0.0018%
Spokane Indian Reservation	0.00125	10.0	10.00125	0.0125%	0.00024	12.0	12.00024	0.0020%
USFS Level of Concern			5.0				3.0	
DOE Significance Level	0.01000				0.06000			
Class II Area of Interest								
Columbia River Gorge National Scenic Area	0.00043	10.0	10.00043	0.0043%	0.00008	12.0	12.00008	0.0007%

Notes:
Emissions are based on continuous 100% load operation with supplemental duct firing and auxiliary boiler operation.
Nitrogen deposition includes ammonium ion.
Source: Wallula Generation (2001).

Regional Haze Assessment. PSD regulations require the applicant to model the increase in the light extinction coefficient (B_{ext} [a measure of visibility]) at Class I areas and other areas designated as sensitive by the federal land managers. The applicant modeled the impacts at nine Class I areas, the Columbia River Gorge National Scenic Area, and the Spokane Indian Reservation. The CALPUFF regional haze analysis results calculate the maximum predicted change in 24-hour extinction coefficient. Changes to extinction are based on seasonal background data for good visibility days and are adjusted with hourly humidity. The extinction budgets for the higher episodes in most Class I areas are influenced by nitrates, PM10, and sulfates (to a lesser extent).

The federal land managers define a significant regional haze impact as a modeled B_{ext} more than 5% higher than the cleanest background values. Table 3.2-12 lists the modeling results for the sensitive areas that were modeled to experience the highest increase in B_{ext}. The modeled changes to extinction are less than the 5% criterion suggested by the federal land managers and Washington Department of Ecology for all seasons and Class I areas. According to this criterion, changes to visual conditions in the Class I areas would not be perceptible even when the Wallula Power Project's combustion gas turbines, HRSG duct-burners, and auxiliary boiler are emitting at their short-term peak rates.

Table 3.2-12. Modeled Regional Haze Impacts

Protected Area	Extinction Coefficient B_{ext} (1/Mm)			Increase in B_{ext}
	Project	Background	Total	
Columbia River Gorge National Scenic Area (Class II)	1.4	41.8	43.2	3.27%
Mt. Hood Wilderness (Class I)	0.77	23.7	24.4	3.25%

Notes:
Emissions based on continuous operation with supplemental duct firing and auxiliary boiler.
Background extinction coefficients derived from aerosol data on days with best visibility: top 20th percentile at Columbia River Gorge National Scenic Area, and top 5th percentile for Class I areas.
Significant impact is defined as a 5% increase in the modeled $B_{ext.}$
Mm = megameters
Source: Wallula Generation (2001).

Odors

The project would be located in an area where several sources of odor already exist (e.g., Iowa Beef Processors slaughterhouse, J.R. Simplot Company cattle feedlot, Ponderosa Fibers deinking plant, and Wallula Mill). The project would not contribute to these odors during normal operation. Natural gas delivered to the Wallula Power Project may be odorized, but it would be contained within the natural gas pipeline and power plant piping system up to the point of use in the combustion gas turbines, HRSGs, and the auxiliary boiler where it would be combusted. There would be a gas metering building that would contain equipment for natural gas pressure reduction. This enclosed structure would contain natural gas detection systems to identify leaks. Other detection equipment would be located in other areas of the plant where natural gas leaks can collect so the power plant operators can contain and vent the gas.

Ammonia used in the SCR system for NOx control is the only other potential source of odor. Trace amounts of ammonia emitted from the combustion turbine stacks would disperse to well below odor thresholds before the plume reached the ground. Otherwise, ammonia odor would not be detected unless it was spilled.

Cooling Tower Plumes

Downwind impacts caused by water vapor and water droplets emitted from the cooling towers were modeled by the applicant using the Seasonal/Annual Cooling Tower Impact Program (SACTIP) computer model. SACTIP calculated the occurrence of elevated visible plumes water and salt deposition, ground-level fogging, and icing. The model simulated downwind dispersion of the steam plumes based on wind data from the local meteorological station and relative humidity data from Pasco, Washington.

The key issue associated with the cooling tower plumes is their potential impact on local climate at the nearest agricultural parcels directly north and northeast of the plant site. Those two parcels are used to grow alfalfa, hay, and fruit orchards. There is concern that the cooling tower plumes could shade those parcels or increase relative humidity enough to retard growth of the crop or drying of the crop after it is harvested. However, as described in the following sections, the SACTIP model indicated that the cooling tower plumes would have no significant impact beyond the power plant facility boundary.

Emissions of Water Droplets and Water Vapor. The power plant would emit water vapor and water droplets from the cooling system, combustion turbine exhaust, and wastewater operations. The applicant estimated water emissions to the atmosphere as follows:

- Water vapor from cooling towers 4.4 mgd
- Water vapor from combustion turbine stacks 2.4 mgd
- Water vapor from wastewater evaporation ponds 0.1 mgd
- Water droplets from cooling towers 0.0005 mgd

Water vapor emitted in the hot exhaust gas from the tall combustion turbine stacks would rapidly disperse before the plume reached ground several miles from the plant, so water emissions from those stacks would cause no significant impacts. However, the downwind impact caused by 4.4 mgd of water vapor emitted from the cooling towers was evaluated using the SACTIP model.

Cooling Tower Steam Plume Visibility. The potential visibility of a cooling tower plume in the area of the Wallula Power Project was evaluated. After excluding those hours in which the plume would be obscured by darkness and bad weather, a map was developed (Figure 3.2-1). It shows that a visible plume would extend beyond Dodd Road to the north for a period of less than 150 hours per year. Visible plume contours to the west, east, and south are less extended and occur for a shorter period of time.

The SACTIP model indicated that the elevated visible plumes shown in Figure 3.2-1 would seldom occur during daytime during the spring and summer growing season. Visible steam plumes extending beyond the power plant facility boundary would not occur when the relative humidity was less than 70%. The average relative humidity during spring and summer is 41%, and it is unlikely that humidity levels during those seasons exceed 70% for extended periods even during morning hours. Therefore, it is unlikely that visible steam plumes would extend over nearby agricultural parcels during the growing season.

Cooling Tower Steam Plume Fogging and Icing. The results of an analysis concerning potential fogging are summarized in Figure 3.2-2, which presents contours lines on a map showing the extent and number of hours in which fogging may be a potential impact to the local area. Based upon the contours it can generally be concluded that

- plume induced ground level fog would occur for less than 1 hour per year on U.S. Highway 12 and the county access road running through the project site; and
- plume induced ground level fog would occur infrequently (for approximately 4 to 5 hours per year) on Dodd Road.

In cold weather, a cooling tower plume would typically persist until the air exiting the cooling tower sufficiently mixes with the surrounding cooler, drier air. If the plume returns to ground level prior to dissipating, it can cause localized fogging or icing of downwind structures and roadways. In order for roadway icing to occur, the cooling tower plume needs to touch down on the road surface, the plume must become condensed, and the temperature of the road surface must be below freezing. The SACTIP model was used to assess icing of the area surrounding the project site, including local roadways (U.S. Highway 12, the county access road running through the project site, and Dodd Road) due to the project's cooling tower plumes. Three years of local meteorological data from the Boise Cascade Corporation Wallula Mill meteorological monitoring station and City of Pasco Airport were used with the SACTIP model for this analysis. For the 3-year period analyzed, icing was not projected to occur.

While the conditions for icing did not occur during the 3-year period evaluated with the cooling tower plume model, the potential for icing on the local roads still exists. Under meteorological conditions of moderate to high winds in the direction of the roadways, low dew-point depression, and low temperatures (below freezing) icing could occur. However, due to the infrequent occurrence of these conditions, if icing were to occur it would be of short duration.

Cooling Tower Plume Droplet Deposition. Local farmers have expressed concern that water droplets emitted from the cooling towers could settle onto nearby agricultural land and possibly retard drying of harvested alfalfa. However, the SACTIP model indicated this is unlikely to occur. The model predicted that the average monthly deposition of water droplets onto the nearest agricultural parcels within 0.25 mile of the plant boundary would be equivalent to only 0.0005 inch per month of rainfall. This additional water deposition would be insignificant compared to the normal rainfall during the summer and autumn months (0.5 to 1.0 inch per month).

Increase in Relative Humidity. Local farmers have expressed concern that water vapor emitted by the cooling towers could increase local humidity during the late growing season and retard drying of harvested alfalfa and hay at nearby agricultural parcels. This is unlikely because the amount of water vapor emitted by the cooling towers is only a small fraction of the naturally occurring water vapor that blows past the plant site. The cooling towers would emit 4.4 mgd of water vapor. However, on an average summertime day, an estimated 250 mgd of naturally occurring water vapor blows past the site (based on an average summertime relative humidity of 41%, average temperature of 56^{o}, and average wind speed of 9.8 miles per hour). The cooling towers would add only about 1/50 of the naturally occurring humidity, so it is unlikely that the additional water vapor would increase regional humidity.

Cooling Tower Steam Plume Salt Deposition. As the droplets of moisture in the plume evaporate, particulates form which would be deposited on areas adjacent to the Wallula Power Project. These particulates represent salts that naturally occur in the groundwater that would be used to make up the cooling tower's water circulating system.

In general, the quantity of the total dissolved solids, rather than specific chemical composition, determines the impact from deposition onto plants. Field studies of agricultural crops in a dry climate have shown that when cooling tower salts are applied at deposition rates of 3 to 4 kilograms per hectare per month (kg/ha/mo) to sensitive species such as corn, significant (10%) reduction in yield may occur. However, natural vegetation is generally more resistant than crop plants to damage from salt deposition.

Figure 3.2-3 shows the rate at which the particulates from the cooling tower would be deposited in the local area. Over 99% of the particulates would be deposited within 100 meters of the cooling towers. The cooling towers would be located adjacent to the J.R. Simplot Company feedlot where the prevailing winds would carry the drift if it extends off-site. Drift falling on the bare feedlot ground would not impact plant life.

Deposition rates modeled for the proposed cooling towers projected a maximum total salt deposition of 1,427 kg/ha/mo at a distance of 50 meters from the wet mechanical-draft cooling towers. This places the maximum deposition within the facility boundaries and approximately 180 meters inside the closest property fence line. Deposition rapidly falls off at distances of 100 meters or more from the cooling towers.

The modeling showed that salt deposition rates at the agricultural parcels south of Dodd Road would be less than the impact thresholds. The modeled salt deposition rate at the nearest alfalfa field due north of the plant (300 to 1,200 meters from the cooling towers) averaged 0.5 kg/ha/mo. The modeled salt deposition rate at the nearest cherry orchard northwest of the plant (500 to 1,500 meters from the cooling towers) averaged less than 0.1 kg/ha/mo. These modeled deposition rates are less than the threshold rates of 3 to 4 kg/ha/mo believed to affect agricultural plants (including cherry orchards), and it is concluded that the cooling towers would not adversely affect the nearest agricultural parcels.

The modeled salt deposition rates at the nearest alfalfa field and orchard north of Dodd Road (1,200 to 2,000 meters from the cooling towers) averaged less than 0.05 kg/ha/mo. These modeled deposition rates are less than the threshold rates of 3 to 4 kg/ha/mo known to affect agricultural plants.

Deposition rates along the adjacent J.R. Simplot Company feedlot property line would range from 1.15 to 0.5 kg/ha/mo. Deposition rates within the J.R. Simplot Company feedlot area would decrease rapidly from these levels and are not expected to be significant (see Figure 3.2-3).

Greenhouse Gases

Greenhouse gases are described in Section 3.17, Cumulative Impacts.

There would be no significant air quality impacts anticipated with the operation of the water supply pipeline, transmission line, or gas pipeline. Maintenance vehicles operating on unpaved access roads would generate minor amounts of dust.

3.2.3 Impacts of Alternatives

3.2.3.1 Alternative Tower Height and Longer Span Design

This alternative would not substantially change the air quality impacts compared to the proposed alternative.

3.2.3.2 Alternative Alignment near McNary Substation

This alternative would not substantially change the air quality impacts compared to the proposed alternative.

3.2.3.3 No Action Alternative

Under the No Action Alternative, the proposed project would not be built. No air quality impacts associated with the proposed project would occur. No acreage currently in cultivation and contributing to PM10 serious nonattainment in the project area would be converted to an alternate usage.

3.2.4 Mitigation Measures

3.2.4.1 Construction

No mitigation measures other than those included as part of the project design are warranted to comply with state regulations for reduction of fugitive dust.

3.2.4.2 Operation and Maintenance

Greenhouse Gas Emissions

Currently, there are no international, national, state, or local regulations that set numerical limits on greenhouse gas emissions. However, the Washington State rule relating to siting energy facilities (WAC 463-42-225, Proposal – emission control) requires the applicant to demonstrate that highest and best practicable treatment for control of emissions is used for a number of air pollutants including CO_2. The Washington regulation does not specify how to quantify "highest and best practicable treatment" for CO_2.

Based on the lack of any current numerical emission limits for greenhouse gas emissions, the applicant does not propose any greenhouse gas mitigation beyond the use of the inherently efficient combined cycle combustion turbines. The Application for Site Certification specifies that the applicant will comply with all future greenhouse regulations when they are promulgated.

It is uncertain whether the applicant's proposal to provide no greenhouse gas mitigation satisfies the WAC regulation requiring "highest and best practicable treatment." To provide perspective on this issue, greenhouse gas offset programs within the Pacific Northwest were evaluated. Other independent power projects, electric utilities, and regulatory agencies in the Pacific Northwest have implemented greenhouse reduction programs to offset emissions from new combined cycle combustion turbine power plants. The greenhouse gas elimination targets for other existing programs are described below.

- The State of Oregon's target is a 17% reduction compared to the most efficient power plant operating in the United States.
- Seattle City Light's greenhouse gas program cites a target of 100% elimination of net future increases of greenhouse gas emissions from all new fossil fuel generating stations added to the city's generating mix (Seattle City Light 2001).
- BC Hydro plans to contract with third-party organizations to procure off-site greenhouse gas projects to offset 50% of the increase in greenhouse gas emissions from two new natural-gas fired electrical generating stations on Vancouver Island, up through the year 2010. (BC Hydro 2001). The year 2010 was specified in the Kyoto Protocol as the date upon which signatory nations must reduce their greenhouse gas emissions. Presumably, new emission reduction programs enacted in response to the Kyoto Protocol (or similar rules) would take effect after BC Hydro's voluntary offset program expired in 2010.
- EFSEC required greenhouse gas offsets for 8% of the overall emissions from the Chehalis Power Project in Washington.
- Another power project that is currently undergoing EFSEC review (the Sumas Energy 2 Generating Facility at Sumas, Washington) has proposed to pay greenhouse gas emission fees of $0.57 per ton of CO_2 emissions. Those emission fees would provide funding to offset an estimated 6% of the plant's greenhouse gas emissions.

Criteria Pollutants (BACT and LAER)

The emission rates and PM10 emission offsets described in Section 3.2 are based on the applicant's proposed emission controls for BACT, LAER, and ERCs. The applicant's proposals are in the PSD permit application currently being reviewed by EFSEC and EPA. It is possible that the agencies could stipulate more stringent emission controls than are described in this document.

3.2.5 Significant Unavoidable Adverse Impacts

Controlled emissions from the Wallula Power Project could combine with emissions from other existing and proposed industrial facilities and contribute to cumulative air quality impacts along the eastern Cascade Mountains. Cumulative impacts are evaluated in Section 3.17.