3.5 Air Resources

The proposed power plant would be a major source of air emissions and require a construction permit under the federally mandated PSD regulations. Since the source would be located on land governed by the Confederated Tribes of the Umatilla Indian Reservation, the PSD permit must be submitted to and approved by the regional office of the USEPA (Region X) in Seattle, Washington.

The PSD application requires analysis of best available control technologies ***(BACT)*** and an assessment of impacts of the plant's maximum emissions on the federal ambient air quality standards (Title 40 of the CFR, paragraph 52.21 [40 CFR 52.21]). That application has been submitted to Region X of the USEPA, and it demonstrates that the proposed facility ***would*** employ the BACT for all air pollutants and ***would*** not cause or contribute to any exceedences of all applicable ambient air quality standards. The facility also ***would*** be required to install monitoring equipment and maintain operations to ensure that it ***would*** comply with emission limits established in the PSD permit.

The proposed power plant site is located in an area that is currently designated as "attainment" for all state and national ambient air quality standards. Meeting these standards indicates that the air quality of the area with the proposed Wanapa Energy Center ***would*** meet or exceed all ambient air quality standards set to protect human health, plant and vegetation health, and ***would*** allow for future growth of farming and industrial activities in the area. The air quality analysis included within the completed PSD application demonstrates that:

- The proposed facility ***would*** not significantly deteriorate the quality of the air surrounding the proposed site;

- The emissions from the proposed operation (when added to the natural background levels of pollutants, existing farming and industrial activities, existing mobile sources of emissions, and recently permitted industrial sources) would not cause or contribute to ambient pollution levels that exceed the ambient air quality standards;

- The facility ***would*** employ BACT that meets or exceeds all recently permitted sources of electrical power in the northwest; and

- The facility ***would*** not lead to deterioration of air quality in nearby pristine areas, such as the Columbia River Gorge, Mount Hood, Mount Adams, Eagle Cap, Goat Rocks, and the Strawberry Mountains.

Under the federal regulations these demonstrations are required for all pollutants for which the source is major. The PSD permit application first identifies the major emissions, the emission units, the control technologies, the emission rates (both short-term and annual average emissions), and a dispersion modeling analysis that compares facility impacts to the applicable standards. After the application has been reviewed and public comments allowed and incorporated, the Region X office ***would*** issue a PSD permit to construct the facility in accord with the accepted application. Any changes to the facility design or operation that affect emissions or impacts would need to be addressed in a revision or update to the PSD permit, depending on the expected change in emissions or impacts. The permitting process itself is designed to ensure that the air quality impacts from this project are acceptable and are minimized to the extent that is reasonably possible.

It should again be noted that the construction and operation of the Wanapa Energy Center ***would*** not impact existing industrial or farming activities and ***would***, in fact, allow room for future growth and development of farming and industrial activities near the proposed site. Moreover, the proposed Wanapa Energy Center is a dramatic improvement over existing methods of electric generation, such as the nearby Boardman Coal Electric Generation Facility as seen below in **Table 3.5-1**.

Table 3.5-1
Comparison of Annual Emissions per Megawatt (MW) of Electricity Produced

Pollutant	Wanapa Energy Center Emissions (tons/MW)[1]	Boardman Coal Facility Emissions (tons/MW)[2]	Improvement
Sulfur Oxides	60.1	101,500.0	99.9%
Nitrogen Dioxide	318.2	42,290.0	99.2%
Particulate Matter	542.8	3,520.0	90.3%
Carbon Monoxide	146.4	2,556.7	94.3%
Volatile Organic Compounds	133.5	306.7	56.5%

[1]Based on a plant-wide electric generation capacity of 1,485 MW.
[2]Based on a plant-wide electric generation capacity of 600 MW.

3.5.1 Affected Environment

Northeastern Oregon has a dry continental climate, typical of locations in the intermountain western U.S. The location has generally low relative humidity, but has distinct seasonal changes in meteorological conditions.

3.5.1.1 Climate

Daily temperatures in January average slightly above freezing, with a wide daily range of temperatures. Temperatures are seldom below 0°F. July temperatures average around 74°F, and a typical summer has only a few days with temperatures above 100°F. The area is very dry with annual average precipitation of slightly more than 23 centimeters (9 inches). Conditions are generally dry in the summer, and most of the precipitation occurs during the winter months (November, December, January, and February). Summertime thunderstorms can occasionally produce intense, short-period rainfall that lead to localized flash flooding on rare occasions. On an annual average a total of 7.8 inches of snowfall occurs in the area, largely during the winter months. Occasionally, (5 years out of a 20-year record) the area will have no snowfall during an entire winter season; however, the area has seen rare heavy snowfall, up to about 25 inches in 1 month (January 1950).

Table 3.5-2 provides a listing of monthly mean and maximum temperatures as well as average precipitation for the Umatilla site.

Wind patterns are most important for assessing impacts of emissions. The region near the Columbia River shows a bimodal distribution of wind direction, with winds "channeled" roughly parallel to the east-west direction of the Columbia River Valley itself. With the prevailing direction of an eastward movement of storms in the area, there is a clear west-southwesterly wind component, and the easterly winds are driven largely by the colder air flow down the river valley at night. Occasional strong storms in the area show a preference for the strongest winds from the west, with the passage of low pressure systems and associated cold fronts, but strong winds can occur from any direction, particularly those related to summertime showers and thunderstorms.

Table 3.5-2
Temperature and Precipitation Data for Umatilla, Oregon[1]

Month	Temperature (°F)					Mean Precipitation (in.)	
	Avg. Max.	Daily Avg.	Avg. Min.	Highest	Lowest	Total	Snowfall
Jan	39.2	31.4	23.6	65	-22	1.20	4.7
Feb	48.1	38.5	28.9	68	-23	0.90	1.4
Mar	56.4	44.2	32.1	80	10	0.82	0.1
Apr	67.0	53.2	39.4	88	22	0.54	0.0
May	74.8	60.8	47.0	98	26	0.79	0.0
Jun	82.1	67.7	53.4	108	38	0.77	0.0
Jul	90.3	74.3	58.3	110	36	0.26	0.0
Aug	88.0	72.5	57.0	114	42	0.27	0.0
Sep	80.6	64.5	48.2	101	31	0.35	0.0
Oct	66.2	52.4	39.0	87	19	0.82	0.0
Nov	50.7	41.3	31.7	77	-6	1.03	0.2
Dec	42.7	35.7	28.6	67	-7	1.40	1.3
Annual	65.5	53.0	40.6	114	-23	9.15	7.8

[1]Source: General Climate Summary, Umatilla, Oregon 1948-1965 (www.dri.edu).

3.5.1.2 Air Quality

Local Air Quality

The air quality in the area is determined by ambient ground-level concentrations of specific pollutants. The air quality regulatory program in the U.S. (as well as within individual states and air pollution control regions) has defined acceptable standards for ambient air quality. These standards protect human health and the health of plants and vegetation. Air quality conditions are determined either through direct measurements with approved instrumentation or by indirectly modeling air quality impacts from the major sources or source groups in an area.

Monitoring data are available for a site approximately 12 miles west of the proposed plant location, and were collected by Portland General Electric at the Coyote Springs Plant near Boardman, Oregon. **Table 3.5-3** lists the air quality conditions at that location for nitrogen dioxide (NO_2), SO_2, and PM_{10}. Impacts of CO emissions are not considered significant (from this proposed source) and therefore ambient CO data are not presented. These data were collected in 1994-1995 and are considered representative of background ambient air quality conditions that include natural background concentrations of these pollutants and also includes area mobile traffic and farming activities. The table demonstrates that the existing background ambient air quality conditions are well below the applicable ambient air quality standards.

Table 3.5-3
Coyote Springs Plant On-site Air Quality Data and Ambient Air Quality Standards

Pollutant	Averaging Period	Maximum Concentration (μg/m^3)	Highest Second-High Concentration[1] (μg/m^3)	Ambient Standards (μg/m^3)
NO_2	Annual	13	--	100
SO_2	Annual	3	--	80
	24-hour	26	26	365[1]
	3-hour	55	52	1,300[1]
PM_{10}	Annual	20	--	50
	24-hour	105	81	150[1]

[1]Highest Second-High Concentration, which applies to 3-hour and 24-hour standards.

The Clean Air Act of 1970 mandated that the USEPA establish ambient ceilings for certain pollutants based on the effects of those pollutant levels on public health and welfare. USEPA promulgated standards for SO_2, NO_2, CO, particulate matter (which was originally based on total suspended particulate matter, but has been replaced by PM_{10}), ozone (O_3), and lead (Pb).

Attainment Status

Section 107 of the Clean Air Act Amendments of 1990 (CAA) requires USEPA and affected regulatory agencies to evaluate attainment of the national ambient air quality standards. Areas may be designated as non-attainment, as unclassified (for areas with insufficient data, but likely attainment), and as attainment for each specific criteria pollutant (NO_2, SO_2, PM_{10}, CO, O_3, and Pb). The unclassified areas are treated as attainment areas.

The proposed power plant is located in Umatilla County, which is currently designated and treated as an area that is in attainment for all criteria air pollutants. The nearest non-attainment areas to the plant include:

- The Wallula, Washington area, for PM_{10};
- The LaGrande, Oregon area for PM_{10}; and
- The Spokane, Washington area for CO.

Hazardous Air Pollutants

The CAA, Title III, require the evaluation of a selected list of major sources and their emissions of a specific list of hazardous air pollutants (HAPs). If a proposed facility will emit more than 10 tons/year of any one of the listed HAPs or more than 25 tons/year of the total HAP emissions, then it may be required to comply with emission limits established under the implementing regulations (40 CFR Part 63) or under the case-by-case permit review (CAA Section 112(g)). Emissions data show that the facility is a major source of HAPs, and it is expected that it ***would*** need to comply with the standards for combustion turbines (40 CFR 63 Subpart YYYY) when promulgated.

Site Configuration and Surrounding Terrain

The layout of the proposed facility and its relation to nearby terrain features can have an important impact on calculated ground-level concentrations. The terrain immediately around the plant site is fairly flat, with a steep drop in elevation from the edge of the facility to the McNary Dam Reservoir along the Columbia River. Higher terrain is seen along the northern edge of the Reservoir, approximately 8 kilometers (km) north and northeast of the proposed facility. The dispersion modeling analysis incorporates the terrain features, specifically the elevation of each identified receptor grid point, into the model. Since the prevailing winds are generally toward the east-northeast, and there is little increase in elevation in that direction, the topographic features are generally conducive to adequate dispersion of pollutant emissions from this source.

Buildings on the site can create wake effects, especially in strong winds, leading to increased ground-level concentrations near the plant site. If the power plant plumes are trapped into the building wakes, the result can lead to high concentrations near the fence line. The facility may employ Good Engineering Practice stack heights to minimize or eliminate the effects of building wake effects. These building effects on dispersion are incorporated into the dispersion modeling analysis.

Land Use

The nature of land use and surface characteristics have an effect on micrometeorological dispersion characteristics near the site. These characteristics are incorporated into dispersion models to better estimate the dispersion nature of the atmosphere around the site. The sectors around the proposed Wanapa Energy Center have been characterized as water or grassland; and those parameters have been included in the dispersion model to provide an accurate depiction of impacts.

3.5.2 Environmental Consequences and Mitigation

The construction and operation of the proposed facility would lead to emission of air contaminants and potential impacts on ambient air quality near the plant site and in the region. These matters are addressed in the air permit application (Trinity 2003), and the results of those analyses are summarized in this section. Other sources of data are cited where appropriate. The major emissions from the facility include:

- Emissions from the combustion of natural gas in the turbines and in the duct burners;
- Emissions of particulate emissions resulting from “drift” droplets in the water vapor plume of the cooling tower;
- Production of a visible plume from the cooling tower;
- Generation of localized fog near the plant site;
- Contribution to the world-wide production of atmospheric gases that may enhance global warming; and
- Generation of emissions related to construction, including the combustion of fuel from heavy equipment and the generation of fugitive dust from soil handing and exposed areas.

3.5.2.1 Emissions and Compliance with Regulatory Standards

Emissions from the Combustion Turbines and Duct Burners

The combustion of natural gas in the turbines generates a very hot exhaust plume, which, in turn, is used to generate steam for operating a steam turbine that is tied to a generator to produce electricity. The performance of the steam turbine can be enhanced by further heating the exhaust plume with a duct burner. The steam turbine generates power from heat that would normally be lost from the turbine exhaust. This method of electric generation produces as much electricity as possible with the same amount of fuel burned since the facility ***would*** take advantage of the hot exhaust gases to produce additional energy in the steam turbines. This additional electricity produced in the steam turbines does not create any additional emissions to the atmosphere. The combined exhaust from the turbine and its associated duct burner are routed to a single stack. Under normal maximum load operations the exhaust plume is about 164°F (346°K) as it exits the stack. The ambient conditions (temperature especially) affect the combustion conditions in the turbine and thereby affect the constituents of the exhaust plume. The emission rates also vary with the "load" on the turbine and the use of the duct burner.

The emissions and impacts of turbine/duct burner operation are the major air quality issue related to obtaining a permit for the facility. The maximum emission rates for each of the criteria pollutants are summarized in **Table 3.5-4**. The emission rates have been demonstrated to comply with BACT requirements, other emission limits, and meet all applicable ambient standards as discussed in the following sections. The permit application included an analysis of emission rates and impacts for each of three ambient temperatures (maximum 109°F, average 52.2°F, and minimum –20°F), at loads ranging from 100 percent to 50 percent of the turbine rating, and both with and without supplemental duct firing at 100 percent load. The maximum short-term impacts were determined to occur at normal temperatures under full load with duct firing. Annual maximum emissions include all four units, at full capacity on the turbines, with duct firing for a combined level of 6,800 hours per year facility-wide. These emission rates were used in modeling the impacts from the proposed facility, because they showed the highest impact.

Table 3.5-4
Summary of Emission Rates of Criteria Air Pollutants from Combustion Turbine/Duct Burner Sources

Pollutant	Emission Rate (ppmvd @ 15% O_2)	Emission rate per CTG (lb/hour)	Combined Units (ton/year)
NO_x	2.0	***33.42***	***588.00***
SO_2	0.5 gr/100 standard cubic feet (scf) in gas	3.25	***56.90***
PM_{10}	Not established	31.04	***548.00***
CO	2.0	10.5	108.70
H_2SO_4 Mist	Not established	2.49	***43.60***
VOC	Not established	17.41	99.15

Emissions of NO_x and CO are mitigated for the combustion turbine/duct burner sources, in response to the requirements of the BACT analysis. Project design includes installation of a SCR system for NO_x emissions. SCR includes: 1) ammonia injection into the exhaust gases prior to emission to the atmosphere and 2) a specially designed catalyst bed in the exhaust stream that promotes the formation of gaseous molecular nitrogen and water vapor from the ammonia and NO_x mixture. The proposed project also includes installation of a catalyst for control of carbon monoxide emissions. The air permitting process provides a thorough technical review of the emission rates and costs for installing these controls. These controls reduce emissions to levels that are as low or lower than controls that are currently applied to new identical sources across the U.S. No other cost effective control technologies would achieve similar or lower emissions.

Table 3.5-5 provides a comparison of control technologies utilized in recently permitted facilities in both Oregon and Washington. This table again demonstrates that the proposed Wanapa Energy Center ***would*** be controlled by control technologies that are equal to, or better than, similar, newly permitted power plants.

The proposed power plant air permit application demonstrates compliance with the full range of applicable requirements, with the proposed emission rates, as discussed below.

Table 3.5-5
Comparison of Emissions Controls of Recently Built and Proposed Power Plants

Facility	Nitrogen Oxides Emissions and Controls	Carbon Monoxide Emissions and Controls
Wanapa Energy Center	**2.0 ppm – Selective Catalytic Reduction**	**2.0 ppm – Oxidation Catalyst System**
Wallula Power Plant	2.5 ppm – Selective Catalytic Reduction	2.0 ppm – Oxidation Catalyst System
Port Westward, PGE	2.5 ppm – Selective Catalytic Reduction	4.9 ppm – Oxidation Catalyst System
Umatilla Generating	2.5 ppm – Selective Catalytic Reduction	6.0 ppm – Oxidation Catalyst System
Summit Westward, Westward Energy	2.5 ppm – Selective Catalytic Reduction	4.0 ppm – Oxidation Catalyst System
Plymouth Generating	2.0 ppm – Selective Catalytic Reduction	2.0 ppm – Oxidation Catalyst System
Fredrickson Power	3.0 ppm – Selective Catalytic Reduction	7.0 ppm – Oxidation Catalyst System
Satsop Power	2.5 ppm – Selective Catalytic Reduction	2.0 ppm – Oxidation Catalyst System
Sumas Energy 2	2.0 ppm – Selective Catalytic Reduction	2.0 ppm – Oxidation Catalyst System

New Source Performance Standards

The USEPA has promulgated a set of national emission standards for a selected list of major sources, under Title 40 of the CFR, Part 60 (40 CFR 60). Various subparts of that rule apply to the proposed project.

- Subpart Da (Standards of Performance for Electric Utility Steam Generating Units)

  This subpart lists emission standards for particulate matter, NO_2 and SO_2, along with monitoring requirements, testing, reporting, and recordkeeping requirements. The standards apply to units with a heat input capacity greater than 250 Million British Thermal Units (MMBtu) per hour. The heat recovery steam generating units, including the duct burners, have a heat input capacity of 546.2 MMBtu/hour at the highest operating scenario. The emission standards for Particulate Matter do not apply to gas-fired boilers. The emission standards for SO_2 are met by firing natural gas that has a maximum sulfur content of 0.5 grain per 100 dry standard cubic feet. The NO_x emission standards are 0.2 lb/MMBtu on a rolling 30-day average. Each unit at the proposed facility duct firing ***would*** meet this limit at about 0.064 lb/MMBtu.

The New Source Performance Standards also require monitoring for NO_x, and the facility is proposing to install a continuous emissions monitor for NO_x emissions (along with oxygen and CO_2) in accord with the regulation. Compliance testing ***would*** be required for NO_x and particulate matter along with opacity. Records of emissions data ***would*** be maintained on site for 2 years. Reports ***would*** include quarterly reports of excess emissions (if they occur).

- Subpart GG (Standards of Performance for Stationary Gas Turbines)

This subpart lists emission limits for SO_2 and NO_x for combustion turbines. The NO_x standard is based on a formulation in the rule, providing an emission rate based on the size of the turbine and on fuel-bound nitrogen. The calculated limit is 203 parts per million by volume, dry (ppmvd) at 15 percent oxygen, while the proposed limit is 2.0 ppmvd at 15 percent oxygen, well within the requirement. The SO_2 limit is based on a fuel sulfur content (0.8 percent by weight), and the natural gas sulfur content is about 0.003 percent sulfur by weight, based on 1 grain per 100 scf of natural gas. Again, the sulfur compliance is well within the required limits.

The facility ***would*** propose and plan to institute a custom fuel monitoring program, as allowed under the regulation. Fuel sulfur content data ***would*** be reported to USEPA Region X in accord with an accepted schedule. The continuous emission monitor for nitrogen oxides ***would*** meet any monitoring requirements for NO_x emissions for this source. An initial compliance test ***would*** be conducted as required by the regulation.

Permitting Under the PSD Program

The PSD program, as promulgated under 40 CFR 52 (paragraph 52.21) applies to the proposed project. A PSD application has been submitted in accord with those requirements. PSD review is triggered initially for the source and subsequently by pollutant, for those pollutants that are emitted above a specified significant emission rate. The PSD process is conducted in the following sequence:

- Is the proposed facility a major source?

  A new source is major if it has the potential to emit any of the regulated pollutants above the established major source threshold. The threshold is 100 tons/year for a list of source categories and 250 tons/year if the source is not listed. Since the facility includes a steam electric generation unit, which is a listed source category, the major source threshold is 100 tons/year of any (at least one) criteria pollutant. The proposed plant ***would*** exceed the major source threshold for NO_x, PM_{10}, and CO. Therefore the construction of the facility requires the issuance of a PSD permit from the relevant regulatory agency (USEPA, Region X).

- Is the facility in an attainment/unclassified area?

  For a source that is proposing to be located in an area that is classified as attainment, or as unclassified, the PSD regulations apply. If the source were locating in an area that is non-attainment for one or more pollutants, the New Source Review requirements for non-attainment areas would apply. The proposed area is attainment or unclassified for all criteria pollutants, and therefore the PSD regulations would apply.

- What pollutants are emitted above the significant emission rate?

  Significant emission rates are established for each of the criteria air pollutants, as well as for additional regulated pollutants. The significant emission rate for NO_x, SO_2, and VOCs is 40 tons/year; for CO it is 100 tons/year; for PM_{10} it is 15 tons/year, for lead it is 0.6 ton/year. The significant emission rates are established for sulfuric acid mist, hydrogen sulfide, total reduced sulfur compounds, and others. The proposed facility ***would*** exceed the significant emission rate for NO_x, SO_2, CO, PM_{10}, VOCs, and sulfuric acid mist.

PSD regulations require several analyses that must be completed for the pollutants emitted above the significant emission rate. Those analyses include an air quality impact analysis, a BACT analysis, a review of background concentrations, and a summary of regulatory requirements.

Table 3.5-6
Other Federal Applicable Requirements for Air Quality

Federal Program	Applicability
Acid Rain Program	
40 CFR Parts 72 and 75	The facility ***would*** be subject and ***would*** need to obtain an acid rain permit. The facility must obtain allowances for SO_2 emissions and must conduct monitoring, reporting, and recordkeeping for SO_2 and NO_x as required by the regulations.
Title V Operating Permit	
40 CFR Part 71	The facility emits over 100 tons/year of any criteria air pollutant, and ***would*** be required to obtain a Federal Operating Permit under 40 CFR 71. A complete and timely application must be submitted to USEPA Region X within 12 months of the start of operation.
Compliance Assurance Monitoring	
40 CFR Part 64	The facility would need to develop a compliance assurance monitoring (CAM) plan for each pollutant that: 1) has a federally enforceable limit, 2) uses a control device to achieve that limit, and 3) has a pre-control potential to emit more than the major source threshold for that permit. The facility ***would*** not need a CAM plan for NO_x emissions because the monitoring is required by the acid rain program, but it ***would*** need a CAM plan to monitor its CO emissions.
Risk Management Program	
40 CFR Part 68	The program requires a risk management plan for sources that store or maintain on site a quantity of a listed substance that is above the stated threshold. The only concern is the ammonia storage for the operation of the SCR. Since the facility is planning to use aqueous ammonia, with a concentration less than 19 percent by weight, this program ***would*** not apply.
National Emission Standards for Hazardous Air Pollutants	
40 CFR Part 63	A federal standard for Maximum Achievable Control Technology (MACT) ***was promulgated on March 4, 2004,*** for combustion turbines (Subpart YYYY). ***In parallel with the rule promulgation, USEPA proposed delisting of gas-fired turbines from the rule. The Wanapa Energy Center would comply with the applicable requirements, if any, of this rule when it begins operation.***
CAA Section 112(g)	This case-by-case MACT standard applies to major sources of HAPs for which no applicable standard has been promulgated. ***A final MACT standard has been issued for combustion turbines (Subpart YYYY); CAA Section 112(g) does not apply.***
Ozone Depleting Compounds	
40 CFR Part 82	The facility ***would*** need to comply with requirements for handling, storing, and disposing of a regulated list of ozone-depleting compounds.

Emissions from Other Sources

Besides the emissions from the Combustion Turbine and Duct Burner sources, the application included modeling of emissions from support units at the site. Chief among those sources are the individual cooling tower cells that are installed in one cooling tower to the southeast of the main combustion sources. Cooling towers dissipate heat from the heat recovery steam generating system by evaporation of cooling water into the atmosphere. This evaporation cools the cooling water droplets in the cooling tower. As the cooling tower operates it generates a small amount of "drift," in the form of small droplets that are entrained into a plume of water vapor from each cooling tower cell. The drift is minimized by installing very efficient cooling tower drift eliminators, which for this project have a drift rate of 0.0005 percent of the total circulating cooling water.

The water vapor is not a regulated emission; however, the drift droplets ***would*** contain a small amount of suspended and dissolved solids (usually inert salts) that lead to the formation of particulate matter (PM_{10}) after the drift droplet is evaporated. The cooling tower drift ***would,*** therefore***, be*** a source of PM_{10} emissions that are regulated by the air permit. Each cell ***would*** represent a source of PM_{10} emissions (no other pollutant emissions) that were included in the model. The total cooling tower emission rate ***would be 2.03*** pounds/hour of PM_{10} or 8 tons/year of PM_{10}. Those emissions as well as the cooling tower "stack" parameters were included in the modeling analysis.

The application also addressed emissions of "refrigeration modules" that were attached to each unit. However, those units ***would*** not be installed. The modeling results included those impacts, which would generally be very small in comparison to the turbine/duct burner emissions, and would be limited to periods when the associated inlet chilling operations were being used. Modeling results have not been modified to account for this reduction in emissions, largely because the expected changes from removing those sources would be very small and would reduce ambient impacts.

Other Federal Permitting Requirements

The proposed facility ***would*** be reviewed for applicability under several additional federal programs. These are listed in **Table 3.5-6**, along with expected applicability of each standard or program. In some cases the standards are not finalized, or the final design or emission rates may lead to a different interpretation. The PSD permit application has identified these requirements and included commitments to meet the applicable requirements as the project is installed and begins operation.

3.5.2.2 Project Air Quality Effects

Construction Equipment Emissions and Fugitive Dust

During construction the activities ***would*** include disturbance of the land surfaces and storage of materials and soil piles on site, as well as from operation of heavy diesel fired equipment. These short-term emissions are exempt from permitting requirements on the site.

Construction emissions include exhaust from diesel engines. The total emissions from this equipment is expected to be very small in comparison to the total vehicular traffic in the region. To reduce combustion emissions, idling of construction equipment would be minimized (shut off when not operating) and engine tune-ups ***would be*** required for any equipment that is maintained on site for more than 60 days.

Fugitive dust would be generated by grading, excavation, and soil handling, including storage piles. Some of the dust particles would be carried off the plant site during windy and dry conditions. Since these emissions occur at ground level, and involve particles that are relatively large, the impact of these emissions ***would be*** felt very near the plant site. Impacts ***would*** rapidly decrease with distance from the site.

The following measures ***would*** be employed to mitigate fugitive emissions:

- During construction in dry weather, and during windy periods when site generated dust plumes are observed off site, the facility ***would*** water the disturbed construction areas twice daily. Haul roads that carry active traffic ***would*** be watered twice daily.

- Stored soil piles ***would*** be stabilized with water to create a crust layer that impeded emissions of fugitive dust.

- Vehicle speeds on unpaved project areas would be limited to 20 miles per hour (30 km/hour).

Plant Operations

Because the PSD review triggers this analysis, a formal series of modeling efforts were performed and included in the PSD application. Three separate impact, or modeling, analyses may be required, including:

- A “significance analysis” that evaluates only the emissions from the proposed project, and is used to determine whether the project’s impacts are “significant.” The source parameters are used, along with characterizations of building downwash, stack data, established receptors at the fenceline and around the site, and meteorological data to determine the maximum impact for each triggered pollutant. Impacts that are above the monitoring significance threshold also require collection of ambient air quality data that is representative of site conditions at the time of the permit application. A significant impact area is determined in this analysis as well, based on the maximum distance to the significant impact level (at the established receptors) plus 50 km.

- An analysis of compliance with National Ambient Air Quality Standards (NAAQS). For those impacts above the significant impact threshold, perform an analysis of impacts on NAAQS is required. This impact analysis is a cumulative dispersion modeling analysis, which includes: 1) emissions from the proposed source; 2) emissions from existing sources (including existing farming, natural, mobile, and industrial emissions); and 3) emissions from recently permitted industrial sources. The impacts are analyzed using the dispersion modeling data for comparison to ambient standards for all pollutants that have impacts above the significant impact threshold.

- An analysis of consumption of PSD increments. For those pollutants with impacts above the significant impact level, a baseline area and baseline date are determined. All major and minor sources within the significant impact area, that received permits to increase emissions since the baseline date, are included in analysis of PSD increment consumption. PSD increments exist for NO_2, SO_2, and PM_{10}. Other pollutants are not regulated by PSD increments. The modeled impacts from these sources, including the reduction in emissions from any enforceable changes to emissions since the baseline date, are then compared to the established PSD increments for both the Class II areas and Class I (pristine areas such as National Parks) areas.

- An analysis of air quality related values at Class I areas. For the nearby Class I areas, the modeling effort should address specific values such as impacts on visibility and on acid deposition. This analysis applies to Class I areas, and is not restricted by ambient air quality impacts.

Ambient air quality impacts were analyzed for the range of applicable requirements. For the turbine and duct burner sources, the analysis selected the individual cases in which the impacts were greatest. (Occasionally, the impacts are greatest when the source is not at full operation, because the plume rise is lessened, even though the emissions also are reduced.) The regulatory guideline model, ISCST3 PRIME, was used to provide this screening analysis, and select those cases for which the maximum impacts were determined.

The full impact analyses were conducted with the regulatory guideline AERMOD-PRIME model, because model development data show that this model is superior to ISCST3 in its assessment of winds around terrain features. Five years of meteorological data (wind speed, wind direction, temperature) that were collected at the Umatilla Army Depot (1995-1999) were used in conjunction with upper air data, from the Hanford Nuclear site and from Spokane Washington, to model these impacts. The Umatilla site is less than 5 miles (8 km) from the proposed plant site, and with no intervening topography, would provide representative meteorological wind data for modeling purposes. Atmospheric stability category data were not available from the Umatilla site, and were developed from the nearby National Weather Service Station at Walla Walla, Washington.

Specific sources were modeled as separate point sources, including each of the four turbine/duct firing stacks, and each of the cooling tower cells.

Table 3.5-7 provides the results of the significant impact analysis, which would address the emissions from only the proposed plant. This table shows the maximum modeled impact, along with the significant impact threshold, and the monitoring impact threshold. The results show that the proposed facility has an insignificant impact for SO_2 and CO emissions but subsequent analyses must be conducted for NO_2 and PM_{10}. The table also shows that the impact for PM_{10} emissions is above the monitoring impact threshold, normally requiring a monitoring program for PM_{10}. However, there are sufficient PM_{10} ambient data in the region to provide a representative background concentration of PM_{10} levels.

Based on these results, the impacts were analyzed for comparison to the NAAQS and PSD increments for NO_2 and for PM_{10}.

Table 3.5-7
Significant Impact Analysis

Pollutant	Averaging Period	Maximum Modeled Concentration (μg/m^3)	Significant Impact Threshold (μg/m^3)	Significant Impact for this Pollutant?	Monitoring Impact Threshold (μg/m^3)
NO_2	Annual	***2.25***	1	Yes	14
SO_2	Annual	0.21	1	No	None
SO_2	24-hour	1.72	5	No	13
SO_2	3-hour	6.82	25	No	None
PM_{10}	Annual	***4.14***	1	Yes	None
PM_{10}	24-hour	***19.23***	5	Yes	10
CO	8-hour	17.86	500	No	575
CO	1-hour	84.55	2,000	No	None

The analysis for compliance with the NAAQS was conducted using the same meteorological data set and receptor grid that were established for the significant impact analysis. The model included emissions from existing and recently proposed nearby industrial sources, along with accepted estimates of background concentrations, which includes natural background pollutant concentrations, existing farming operations, and existing mobile sources of emissions. All known sources were included in this analysis.

The analysis for compliance with PSD increment consumption identified those sources that consume PSD increment also were conducted. The AERMOD model was used to assess impacts in the nearby Class II areas, and a separate modeling effort, using the guideline model CALPUFF, with its associated pre- and post-processing algorithms, was used to assess impacts at the specific Class I areas. Those areas are:

- Eagle Cap Wilderness Area (WA)
- Goat Rocks WA
- Mount Adams WA
- Strawberry Mountain WA
- Columbia Gorge (designated area)
- Mount Hood WA

Modeling for Class I impacts used the guidance that has been provided by the Federal Land Manager's Air Quality Workgroup for assessing impacts on PSD increments in Class I areas.

Table 3.5-8 lists the relevant NAAQS and the modeled impacts for those pollutants, along with the relevant Class II PSD increment and their modeled impacts (at the maximum impact area).

Table 3.5-8
Modeled Maximum Impacts Compared to NAAQS and Class II PSD Increments

Pollutant	Averaging Period	NAAQS (Data in µg/m³)				Class II PSD Increments (Data in µg/m³)	
		Modeled[1]	Background[2]	Total	NAAQS	Modeled	PSD Increment
NO_2	Annual	7.24	13	20.24	100	7.24	25
PM_{10}	Annual	8.86	20	28.86	50	8.86	17
PM_{10}	24-hour	27.33	105	132.33	150	27.33	30

[1]The modeled concentration includes impacts from the proposed operation of the Wanapa Energy Center, existing industrial emission sources, and proposed industrial emission sources.
[2]The background concentration includes emissions from existing farming activities, mobile sources, and natural pollutant concentrations.

Table 3.5-9 provides a list of maximum PSD increment analyses for NO_2 and PM_{10} for Class I areas. The results show the greatest impact at any of the listed receptor areas. Impacts at other Class I areas, are less than these levels, and as can be easily deduced, all are below the PSD significance threshold. No additional air quality modeling of impacts at the Class I areas is required.

Table 3.5-9
Maximum Modeled Impacts at Class I Areas and PSD Increments

Pollutant	Averaging Period	Modeled Impact (µg/m³)	Class II Significant Impact (µg/m³)	Allowable PSD Increment (µg/m³)	Location of Maximum Impact
NO_2	Annual	0.0005	0.1	2.5	Columbia Gorge
PM_{10}	Annual	0.0029	0.2	4	Columbia Gorge
PM_{10}	24-hour	0.085	0.3	8	Mount Adams

The Class I analysis also requires an evaluation of air quality related values, to include an assessment of impacts on visibility and on soils (acid deposition) at each area.

The deposition of both nitrogen-based acidic compounds and sulfur-based acidic compounds was analyzed for each site. The sulfur deposition is much less than the nitrogen deposition rates. The maximum nitrogen deposition was determined to be 0.00025 kg/hectare-year at the Columbia Gorge. The threshold for a significant impact is 0.005 kg/hectare-year for nitrogen based acidic compounds. Impacts are well below that threshold at any receptor in any of the Class I areas.

The impacts on visibility resources at Class I areas is calculated using the estimated maximum extinction percent over a 24-hour period. If the maximum extinction is below 5 percent of a “clean” background (natural) extinction level, for all of the modeled days, the impact is determined to be insignificant. Impacts at all Class I areas were below this threshold. There were no days in any of the Class I areas that had an average change in extinction of 5 percent or more. The maximum 24-hour extinction was 2.37 percent at Mount Adams.

Startup Emissions

Operational requirements, as well as demand for electric power, may lead to the startup or shut-down of any of the turbines or any of the duct burners. The operators have the flexibility to fire any or all units, and to operate the turbines at less than full load, in order to tailor production to current demand. Pollutant emissions during startup can exceed the normal operation emission rates, due largely to the fact that control equipment has not reached its optimum operating temperature. CO is the main constituent of concern regarding startup emissions, because the startup events are of short duration, CO emissions are known to be higher during startup, and there are short term (1-hour and 8-hour) standards that apply to CO. The permit application has demonstrated that the emissions of CO during startup lead to an impact that is less than the established significance levels for these standards. Therefore, such emissions would not have a significant impact on ambient air quality.

Cooling Tower Water Vapor Plumes

Cooling towers release water vapor into the atmosphere along with a small amount of water droplets. A recent application has analyzed cooling tower water vapor plume formation, specifically addressing the development of icing and fogging conditions that can occur during very cold weather. Results showed that cooling tower fogging or icing was not predicted to occur as a result of the operation of a similar cooling tower. It also should be noted that the proposed cooling towers ***would*** not be placed near any public roadways where fogging or icing could cause potentially hazardous conditions. Under the proposed design measures, cooling tower fogging and icing are not predicted for this project. No mitigation measures are planned to address this impact.

Cooling Tower Drift

Cooling towers also generate a small amount of "drift" as discussed above. The proposed drift eliminators, designed to reduce drift to 0.0005 percent of total circulating water, are comparable to the best performing drift eliminators that are in operation. The proposed dissolved and suspended solids concentration in the drift, at approximately 1,700 parts per million by weight, is low compared to the concentrations in other cooling tower operations. Given the low emission rates of PM_{10} resulting from these drift droplets, and the anticipated low level of impact, there are no mitigation measures proposed to further reduce drift and PM_{10} emissions from the cooling towers.

Greenhouse Gases

The project would generate large amounts of CO_2, resulting from the combustion of natural gas in the turbines and duct burners. CO_2 is a "greenhouse gas" that has the potential to contribute to global warming. There are no specific federal requirements to mitigate impacts of CO_2 emissions from the proposed facility. The use of natural gas to generate electricity from a combined cycle power plant is perhaps the most efficient method to generate electricity using fossil fuels. Recent studies, including the analysis provided for the Umatilla Generating Station, showed that the efficiency of electric generation with a similar combined cycle natural gas fired power plant was sufficient to meet the requirements of the State of Oregon's CO_2 emission standard for energy facilities. The proposed project would provide a similar level of efficiency. No mitigation measures are proposed for this project.

3.5.3 Proposed Action Impact Summary

Project construction would result in disturbance and handling of surface soils at the plant site and along the pipeline corridors, access road, and transmission line route. By implementing dust control measures, the impacts of construction-related fugitive dust would be minimized. The construction activities would include periodic watering of haul roads and storage piles during periods of observed fugitive dust transport off the site. Traffic speed limits would be established and may be specifically constrained during dry periods when fugitive dust is generated. Once constructed, the soil storage piles ***would*** be stabilized, roadways graveled or hard-surfaced, and exposed areas would be reclaimed or revegetated with native species or with special plantings that are maintained.

The air emissions from of project operation ***would*** include the discharge of air pollutants from the main stacks of the combustion turbines and duct firing units. The proposed project is classified as a major source and would be regulated under the PSD program and the Title V operating permit program. The facility must demonstrate continuous compliance with emissions of NO_x, CO, and SO_2 from these sources, and must perform periodic monitoring of other pollutants including PM_{10} and VOCs.

The facility ***would*** utilize "state of the art" pollution controls including selective catalytic reduction of NO_x emissions and the use of a CO oxidation catalyst. The permit application has demonstrated that the facility ***would*** install BACT for NO_x, CO, SO_2, and PM_{10}. This level of BACT is equal to or better than all recently permitted power production facilities in the Pacific Northwest. The facility also ***would*** produce power in a very efficient and clean way with the use of steam turbines producing power from the hot exhaust gases of the combustion turbines that would otherwise be wasted. The facility also would install high performing drift eliminators on its cooling tower emissions.

The dispersion modeling for the air permit application shows that impacts of these emissions are below established significance levels for CO and SO_2. The dispersion modeling also demonstrates that predicted pollutant concentrations are well within allowable ambient air quality standards and PSD increments for NO_2 and PM_{10} including impacts from existing industrial and farming activities, recently permitted industrial activities, existing mobile sources of emissions, and natural sources of emissions. This therefore indicates that the operation of the Wanapa Energy Center ***would*** not affect any existing industrial or farming activities and also ***would*** allow for any future growth of possible farming or industrial activities. The modeling also addressed impact on nearby pristine (Class I) areas and demonstrated acceptable impacts on visibility, soils (acid deposition), and vegetation within those areas. The operation of the proposed facility would not cause or contribute to an exceedence of any established air quality standard and would not adversely impact air quality related values.

In summary, the Wanapa Energy Center is a very clean and good alternative to older methods of electric generation, such as coal-fired power plants. Also, the Wanapa Energy Center ***would*** meet or exceed emission controls that have been implemented at similar facilities in the Pacific Northwest. And finally, the operation of the Wanapa Energy Center ***would*** not cause or contribute to any exceedences of any established air quality standards and ***would*** not hinder existing or future farming or industrial activities.

3.5.4 Component Alternatives Impact Summaries- Air Quality

The relative air quality effects of the component alternatives would be nearly the same as the Proposed Action for the gas/water discharge pipelines, transmission line alternatives, and the water supply line. It is likely that fugitive dust generation would be slightly greater for the longer pipeline routes that cross croplands and shrublands lands (Alternatives 2 and 4). Construction equipment emissions would depend on the length of the construction period for each pipeline alternative, which are presently unknown. Construction of Alternatives 5 and 6 in the county roadways may result in lower fugitive dust generation, but the construction period may be longer than other alternatives because of the relatively slower construction progress within county road right-of-ways because of less working space.

The air quality effects for constructing and operating plant discharge water facilities would be nearly the same as the Proposed Action. Electrical energy required to operate either water discharge alternative would be similar since plant discharge water would flow to the discharge by gravity.