PROJECT REPORT

City of Jerome WWTP > Jerome, ID

Permit-To-Construct Application

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1. EXECUTIVE SUMMARY

The City of Jerome is proposing to upgrade the existing Waste Water Treatment Plant (WWTP). Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1) biogas fired boiler, one (1) biogas flare, five (5) emergency generators and various small natural gas-fired heaters. In addition, there are three (3) existing emergency generators that will be included in the modeling analyses and permit application. Auxiliary support and controls equipment and new facility buildings will also be included as part of the upgrade. The City does not currently have a Permit To Construct (PTC).

The Jerome WWTP facility will be a minor source of criteria pollutants and Hazardous Air Pollutants (HAPs)/Toxic Air Pollutants (TAPs). In addition, the emergency generators at the facility will be subject to 40 CFR Part 60, Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines and 40 CFR Part 63, Subpart ZZZZ—National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

Air dispersion modeling was conducted for those criteria pollutants which exceed the Idaho Level I modeling thresholds and TAPs which exceed the screening emissions level (EL) in Idaho Air Rules Section 585 and 586.

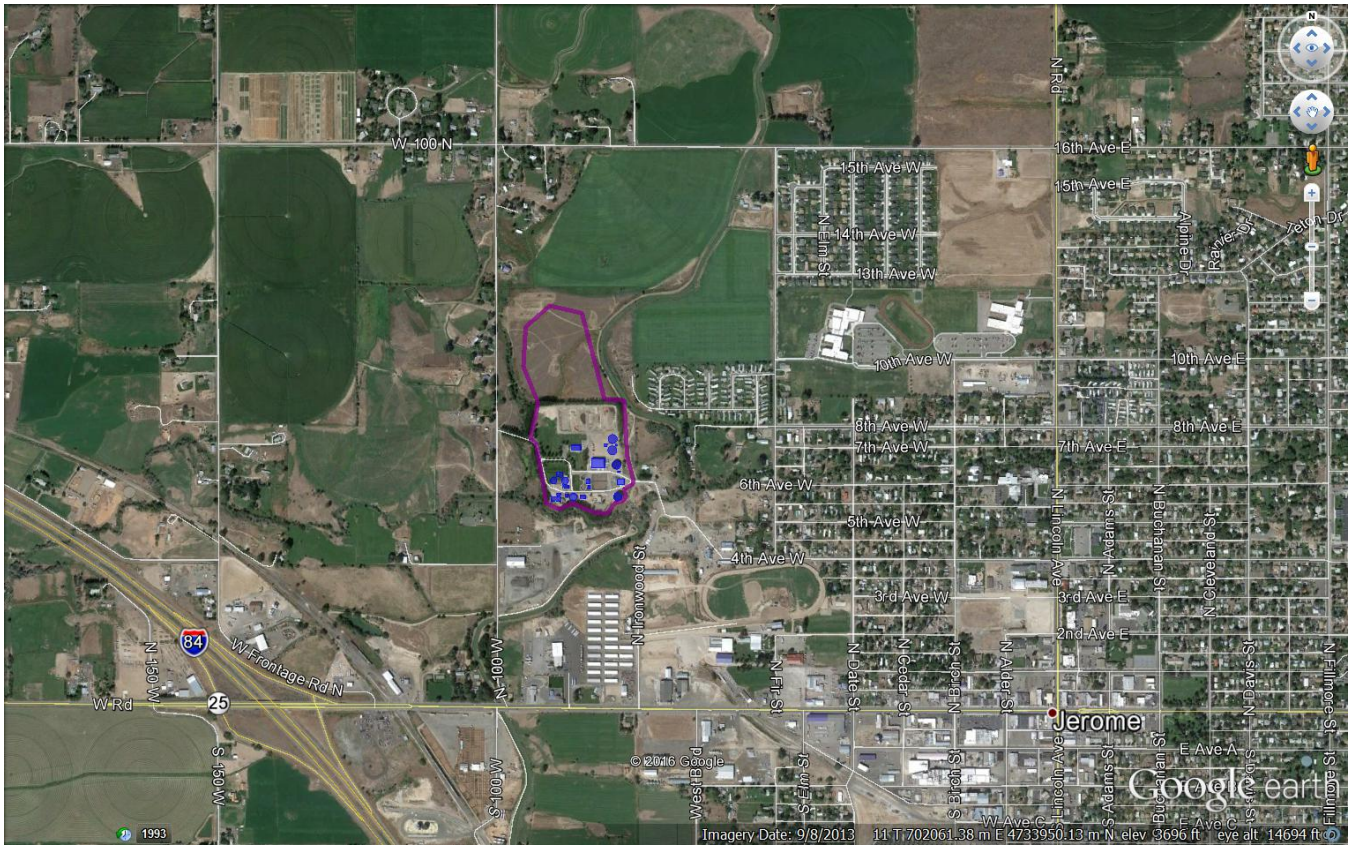
The purpose of this document is to present all necessary and applicable information regarding the facility in support of a PTC Application for the facility. All information provided in this PTC application, including Air Dispersion Modeling Report, is based on preliminary facility design and bid package response. All available manufacturer and vendor information has been provided. If, upon final design and construction, information or parameters differ from the values presented in this modeling report and PTC application and/or PTC, the City of Jerome will review the applicability of a modification to the PTC including impacts to the National Ambient Air Quality Standards (NAAQS) analyses completed as part of this initial PTC application.

2.1. PROJECT LOCATION

The Jerome WWTP is located at 500 N 100 W in Jerome in Jerome County, ID. The UTM coordinates for the facility are approximately 701,811 m E, 4,733,848 m N, Zone 11 (NAD83 coordinate system). Jerome County is an attainment area for all criteria pollutants. Land use in the area includes agricultural, light industrial and residential properties. Terrain surrounding the project site is relatively flat. A map showing the location of the facility is provided as **Figure 2-1.**

The proposed equipment will be constructed within the existing property boundary. Some of the existing site buildings and equipment such as the sludge storage tanks will be decommissioned and removed to accommodate the new equipment and facility buildings.

Figure 2-1. Facility Location



2.2. PROCESS OVERVIEW

The City of Jerome provides wastewater treatment for City residents, commercial retail, light industrial, and industrial wastewater. The current treatment facility includes headworks (fine screening, grit removal, and flow measurement) trickling filters (two bio-towers), membrane bioreactor (MBR) treatment (two aeration basins,

MBR tanks, blowers and permeate pumps), chemical addition for phosphorus removal, ultraviolet disinfection, solids handling facilities (aerobic digester, pumps, belt press and back up drying beds), a lab and a control building. Treated wastewater is discharged to the J8 Canal under a discharge permit issued by the Environmental Protection Agency. Since the existing WWTP was originally constructed, the plant has experienced a drastic increase in both flows and loading with new commercial, industrial and residential development. Due to these increases as well as stricter effluent discharge permit conditions and limitations, upgrades to the WWTP are necessary.

The proposed upgrades to the plant include construction of two new anaerobic digesters to allow for improvements in solids handling; biogas will be generated by the anaerobic digesters. The typical composition of biogas ranges from 60%-70% methane (CH_4), 20%-30% carbon dioxide (CO_2), and less than 1% sulfur gases. The accumulated biogas will be collected and conveyed via piping to one dual-fuel fired boiler and one biogas fired boiler. The boilers will use biogas as the primary fuel. If an inadequate amount of biogas is generated by the digesters, the second boiler will fire on natural gas. The boilers will be operated to maintain a specific temperature of the sludge in the digesters; as such, there may be times when one boiler is operating at partial capacity. During these times some biogas will be burned at the boilers, and some will be burned at the flare. Since the production of biogas is not consistent and varies with loadings and other factors, there will be flaring at the waste gas burner especially during the summer when there is minimal heat demand.

Five new diesel-fired emergency generators as well as three existing diesel-fired emergency generators will be used to supply emergency backup power to the entire WWTP if necessary. The engines will operate a maximum of 100 hours per year for testing and maintenance and required regulatory purposes. Generator maintenance and testing will be limited to 30 minutes per day to account for load bank and other required testing. In addition to the generators, the City of Jerome is proposing to install various small (<1 MMBtu/hr) natural gas-fired heaters throughout the facility for comfort heating in the winter months.

The facility proposes to operate 8,760 hours per year, with the exception of the emergency generators. The emergency generators will operate less than 100 hours/year for non-emergency situations; testing of the engines will only occur between the hours of 6am and 7pm. Process flow diagrams are included in **Appendix A.**

3.1. ANAEROBIC DIGESTERS

Anaerobic digestion involves the decomposition of organic and inorganic matter in the absence of oxygen. In the process of decomposing organic and inorganic matter, heat is generated. This heat facilitates pathogen reduction. In addition to heat, anaerobic digestion produces biogas, consisting of methane, carbon dioxide and traces of other gases, and can be combusted to generate steam, heat or electricity.

The proposed project will include installation of two anaerobic digesters. Each digester will be approximately 99,500 cubic feet (cf) in size (745,000 gallons). The biogas produced by the digesters will be collected and conveyed via piping to one dual-fuel fired boiler and one biogas fired boiler to maintain the temperature of the sludge in the digesters. If the amount of biogas produced exceeds the combined capacity of the boilers, or when there is minimal heat demand by the digesters, the biogas will be directed to the proposed open-top flare.

3.2. BOILERS

Biogas generated by the anaerobic digesters will be collected and conveyed to the Burnham biogas boiler and Burnham dual-fuel boiler. Operation of the boilers will be dependent on the amount of biogas generated by the digesters, which can vary based on the incoming wastewater characteristics. Operation of the boilers will also be dependent on the amount of heat required to maintain the temperature of the digesters. Biogas will be primarily conveyed to the biogas boiler. If the digester biogas generation exceeds the capacity of the biogas boiler, the excess biogas will be conveyed to the dual-fuel boiler. If insufficient biogas is available to fire both boilers, and additional heating of the digesters is required, the dual-fuel fired boiler can be operated solely on natural gas.

The boilers will be located inside the Anaerobic Digester Control building, and will exhaust through stacks on top of the roof. A site layout drawing is included in **Appendix A**. Emissions of criteria pollutants were calculated using a combination of manufacturer specific emission factors and AP-42 Section 1.4.HAPs/TAPs were calculated using AP-42 Section 1.4. Emission factors from the manufacturer and from AP-42 Tables 1.4-1 through 1.4.-4 are for combustion of natural gas, which has a heating value of 1020 Btu/scf. In order to develop emission factors for biogas combustion, the emission factors from the manufacturer and AP-42 were converted to biogas emission factors by multiplying the given natural gas emission factor by the ratio of the specified biogas heating value to the average natural gas heating value. The biogas from the digesters will have an average heating value of 550 Btu/scf. Boiler spec sheets are provided in **Appendix B.**

3.3. FLARE

Biogas generated by the anaerobic digesters will be conveyed to the biogas and dual-fuel boilers. However, if the amount of biogas generated by the digesters exceeds the capacity of both of the boilers, or if one or both of the boilers is not needed to maintain the digester sludge temperature, excess biogas will be directed to the open flare.

The flare is located near the Anaerobic Digester Control building and is shown on the site layout as J6 (**Appendix A**).

Emissions from the flare and natural gas flare pilot were calculated using AP-42 Section 1.4. Emission factors from AP-42 Tables 1.4-1 through 1.4.-4 are for combustion of natural gas, which has a heating value of 1020 Btu/scf. In order to develop emission factors for biogas combustion, the emission factors from AP-42 were

converted to biogas emission factors by multiplying the given natural gas emission factor by the ratio of the specified biogas heating value to the average natural gas heating value. The biogas from the digesters will have an average heating value of 550 Btu/scf.

The manufacturer specifications are provided in **Appendix B.**

3.4. EMERGENCY GENERATORS

Five new Caterpillar diesel-fired emergency generators as well as three existing Generac diesel-fired emergency generators will be used to supply emergency backup power to the entire WWTP if necessary. The engines will operate a maximum of 100 hours per year for testing and maintenance and required regulatory purposes. Generator maintenance and testing will be limited to 30 minutes per day to account for load bank and other required testing. The emergency generators will operate less than 100 hours/year for non-emergency situations; testing of the engines will only occur between the hours of 6am and 7pm.

The three existing generators (GENA-GENC) are located near the MBR & UV building. Two of the new generators will be located near the existing Sludge Storage tank (structure K3 on Site Layout) and three of the new generators will be located near Biotower #1 (structure K2 on Site Layout). Emissions from the generators were calculated using manufacturer's specifications and AP-42 Section 3.4; manufacturer specification sheets are included in **Appendix B**.

3.5. HEATERS

Various small (<1 MMBtu/hr) natural gas-fired heaters will be installed throughout the facility for comfort heating in the winter months. The heaters will be located in the Solids & Dewatering building and Anaerobic Digester Control building, and will exhaust through the sides of the building. One heater, GUH3, will exhaust through the roof of the Sludge Pump Building. The manufacturer specification sheets are included in **Appendix B.** Criteria and HAP/TAP emissions from the heaters were calculated using AP-42 Section 1.4.

3.6. EMISSIONS SOURCES

Emission sources at the facility are described in the sections above. IDEQ emission unit forms are included in **Appendix C.** Detailed emissions calculations are included in **Appendix D.**

3.7. POTENTIAL TO EMIT

The Jerome WWTP facility will be a minor source of criteria pollutants and HAPs/TAPs. The facility-wide potential to emit is shown in **Table 3-1, Table 3-2** and **Table 3-3** below. Hourly emission rates are based on the maximum material throughputs and equipment capacities. Annual emission rates are based on 8,760 operating hours per year, with the exception of the emergency generators which will operate a maximum of 100 hours per year. Individual emission source calculations are provided in **Appendix D.**

The emergency generators at the facility will be subject to 40 CFR Part 60, Subpart IIII and 40 CFR Part 63, Subpart ZZZZ. Per IDEQ policy and guidance, HAPs that are regulated by a federal New Source Performance Standards (NSPS) or National Emissions Standards for Hazardous Air Pollutants (NESHAPS) are not required to be included in the calculation of Potential to Emit (PTE) or in the modeling analysis. The regulated HAPs under Subparts IIII and ZZZZ include PAH, acetaldehyde, arsenic, benzene, beryllium, cadmium, formaldehyde, acrolein and methanol. Therefore emissions of these pollutants from the emergency generators were not included in the PTE calculation nor in the modeling for those pollutants listed that exceeded the IDAPA modeling thresholds.

Air dispersion modeling was conducted for the criteria pollutants which exceed the Idaho Level 1 modeling threshold, including PM_{10}, $PM_{2.5}$, and NO_X. In addition, several TAPs exceed the screening ELs in IDAPA 58.01.01.585 and 586. These TAPs include formaldehyde, arsenic, cadmium, and nickel. Air dispersion modeling, as well as comparison of the facility PTE to applicable modeling thresholds in discussed in Section 5.0.

Table 3-1. Facility-wide Potential to Emit (lb/hr)

Emission Sources	CO	NO_X	PM	PM_{10}	$PM_{2.5}$	SO_2	VOC	Lead
Boiler – Biogas	0.06	0.15	0.01	0.01	0.01	0.002	0.01	1.43E-05
Boiler - NG	0.07	0.19	0.01	0.01	0.01	0.002	0.02	9.56E-06
Flare – Biogas Combustion	1.09	1.29	0.10	0.10	0.10	0.008	0.07	6.47E-06
Flare – NG Pilot	0.004	0.01	0.0004	0.0004	0.0004	3.00E-05	2.75E-04	2.50E-08
Emergency Generators	7.23	61.55	0.52	0.52	0.52	0.07	1.70	n/a
Heaters	0.03	0.07	0.01	0.01	0.01	0.0005	0.004	3.78E-07
TOTAL	8.5	63.3	0.6	0.6	0.6	0.09	1.8	3.08E-05

Table 3-2. Facility-wide Potential to Emit (tpy)

Emission Sources	CO	NO_X	PM	PM_{10}	$PM_{2.5}$	SO_2	VOC	Lead
Boiler – Biogas	0.26	0.66	0.03	0.03	0.03	0.007	0.06	6.28E-05
Boiler - NG	0.32	0.82	0.04	0.04	0.04	0.009	0.07	4.19E-05
Flare – Biogas Combustion	4.76	5.67	0.43	0.43	0.43	0.034	0.31	2.83E-05
Flare – NG Pilot	0.02	0.02	0.002	0.002	0.002	1.31E-04	0.001	1.10E-07
Emergency Generators	0.36	3.08	0.03	0.03	0.03	0.004	0.08	n/a
Heaters	0.13	0.31	0.03	0.03	0.03	0.002	0.02	1.65E-06
TOTAL	5.84	10.56	0.56	0.56	0.56	0.06	0.54	1.35E-04

Table 3-3. Facility-wide Potential to Emit (HAPs/TAPs)

Pollutant	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Potential Emissions	
				lb/hr	tpy
Benzene	Yes	No	Yes	3.89E-05	1.70E-04
Formaldehyde	Yes	No	Yes	1.39E-03	6.09E-03

Pollutant	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Potential Emissions	
				lb/hr	tpy
Toluene	Yes	Yes	No	4.42E-03	4.94E-04
Xylenes	Yes	Yes	No	2.99E-03	1.50E-04
2-Methylnaphthalene	Yes	No	Yes	4.45E-07	1.95E-06
3-Methylchloranthrene	Yes	No	Yes	3.33E-08	1.46E-07
7,12-Dimethylbenz(a)anthracene	Yes	No	Yes	2.96E-07	1.30E-06
Acenaphthylene	Yes	No	Yes	3.33E-08	1.46E-07
Benzo(a)pyrene	Yes	No	Yes	2.22E-08	9.74E-08
Benzo(b)fluoranthene	Yes	No	Yes	3.33E-08	1.46E-07
Benzo(k)fluoranthene	Yes	No	Yes	3.33E-08	1.46E-07
Dibenzo(a,h)anthracene	Yes	No	Yes	2.22E-08	9.74E-08
Dichlorobenzene	Yes	Yes	No	2.22E-05	9.74E-05
Hexane	Yes	Yes	No	3.33E-02	1.46E-01
Naphthalene	Yes	Yes	No	1.13E-05	4.95E-05
Acenaphthene	Yes	No	Yes	3.33E-08	1.46E-07
Anthracene	Yes	No	Yes	4.45E-08	1.95E-07
Benzo(a)anthracene	Yes	No	Yes	3.33E-08	1.46E-07
Benzo(g,h,i)perylene	Yes	No	Yes	2.22E-08	9.74E-08
Chrysene	Yes	No	Yes	3.33E-08	1.46E-07
Fluoranthene	Yes	No	Yes	5.56E-08	2.43E-07
Fluorene	Yes	No	Yes	5.19E-08	2.27E-07
Indeno(1,2,3-cd)pyrene	Yes	No	Yes	3.33E-08	1.46E-07
Phenanthrene	Yes	No	Yes	3.15E-07	1.38E-06
Pentane	No	Yes	No	4.82E-02	2.11E-01
Pyrene	Yes	No	Yes	9.26E-08	4.06E-07
Arsenic	Yes	No	Yes	3.71E-06	1.62E-05
Barium	No	Yes	No	8.15E-05	3.57E-04
Beryllium	Yes	No	Yes	2.22E-07	9.74E-07
Cadmium	Yes	No	Yes	2.04E-05	8.93E-05
Chromium	Yes	No	Yes	2.59E-05	1.14E-04
Cobalt	Yes	Yes	No	1.56E-06	6.82E-06
Copper	No	Yes	No	1.57E-05	6.90E-05
Manganese	Yes	Yes	No	7.04E-06	3.08E-05
Molybdenum	No	Yes	No	2.04E-05	8.93E-05

Pollutant	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Potential Emissions	
				lb/hr	tpy
Nickel	Yes	Yes	No	3.89E-05	1.70E-04
Selenium	Yes	No	Yes	4.45E-07	1.95E-06
Vanadium	No	No	Yes	4.26E-05	1.87E-04

The Jerome WWTP facility will be a minor source of criteria pollutants and HAPs/TAPs. In addition, the emergency generators at the facility will be subject to 40 CFR Part 60, Subpart IIII - - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines and 40 CFR Part 63, Subpart ZZZZ—National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

A review of applicable State and Federal Rules is provided in Sections 4.1 and 4.2 below.

4.1. STATE REGULATORY APPLICABILITY

A review of applicable requirements of the Rules for the Control of Air Pollution in Idaho is provided in **Table 4-1**. Each regulation is described in the sections following the table.

Table 4-1. State Regulatory Applicability

Section	Description	Regulatory Citation	Applicable?
4.1.1	Certification of Documents	IDAPA 58.01.01.123	Yes
4.1.2	Excess Emissions	IDAPA 58.01.01.130-136	Yes
4.1.3	Test Methods and Procedures	IDAPA 58.010.01.157	Yes
4.1.4	Procedures and Requirements for Permits To Construct	IDAPA 58.01.01.200-203	Yes
4.1.5	Permit Requirements For New Major Facilities Or Major Modifications In Nonattainment Areas	IDAPA 58.01.01.204	No
4.1.6	Permit Requirements For New Major Facilities Or Major Modifications In Attainment Or Unclassifiable Areas.	IDAPA 58.01.01.205	No
4.1.7	Demonstration of Preconstruction Compliance with Toxic Standards	IDAPA 58.01.01.210	Yes
4.1.8	Mercury Emission Standard for New or Modified Sources	IDAPA 58.01.01.215	Yes
4.1.9	Procedures And Requirements For Tier I Operating Permits.	IDAPA 58.01.01.300-399	No
4.1.10	Air Pollution Emergency Rule	IDAPA 58.01.01.550-562	Yes
4.1.11	Toxic Air Pollutants	IDAPA 58.01.01.585 and 586	Yes
4.1.12	New Source Performance Standards	IDAPA 58.01.01.590	Yes
4.1.13	National Emissions Standards for Hazardous Air Pollutants	IDAPA 58.01.01.591	Yes
4.1.14	Open Burning	IDAPA 58.01.01.600-617	Yes
4.1.15	Visible Emissions	IDAPA 58.01.01.625	Yes
4.1.16	Rules for Control of Fugitive Dust	IDAPA 58.01.01.650-651	Yes

Section	Description	Regulatory Citation	Applicable?
4.1.17	Fuel Burning Equipment – Particulate Matter	IDAPA 58.01.01.675-681	No
4.1.18	Particulate Matter – Process Weight Limitations	IDAPA 58.01.01.700-701	No
4.1.19	Rules For Sulfur Content Of Fuels	IDAPA 58.01.01.725	No
4.1.20	Odors	IDAPA 58.01.01.775-776	Yes

4.1.1. Certification of Documents

IDAPA 58.01.01.123 requires all documents including application forms for permits to construct, records, and monitoring reports submitted to the Department shall contain a certification by a responsible official. The WWTP will comply with this requirement and the appropriate certifications by a responsible official are being submitted with this application.

4.1.2. Excess Emissions

IDAPA 58.01.01.130-136 establishes procedures and requirements to be implemented in all excess emissions events. The WWTP will comply with the procedures and requirements outlined in Section 131-136 and submit the necessary information and reports to DEQ related to excess emissions due to startup, shutdown, scheduled maintenance, safety measures, upsets and breakdowns.

4.1.3. Test Methods and Procedures

IDAPA 58.01.01.157 establishes procedures and requirements for test methods and results. If a source test is required to be performed to satisfy a performance test requirement or a compliance test requirement imposed by state or federal regulation, rule, permit, order or consent decree, then the test methods and procedures shall be conducted in accordance with the requirements of Section 157.

4.1.4. Procedures and Requirements for Permits To Construct

IDAPA 58.01.01.200-203 establish uniform procedures and requirements for the issuance of PTCs. The WWTP will not commence modification of the existing facility without first obtaining a PTC from the Department which satisfies the requirements of Sections 200 through 228. The PTC application will be made using forms furnished by the Department, or by other means prescribed by the Department.

4.1.5. Permit Requirements For New Major Facilities Or Major Modifications In Nonattainment Areas

The WWTP is located in Jerome County. Jerome County is in attainment for all criteria pollutants, therefore the requirements of IDAPA 58.01.01.204 do not apply to the WWTP.

4.1.6. Permit Requirements For New Major Facilities Or Major Modifications In Attainment Or Unclassifiable Areas

The intent of IDAPA 58.01.01.205 is to incorporate the federal Prevention of Significant Deterioration (PSD) rule requirements. The WWTP will be a minor source; therefore the requirements of this section do not apply to the WWTP.

4.1.7. Demonstration of Preconstruction Compliance with Toxic Standards

IDAPA 58.01.01.210 establishes requirements for preconstruction compliance with toxic standards. The WWTP will comply with this rule by identifying and calculating the toxic pollutant emission rates from all applicable emissions units at the facility.

As described in Section 5.0, the increase in TAP emission rates from the facility was calculated and compared to the Idaho screening levels. Air dispersion modeling was conducted for those TAPs which exceed the screening EL in Idaho Air Rules Section 585 and 586. A complete Modeling Report (Ambient Impact Assessment) is included in **Appendix E** which documents how the WWTP demonstrates preconstruction compliance with toxic air quality preconstruction standards.

4.1.8. Mercury Emission Standard for New or Modified Sources

IDAPA 58.01.01.215 requires an owner or operator of a stationary source or facility to include a mercury BACT (MBACT) analysis in the PTC application if a facility has annual potential emissions of mercury of 25 pounds or more. The estimated mercury emissions from the WWTP facility will be 4.22E-02 pounds/year, therefore an MBACT analysis is not required with the permit application.

4.1.9. Procedures And Requirements For Tier I Operating Permits

IDAPA 58.01.01.300-399 establish requirements and procedures for the issuance of Tier I operating permits. The WWTP facility will be a minor source for all criteria pollutants and HAPs, and will not be subject to Title V of the Clean Air Act, therefore a Tier I operating permit will not be required.

4.1.10. Air Pollution Emergency Rule

IDAPA 58.01.01.550 through 562 define criteria for an air pollution emergency, formulates a plan for preventing or alleviating such an emergency, and specifies rules for carrying out the plan. In the event of an air pollution emergency, the WWTP will comply with applicable requirements as specified by the Director based on the specific episode conditions which then exist.

4.1.11. Toxic Air Pollutants

IDAPA 58.01.01.585 and 586 establishes requirements for compliance with toxic air pollutants. The WWTP demonstrates compliance with the standards as described in the modeling report included in **Appendix E**.

4.1.12. New Source Performance Standards

NSPS in 40 CFR Part 60 are applicable to new, modified, or reconstructed stationary sources that meet or exceed specified applicability thresholds. Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines applies to the emergency generators at the WWTP. The WWTP will comply with the applicable requirements of Subpart IIII as documented on IDEQ Form FRA included in **Appendix C**.

4.1.13. National Emissions Standards for Hazardous Air Pollutants

Two sets of NESHAPs may potentially apply to the WWTP. The first NESHAP regulations were developed under the auspices of the original Clean Air Act. These standards are codified in 40 CFR Part 61, and address a limited

number of pollutants and industries. The WWTP does not fall under any of the industries or have the PTE any of the pollutants listed in 40 CFR Part 61, and therefore, 40 CFR Part 61 regulations do not apply to this facility.

Newer regulations are codified in 40 CFR Part 63 under the authority of the 1990 Clean Air Act Amendments (CAAA). These standards regulate HAP emissions from specific source categories and typically affect only major sources of HAPs. Part 63 regulations are frequently called Maximum Achievable Control Technology (MACT) standards. Major HAP sources have a PTE of 10 tpy or more of any single HAP or 25 tpy or more of all combined HAP emissions. The WWTP will be a minor source of HAPs.

40 CFR Part 63 Subpart ZZZZ—National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines applies to the emergency generators. The WWTP will comply with the applicable requirements of Subpart ZZZZ as documented on IDEQ Form FRA included in **Appendix C**.

4.1.14. Open Burning

IDAPA 58.01.01.600-617 establish requirements for open burning. The WWTP does not expect to conduct open burning at the facility however will comply with the requirements under Section 600-617 if any allowable burning is to be conducted at the facility.

4.1.15. Visible Emissions

IDAPA 58.01.01.625 restricts discharge of air pollutants into the atmosphere which is greater than 20% opacity for a period or periods aggregating more than three (3) minutes in any sixty (60) minute period. The WWTP will comply with the IDAPA rule by conducting monthly facility-wide inspections of potential sources of visible emissions, during daylight hours and under normal operating conditions. The inspection will consist of a see/no see evaluation for each potential source. If any visible emissions are observed WWTP personnel will take corrective action or perform a Method 9 opacity test in accordance with the procedures outlined in IDAPA 58.01.01.625. The WWTP will keep records onsite documenting the monthly visible emission inspection and Method 9 test conducted.

4.1.16. Rules for Control of Fugitive Dust

IDAPA 58.01.01.650-651 requires that all reasonable precautions be taken to prevent the generation of fugitive dust. The WWTP will comply with fugitive particulate matter regulations through the use of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations or clearing of land and covering, when practical, open bodied trucks transporting materials likely to give rise to airborne dusts.

4.1.17. Fuel Burning Equipment – Particulate Matter

IDAPA 58.01.01.675-681 restricts fuel burning sources (larger than 10 MMBtu/hr) to limit the PM combustion emissions to 0.015 gr/dscf for gas fuels and 0.05 gr/dscf for liquid fuels. None of the fuel burning sources at the WWTP will be greater than 10 MMBtu/hr.

4.1.18. Particulate Matter – Process Weight Limitations

IDAPA 58.01.01.701 promulgates restrictions on PM for the entire facility based on process weight. Fuel burning equipment at the facility is not subject to this requirement. The only sources of PM at the WWTP are combustion sources.

4.1.19. Rules For Sulfur Content Of Fuels

IDAPA 58.01.01.725 applies to fuel burning sources in Idaho. Its purpose is to prevent excessive ground level concentrations of sulfur dioxide. However, the requirements only apply to sources that sell, distribute, use or make available for use distillate oil, residual oil or coal. Therefore the requirements of this subpart do not apply to the WWTP.

4.1.20. Odors

IDAPA 58.01.01.775-776 requires no emissions of odorous gases, liquids, or solids to the atmosphere in such quantities as to cause air pollution. The WWTP will comply with this requirement by keeping records of any odor complaints received and will take appropriate action for each complaint which has merit.

4.2. FEDERAL REGULATORY APPLICABILITY

A review of applicable Federal Rules is provided in **Table 4-2**. Included in **Appendix C** is the completed NSPS/NESHAP Regulation Review and Applicability Form FRA.

Table 4-2. Federal Regulatory Applicability

Section	Description	Regulatory Citation	Applicable?
4.2.1	National Ambient Air Quality Standards (NAAQS)- (dispersion modeling)	40 CFR Part 50	Yes
4.2.2	New Source Review (NSR)	40 CFR Part 52	No
4.2.3	New Source Performance Standards (NSPS)	40 CFR Part 60	Yes
4.2.4	National Emissions Standards for Hazardous Air Pollutants (NESHAPs)	40 CFR Parts 61, 63	Yes
4.2.5	Risk Management Programs For Chemical Accidental Release Prevention	40 CFR Part 68	No
4.2.6	Title V Operating Permit	40 CFR Part 70	No
4.2.7	Acid Rain Requirements	40 CFR Parts 72–78	No
4.2.8	Mandatory Greenhouse Gas Reporting	40 CFR Part 98	No

4.2.1. National Ambient Air Quality Standards (NAAQS)

Primary NAAQS are identified in 40 CFR Part 50 and define levels of air quality, which the United States Environmental Protection Agency (USEPA) deems necessary to protect the public health. Secondary NAAQS define levels of air quality, which the USEPA judges necessary to protect public welfare from any known, or anticipated adverse effects of a pollutant. Examples of public welfare include protecting wildlife, buildings, national monuments, vegetation, visibility, and property values from degradation due to excessive emissions of criteria pollutants.

Specific standards for the following pollutants have been promulgated by USEPA: $PM_{2.5}$, PM_{10}, SO_2, NO_x, CO, ozone, and lead. The WWTP will emit $PM_{2.5}$, PM_{10}, SO_2, NO_x, CO, lead, and VOCs, a precursor to ozone. Air dispersion modeling will be conducted to show compliance with the NAAQs.

4.2.2. New Source Review (NSR)

Jerome County is designated as an attainment area for all criteria pollutants. Therefore, the PSD regulations codified in 40 CFR Part 52 could potentially apply to the proposed facility. The PSD rule applies to: (1) a new major source that has the potential to emit 100 tons per year or more for any criteria pollutant for a facility that is one of the 28 industrial source categories listed in 40 CFR § 52.21(b)(1)(i)(a); or (2) a new major source that has the potential to emit 250 tons per year or more of a regulated pollutant if the facility is not on the list of industrial source categories; or (3) a modification to an existing major source that results in a net emission increase greater than a PSD significant emission rate as specified in 40 CFR § 52.21 (b)(23)(i); or (4) a modification to an existing minor source that is major in itself. The WWTP does not fall under one of the 28 industrial source categories, nor will the PTE exceed 250 tpy for any regulated pollutant. Therefore, the WWTP is not subject to PSD regulations.

4.2.3. New Source Performance Standards (NSPS)

NSPS are discussed in Section 4.1.12 above.

4.2.4. National Emissions Standards for Hazardous Air Pollutants (NESHAPs)

NESHAPS are discussed in Section 4.1.13 above.

4.2.5. Risk Management Programs For Chemical Accidental Release Prevention

The facility is not subject to the Chemical Accidental Release Prevention Program and will not be required to develop a Risk Management Plan (RMP). Facilities that produce, process, store, or use any regulated toxic or flammable substance in excess of the thresholds listed in 40 CFR Part 68 must develop a RMP. The facility does not store any regulated toxic or flammable substances in excess of the applicable thresholds. A RMP is not necessary for this facility.

4.2.6. Title V Operating Permit

Title V of the Clean Air Act (CAA) created the federal operating permit program. These permitting requirements are codified in 40 CFR Part 70. These permits are required for major sources with a PTE (considering federally enforceable limitations) greater than 100 tpy for any criteria pollutant, 25 tpy for all HAPs in aggregate, or 10 tpy of any single HAP. The WWTP's PTE for all criteria pollutants is less than 100 tons per year, and the PTE of all HAPs in aggregate is less than 25 tpy. Therefore, the WWTP will not be subject to Title V requirements.

4.2.7. Acid Rain Requirements

The acid rain requirements codified in 40 CFR Parts 72-78 apply only to utilities and other facilities that combust fossil fuel and generate electricity for wholesale or retail sale. The proposed facility will not combust fossil fuel as the primary fuel nor will it generate electricity for wholesale or retail sale. Therefore, the facility is not subject to the acid rain provisions and will not require an acid rain permit.

4.2.8. Mandatory Greenhouse Gas Reporting

Greenhouse gas reporting requirements are codified under 40 CFR Part 98. Part 98.2 describes facilities who are subject to mandatory reporting requirement. The WWTP does not fall under any source category that is listed in Table A–3 or A-4 of the subpart. However, Part 98.2(a)(3) states the following:

> (3) A facility that in any calendar year starting in 2010 meets all three of the conditions listed in this paragraph (a)(3) . For these facilities, the annual GHG report must cover emissions from stationary fuel combustion sources only.
>
> > (i) The facility does not meet the requirements of either paragraph (a)(1) or (a)(2) of this section.
> >
> > (ii) The aggregate maximum rated heat input capacity of the stationary fuel combustion units at the facility is 30 MMBtu/hr or greater.
> >
> > (iii) The facility emits 25,000 metric tons CO2e or more per year in combined emissions from all stationary fuel combustion sources.

The heat input capacity of the facility will be less than 30 MMBtu/hr, therefore, the WWTP will not be subject to the GHG reporting requirements in 40 CFR Part 98.

Air dispersion modeling was conducted for those criteria pollutants which exceeded the Idaho Level I modeling thresholds and TAPs which exceed the screening EL in Idaho Air Rules Section 585 and 586. A complete Modeling Report (Ambient Impact Assessment) is included in **Appendix E** which documents how the WWTP demonstrates compliance with the NAAQs and AAC/AACC for TAPs.

5.1. MODELING THRESHOLDS

The facility-wide PTE was compared to the Idaho Level I Modeling Thresholds to determine the criteria pollutants required to be modeled, as show in **Table 5-1**.

Table 5-1 Criteria Pollutant PTE vs. Modeling Thresholds

Pollutant	Facility-Wide PTE	Idaho Level I Modeling Threshold	Modeling Required?
CO (lb/hr)	8.5	15	No
NO_x (lb/hr)	63.3	0.20	Yes
NO_x (tpy)	10.6	1.2	Yes
SO_2 (lb/hr)	0.09	0.21	No
SO_2 (tpy)	0.06	1.2	No
PM_{10} (lb/hr)	0.60	0.22	Yes
$PM_{2.5}$ (lb/hr)	0.60	0.054	Yes
$PM_{2.5}$ (tpy)	0.56	0.35	Yes
Lead (lb/month)	0.02	14	No

The emergency generators at the facility will be subject to 40 CFR Part 60, Subpart IIII and 40 CFR Part 63, Subpart ZZZZ. Per IDEQ policy and guidance, HAPs that are regulated by a federal NSPS or NESHAPS are not required to be included in the calculation of PTE or in the modeling analysis. The regulated HAPs under Subparts IIII and ZZZZ include PAH, acetaldehyde, arsenic, benzene, beryllium, cadmium, formaldehyde, acrolein and methanol. Therefore emissions of these pollutants from the emergency generators were not included in the PTE calculation nor in the modeling for those pollutants listed that exceeded the IDAPA modeling thresholds.

Table 5-2 presents the facility-wide TAPs PTE, IDAPA 58.01.01.585 and 586 Emissions Levels (ELs), and modeling applicability.

Table 5-2 TAPs PTE vs. Modeling Thresholds

Pollutant	HAP?	Non-Carc. TAP?	Carc. TAP?	Potential Emissions		IDAPA EL	Exceeds EL?
				lb/hr	tpy	lb/hr	
Benzene	Yes	No	Yes	3.89E-05	1.70E-04	8.00E-04	No
Formaldehyde	Yes	No	Yes	1.39E-03	6.09E-03	5.10E-04	Yes
Toluene	Yes	Yes	No	4.42E-03	4.94E-04	2.50E+01	No
Xylenes	Yes	Yes	No	2.99E-03	1.50E-04	2.90E+01	No
2-Methylnaphthalene	Yes	No	Yes	4.45E-07	1.95E-06	9.10E-05	No
3-Methylchloranthrene	Yes	No	Yes	3.33E-08	1.46E-07	9.10E-05	No
7,12-Dimethylbenz(a)anthracene	Yes	No	Yes	2.96E-07	1.30E-06	9.10E-05	No
Acenaphthylene	Yes	No	Yes	3.33E-08	1.46E-07	9.10E-05	No
Benzo(a)pyrene	Yes	No	Yes	2.22E-08	9.74E-08	2.00E-06	No
Benzo(b)fluoranthene	Yes	No	Yes	3.33E-08	1.46E-07	2.00E-06	No
Benzo(k)fluoranthene	Yes	No	Yes	3.33E-08	1.46E-07	2.00E-06	No
Dibenzo(a,h)anthracene	Yes	No	Yes	2.22E-08	9.74E-08	2.00E-06	No
Dichlorobenzene	Yes	Yes	No	2.22E-05	9.74E-05	3.00E+01	No
Hexane	Yes	Yes	No	3.33E-02	1.46E-01	1.20E+01	No
Naphthalene	Yes	Yes	No	1.13E-05	4.95E-05	3.33E+00	No
Acenaphthene	Yes	No	Yes	3.33E-08	1.46E-07	9.10E-05	No
Anthracene	Yes	No	Yes	4.45E-08	1.95E-07	9.10E-05	No
Benzo(a)anthracene	Yes	No	Yes	3.33E-08	1.46E-07	2.00E-06	No
Benzo(g,h,i)perylene	Yes	No	Yes	2.22E-08	9.74E-08	9.10E-05	No
Chrysene	Yes	No	Yes	3.33E-08	1.46E-07	2.00E-06	No
Fluoranthene	Yes	No	Yes	5.56E-08	2.43E-07	9.10E-05	No
Fluorene	Yes	No	Yes	5.19E-08	2.27E-07	9.10E-05	No
Indeno(1,2,3-cd)pyrene	Yes	No	Yes	3.33E-08	1.46E-07	2.00E-06	No
Phenanthrene	Yes	No	Yes	3.15E-07	1.38E-06	9.10E-05	No
Pentane	No	Yes	No	4.82E-02	2.11E-01	1.18E+02	No
Pyrene	Yes	No	Yes	9.26E-08	4.06E-07	9.10E-05	No
Arsenic	Yes	No	Yes	3.71E-06	1.62E-05	1.50E-06	Yes
Barium	No	Yes	No	8.15E-05	3.57E-04	3.30E-02	No
Beryllium	Yes	No	Yes	2.22E-07	9.74E-07	2.80E-05	No
Cadmium	Yes	No	Yes	2.04E-05	8.93E-05	3.70E-06	Yes
Chromium	Yes	No	Yes	2.59E-05	1.14E-04	3.30E-02	No
Cobalt	Yes	Yes	No	1.56E-06	6.82E-06	3.30E-03	No

Pollutant	HAP?	Non-Carc. TAP?	Carc. TAP?	Potential Emissions		IDAPA EL	Exceeds EL?
				lb/hr	tpy	lb/hr	
Copper	No	Yes	No	1.57E-05	6.90E-05	6.70E-02	No
Manganese	Yes	Yes	No	7.04E-06	3.08E-05	3.33E-01	No
Molybdenum	No	Yes	No	2.04E-05	8.93E-05	3.33E-01	No
Nickel	Yes	Yes	No	3.89E-05	1.70E-04	2.70E-05	Yes
Selenium	Yes	No	Yes	4.45E-07	1.95E-06	1.30E-02	No
Vanadium	No	No	Yes	4.26E-05	1.87E-04	3.00E-03	No

5.2. MODEL DESCRIPTION

The model used for this application is AERMOD (version 15181), the USEPA–approved model for near-field new source review. Based on EPA guidance AERMOD is the most appropriate of the EPA-approved models given the site's physical characteristics and the facility emission sources. AERMOD was applied as recommended in EPA's Guideline on Air Quality Models and consistent with guidance in IDEQ's Dispersion Modeling Guidelines. An air dispersion modeling protocol was submitted to IDEQ for concurrence; concurrence was received on July 11, 2016. In general, the modeling was conducted as outlined in the protocol; however slight modifications were made to the modeling methodology. A description of the modifications as well as responses to comments in DEQ's protocol approval are provided in the Modeling Report.

5.3. MODEL RESULTS

As shown in **Table 5-3**, the facility is in compliance with the applicable NAAQs for criteria pollutants and AAC or AACC for TAPs. A complete Modeling Report (Ambient Impact Assessment) is included in **Appendix E.**

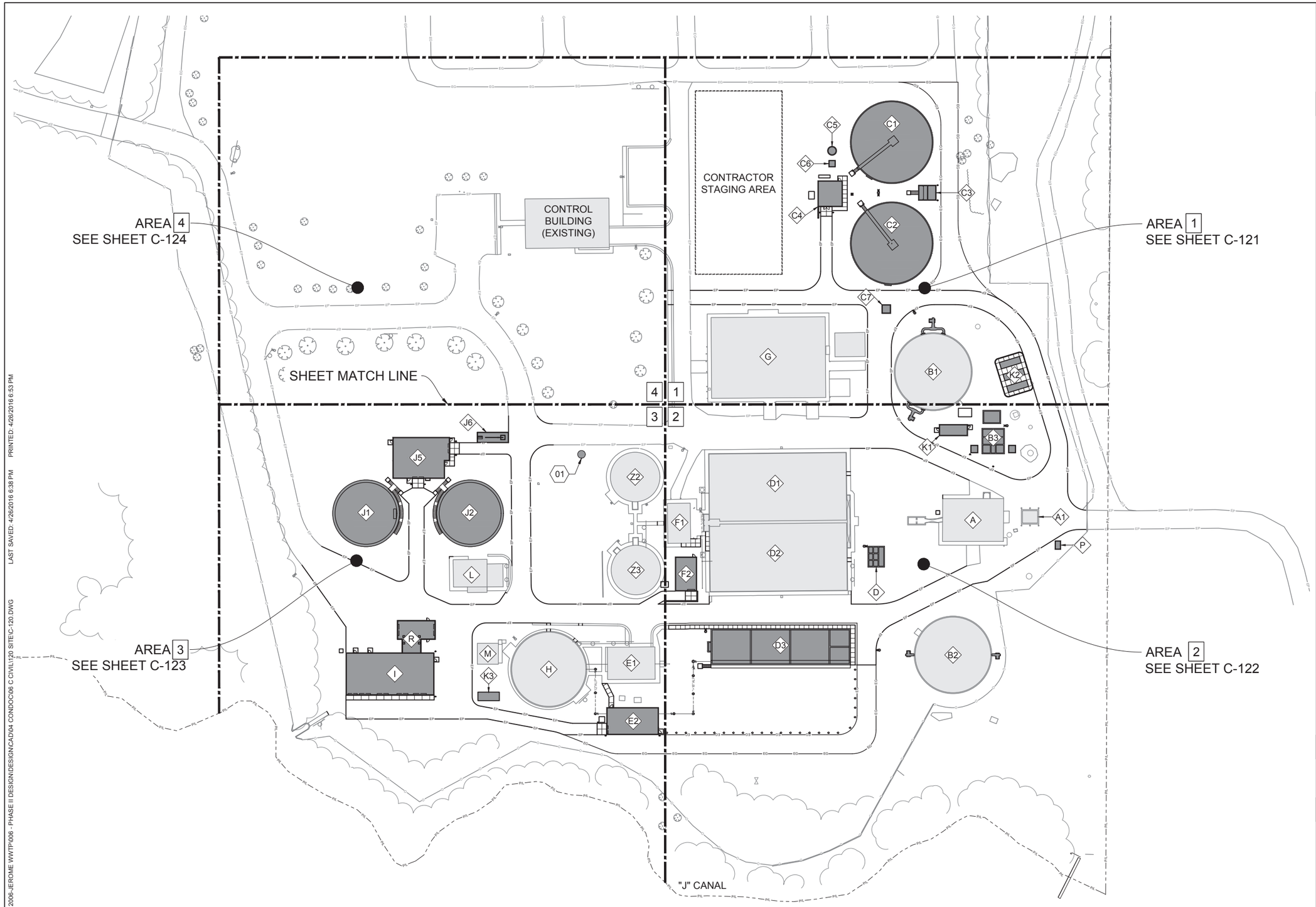
Table 5-3. Air Dispersion Modeling Results

Pollutant	Averaging Period	Modeled Design Concentration (µg/m³)[a]	Background Concentration (µg/m³)	Total Impact (µg/m³)	NAAQS (µg/m³)
$PM_{2.5}$[b]	24-hour	5.40[e]	24	29.4[e]	35
	Annual	0.65[f]	8	8.65[f]	12
PM_{10}[c]	24-hour	6.22[g]	52	58.2[g]	150
NO_2[d]	1-hour	110.2[e]	24.5	134.7[e]	188
	Annual	10.3	4.14	14.5	100

a. Micrograms/cubic meter
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
d. Nitrogen dioxide.
e. Maximum of 5-year means (or a lesser averaging period if less than 5 years of meteorological data were used in the analyses) of 8th highest modeled concentrations for each year modeled.
f. Maximum of 5-year means (or a lesser averaging period if less than 5 years of meteorological data were used in the analyses) of maximum modeled concentrations for each year modeled.

Pollutant	Averaging Period	Modeled Design Concentration (µg/m³)[a]	Background Concentration (µg/m³)	Total Impact (µg/m³)	NAAQS (µg/m³)
g. Maximum of 6th highest modeled concentrations for a 5-year period (or the maximum of the 2nd highest modeled concentrations if only 1 year of meteorological data are modeled).					

APPENDIX A: PROCESS FLOW DIAGRAMS AND SITE LAYOUT



0 50 100

STRUCTURE DESIGNATORS

A	HEADWORKS BUILDING (E)
A1	HEADWORKS COLLECTION BOX (E)
B1	BIO-TOWER #1 (E)
B2	BIO-TOWER #2 (E)
B3	BIO-TOWER RECYCLE & INTERMEDIATE CLARIFIER PUMP STATION (N) INTERMEDIATE CLARIFIER PUMP STATION VALVE VAULT (N) BIO-TOWER #1 PUMP STATION VALVE VAULT (N) BIO-TOWER #2 PUMP STATION VALVE VAULT (N)
C1	INTERMEDIATE CLARIFIER #1 (N)
C2	INTERMEDIATE CLARIFIER #2 (N)
C3	INTERMEDIATE CLARIFIER SPLITTER BOX (N)
C4	INTERMEDIATE CLARIFIER SLUDGE PUMP BUILDING #2 (N)
C5	INTERMEDIATE CLARIFIER SCUM PIT (N)
C6	INTERMEDIATE CLARIFIER SCUM PIT VALVE VAULT (N)
C7	INTERMEDIATE CLARIFIER COLLECTION BOX (N)
D	AERATION BASIN SPLITTER BOX (N)
D1	AERATION BASIN #1 (E)
D2	AERATION BASIN #2 (E)
D3	AERATION BASIN #3 (N)
E1	BLOWER BUILDING #1 (E)
E2	BLOWER BUILDING #2 (N)
F1	AERATION BASIN PUMP STATION #1 (E)
F2	AERATION BASIN PUMP STATION #2 (N)
G	MBR & UV BUILDING (E)
H	SLUDGE STORAGE (E)
I	SOLIDS & DEWATERING BUILDING (N)
J1	ANAEROBIC DIGESTER #1 (N)
J2	ANAEROBIC DIGESTER #2 (N)
J5	ANAEROBIC DIGESTER CONTROL BUILDING (N)
J6	BIO-GAS WASTE BURNER (N)
K1	ELECTRICAL BUILDING (N)
K2	GENERATOR PADS (N)
K3	GENERATOR PADS (N)
L	SLUDGE PUMP BUILDING #1 (E)
M	CENTRIFUGE BUILDING (E)
P	BACKFLOW PREVENTER VAULT (N)
R	SOLIDS LOADING BUILDING (N - ADDITIVE BID ITEM #3)
Z2	SLUDGE STORAGE #1 (E) (TO BE DECOMMISSIONED)
Z3	SLUDGE STORAGE #2 (E) (TO BE DECOMMISSIONED)

SHEET KEYNOTES

01 PTZ CAMERA (PAN-TILT-ZOOM), RE: SPECIFICATIONS

KEY PLAN

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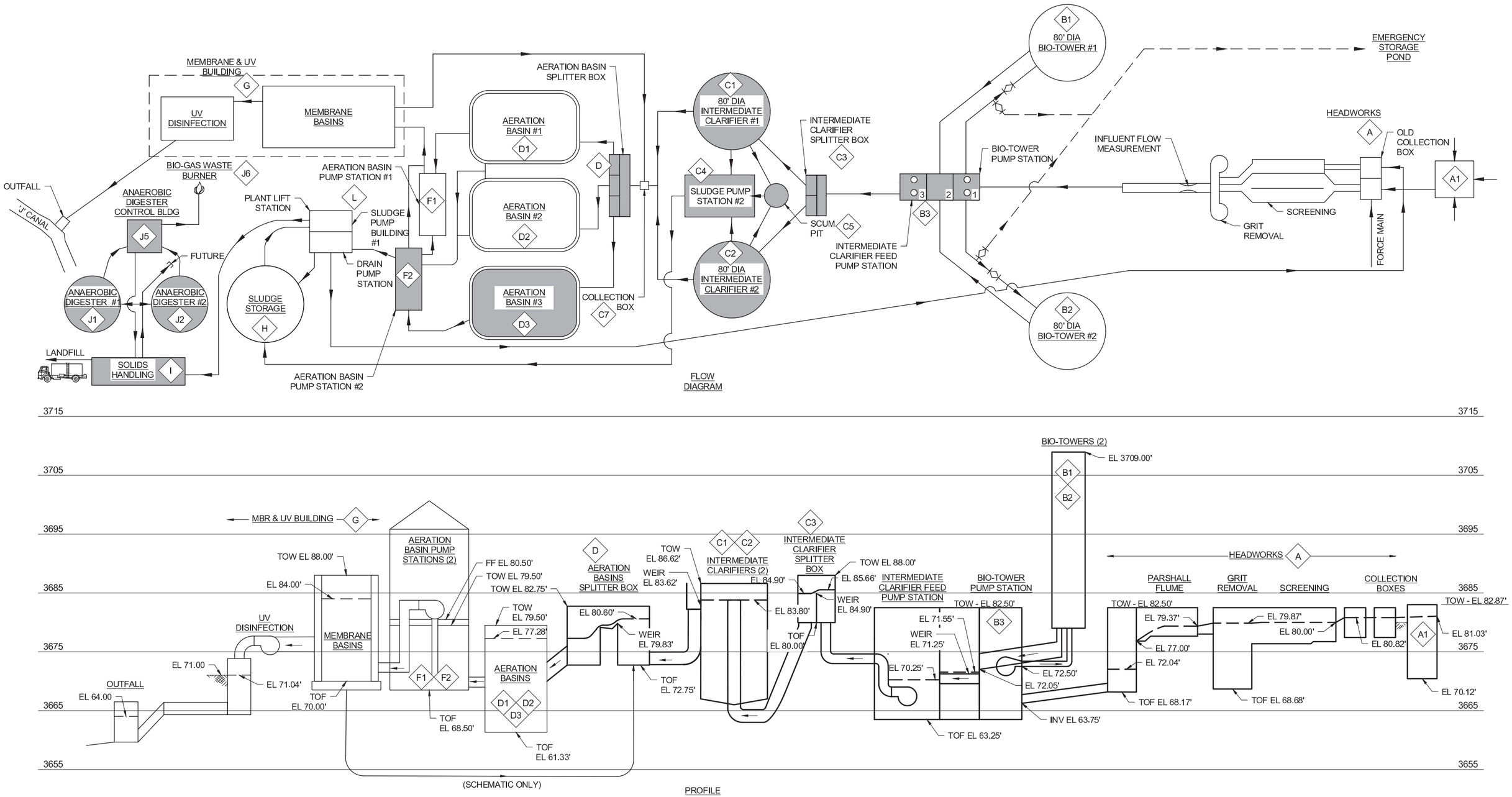
JEROME, IDAHO

PHASE II WWTP IMPROVEMENTS

SITE PLAN

PROJECT NO. 212006-006

SHEET NO. C-120



A1 HYDRAULIC PROFILE THROUGH MAJOR TREATMENT UNITS AT PEAK FLOW - 9.41 MGD INFLUENT FLOW

N.T.S.

NO.	REVISIONS	BY	DATE
0	QA REVISIONS	GRH	04-11-16

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PHASE II WWTP IMPROVEMENTS

HYDRAULIC PROFILE

PROJECT NO. 212006-006

SHEET NO. G-010

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APPENDIX B: MANUFACTURER SPECIFICATIONS

VAREC BIOGAS 244W Series
WASTE GAS BURNER IGNITION SYSTEM

The Varec Biogas 244W Series Waste Gas Burner is a highly reliable flare and ignition system ideal for use in burning excess biogas.

Introduction

The Varec Biogas 244W Series Waste Gas Burner is a highly reliable flare and ignition system. The pilot has proven reliability even in extreme climate conditions. The 244W Series is ideal for use in burning excess biogas.

Application

Excess biogas must be disposed of safely. The gas is flared to avoid an odor nuisance or an explosion hazard. Biogas is generated through the anaerobic digestion of organic solids. It is produced in municipal or industrial anaerobic digesters, lagoons, and municipal landfills. Biogas is typically a highly-moist mixture of gases. It consists of approximately 55 to 70% methane, 25 to 35% carbon dioxide and trace amounts of nitrogen, hydrogen sulfide, and water vapor. The biogas often has a fluctuating flow and BTU value. The 244W Series is designed to operate reliably at low and high flow rates, and is not affected by changes in the biogas BTU value.

Operation

The Varec Biogas 244WS Series Burner is a state-of-the-art, candle-stick flare. The burner utilizes a patented pilot ignition system. Pilot gas and air are mixed and ignited at ground level, remote from the burner stack. This controlled method results in a stable pilot flame with an ideal gas-to-air ratio. The pilot burns a true stoichiometric, non-smoking flame. It is not affected by changes in the biogas flow rate or BTU content.

The electronics package controls automatic pilot ignition and monitoring. During the ignition cycle, pilot gas is directed to the flame retention nozzle. Pilot gas is also directed to the venturi where air is inspirated. The air/ gas mixture is ignited at the venturi outlet. The ignition generates a flame front which travels through the continuous flame line and exits the continuous flame nozzle at the burner tip. Gas flowing in the flame retention nozzle is ignited by this flame front.

A thermocouple is installed in the continuous flame nozzle. When it reaches its temperature setting, the pilot gas flowing in the secondary flame retention line is shut-off. Pilot is flowing only on the continuous flame line and only when there is demand to combust biogas at the burner. In case the pilot is lost, automatic pilot reignition occurs in AUTO mode. If the burner goes through the number of reignition attempts within the set time and the thermocouple fails to reach its temperature setting, a system alarm comes on requiring a manual re-set.

Varec Biogas reserves the right to change product design and specifications without notice.
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Design Features

The 244W Series design includes features that provide reliable and efficient operation. The flare can withstand wind loading of 150 mph (242 km/h) and wind speeds of 110 mph (180 km/h). Baffles, downdraft preventers, vortex vanes, and secondary stacks are not required. The inclined continuous pilot nozzle provides a long-profile flame which penetrates the waste gas as it passes through. This feature ensures the biogas is ignited at near zero flows.

Installation is simplified. The burner allows high turndown ratios; therefore there is no need to manifold several burners together. Pre-cast concrete supports are not necessary. The burner includes an integral ANSI 150 RF flange. The contractor just has to provide a matching flange and pipe supports. These features keep installation costs to a minimum.

The venturi-driven pilot burns at higher temperature when fueled by propane, natural gas or biogas (see 244WG or 244WL systems). This improves H_2S conversion, which reduces odor to a minimum. The heavy-wall continuous pilot nozzle and flame retention nozzle are both mounted at the burner tip. The nozzles are designed to withstand the elevated pilot temperature and H_2S environment. A heavily protected thermocouple permits pilot flame monitoring. The thermocouple provides an extremely reliable pilot signal.

Contacts are provided as standard for remote pilot indication and system alarm. HAND and AUTO ignition mode is selectable.

The Varec Biogas 244WS is designed to operate satisfactorily in very cold climates.

The large venturi design allows the ignition components to be mounted up to 100 feet (30 m) away from the burner. The control package may also be mounted at this distance without suffering any performance loss.

The venturi includes a backflash preventer for safety. An anti-clog orifice is supplied which eliminates the need for pilot filters. The Varec Biogas Model 244WS is designed with operator safety in mind. All hi-tension leads and sparking devices are located a safe distance from the flame. Typical adjustments and maintenance are performed at ground level, away from the heat of combustion. Ignition components are also located remote from the burner, which provides optimum serviceability.

BLOWER PACKAGE

A blower package is available when the pilot gas supply is less than 10 psig (70 kPa) and as low as 8” W.C. (2 kPa) pressure.

The burner stack and control panel design is the same as the standard 244WS with a venturi.

This option can also handle the same burner flow capacities. Local or “Remote-Start” features are still available. You retain the advantage of having the theory of operation using flamefront technology.

A blower panel replaces the venturi and valve + regulator panel and utilizes a blower to pre-mix air and pilot gas. The blower comes with an air/gas mixing chamber to achieve proper airgas mixture and is ignited at the chamber exit. It also includes the pilot gas solenoid valves, regulators and gauges required to control pilot gas.

See the Sample Specification Product Data Sheet for more information.

244WG Series Low Pressure Pilot Ignition System

The Varec Biogas 244WG option is specifically designed to burn biogas efficiently with the use of low pressure biogas for pilot fuel (4” < pilot gas pressure < 14” WC) without the requirement of blower-assisted fuel or air.

The burner comes with two inspirating venturis to help pre-mix air and pilot gas and ensure pilot reliability and efficient combustion of biogas even with the low volume biogas pilot fuel. The control panel and pilot gas control components are mounted on stainless steel plate. It is installed a maximum of 10 feet horizontal distance from the waste gas burner. The pilot gas piping from the venturis to the waste gas burner connection must be a straight pipe – no pipe bends allowed. This will ensure that the stoichiometric gas can travel to the burner tip.

The 244WG also utilizes flamefront technology like the 244WS option and follows the same operation scheme.

244WL Series Low Pressure Pilot Ignition System

The 244WL ignition system utilizes the same flame from technology as the industry standard for our Model 244W Waste Gas Burners. The pilot gas control components panel can be mounted up to 70 ft. (seventy feet) from the burner stack. It can utilize biogas, natural gas or propane at pressures as low as 4" WC.

The 244WL ignition system no longer requires a straight pilot gas piping run from the pilot gas control components panel to the burner stack.

45 degrees elbows are allowed providing for greater flexibility during design and installation.

The "L" ignition system comes equipped with a blower to pre-mix air with the pilot gas to achieve the proper air-gas mixture required for combustion. This pre-mixing of the pilot gas and air insures that the pilot stays lit under virtually all flow and weather conditions.

The sparkplug is located at the exit of the 2" mixing chamber. A flame front travels on the 2" pilot gas line and as it exits the burner stack, the 1/2" retention line is there to capture the flame front. The angled design of the pilot gas piping has been field tested to achieve the proper air-gas mixture needed for optimum combustion of the waste gas. All serviceable items are located remotely from the burner stack which protects all electrical components from the heat of combustion. More importantly, Operators are protected from radiant heat effects from the waste gas burner when it is in operation.

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Optional Features

"REMOTE-START"

If biogas will be flared intermittently, an option to conserve pilot fuel is available through our "Remote-Start" pilot ignition option. It includes a pilot-gas supply solenoid valve, which opens when pilot ignition is required and remains open while the gas is flaring. The solenoid may be specified to: (a) fail open which will continue to deliver pilot fuel during a power failure and keep the burner operational in an emergency condition, or (b) fail close, which is used when a blower is available to deliver the biogas to the burner ("L" ignition system).

The "call for ignition" signal may be provided by a pressure switch, flow-switch, or through a contact change-over.

FLASHBACK PROTECTION

It is recommended that suitable flame flashback protection be installed in fuel gas lines supplying any of the 244W burner systems. Please refer to 5200 Series Product Data Sheet for information.

CONTROL

The standard control panel is provided with a programmable logic controller (PLC). The PLC can be provided with HMI touch screen controls. Relay logic panels available upon request.

HEATER & THERMOSTAT

For ambient temperatures below -200F (-290C), a heater and thermostat is recommended.

REMOTE SPARK GENERATOR

The hi-tension lead wire supplied with the unit is a maximum 10 feet (3 m) in length. In cases where the control panel that houses the transformer cannot be located within 10 feet of the spark plug location, a remote generator can be specified.

The transformer is supplied in either a NEMA 4, 4X or 4 & 7 enclosure and located within 10 feet of the spark plug. This allows an operator to have the control panel installed further away from the burner for improved burner monitoring.

Specifications

SIZES

2", 3", 4", 6", 8", 10" and 12"

CONNECTIONS

Burner Stack
ANSI 150 RF Flange

CONTROL PANEL

Power Supply Input:
115/ 120 VAC, 60 Hz, Standard
220/ 240 VAC, 50 Hz, Option
220/ 240 VAC, 60 Hz, Option

Load:
Maximum 10 AMPS at 120 VAC or
5 AMPS at 220 VAC (50-/ 60 Hz)

Ambient Temperature Rating:
-20°F to +131°F (-29°C to +55°C), Standard

REMOTE ALARM CONTACTS

SPDT (NC, NO and Common) Contacts
Contact Rating:
2 AMPS at 115 or 240 VAC (50/ 60 Hz)
Funtion:
Pilot Out and System Alarm

Materials

BURNER
Stainless Steel Shroud and Upper 24" of Stack; Remainder Mild Steel, Standard.

All 304SS or 316SS (Optional)

PILOT NOZZLES

316 SS

THERMOCOUPLE

316 SS

CONTROL ENCLOSURE[1]

NEMA 4, Steel Construction, Standard

NEMA 4X, 316 SS Construction, Optional

NEMA 7, Aluminum Construction with O'ring or Steel, Optional

NOTES:
1. UL Certified

HIGH PRESSURE PILOT GAS SUPPLY

Natural Gas or Propane
Min. Supply Pressure: 10 PSIG (70 kPa)
Max. Supply Pressure: 100 PSIG (700 kPa)

Recommended Pipe Length from Venturi to Continuous Flame Nozzle:
Minimum Distance: 15 feet (5m)
Maximum Distance: 100 feet (30m)

LOW PRESSURE PILOT GAS SUPPLY

When available pilot gas pressure is less than 10
PSIG (70 kPa) and greater than 4" WC.

BLOWER PACKAGE

Natural Gas or Propane
Minimum Supply Pressure: 6" - 8" WC
Explosion Proof Motor and Switch, Standard

Recommended Pipe Length from blower package to continuous flame nozzle:
Maximum distance: 33 feet (10m)

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Specifications

244WG Biogas Pilot Ignition System

Dry Biogas Pilot of 500 BTU/ ft^3 Minimum

Biogas or Natural Gas Supply Pressure

Supply Pressure:
4" WC min. to 14" WC max.
(100mm WC - 360mm WC)

Recommended Pipe Length from Venturis to waste gas burner (244WG):
Maximum distance: 10 feet (3m)

Only one 90° bend allowed on pilot gas piping, Maximum.

244WL Biogas Pilot Ignition System

Dry Biogas Pilot of 500 BTU/ ft^3 Minimum

Biogas or Natural Gas Supply Pressure

Supply Pressure:
4" WC min. to 20" WC max.
(100mm WC - 500mm WC)

Pipe Gas Piping Connections

1. Pilot Fuel Supply - 1" NPT
2. Valve & Regulator Panel Connections.
   a. Continous Line - 2" NPT
   b. Flame Retention Line - 1/2" NPT

Recommended Pipe Length from Venturi Continuouse Flame Nozzle:

Maximum Distance: 70 Feet (21m)

45° Bend Allowed on Pilot Gas Piping

NOTE:
Varec Biogas does not supply the pilot gas piping between the valve & regulator panel to the combustion stack.

GAS TO BE FLARED

Biogas
Composed primarily of Methane (50 - 55%) and CO_2 (40 - 45%)

Minimum Inlet Pressure
4" WC (1 kPa)

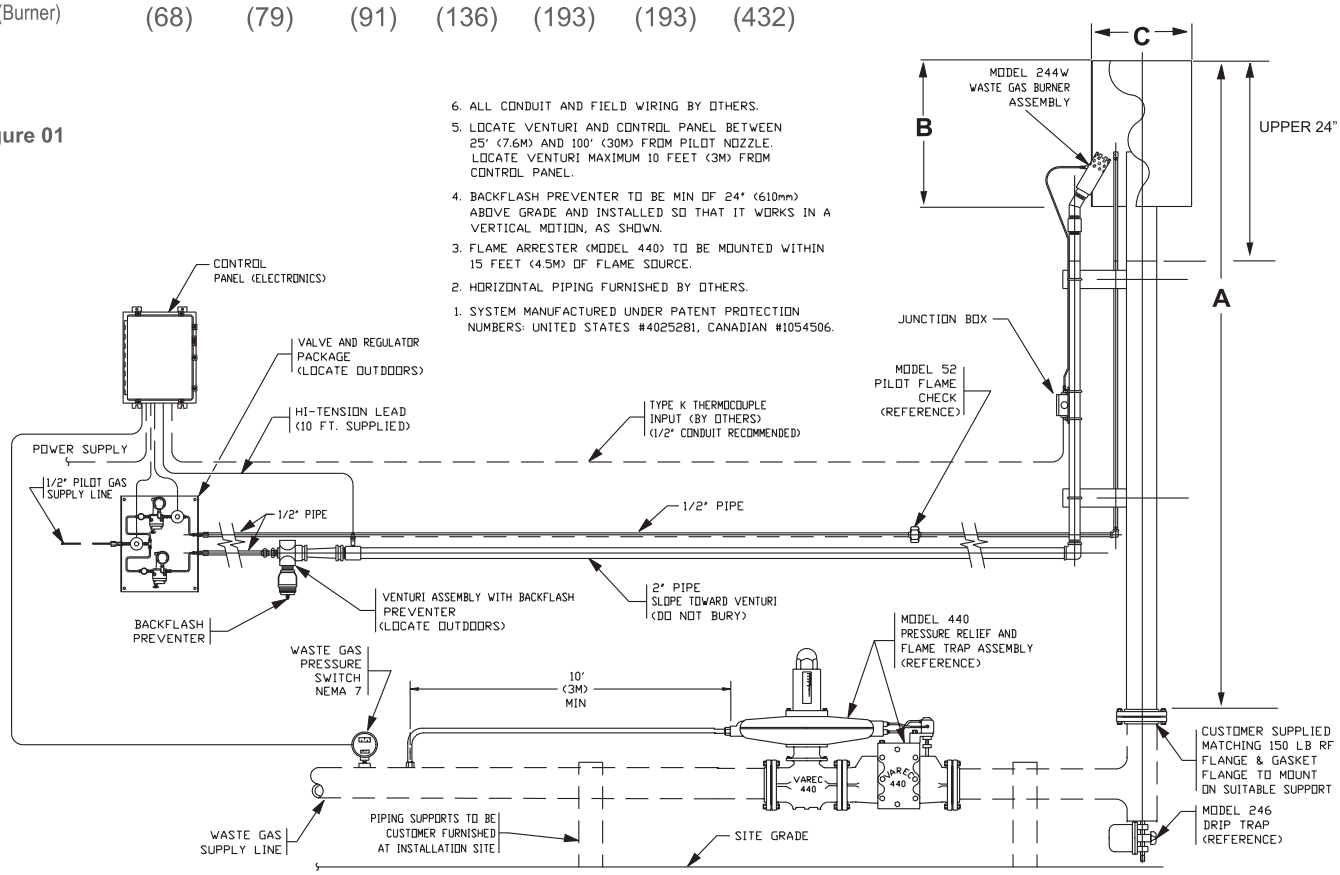
OPTIONAL FEATURES
Auto-Start Signal (Specify With)
Dry Contact, Standard

Explosion Proof Pressure Switch
Operating Range: 4" - 20" (100mm - 500mm) WC
Deadband: Approximately 0.5" (13mm) WC

Dimensions and Weights, inches [mm] and lbs. (kg)

Size Code	2	3	4	6	8	0	1
Nominal Pipe Size	2 [50]	3 [80]	4 [100]	6 [150]	8 [200]	10 [250]	12 [300]
A	88 [2235]	92 [2337]	92 [2337]	128 [3251]	144 [3658]	176 [4470]	188 [4775]
B	20 [508]	24 [610]	24 [610]	32 [813]	48 [1219]	48 [1219]	60 [1524]
C	17 [431]	18 [457]	19 [482]	22 [559]	24 [610]	24 [610]	36 [914]
Weight (Burner)	150 (68)	175 (79)	200 (91)	300 (136)	425 (193)	425 (193)	950 (432)

Figure 01



NOTE: 1 - The appropriate height of the flare must be calculate to ensure occupational safety. Consult factory for assistance.
2 - Stack dimensions are the same for all the options available with the 244W (244WS or 244WG).

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Specifications

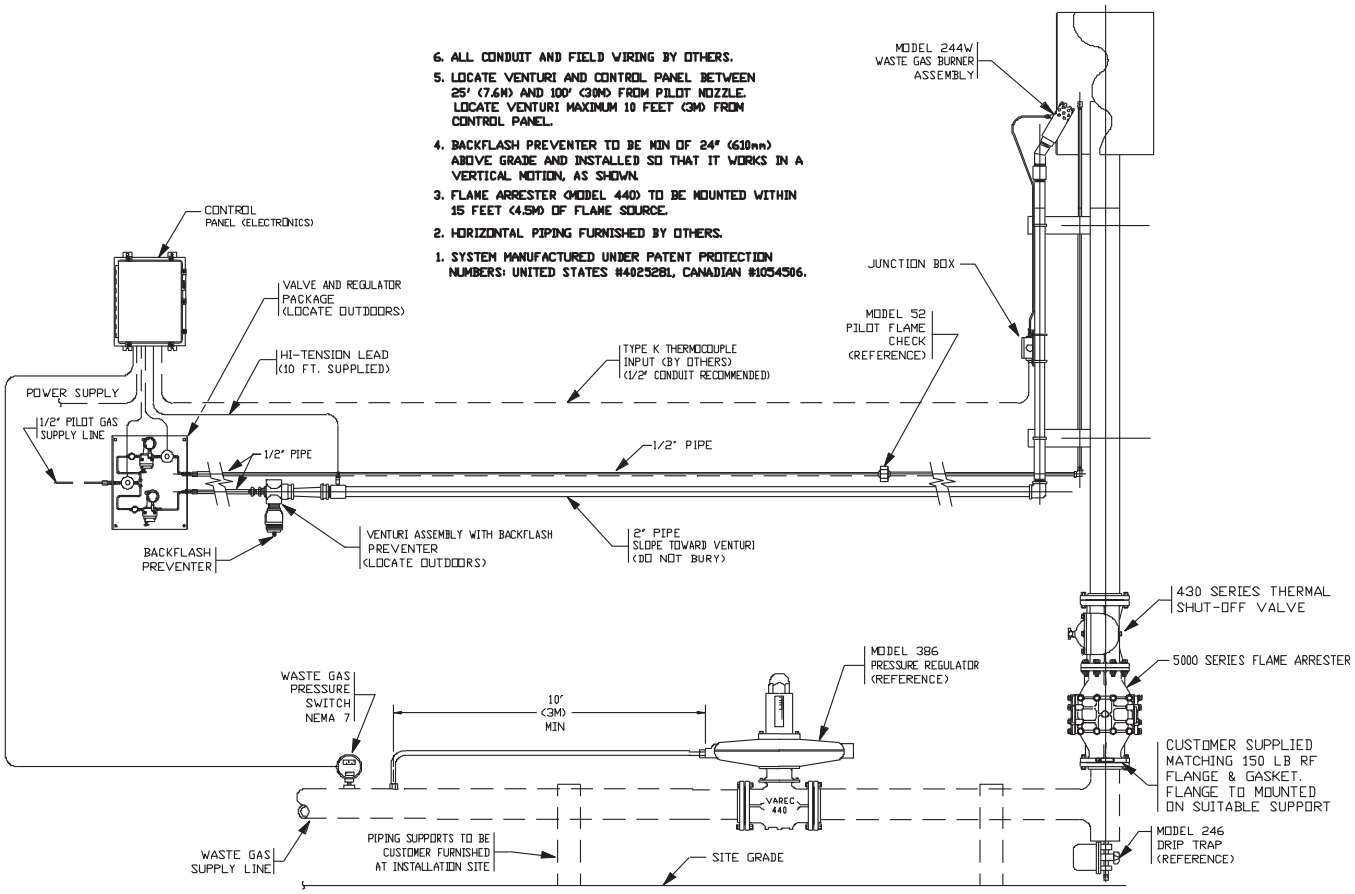
Burning Capcity, FT³ / HR [M³ / HR] - Maximum Flows

Flow stated for biogas with specific gravity 0.8 with 4” WC inlet pressure at flange connection and 0.5” WC pressure drop at 60°F (15°C) between the inlet flange and burner tip. Consult factory for flare sizing base on meeting 40 CFR Part 60.18 and Water Environment Federation, Manual of Practoce (MOP) No. 8

Size Code	2	3	4	6	8	0	1
	2”	3”	4”	6”	8”	10”	12”
FT³ / HR	3850	11600	22250	51300	88150	150000	250000
M³ / HR	109	328	630	1453	2496	4245	7075
MOP 8 Recommended Maximum Flow Rates*							
FT³ / HR	1100	2500	4275	9520	16350	25580	361701
M³ / HR	31	71	121	270	463	724	024

*The Water Environment Federation Manual of Practice Number 8 (MOP 8), copyright © 1998 recommends a velocity of no more than 12 feet per second. The maximum flow rates given are based upon Schedule 10 pipe leading up to the burner. Different schedule pipe will have different maximum recommended flow rates.

Figure 02: 244WS - Venturi with Varec Biogas 386 Series Regulator and 450 Series Flame Trap Assembly.



NOTE: The 450 Flame Trap Assembly is not designed to support burner weight. Alternate support may be required and is recommended.

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Specifications

See Fig 01 for Dimensions

Figure 03: 244WG - Venturi with Varec Biogas 440 Series Flame Trap Assembly

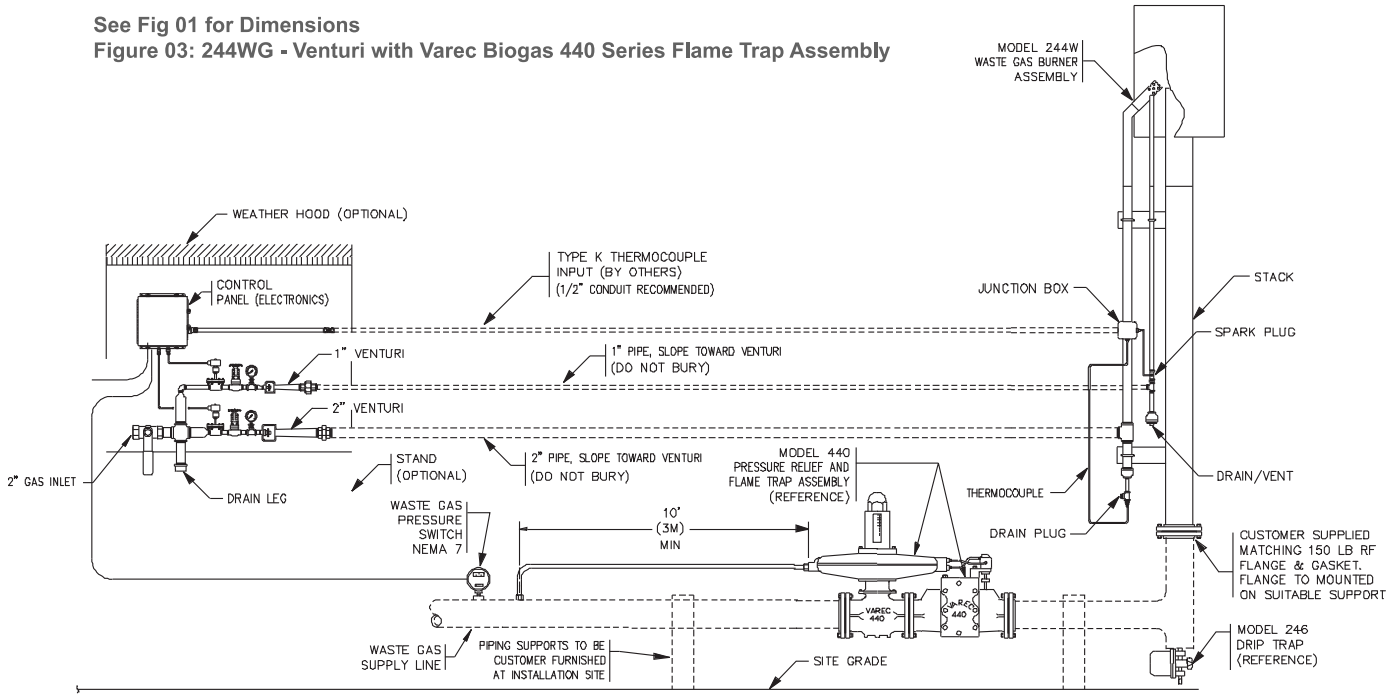
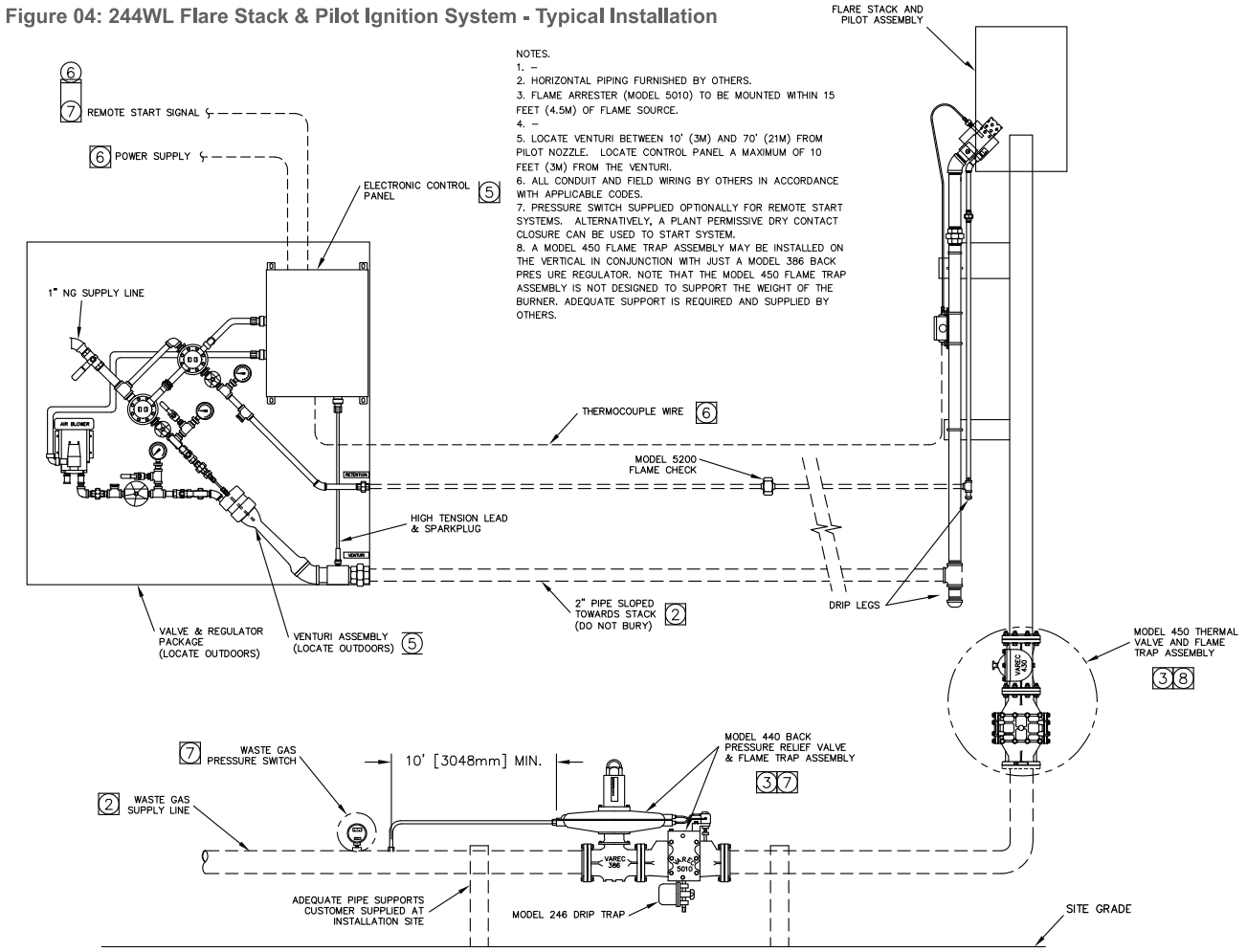


Figure 04: 244WL Flare Stack & Pilot Ignition System - Typical Installation



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Ordering Information

Model	Description
244W	Waste Gas Burner & Ingnition System

Code	Pilot Ignition System
S	Standard
G	Low Pressure Pilot Ignition System (Pilot Gas is 15" WC > X > 4" WC)
L	Low Pressure Pilot Ignition System (Pilot Gas is 20" WC > X > 4" WC)

Code	Size
2	2"
3	3"
4	4"
6	6"
8	8"
0	10"
1	12"

Code	Power Requirements (Must Select One)
1	115/ 120 VAC, 60 Hz (Standard)
2	220/ 240 VAC, 60 Hz
3	220/ 240 VAC, 50 Hz

Code	Electronic Enclosure Rating (Must Select One)
4	NEMA 4, Weather-Proof (Standard)
7	NEMA 7, Explosion-Proof (Optional)
9	NEMA 4X, Stainless Steel (Optional)

Code	Auto-Start Option (Must Select One)
0	None - Manual Start
1	Dry Contact - NEMA 7 Pressure Switch Included
2	Dry Contact - Pressure Switch Not Required

Code	Pilot Solenoid (Used Only with Auto-Start Option) (Must Select One)
0	No Auto Start Option Required
1	Pilot Solenoid Shall Fail Open (Not Avail. w/ Blower)
2	Pilot Solenoid Shall Fail Closed

Code	Blower Package Option (Only w/ 244WS) Indicate When Specified:
0	Standard Venturi-Driven System (Pilot Gas 10PSIG or Greater) or "G" & "L" Pilot Ignition System
1	Blower-Driven System [1]

Code	Options (May Select More Than One)
0	None required (Standard)
1	Heater and Thermostat Mounted within Electronic Enclosure Panel
2	Remote Spark Generator NEMA 4
3	Remote Spark Generator NEMA 7
4	Low Pressure Natural Gas for Pilot Gas (244WG & 244WL)
5	Propane/ LPG for Pilot Gas (244WS or 244WL Option)
7	244WG or 244WL Mounting Stand & Weatherhood (316L Weatherhood and Mounting Plate and 304L Stands) [2]
9	Auxiliary Weatherhood and Mounting Stand (316L Weatherhood and Mounting Plate and 304L Stands) [3]
R	Relay for use with Model 386/ 440 [4]
A	Anchor Bolt Calculations
B	Standard Support Burner Base for Flare Stack [5]
C	CSA Approval (Min. Stack Height, FF Flange, CSA Inspection)
W	Left Exit Panel (Right Exit - Standard)
P	Step Down Pilot Gas Pressure Regulator Max 10 PSIG Regulated to 12" WC [6]

Code	Burner Stack, Shroud and Pilot Gas Piping Material [7]
*	Leave blank when specifying standard of upper 24 inches of stack
S4	All 304 SS
S6	All 316 SS

244W	S	6	1	4	1	1	0	0	(Example)

Example: Standard Unit 6" Flange Connection; Electronic Panel to Accept 120 VAC, 60 Hz Input Power; Housed in NEMA 4 Enclosure. Includes Auto-Start Option with Pressure Switch/ Dry Contact Input and Fail Open Pilot Solenoid Valve

NOTE:
1 - Comes standard with Explosion Proof Motor and Switch.
2 - Available option with the 244WG and 244WL.
3 - Option can be used for 244WS/ WG/ WL Systems.
4 - Include when specifying a 3-Way Solenoid Valve with the Model 386/ 440.

NOTE:
5 - Standard design for support base. Add SPC if a special support base is required.
6 - Always include with an "L" ignition system.
7 - Add S4 or S6 at the end of the PN to signify choice of either all 304 SS or all 316 SS burner stack, shroud and pilot gas piping

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STATEMENT OF EXHAUST EMISSIONS
2016 PERKINS DIESEL FUELED GENERATOR

The measured emissions values provided here are proprietary to Generac and it's authorized dealers. This information may only be disseminated upon request, to regulatory governmental bodies for emissions permitting purposes or to specifying organizations as submittal data when expressly required by project specifications, and shall remain confidential and not open to public viewing. This information is not intended for compilation or sales purposes and may not be used as such, nor may it be reproduced without the expressed written permission of Generac Power Systems, Inc. The data provided shall not be meant to include information made public by Generac.

Generator Model:	**SD500**	EPA Certificate Number:	**GCPXL15.2NZS-003**
kW_e Rating:	**500**	CARB Certificate Number:	**Not Applicable**
Engine Family:	**GCPXL15.2NZS**	SCAQMD CEP Number:	**545376**
Engine Model:	**2506C-E15TAG3**	Emission Standard Category:	**Tier 2**
Rated Engine Power (BHP)*:	**762**	Certification Type:	**Stationary Emergency CI**
Fuel Consumption (gal/hr)*:	**31.2**		**(40 CFR Part 60 Subpart IIII)**
Aspiration:	**Turbo/Aftercooled**		
Rated RPM:	**1800**		

*Engine Power and Fuel Consumption are declared by the Engine Manufacturer of Record and the U.S. EPA.

Emissions based on engine power of specific Engine Model.
(These values are actual composite weighted exhaust emissions results over the EPA 5-mode test cycle.)

CO	NOx + NMHC	PM	
1.43	**5.02**	**0.07**	Grams/kW-hr
1.06	**3.73**	**0.05**	Grams/bhp-hr

- The stated values are actual exhaust emission test measurements obtained from an engine representative of the type described above.
- Values based on 5mode testing are official data of record as submitted to regulatory agencies for certification purposes. Testing was conducted in accordance with prevailing EPA protocol, which is typically accepted by SCAQMD and other regional authorities.
- No emissions values provided above are to be construed as guarantees of emission levels for any given Generac generator unit.
- Generac Power Systems, Inc. reserves the right to revise this information without prior notice.
- Consult state and local regulatory agencies for specific permitting requirements.
- The emission performance data supplied by the equipment manufacturer is only one element required toward completion of the permitting and installation process. State and local regulations may vary on a case-by-case basis and local agencies must be consulted by the permit application/equipment owner prior to equipment purchase or installation. The data supplied herein by Generac Power Systems cannot be construed as a guarantee of installability of the generating set.

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DIESEL GENERATOR SET

Image shown may not reflect actual package.

PRIME
500 ekW 625 kVA
60 Hz 1800 rpm 480 Volts

Caterpillar is leading the power generation marketplace with Power Solutions engineered to deliver unmatched flexibility, expandability, reliability, and cost-effectiveness.

FEATURES

FUEL/EMISSIONS STRATEGY

- EPA Certified for Stationary Emergency Application (EPA Tier 2 emissions levels)

DESIGN CRITERIA

- The generator set accepts 100% rated load in one step per NFPA 110 and meets ISO 8528-5 transient response

UL 2200 / CSA – Optional

- UL 2200 Listed packages
- CSA Certified

Certain restrictions may apply.

Consult with your Cat® Dealer.

FULL RANGE OF ATTACHMENTS

- Wide range of bolt-on system expansion attachments, factory designed and tested
- Flexible packaging options for easy and cost effective installation

SINGLE-SOURCE SUPPLIER

- Fully prototype tested with certified torsional vibration analysis available

WORLDWIDE PRODUCT SUPPORT

- Cat dealers provide extensive post sale support including maintenance and repair agreements
- Cat dealers have over 1,800 dealer branch stores operating in 200 countries
- The Cat S•O•S℠ program cost effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by-products

CAT C18 ATAAC DIESEL ENGINE

- Utilizes ACERT™ Technology
- Reliable, rugged, durable design
- Field-proven in thousands of applications worldwide
- Four-stroke-cycle diesel engine combines consistent performance and excellent fuel economy with minimum weight
- Electronic controlled governor

CAT GENERATOR

- Matched to the performance and output characteristics of Cat engines
- UL 1446 Recognized Class H insulation
- CSA Certified

CAT EMCP 4 CONTROL PANELS

- Simple user friendly interface and navigation
- Scalable system to meet a wide range of customer needs
- Integrated Control System and Communications Gateway
- Integrated Voltage Regulation

SEISMIC CERTIFICATION

- Seismic Certification available
- Anchoring details are site specific, and are dependent on many factors such as generator set size, weight, and concrete strength.

  IBC Certification requires that the anchoring system used is reviewed and approved by a Professional Engineer
- Seismic Certification per Applicable Building Codes: IBC 2000, IBC 2003, IBC 2006, IBC 2009, IBC 2012, CBC 2007, CBC 2010

FACTORY INSTALLED STANDARD & OPTIONAL EQUIPMENT

System	Standard	Optional
Air Inlet	• Disposable air filter	[ ] Canister type, dual element [ ] Heavy duty air cleaner
Cooling	• Package mounted radiator	
Exhaust	• Exhaust flange outlet	[ ] Industrial [ ] Residential / Critcal
Fuel	• Primary fuel filter with integral water separator • Secondary fuel filters • Fuel priming pump	
Generator	• Matched to the performance and output characteristics of Cat engines • IP23 Protection	[ ] Permanent magnet excitation (PMG) [ ] Anti-condensation space heater [ ] Internal excitation (IE) [ ] Coastal insulation protection
Power Termination	• Power terminal strips	[ ] Circuit breakers – 100% rated assembly, UL Listed [ ] SUSE (Suitable for use as service equipment)
Control Panels	• EMCP 4.2	[ ] EMCP 4.3 [ ] EMCP 4.4 [ ] Local and remote annunciator modules [ ] Remote monitoring software
Mounting	• Rubber vibration isolators	
Starting/Charging	• 24 volt starting motor & charging alternator • Batteries	[ ] Battery chargers [ ] Oversize batteries [ ] Jacket water heater
General	• Paint - Caterpillar Yellow except rails and radiators gloss black • Narrow skid base	The following options are based on regional and product configuration: [ ] Seismic Certification per Applicable Building Codes: IBC 2000, IBC 2003, IBC 2006, IBC 2009, IBC 2012, CBC 2007, CBC 2010 [ ] UL 2200 Listed package [ ] CSA Certified [ ] Wide skid base [ ] Sound attenuated enclosure [ ] Weather protective enclosure [ ] Integral dual wall UL Listed 8 hr fuel tank [ ] Sub-base dual wall UL Listed 24 hr fuel tank [ ] Sub-base dual wall UL Listed 48 hr fuel tank

SPECIFICATIONS

STANDARD CAT GENERATOR	
Frame size	LC6114G
Excitation	Self Excitation
Pitch	0.6667
Number of poles	4
Number of bearings	Single bearing
Number of leads	12
Insulation	UL 1446 Recognized Class H with tropicalization and antiabrasion
IP Rating	IP23
Alignment	Pilot shaft
Overspeed capability (%)	125
Wave form deviation (%)	2
Voltage regulator	Three phase sensing
Voltage regulation	+/- 0.25% (steady state)
– Consult your Cat dealer for other available voltages	
CAT DIESEL ENGINE	
C18 ATAAC, I-6, 4-Stroke Water-cooled Diesel	
Bore	145.00 mm (5.71 in)
Stroke	183.00 mm (7.2 in)
Displacement	18.13 L (1106.36 in^3)
Compression ratio	14.5:1
Aspiration	Air-to-air aftercooled
Fuel system	MEUI
Governor type	Caterpillar ADEM control system

CAT EMCP 4 SERIES CONTROLS

EMCP 4 controls including:
- Run / Auto / Stop Control
- Speed and Voltage Adjust
- Engine Cycle Crank
- 24-volt DC operation
- Environmental sealed front face
- Text alarm/event descriptions

Digital indication for:
- RPM
- DC volts
- Operating hours
- Oil pressure (psi, kPa or bar)
- Coolant temperature
- Volts (L-L & L-N), frequency (Hz)
- Amps (per phase & average)
- ekW, kVA, kVAR, kW-hr, %kW, PF (4.2 only)

Warning/shutdown with common LED indication of:
- Low oil pressure
- High coolant temperature
- Overspeed
- Emergency stop
- Failure to start (overcrank)
- Low coolant temperature
- Low coolant level

Programmable protective relaying functions:
- Generator phase sequence
- Over/Under voltage (27/59)
- Over/Under Frequency (81 o/u)
- Reverse Power (kW) (32) (4.2 only)
- Reverse reactive power (kVAr) (32RV)
- Overcurrent (50/51)

Communications:
- Four digital inputs (4.1)
- Six digital inputs (4.2 only)
- Four relay outputs (Form A)
- Two relay outputs (Form C)
- Two digital outputs
- Customer data link (Modbus RTU) (4.2 only)
- Accessory module data link (4.2 only)
- Serial annunciator module data link (4.2 only)
- Emergency stop pushbutton

Compatible with the following:
- Digital I/O module
- Local Annunciator
- Remote CAN annunciator
- Remote serial annunciator

TECHNICAL DATA

Open Generator Set - - 1800 rpm/60 Hz/480 Volts	DM8521	
EPA Certified for Stationary Emergency Application (EPA Tier 2 emissions levels)		
Generator Set Package Performance		
Genset power rating @ 0.8 pf	625 kVA	
Genset power rating with fan	500 ekW	
Fuel Consumption		
100% load with fan	138.8 L/hr	36.7 gal/hr
75% load with fan	112.3 L/hr	29.7 gal/hr
50% load with fan	81.8 L/hr	21.6 gal/hr
Cooling System[1]		
Air flow restriction (system)	0.12 kPa	0.48 in. water
Air flow (max @ rated speed for radiator arrangement)	568 m³/min	20059 cfm
Engine Coolant capacity with radiator/exp. tank	54.9L	14.5 gal
Engine coolant capacity	20.8 L	5.5 gal
Radiator coolant capacity	34.1 L	9.0 gal
Inlet Air		
Combustion air inlet flow rate	44.8 m³/min	1582.1 cfm
Exhaust System		
Exhaust stack gas temperature	501.5°C	934.7°F
Exhaust gas flow rate	121.5 m³/min	4290.7 cfm
Exhaust flange size (internal diameter)	203 mm	8 in
Exhaust system backpressure (maximum allowable)	10.0 kPa	40.2 in. water
Heat Rejection		
Heat rejection to coolant (total)	166 kW	9440 Btu/min
Heat rejection to exhaust (total)	549 kW	31222 Btu/min
Heat rejection to aftercooler	129 kW	7336 Btu/min
Heat rejection to atmosphere from engine	69.0 kW	3924 Btu/min
Heat rejection to atmosphere from generator	28.5 kW	1620.8 Btu/min
Alternator[2]		
Motor starting capability @ 30% voltage dip	1445 skVA	
Frame	LC6114G	
Temperature rise	105°C	189°F
Lubrication System		
Sump refill with filter	64.0 L	16.9 gal
Emissions (Nominal)[3]		
NOx g/hp-hr	5.08 g/hp-hr	
CO g/hp-hr	0.22 g/hp-hr	
HC g/hp-hr	0.01 g/hp-hr	
PM g/hp-hr	0.03 g/hp-hr	

[1] For ambient and altitude capabilities consult your Cat dealer. Air flow restriction (system) is added to existing restriction from factory.

[2] Generator temperature rise is based on a 40° C (104° F) ambient per NEMA MG1-32. Some packages may have oversized generators with a different temperature rise and motor starting characteristics.

[3] Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77°F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 btu/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

RATING DEFINITIONS AND CONDITIONS

Applicable Codes and Standards:
AS1359, CSA C22.2 No100-04, UL142,UL489, UL869, UL2200, NFPA37, NFPA70, NFPA99, NFPA110, IBC, IEC60034-1, ISO3046, ISO8528, NEMA MG1-22,NEMA MG1-33, 72/23/EEC, 98/37/EC, 2004/108/EC.

Prime – Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand is 100% of prime rated ekW with 10% overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year.

Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions.

Fuel Rates are based on fuel oil of 35° API (16°C or 60°F) gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29°C (85°F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.).

Additional Ratings may be available for specific customer requirements. Consult your Cat representative for details.

DIMENSIONS

Package Dimensions		
Length	3361 mm	132.3 in
Width	1580 mm	62.2 in
Height	2078 mm	81.8 in

NOTE: For reference only – do not use for installation design. Please contact your local dealer for exact weight and dimensions.

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Materials and specifications are subject to change without notice. The International System of Units (SI) is used in this publication.

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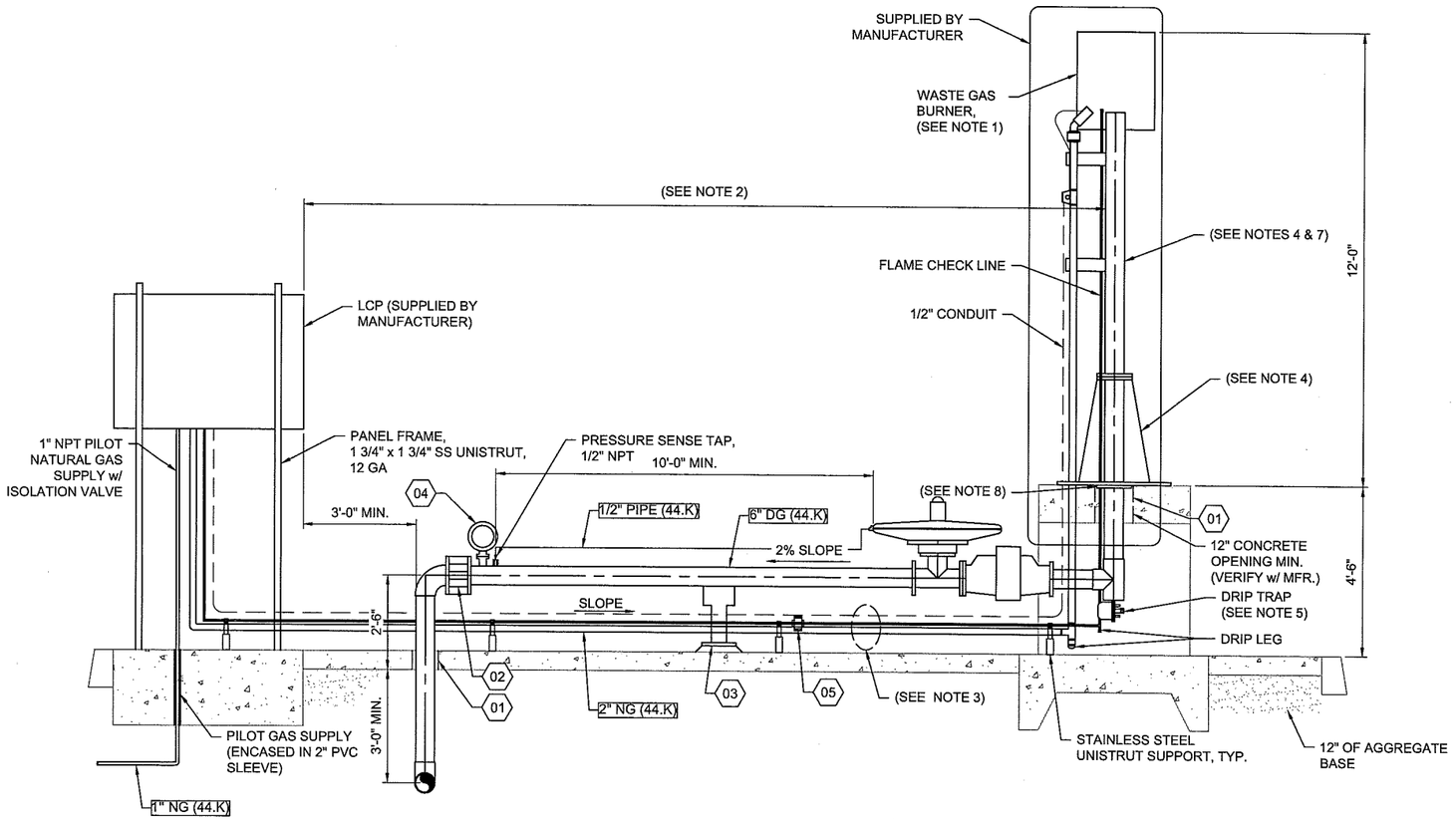
Performance No.: DM8521

Feature Code: C18DE6D

Gen. Arr. Number: 4183869

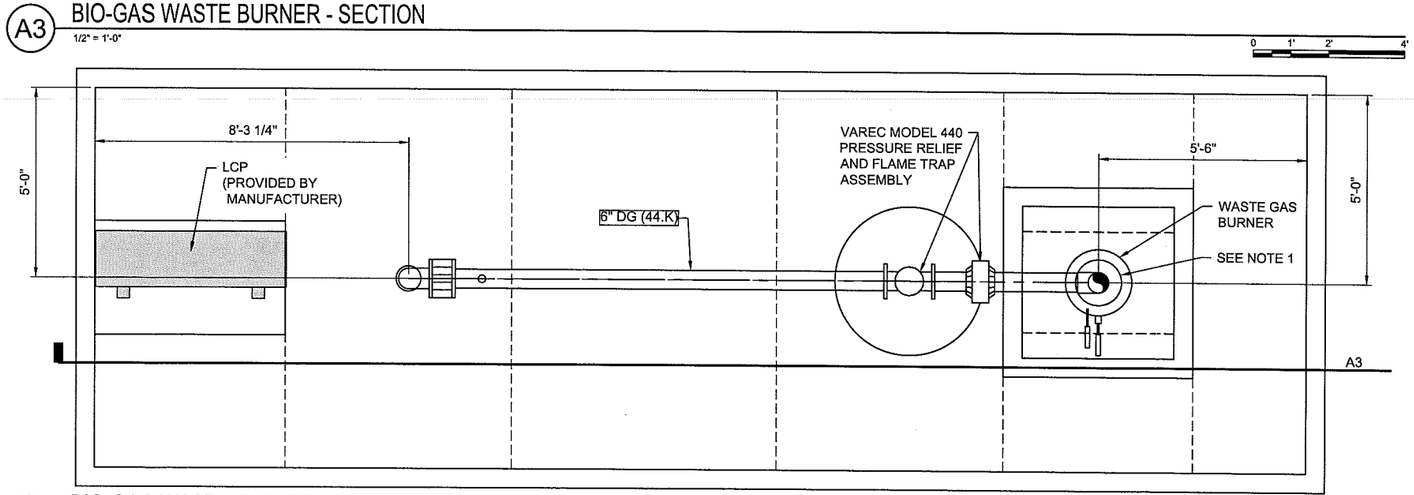
Source: U.S. Sourced

LEHE0480-00 (12/13)



A3 BIO-GAS WASTE BURNER - SECTION

1/2" = 1'-0"



A1 BIO-GAS WASTE BURNER - PLAN

1/2" = 1'-0"

GENERAL SHEET NOTES

1. ARRANGE AND INSTALL BURNER AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. LCP SHALL BE A MINIMUM OF 15' FROM BURNER.
3. INSULATE ALL EXPOSED DIGESTER GAS PIPING FROM THE LCP TO THE WASTE GAS BURNER. COORDINATE WITH MANUFACTURER FOR PLACEMENT LOCATION OF PIPING/CONDUIT TO GAS BURNER.
4. MANUFACTURER TO PROVIDE SUPPORT BASE AND ANCHOR BOLT CALCULATIONS FOR BURNER SUPPORT UPWARD FROM BASE SLAB ELEVATION.
5. INSTALL SHARPE SERIES 5457 SPRING BALL VALVE ON DRIP TRAP FOR DRAINING.
6. NOT USED.
7. ALL VERTICAL 6" DIGESTER GAS PIPING AND ASSOCIATED FLANGES ABOVE CONCRETE SLAB IS SUPPLIED BY THE MANUFACTURER.
8. CONNECT 6" DIGESTER GAS PIPE TO BOTTOM OF SUPPORT BASE WITH STAINLESS STEEL FLANGE. SUPPORT BASE IS PROVIDED WITH FLANGE CONNECTIONS.

SHEET KEYNOTES

01 PIPE PENETRATION, RE: STANDARD DETAIL M-227

02 SLEEVE TYPE COUPLING, INSTALL OUTSIDE OF WASTE GAS FLARE FACILITY FOOTPRINT

03 PIPE SUPPORT, RE: STANDARD DETAIL M-048

04 PRESSURE SWITCH

05 PILOT FLAME CHECK

P:\212006-JEROME WWTP\006 - PHASE II DESIGN\DESIGN\CAD\04 CONDOC\15 M MECHANICAL\10.6 STRUCTURE J6\M-101-J6.DWG LAST SAVED: 4/27/2016 12:21 PM PRINTED: 4/27/2016 2:02 PM

NO.	REVISIONS	BY	DATE
0	QA REVISIONS	NGC	04-27-16

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CHECKED: JMK
DESIGNED: NGC
APPROVED: NGC
CAD NAME:
SCALE: (Based on 22"x34" sheet) AS NOTED

PROFESSIONAL ENGINEER REGISTERED 12490 STATE OF IDAHO NATHAN CLEAVER

Digitally signed by Nathan Cleaver
Date: 2016.04.27 17:17:01 -06'00'

KELLER associates

THE SEAL OF THE CITY OF JEROME IDAHO

CITY OF
JEROME, IDAHO

PHASE II WWTP IMPROVEMENTS

BIO-GAS WASTE BURNER - MECHANICAL PLAN & SECTIONS

PROJECT NO. 212006-006

SHEET NO. M-101-J6

SD500 | 15.2L | 500 kW

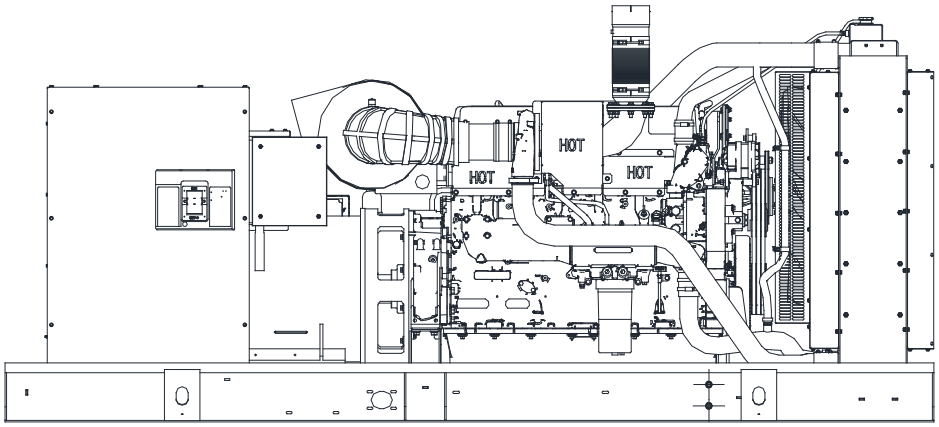
INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

STANDBY POWER RATING

500 kW, 625 kVA, 60 Hz



*Built in the USA using domestic and foreign parts

*EPA Certified Prime ratings are not available in the US or its Territories

**Certain options or customization may not hold certification valid

Image used for illustration purposes only

CODES AND STANDARDS

Generac products are designed to the following standards:

UL2200, UL508, UL142, UL498

NFPA70, 99, 110, 37

NEC700, 701, 702, 708

ISO9001, 8528, 3046, 7637, Pluses #2b, 4

NEMA ICS10, MG1, 250, ICS6, AB1

ANSI C62.41

POWERING AHEAD

For over 50 years, Generac has led the industry with innovative design and superior manufacturing.

Generac ensures superior quality by designing and manufacturing most of its generator components, including alternators, enclosures and base tanks, control systems and communications software.

Generac's gensets utilize a wide variety of options, configurations and arrangements, allowing us to met the Standby power needs of practically every application.

Generac searched globally to ensure the most reliable engines power our generator. We choose only engines that Have already been proven in heavy-duty industrial application under adverse conditions.

Generac is committed to ensuring out customer's service support continues after their generator purchase.

SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

STANDARD FEATURES

ENGINE SYSTEM

General

- Oil Drain Extension
- Air Cleaner
- Fan Guard
- Stainless Steel flexible exhaust connection
- Critical Exhaust Silencer (enclosed only)
- Factory Filled Oil
- Radiator Duct Adapter (open set only)

Fuel System

- Fuel lockoff solenoid
- Primary fuel filter

Cooling System

- Closed Coolant Recovery System
- UV/Ozone resistant hoses
- Factory-Installed Radiator
- Radiator Drain Extension
- 50/50 Ethylene glycol antifreeze
- 120 VAC Coolant Heater

Engine Electrical System

- Battery charging alternator
- Battery cables
- Battery tray
- Solenoid activated starter motor
- Rubber-booted engine electrical connections

ALTERNATOR SYSTEM

- UL2200 GENprotect™
- 12 leads (3-phase, non 600 V)
- Class H insulation material
- Vented rotor
- 2/3 pitch
- Skewed stator
- Auxiliary voltage regulator power winding
- Amortisseur winding
- Brushless Excitation
- Sealed Bearings
- Automated manufacturing (winding, insertion, lacing, varnishing)
- Rotor dynamically spin balanced
- Full load capacity alternator
- Protective thermal switch

GENERATOR SET

- Internal Genset Vibration Isolation
- Separation of circuits - high/low voltage
- Separation of circuits - multiple breakers
- Silencer Heat Shield
- Wrapped Exhaust Piping
- Silencer housed in discharge hood (enclosed only)
- Standard Factory Testing
- 2 Year Limited Warranty (Standby rated Units)
- 1 Year Limited Warranty (Prime rated Units)

ENCLOSURE (IF SELECTED)

- Rust-proof fasteners with nylon washers to protect finish
- High performance sound-absorbing material
- Gasketed doors
- Stamped air-intake louvers
- Air discharge hoods for radiator-upward pointing
- Stainless steel lift off door hinges
- Stainless steel lockable handles
- Rhino Coat™ - Textured polyester powder coat

TANKS (IF SELECTED)

- UL 142
- Double wall
- Vents
- Sloped top
- Sloped bottom
- Factory pressure tested (2 psi)
- Rupture basin alarm
- Fuel level
- Check valve in supply and return lines
- Rhino Coat™- Textured polyester powder coat
- Stainless hardware

CONTROL SYSTEM

Control Panel

- Digital H Control Panel - Dual 4x20 Display
- Programmable Crank Limiter
- 7-Day Programmable Exerciser
- Special Applications Programmable PLC
- RS-232/485
- All-Phase Sensing DVR
- Full System Status
- Utility Monitoring
- Low Fuel Pressure Indication
- 2-Wire Start Compatible
- Power Output (kW)
- Power Factor
- kW Hours, Total & Last Run
- Real/Reactive/Apparent Power
- All Phase AC Voltage
- All Phase Currents
- Oil Pressure
- Coolant Temperature
- Coolant Level
- Engine Speed
- Battery Voltage
- Frequency
- Date/Time Fault History (Event Log)
- Isochronous Governor Control
- Waterproof/sealed Connectors
- Audible Alarms and Shutdowns
- Not in Auto (Flashing Light)
- Auto/Off/Manual Switch
- E-Stop (Red Mushroom-Type)
- NFPA110 Level I and II (Programmable)
- Customizable Alarms, Warnings, and Events
- Modbus protocol
- Predictive Maintenance algorithm
- Sealed Boards
- Password parameter adjustment protection
- Single point ground
- 15 channel data logging
- 0.2 msec high speed data logging
- Alarm information automatically comes up on the display

Alarms

- Oil Pressure (Pre-programmable Low Pressure Shutdown)
- Coolant Temperature (Pre-programmed High Temp Shutdown)
- Coolant Level (Pre-programmed Low Level Shutdown)
- Engine Speed (Pre-programmed Over speed Shutdown)
- Battery Voltage Warning
- Alarms & warnings time and date stamped
- Alarms & warnings for transient and steady state conditions
- Snap shots of key operation parameters during alarms & warnings
- Alarms and warnings spelled out (no alarm codes)

SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

CONFIGURABLE OPTIONS

ENGINE SYSTEM

General

- O 50º C Ambient Cooling System
- O Heavy Duty Air Cleaner
- O Critical & Hospital Grade Silencers
- O CCV (Closed Crankcase Ventilation)

Fuel Electrical System

- O 10A & 20A UL battery charger
- O Battery Warmer

ALTERNATOR SYSTEM

- O Alternator Upsizing
- O Antl-Condensation Heather

CIRCUIT BREAKER OPTIONS

- O Main Line Circuit Breaker
- O 2nd Main Line Circuit Breaker
- O Shunt Trip and Auxiliary Contact
- O Electronic Trip Breaker

GENERATOR SET

- O Intelimonitor Communications Software (English Only)
- O 8 Load Position Load Center
- O AC Electrical Lighting Package (ELP)
- O 5 Year Warranty
- O 5 Year Extended Warranty
- O Spring Isolators (Standard/Seismic)

ENCLOSURE

- O Weather Protected Enclosure
- O Level 1 Sound Attenuation
- O Level 2 Sound Attenuation
- O Steel Enclosure
- O Aluminum Enclosure
- O 150/180 MPH Wind Rating
- O Louvers with Gravity Dampers
- O Enclosure Heaters

TANKS (Size on last page)

- O Electrical Fuel Level
- O Mechanical Fuel Level
- O 12 Hour Run Time
- O 24 Hour Run Time
- O Fuel Line Kits
- O Fuel Water Separator

CONTROL SYSTEM

- O NFPA 110 Complaint
- O Remote Relay Board (8 or 16)
- O Oil Temperature Sender with Indication Alarm
- O Remote E-Stop (Break Glass-Type, Surface Mount)
- O Remote E-Stop (Red Mushroom- Type, Surface Mount)
- O Remote E-Stop (Red Mushroom-Type, Flush Mount)
- O Remote Communication - Bridge
- O Remote Communication - Ethernet
- O 10A Run Relay, 12 outputs
- O Ground Fault Indication and Protection Functions

ENGINEERED OPTIONS

ENGINE SYSTEM

- O Fluid containment Pan
- O Oil Heater
- O Stainless Steel Hardware

ALTERNATOR SYSTEM

- O 3rd Breaker Systems
- O Unit Mounted Load Banks
- O Medium Voltage Alternators

CONTROL SYSTEM

- O Spare inputs (x4) / outputs (x4)
- O Battery Disconnect Switch

GENERATOR SET

- O Special Testing
- O 12 VDC Enclosure Lighting Kit
- O 24 VDC/120 VAC Enclosure Lighting Kit

ENCLOSURE

- O Motorized Dampers
- O Intrusion Alert Door Switch

TANKS

- O Overfill Protection Valve
- O UL2085 Tank
- O ULC S-601 Tank
- O Stainless Steel Tank
- O Special Fuel Tanks (MIDEQ and FL DEP/DERM, etc.)
- O Vent Extensions
- O Transfer Pumps and Controllers
- O Fuel Tank Heaters

RATING DEFINITIONS

Standby - Applicable for a varying emergency load for the duration of a utility power outage with no overload capability.

Prime - Applicable for supplying power to a varying load in lieu of utility for an unlimited amount of running time. A 10% overload capacity is available for 1 out of every 12 hours. The Prime Power option is only available on International applications. Power ratings in accordance with ISO 8528-1, Second Edition

SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC® | INDUSTRIAL POWER

APPLICATION AND ENGINEERING DATA

ENGINE SPECIFICATIONS

General

Make	Perkins
EPA Emissions Compliance	Stationary Emergency
EPA Emissions Reference	See Emissions Data Sheet
Cylinder #	6
Type	In-Line
Displacement - L (cu In)	15.2
Bore - mm (in)	137 (5.39)
Stroke - mm (in)	171 (6.73)
Compression Ratio	16.0:1
Intake Air Method	Turbocharged/Intercooled
Cylinder Head Type	4 - Valve
Piston Type	Aluminum
Crankshaft Type	I-Beam Section

Engine Governing

Governor	Electronic Isochronous
Frequency Regulation (Steady State)	+/- 0.25%

Lubrication System

Oil Pump Type	Gear
Oil Filter Type	Full-Flow Cartridge
Crankcase Capacity - L (qts)	45 (47.55)

Cooling System

Cooling System Type	Closed Recovery
Water Pump	Centrifugal Type, Belt Driven
Fan Type	Pusher
Fan Speed (rpm)	1658
Fan Diameter mm (in)	927 (36.5)
JW Coolant Heater Standard Wattage	
After Coolant Heater Standard Wattage	1500
Coolant Heater Standard Voltage	240VAC

Fuel System

Fuel Type	Ultra Low Sulfur Diesel #2
Fuel Specifications	ASTM
Fuel Filtering (microns)	Primary 10 - Secondary 2
Fuel Injection	Electronic
Fuel Pump Type	Engine Driven Gear
Injector Type	MEUI
Engine Type	Pre-Combustion
Fuel Supply Line mm (in)	12.7 (½"NPT)
Fuel Return Line mm (in)	12.7 (½"NPT)

Engine Electrical System

System Voltage	24 VDC
Battery Charging Alternator	70 Amps at 24V
Battery Size	1155 CCA
Battery Group	8D
Battery Voltage	(2) - 12 VDC
Ground Polarity	Negative

ALTERNATOR SPECIFICATIONS

Standard Model	WEG
Poles	4
Field Type	Revolving
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	<3%
Telephone Interference Factor (TIF)	<50

Standard Excitation	Permanent Magnet
Bearings	Single Sealed Cartridge
Coupling	Direct, Flexible Disc
Load Capacity - Standby	100%
Prototype Short Circuit Test	Yes
Voltage Regulator Type	Digital
Regulation Accuracy (Steady State)	±0.5%

SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

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OPERATING DATA

POWER RATINGS

		Standby
Three-Phase 120/208 VAC @0.8pf	500 kW	Amps: 1735
Three-Phase 120/240 VAC @0.8pf	500 kW	Amps: 1504
Three-Phase 277/480 VAC @0.8pf	500 kW	Amps: 752
Three-Phase 346/600 VAC @0.8pf	500 kW	Amps: 601

STARTING CAPABILITIES (sKVA)

sKVA vs. Voltage Dip

		480 VAC								208/240 VAC					
Alternator	kW	10%	15%	20%	25%	30%	35%	Alternator	kW	10%	15%	20%	25%	30%	35%
Standard	500	475	686	914	1143	1371	1600	Standard	500	429	643	857	1071	1286	1500
Upsize 1	642	471	707	943	1179	1414	1650	Upsize 1	689	543	814	1086	1357	1629	1900
Upsize 2	832	757	1136	1514	1893	2271	2650	Upsize 2	723	571	857	1143	1429	1714	2000

FUEL CONSUMPTION RATES*

Fuel Pump Lift - ft (m)
12 (3.7)

Total Fuel Pump Flow (Combustion + Return) gal/hr (l/hr)
121 (457)

	Diesel - gal/hr (l/hr)
Percent Load	Standby
25%	10.5 (39.7)
50%	19.5 (73.8)
75%	23.7 (89.7)
100%	31.2 (118.1)

* Fuel supply installation must accommodate fuel consumption rates at 100% load.

COOLING

		Standby
Coolant Flow per Minute	gal/min (l/min)	114.1 (432)
Coolant System Capacity	gal (L)	13 (49)
Heat Rejection to Coolant	BTU/hr	1,198,080
Inlet Air	cfm (m^3/hr)	30,582 (866)
Max. Operating Radiator Air Temp	F° (C°)	122 (50)
Max. Ambient Temperature (before derate)	F° (C°)	104 (40)
Maximum Radiator Backpressure	in H_2O	0.5

COMBUSTION AIR REQUIREMENTS

		Standby
Flow at Rated Power	cfm (m^3/min)	1483 (42)

ENGINE

		Standby
Rated Engine Speed	rpm	1800
Horsepower at Rated kW**	hp	762
Piston Speed	ft/min (m/min)	2020
BMEP	psi	366

** Refer to "Emissions Data Sheet" for maximum bHP for EPA and SCAQMD permitting purposes.

EXHAUST

		Standby
Exhaust Flow (Rated Output)	cfm (m^3/min)	3955 (112)
Max. Backpressure (Post Silencer)	inHg (Kpa)	2.01 (6.8)
Exhaust Temp (Rated Output)	°F (°C)	1022 (550)
Exhaust Outlet Size (Open Set)	mm (in)	127 (5)

Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions. Please consult a Generac Power Systems Industrial Dealer for additional details. All performance ratings in accordance with ISO3046, BS5514, ISO8528 and DIN6271 standards.

SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

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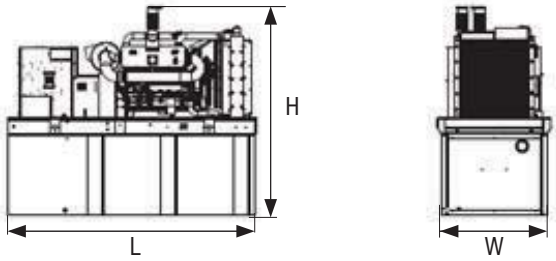
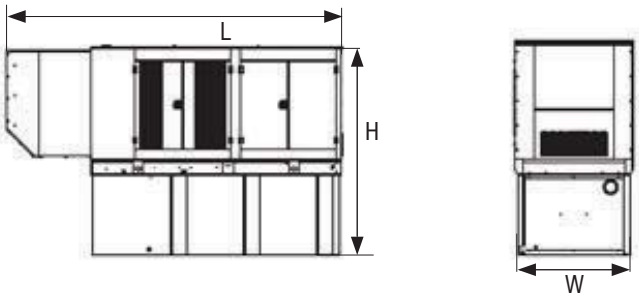
DIMENSIONS AND WEIGHTS*



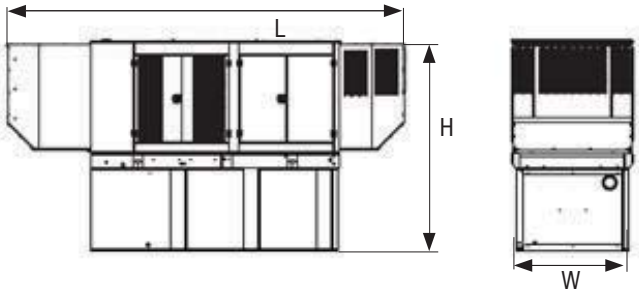
OPEN SET

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) - Tank & Open Set
NO TANK	-	154.4 (3923) x 71 (1803) x 67 (1702)	10580 (4799)
10	334	158.5 (4026) x 71 (1803) x 81 (2057)	12255 (5559)
32	1001	158.5 (4026) x 71 (1803) x 103 (2616)	13180 (6978)
32	1001	228 (5791) x 71 (1803) x 92 (2337)	13730 (6228)
64	2002	290 (7366) x 71 (1803) x 103 (2616)	15430 (6999)



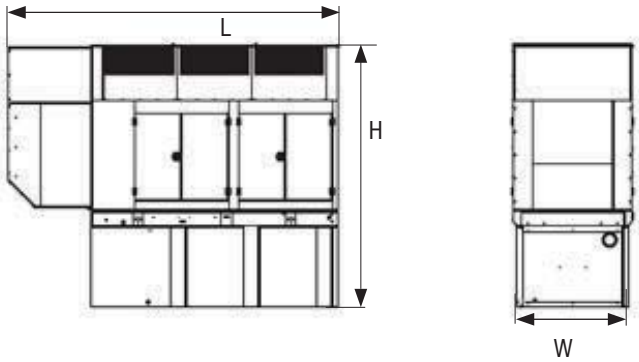
STANDARD ENCLOSURE

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) – Enclosure Only	
			Steel	Aluminum
NO TANK	-	207.4 (5268) x 71 (1803) x 80 (2032)	1999 (907)	869 (394)
10	334	207.4 (5268) x 71 (1803) x 94 (2388)		
32	1001	207.4 (5268) x 71 (1803) x 116 (2946)		
32	1001	228 (5791) x 71 (1803) x 105 (2667)		
64	2002	290 (7366) x 71 (1803) x 116 (2946)		



LEVEL 1 ACOUSTIC ENCLOSURE

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) - Enclosure Only	
			Steel	Aluminum
NO TANK	-	247.5 (6285) x 71 (1803) x 80 (2032)	2782 (1262)	1291 (586)
10	334	247.5 (6285) x 71 (1803) x 94 (2388)		
32	1001	247.5 (6285) x 71 (1803) x 116 (2946)		
32	1001	247.5 (6285) x 71 (1803) x 105 (2667)		
64	2002	290 (7366) x 71 (1803)x 116 (2946)		



LEVEL 2 ACOUSTIC ENCLOSURE

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) - Enclosure Only	
			Steel	Aluminum
NO TANK	-	207.4 (5268) x 71 (1803) x 114 (2899)	3330 (1510)	1522 (692)
10	334	207.4 (5268) x 71 (1803)) x 128 (3251)		
32	1001	207.4 (5268) x 71 (1803) x 150 (3810)		
32	1001	228 (5791) x 71 (1803) x 139 (3531)		
64	2002	290 (7366) x 71 (1803) x 150 (3810)		

* All measurements are approximate and for estimation purposes only. Sound dBA can be found on the sound data sheet. Enclosure Only weight is added to Tank & Open Set weight to determine total weight.

SPEC SHEET

Specification characteristics may change without notice. Dimensions and weights are for preliminary purposes only. Please consult a Generac Power Systems Industrial Dealer for detailed installation drawings.

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Part No 0197160SBY
Rev. D 09/21/15

Estimated Emissions -JB and JBX Burners

The following emissions apply to all JB and JBX burners firing the fuels shown.

Estimated Emission Levels Firing Natural Gas			
Pollutant		**Model JB**	**Model JBX**
NOx (B)	ppm lb/mmbtu	80 0.096	25 0.03
CO (A)	ppm lb/mmbtu	50 0.037	50 0.037
SOx (C)	ppm lb/mmbtu	1 0.001	1 0.001
HC / VOC	ppm lb/mmbtu	20 0.008	20 0.008
PM	ppm lb/mmbtu	na 0.0048	na 0.0048

~~Estimated Emission Levels Firing #2 Oil~~ (D)			
Pollutant		**Model JB**	**Model JBX**
NOx (B)	ppm lb/mmbtu	135 0.176	120 0.157
CO (A)	ppm lb/mmbtu	50 0.04	50 0.04
SOx (C)	ppm lb/mmbtu	278 0.52	278 0.52
HC / VOC	ppm lb/mmbtu	25 0.013	25 0.013
PM	ppm lb/mmbtu	na 0.014	na 0.014

Assumption sued for above (Contact Webster if different assumptions required)

A. CO varies with firing rate. Lower levels available, contact sales.
B. The ppm levels are corrected to 3% Oxygen (15% excess air) and dry volume basis.
C. Maximum sulfur in natural gas is 0.0006% wt.
D. ASTM #2 fuel, 0.02% Nitrogen, 0.5% Sulfur and 0.01% Ash (% by weight).
E. All levels are above backround (ambient) conditions.
F. Emission levels are based on a properly maintained and tuned burner.

SELKIRK®
COMMERCIAL & INDUSTRIAL
5030 Coporate Exchange Blvd.
Grand Rapids, MI 49512
Phone: 800.848.2149
Fax: 800.972.1421

DIGESTER GAS

THE FOLLOWING CALCULATIONS ARE THEORETICAL AND ARE FOR REFERENCE ONLY TO ASSIST OUR CLIENTS. SELKIRK ASSUMES NO RESPONSIBILITY FOR FIELD CLAIMS AGAINST THIS DATA. CALCULATIONS SHOULD BE VERIFIED BY A LICENSED HVAC PROFESSIONAL ENGINEER.

SELKIRK Run Date: 6/24/2016 4:17:55 PM EST

~~~~~~~~~~~~~~ BOILER / APPLIANCE FLUE GAS CALCULATION ~~~~~~~~~~~~~~~~~~~~~~

PROJECT:	JEROME W.W.T.P.	PREPARED FOR:	Mike Branan
PREPARED BY:	W. Norman Foster		FOLSOM ASSOCIATES

Fuel Type:	1 - Natural Gas or Equivalent.	
MBTU Input (1000 / BTU):	2925	Per Hour
Ambient Temperature:	70	Degrees F.
Flue Gas Temp. Rise Above Ambient:	380	Degrees F.
%CO2 in Combustion Products:	8.5	%
Altitude Above Sea Level:	3800	Feet
Effective Height of System:	23	Feet
Length of System (inc. height):	28	Feet
Outlet Diameter:	10	Inches

Veritcal Manifold Tees:	1	Horizontal Manifold Tee:	0
45 Degree Lateral Tee:	0	90 Degree Wye Tee:	0
15 Degree Elbow:	0	30 Degree Elbows:	0
45 Degree Elbow :	0	90 Degree Turns (2-45's) :	1
Drain Sections:	0	Duct Drains:	0
		Other System Resistance:	0
Tapered Increasers in Sys. :	NO	Stepped Increasers in Sys.:	NO
Tapered Reducers in Sys:	NO	Stepped Reducer in Sys. :	NO
Allowable Pressure:	0	Pressure Changes :	0
Barometric Damper:	0		

Stack Cap Termination

Computer Sized at:	14.132	Inches
Selkirk Product Size Selected :	12	Inches
Barometric Pressure @ Altitude :	26.12	Inches Hg
Density of Flue Gasses :	0.039	lbs. / Foot^3
Theoretical Draft:	0.121	Inches H2O
Flue Gas %CO@ Used for Calcs:	8.5	%
Combustion Products Mass :	1.04	lbs. / MBTU
Flue Gas Mass Flow:	50.62	lbs. / min.
Flue Gas Volume Flow(CFM):	1317.2	Feet^3 / min.
Flue Gas Velocity (@ Size):	27.95	Feet / Sec.
Total System Velocity Heads :	2.644	K
Total System Pressure Losses:	0.239	Inches H2O
Max. Pres. at System Entrance :	0.118	Inches H2O

Powered By US Draft Co., LLC Technology
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NATURAL GAS.

SELKIRK®
COMMERCIAL & INDUSTRIAL
5030 Coporate Exchange Blvd.
Grand Rapids, MI 49512
Phone: 800.848.2149
Fax: 800.972.1421

THE FOLLOWING CALCULATIONS ARE THEORETICAL AND ARE FOR REFERENCE ONLY TO ASSIST OUR CLIENTS. SELKIRK ASSUMES NO RESPONSIBILITY FOR FIELD CLAIMS AGAINST THIS DATA. CALCULATIONS SHOULD BE VERIFIED BY A LICENSED HVAC PROFESSIONAL ENGINEER.

SELKIRK Run Date: 6/24/2016 4:16:43 PM EST

~~~~~~~~~~~~~~ BOILER / APPLIANCE FLUE GAS CALCULATION ~~~~~~~~~~~~~~~~~~~~~

PROJECT: JEROME W.W.T.P. PREPARED FOR: Mike Branan
PREPARED BY: W. Norman Foster FOLSOM ASSOCIATES

Fuel Type:	1 - Natural Gas or Equivalent.	
MBTU Input (1000 / BTU):	1950	Per Hour
Ambient Temperature:	70	Degrees F.
Flue Gas Temp. Rise Above Ambient:	380	Degrees F.
%CO2 in Combustion Products:	8.5	%
Altitude Above Sea Level:	3800	Feet
Effective Height of System:	23	Feet
Length of System (inc. height):	28	Feet
Outlet Diameter:	10	Inches

Veritcal Manifold Tees:	1	Horizontal Manifold Tee:	0
45 Degree Lateral Tee:	0	90 Degree Wye Tee:	0
15 Degree Elbow:	0	30 Degree Elbows:	0
45 Degree Elbow :	0	90 Degree Turns (2-45's) :	1
Drain Sections:	0	Duct Drains:	0
		Other System Resistance:	0
Tapered Increasers in Sys. :	NO	Stepped Increasers in Sys.:	NO
Tapered Reducers in Sys:	NO	Stepped Reducer in Sys. :	NO
Allowable Pressure:	0	Pressure Changes :	0
Barometric Damper:	0		

Stack Cap Termination

Computer Sized at:	11.756	Inches
Selkirk Product Size Selected :	12	Inches
Barometric Pressure @ Altitude :	26.12	Inches Hg
Density of Flue Gasses :	0.039	lbs. / Foot^3
Theoretical Draft:	0.121	Inches H2O
Flue Gas %CO@ Used for Calcs:	8.5	%
Combustion Products Mass :	1.04	lbs. / MBTU
Flue Gas Mass Flow:	33.74	lbs. / min.
Flue Gas Volume Flow(CFM):	878.1	Feet^3 / min.
Flue Gas Velocity (@ Size):	18.63	Feet / Sec.
Total System Velocity Heads :	2.693	K
Total System Pressure Losses:	0.108	Inches H2O
Max. Pres. at System Entrance :	-0.013	Inches H2O

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REZNOR®
Model UDBS

Separated Combustion, High Static Blower Type Unit Heaters for Commercial/Industrial Use

CSA 2.6b

ANSI Z83.8b

DESCRIPTION

Reznor® V3 Series Model UDBS gas-fired separated combustion unit heaters are available in 14 sizes ranging from 30,000 to 400,000 BTUH gas input. Model UDBS heaters are designed for 82-83% thermal efficiency and are approved for commercial/industrial installations in the United States and Canada by the Canadian Standards Association (CSA).

Reznor V3 Series unit heaters have a refreshing new appearance with a glossy white cabinet finish and less visible hardware. Each size cabinet is easily suspended from four suspension points. The low voltage terminal strip on the outside of the cabinet makes connecting control wiring easy with no panels to remove. The addition of a "G" terminal to the low voltage strip, along with the new design of the circuit board, allows for blower only operation (without adding relays). All units have a factory installed gas line nipple to the exterior of the cabinet for easy gas service connection.

The preeminent new internal feature is the TCORE² heat exchanger and single burner combustion system. Other standard features include a single-stage gas valve, multi-try direct spark ignition with timed lockout, pressure switch to verify vent flow, resiliently isolated venter motor, venter wheel with improved housing, a high temperature limit control, interlock door switch, and a built-in disconnect switch. Sizes 30-125 are equipped with a centrifugal blower and direct drive motor with multispeed taps. Sizes 30 and 45 are capable of handling up to .5" w.c. of external static pressure; Sizes 60-125 will handle up to .75" w.c. of external static pressure. Sizes 150-400 are equipped with a centrifugal blower with an adjustable belt drive and motor. All units are designed for use with optional 30° and 60° downturn nozzles with horizontal and vertical louvers. Operation is controlled through an integrated circuit board. The circuit board monitors heater operation and has LED diagnostic indicator lights to identify abnormalities in control functions.

The 1ST ever separated combustion system in the commercial/industrial heating industry **was introduced on a Reznor heater** in the 1960s, and that proven technology is continued in this new separated combustion product. Model UDBS separated combustion units require installation of a specially designed combustion air/vent system including the unique concentric adapter box that allows for only one building penetration for both the vent and combustion air.

The V3 Series unit heaters are designed to provide all the features you expect in a Reznor heater plus improved efficiency, easier installation, and a new look ***~ both inside and out.*** Look for the unique white unit with no visible front and bottom hardware, deep red louvers, black side handle, and angled corner to know you have a genuine Reznor heater.

STANDARD FEATURES

- Certified for commercial/industrial heating applications
- 82-83% Thermal efficient ***~ TOP in its class!***
- 45-75°F Rise range - Sizes 30-350 50-80°F Rise range - Size 400
- TCORE² titanium stabilized aluminized steel heat exchanger
- Patented [A] single burner combustion system including a one-piece burner assembly
- 115/1/60 Supply voltage
- 115 Volt open dripproof blower motor with internal overload protection - Sizes 30-125
- 115 Volt open dripproof blower motor with internal overloads and definite purpose motor contactor - Sizes 150-400
- Direct drive blower with multispeed taps - Sizes 30-125
- Adjustable belt drive blower - Sizes 150-400
- Transformer for 24-volt controls
- Integrated circuit board with diagnostic indicator lights
- Blower relay (included on the circuit board)
- Multi-try direct spark ignition with timed lockout
- Single-stage natural gas valve (field adjustable for operation to 9,000 ft. elevation ®)
- Vibration/noise isolated venter motors
- Sealed compartment houses all electrical components
- 4-pt Suspension
- Built-in disconnect switch - Sizes 30-125, 20A@115V rating; Sizes 150-400 30A@115V rating
- External terminal strip for 24-volt wiring
- Sealed junction box for supply wiring
- External gas connection
- Fully gasketed door panel with safety door switch
- Improved cabinet design with less visible hardware

[A] U.S. Patent No. 6,889,686

OPTIONAL FEATURES - FACTORY INSTALLED

- Equipped for propane gas
- Single-stage, propane gas valve (field adjustable for operation to 9,000 ft. elevation [B])
- Two-stage natural gas or propane gas valve - Sizes 60-400
- 409 or 316 Stainless steel heat exchanger
- 208, 230, 480, and 575 Three phase voltage - Sizes 150-400 (step down transformer shipped separate for field installation for 480 and 575 units)
- Adjustable belt drive and motor for up to .5" w.c. external static pressure - Sizes 150-400
- Totally enclosed blower motor - Sizes 150-250
- Belt and blower guards

OPTIONAL FEATURES - FIELD INSTALLED

- Horizontal or Vertical Combustion Air/Vent Kit including concentric adapter [C]
- Thermostat
- Thermostat guard with locking cover
- Vertical louvers
- Downturn nozzle (30° or 60° deflection, with and without vertical louvers)
- Gas conversion kits
- Manual shutoff valves
- High altitude kits (above 6,000 ft. to 9,000 ft.)
- Primary/secondary controls for zoning up to six units
- Duct flange
- Polytube adapters
- Blower and belt guards
- Hanger kits for 1" pipe
- Stepdown transformer (for 208/115, 230/115 or 460/115 supply voltage) - Sizes 30-125

[B] Pressure switch change required for installations above 6,000 ft.
[C] Selection of either a horizontal or vertical combustion air/vent kit is required.

For installations where dirt, dust, and other air borne contamination is present in the indoor environment, it is [illegible] use separated [illegible] units (Model UDBS). These models use air from outside the space [illegible] This will help re[illegible] of contaminates on the burner which would affect the combustion process. Refer to the installation manuals for recommended frequency of maintenance and cleaning.

TECHNICAL DATA

Model UDBS

GUH 1 GUH 2

Size		30	45	60	75	100	125	150	175	200	225	250	300	350	400
Input Heating Capacity	BTUH	30,000	45,000	60,000	75,000	105,000	120,000	150,000	175,000	200,000	225,000	250,000	300,000	350,000	400,000
	kw/h	8.8	13.2	17.6	22.0	30.8	35.2	43.9	51.2	58.6	65.9	73.2	87.8	102.5	117.1
Thermal Efficiency (%)		82	82	82	82	83	83	83	83	83	83	83	83	83	82
Output Heating Capacity [D]	BTUH	24,600	36,900	49,200	61,500	87,150	99,600	124,500	145,250	166,000	186,750	207,500	249,000	290,500	328,000
	kw/h	7.2	10.8	14.4	18.0	25.6	29.2	36.4	42.5	48.6	54.7	60.8	72.9	85.1	96.0
Gas Connection (in.) [E]	Natural	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4
	Propane	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4
Vent Connection [F] (in. diameter)		4	4	4	4	4	4	5	5	5	5	5	6	6	6
Combustion Air Inlet [F] (in. diameter)		4	4	4	4	4	4	6	6	6	6	6	6	6	6
Control Amps (24 volt)		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
FLA (with standard HP 115V motor)		3.7	3.7	7.1	7.1	13.0	13.0	5.9	6.3	10.5	12.7	12.7	17.7	27.3	27.3
Maximum OCP (115V) [G]		15	15	15	15	30	30	15	15	25	30	30	40	60	60
Normal Power Consumption (watts @ full load, medium speed)		215	215	447	447	537	537	230	415	485	675	675	1260	1635	1635
Minimum Discharge Air Temperature Rise	°F	45	45	45	45	45	45	45	45	45	45	45	45	45	50
Maximum Discharge Air Temperature Rise	°F	75	75	75	75	75	75	75	75	75	75	75	75	75	80
Maximum Air Volume	CFM	506	759	1012	1265	1793	2049	2562	2989	3416	3843	4270	5123	5977	6185
	M^3/min	14.3	21.5	28.7	35.8	50.8	58.0	72.5	84.6	96.7	108.8	120.9	145.1	169.2	175.1
Minimum Air Volume	CFM	304	456	607	759	1076	1230	1537	1793	2049	2306	2562	3074	3586	4100
	M^3/min	8.6	12.9	17.2	21.5	30.5	34.8	43.5	50.8	58.0	65.3	72.5	87.0	101.5	116.1
Discharge Air Opening Area	Ft^2	0.96	0.96	1.25	1.25	2.01	2.01	2.56	2.56	2.56	3.51	3.51	4.79	4.79	4.79
	M^2	0.09	0.09	0.12	0.12	0.19	0.19	0.24	0.24	0.24	0.33	0.33	0.45	0.45	0.45
Maximum Output Velocity	FPM	527	791	810	1012	892	1020	1001	1168	1334	1095	1217	1070	1248	1291
	M^3/min	159	239	239	299	267	305	305	356	407	334	371	326	380	393
Minimum Output Velocity	FPM	316	475	486	607	535	612	600	700	800	657	730	642	749	856
	M^3/min	96	143	143	179	160	183	183	213	244	200	223	196	228	261
Standard Blower Motor HP		1/6	1/6	1/3	1/3	3/4	3/4	1/4	1/2	1/2	3/4	3/4	1-1/2	2	2
Blower Size	inches	9 X 6	9 X 6	9 X 6	9 X 6	10 X 10	10 X 10	12 x 12	12 x 12	12 x 12	15 x 11	15 x 11	15 x 15	15 x 15	15 x 15
Approximate Net Weight	lbs	72	77	89	94	131	136	255	275	275	320	335	375	410	425
	kg	33	35	40	43	59	62	116	125	125	145	152	170	186	193
Approximate Ship Weight	lbs	90	95	110	115	176	181	315	335	335	400	415	475	510	525
	kg	41	43	50	52	80	82	143	152	152	181	188	215	231	238

[D] CSA rating for altitudes to 2000 ft.
[E] Size shown is for gas connection to a single stage gas valve, not supply line size.
[F] Smaller and/or larger vent and combustion air pipe diameters may be allowed; refer to the Venting Installation Manual for Separated Combustion Units, Form I-UD-V-SC. If vent diameter is different from vent connection, reducer/enlargers will be field-required.
[G] MOP = 2.25 x largest motor FLA + remaining load. Answer is rounded down to the next size of commercially available circuit breaker or fuse.

REZNOR®

Model UDAS

Separated Combustion, Low Static Commercial/Industrial Unit Heaters

Sizes 30-125 carry an additional approval for use in residential garage/workshops under CSA International Requirement 10.96 - U.S. and CR96-0005 - Canada

CSA 2.6b

ANSI Z83.8b

DESCRIPTION

Reznor® V3 Series Model UDAS gas-fired separated combustion unit heaters are available in 14 sizes ranging from 30,000 to 400,000 BTUH gas input. All sizes are approved for commercial/industrial installations. Sizes 30-125 carry an additional approval for use in attached residential garage/workshop application. Model UDAS heaters are designed for 82-83% thermal efficiency and are approved for installation in the United States and Canada by the Canadian Standards Association (CSA).

Reznor® V3 Series unit heaters have a refreshing new appearance with a glossy white cabinet finish and less visible hardware. Each size cabinet is easily suspended from either 2 or 4 suspension points. Or, an optional hanger kit for Sizes 30-125 allows for ceiling mounting. The low voltage terminal strip on the outside of the cabinet makes connecting control wiring easy with no panels to remove. The addition of a “G” terminal to the low voltage strip, along with the new design of the circuit board, allows for fan only operation (without adding relays). All units have a factory installed gas line nipple to the exterior of the cabinet for easy gas service connection.

The preeminent new internal feature is the TCORE² ® heat exchanger and single burner combustion system. Other standard features include a single-stage gas valve, multi-try direct spark ignition with timed lockout, pressure switch to verify vent flow, resiliently isolated venter motor, venter wheel with improved housing, resiliently isolated axial fan and motor assembly, a high temperature limit control, interlock door switch, and a built-in disconnect switch. Sizes 30-125 also include a flame rollout safety switch. Operation is controlled through an integrated circuit board. The circuit board monitors heater operation and has LED diagnostic indicator lights to identify abnormalities in control functions.

The 1ST ever separated combustion system in the commercial/industrial heating industry **was introduced on a Reznor heater** in the 1960s, and that proven technology is continued in this new separated combustion product. Model UDAS separated combustion units require installation of a specially designed combustion air/vent system including the unique concentric adapter box that allows for only one building penetration for both the vent and combustion air.

The new V3 Series unit heaters are designed to provide all the features you expect in a Reznor heater plus improved efficiency, easier installation, and a new look ***~ both inside and out.*** Look for the unique white unit with no visible front and bottom hardware, deep red louvers, black side handle, and angled corner to know you have a genuine Reznor heater.

STANDARD FEATURES

- Sizes 30-400 certified for commercial/industrial heating application
- Sizes 30-125 carry an additional approval for use in residential garage/workshop heating applications
- 82-83% Thermal efficient ***~ TOP in its class!***
- 50-60°F Rise range
- TCORE² titanium stabilized aluminized steel heat exchanger
- Patented [A] single burner combustion system including a one-piece burner assembly
- 115/1/60 Supply voltage
- 115 Volt open fan motor with internal overload protection
- Transformer for 24-volt controls
- Integrated circuit board with diagnostic indicator lights
- Multi-try direct ignition with timed lockout
- Fan relay (included on the circuit board)
- Single-stage natural gas valve (field adjustable for operation to 9,000 ft. elevation ⊘)
- Vibration/noise isolated fan and venter motors
- Sealed control compartment houses all electrical components
- 2-pt ***and*** 4-pt Suspension ***~ standard on all sizes***
- Built-in disconnect switch (20A @ 115V Rating)
- External terminal strip for 24-volt wiring
- Sealed junction box for supply wiring
- External gas connection
- Fully gasketed door panel with safety door switch
- Full fan guard ***~ engineered for safety***
- Improved cabinet design with less visible hardware

[A] U.S. Patent No. 6,889,686.

OPTIONAL FEATURES - FACTORY INSTALLED

- Single-stage, propane gas valve (field adjustable for operation to 9,000 ft. elevation [B])
- Two-stage natural gas or propane gas valve - Sizes 60-400
- 409 or 316 Stainless steel heat exchangers
- Totally enclosed fan motor (Sizes 30-250, 115V only)

ACCESSORIES - FIELD INSTALLED

- Horizontal or Vertical Combustion Air/Vent Kit including concentric adapter [C]
- Thermostat
- Thermostat guard with locking cover
- Vertical louvers
- Downturn nozzle kits
- Gas conversion kits (natural and propane)
- Primary/secondary controls for zoning up to six units
- Ceiling suspension kit - Sizes 30-125
- Hanger kits for 1" pipe
- Stepdown transformer (for 208/115, 230/115 or 460/115 supply voltage)
- Manual shutoff valves

[B] Pressure switch change required for installations above 6,000 ft.
[C] Selection of either a horizontal or vertical combustion air/vent kit is required.

TECHNICAL DATA

Model UDAS

GUH 3 GUH 4

Size		30	45	60	75	100	125	150	175	200	225	250	300	350	400
Input Heating Capacity	BTUH	30,000	45,000	60,000	75,000	105,000	120,000	150,000	175,000	200,000	225,000	250,000	300,000	350,000	400,000
	(kw/h)	(8.8)	(13.2)	(17.6)	(22.0)	(30.8)	(35.2)	(44.0)	(51.3)	(58.6)	(65.9)	(73.3)	(87.9)	(102.6)	(117.2)
Thermal Efficiency (%)		82	83	83	83	83	83	83	83	83	83	83	83	83	83
Output Heating Capacity [D]	BTUH	24,600	37,350	49,800	62,250	87,150	99,600	124,500	145,250	166,000	186,750	207,500	249,000	290,500	332,000
	(kw/h)	(7.2)	(10.9)	(14.6)	(18.2)	(25.5)	(29.2)	(36.5)	(42.6)	(48.7)	(54.7)	(60.8)	(73.0)	(85.1)	(97.3)
Gas Connection (inches) [E]	Natural	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4
	Propane	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4
Vent Connection [F] (inches diameter)		4	4	4	4	4	4	5	5	5	5	5	6	6	6
Combustion Air Inlet [F] (inches diameter)		4	4	4	4	4	4	6	6	6	6	6	6	6	6
Control Amps (24 volt)		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Full Load Amps (115 volt)		1.9	2.4	2.4	3.3	3.9	5.1	3.8	3.8	4.6	7.5	7.5	11.0	11.0	11.0
Maximum Over Current Protection (115V) [G]		15	15	15	15	15	15	15	15	15	15	15	20	20	20
Normal Power Consumption (watts)		109	155	155	217	276	354	392	392	491	747	747	1086	1086	1086
Discharge Air Temperature Rise (°F)		50	55	60	60	60	60	60	60	60	60	60	60	60	60
Air Volume	CFM	456	629	769	961	1345	1537	1921	2242	2562	2882	3202	3843	4483	5123
	(M^3/min)	(12.9)	(17.8)	(21.8)	(27.2)	(38.1)	(43.5)	(54.4)	(63.5)	(72.5)	(81.6)	(90.7)	(108.8)	(126.9)	(145.1)
Discharge Air Opening Area	ft^2	0.96	0.96	1.25	1.25	2.01	2.01	2.56	2.56	2.56	3.51	3.51	4.79	4.79	4.79
	(M^2)	(0.09)	(0.09)	(0.12)	(0.12)	(0.19)	(0.19)	(0.24)	(0.24)	(0.24)	(0.33)	(0.33)	(0.45)	(0.45)	(0.45)
Output Velocity	FPM	475	656	616	770	668	763	752	877	1003	820	911	802	936	1069
	(M/min)	(145)	(200)	(188)	(235)	(204)	(233)	(229)	(267)	(306)	(250)	(278)	(244)	(285)	(326)
Fan Motor HP [H]	Open	0.02	0.03	0.03	0.06	1/30	1/20	1/6	1/6	1/6	1/4	1/4	1/2	1/2	1/2
	Enclosed	0.06	0.06	0.06	0.06	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2
Fan Motor	RPM	1550	1550	1550	1550	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
Fan Diameter	inches	10	10	12	12	16	16	18	18	18	20	20	24	24	24
Sound Level	dba @ 15 ft	40	40	40	49	54	55	51	52	53	56	56	59	61	62
Approximate Net Weight	lbs	55	60	68	73	97	102	173	188	188	204	216	270	295	307
	(kg)	(25)	(27)	(31)	(33)	(44)	(46)	(78)	(85)	(85)	(93)	(98)	(122)	(134)	(139)
Approximate Ship Weight	lbs	63	68	76	81	120	125	206	221	221	247	259	323	348	360
	(kg)	(29)	(31)	(34)	(37)	(54)	(57)	(93)	(100)	(100)	(112)	(117)	(147)	(158)	(163)

[D] CSA rating for altitudes to 2000 ft.
[E] Size shown is for gas connection to a single stage gas valve, not supply line size.
[F] Smaller and/or larger vent and combustion air pipe diameters may be allowed; refer to the Venting Installation Manual for Separated Combustion Units, Form I-V-SC. If vent diameter is different from vent connection, reducer/enlargers will be field-required.
[G] MOP = 2.25 x largest motor FLA + remaining load. Answer is rounded down to the next size of commercially available circuit breaker or fuse.
[H] All other information in this table is based on a heater equipped with a standard 115 volt open fan motor.

For installations where dirt, dust, and other air borne contamination is present in the indoor environment, it is recommended to use separated combustion units (Model UDAS). These models use air from outside the space for combustion. This will help reduce the build up of contaminates on the burner which would affect the combustion process. Refer to the installation manuals for recommended frequency of maintenance and cleaning.

APPENDIX C: IDEQ FORMS

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

General Information - **Form GI**
4/7/16

Please see instructions on second page before filling out the form.

FACILITY AND PERMIT INFORMATION

1. Facility Name:	2. Facility ID Number:
City of Jerome Wastewater Treatment Plant (Jerome WWTP)	
3. Brief Project Description:	The City of Jerome is proposing to upgrade the existing WWTP. Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1) biogas fired boiler, one (1) biogas flare, five (5) emergency generators and various small natural gas fired heaters. In addition, there are three (3) existing emergency generators that will be included in the modeling analyses and permit application
4. Facility Contact Name:	5. Facility Contact Title:
Gilbert Sanchez	Wastewater Superindendent / Public Works Director
6. Facility Contact Telephone Number:	7. Facility Contact Email:
(208) 324-7122	gsanchez@ci.jerome.id.us
8. Mailing address where permit will be sent (street/city/state/zip code):	9. Physical address of facility (if different than mailing address) (street/city/state/zip code):
50 North 100 West Jerome, Idaho 83338	Same as mailing address
10. County Facility is located	Jerome
11. Is the equipment portable?	☒ No ☐ Yes
12. NAICS codes	Primary NAICS: 221320 / Secondary NAICS (if applicable):
13. Brief business description and principal product produced:	The City of Jerome provides wastewater treatment for City residents, commercial retail, some light industrial, and industrial wastewater.
14. Describe any contiguous or adjacent facility this company owns or operates:	None
15. Permit Application Type. Provide Permit Number for existing permit. For a PTC, an application fee is required.	☒ Initial Permit to Construct (PTC) ☐ PTC Modification — PTC No. _____ Issued Date _____ ☐ Initial Tier II ☐ Tier II Modification ☐ Tier II Renewal — Tier II No. _____ Issued Date _____ ☐ Initial Tier I ☐ Tier I Administrative Amendment ☐ Tier I Minor Modification ☐ Tier I Significant Modification ☐ Tier I Renewal — Tier I No. _____ Issued Date _____
16. **For Tier I permitted facilities only:** If you are applying for a PTC then you must specify how the PTC will be incorporated into the Tier I permit.	☐ Incorporate PTC at the time of Tier I renewal (IDAPA 58.01.01.209.05.a) ☐ Co-process PTC with Tier I Modification (IDAPA 58.01.01.209.05.b) ☐ Administrative amend the Tier I to incorporate PTC upon applicant's request (IDAPA 58.01.01.209.05.c)
17. ☒ Check here to request facility draft permit before final issuance.	

Certification of Truth, Accuracy, and Completeness (by Responsible Official)
I hereby certify that based on information and belief formed after reasonable inquiry, the statements and information contained in this and any attached and/or referenced document(s) are true, accurate, and complete in accordance with IDAPA 58.01.01.123 124.

Responsible Official Signature	Responsible Official Title	Date
	Public Serv. Director	7-28-2016

Gilbert Sanchez
Print or Type Responsible Official Name

Instructions for Form GI

Facility Information:

1. Provide facility name. If the facility is doing business as (dba) a facility different in name than the primary facility, provide the dba name.
2. If the facility is an existing permitted facility in Idaho, provide the facility identification number. If the facility is new and does not yet have a Facility ID, leave blank.
3. Provide a brief project description.

4-7. Provide the name of the *primary* contact person for this permit application. Provide title, telephone number, and e-mail address for the primary contact person.

8. Provide mailing address where DEQ should mail the final permit.
9. Provide the physical address where the equipment or facility is located (if different than 8).
10. Provide the Idaho County where the equipment or facility is located.
11. Indicate if equipment is portable by checking the appropriate box.
12. Provide the primary and secondary (if applicable) North American Industry Classification System (NAICS) code(s) for your facility.
13. Describe the primary activity and principal product of your business as it relates to the NAICS code listed in 12.
14. Identify and describe any other sources or equipment owned and operated by the primary facility that are located on contiguous or adjacent properties and the role the source or equipment plays in supporting the primary facility.

Permit Application Type:

15. Check the box describing the type of permit application. Provide the permit number as applicable.

    Important note: One hard copy of the application and a compact disc (CD) with a PDF version of the application is required to be submitted. Applications can be mailed or submitted to:

    Idaho Department of Environmental Quality
    Attn: Air Quality Program
    1410 North Hilton
    Boise, ID 83706-1255

PTC Fee:

Important note: If application is for a permit to construct (PTC), include the application fee of $1,000 when submitting the application. Per IDAPA 58.01.01.226.02, DEQ cannot process the application without the fee, which must be submitted with the application.

If paying PTC Fee with a check, make the check payable to the Idaho Department of Environmental Quality, and send with the application to the above address:

If paying with a credit card or E-check, payment can be made at https://www.accessidaho.org/ai/payport/online/deq/index.html (***Note:*** *Convenience fee of 3% applies to credit card payments, $5 to E-check payments.*)

If paying by bank wire transfer the DEQ Fiscal Office at (208) 373-0446.

16. For existing Tier I facilities that are applying for a PTC, the applicant must specify how the PTC will be incorporated into the Tier I permit (IDAPA 58.01.01.209.05). If you have questions, call the Air Permit Hotline at 1-877- 5Permit (1-877-573-7648).
17. Check this box to indicate if you want to review a draft permit before the final permit is issued.

Certification of Truth, Accuracy, and Completeness (by Responsible Official):

Provide the name, title, address, telephone number, and e-mail of the facility's responsible official. Responsible Official is defined in IDAPA 58.01.01.006. The responsible official must sign and date the application before it is submitted to DEQ. **Important note:** Only a "wet signature" can be accepted.

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
City of Jerome	Jerome WWTP	

4. Brief Project Description:	The City of Jerome is proposing to upgrade the existing WWTP. Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1)

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	FLARE
6.	EU ID Number:	FLARE
7.	EU Type:	☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #: Date Issued:
8.	Manufacturer:	VAREC
9.	Model:	244WL
10..	Maximum Capacity:	24,000 SCF/HR
11.	Date of Construction:	2016
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:			
15. Date of Installation:		16. Date of Modification (if any):	
17. Manufacturer and Model Number:			
18. ID(s) of Emission Unit Controlled:			
19. Is operating schedule different than emission units(s) involved?	☐ Yes ☐ No		
20. Does the manufacturer guarantee the control efficiency of the control equipment?	☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)		

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	TBD
23.	Maximum Operation:	8760 HRS/YEAR

REQUESTED LIMITS

24.	Are you requesting any permit limits?	☐ Yes ☒ No (If Yes, indicate all that apply below)
	☐ Operation Hour Limit(s):	
	☐ Production Limit(s):	
	☐ Material Usage Limit(s):	
	☐ Limits Based on Stack Testing:	Please attach all relevant stack testing summary reports
	☐ Other:	
25.	Rationale for Requesting the Limit(s):	

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
City of Jerome	Jerome WWTP	

4. Brief Project Description:	The City of Jerome is proposing to upgrade the existing WWTP. Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1)

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	1GUH1-6GUH1
6.	EU ID Number:	1GUH1-6GUH1
7.	EU Type:	☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #: Date Issued:
8.	Manufacturer:	REZNOR
9.	Model:	UDBS
10..	Maximum Capacity:	60,000 BTU/HR
11.	Date of Construction:	2016
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:			
15. Date of Installation:		16. Date of Modification (if any):	
17. Manufacturer and Model Number:			
18. ID(s) of Emission Unit Controlled:			
19. Is operating schedule different than emission units(s) involved?	☐ Yes ☐ No		
20. Does the manufacturer guarantee the control efficiency of the control equipment?	☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)		

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	TBD
23.	Maximum Operation:	8760 HRS/YEAR

REQUESTED LIMITS

24.	Are you requesting any permit limits?	☐ Yes ☒ No (If Yes, indicate all that apply below)
	☐ Operation Hour Limit(s):	
	☐ Production Limit(s):	
	☐ Material Usage Limit(s):	
	☐ Limits Based on Stack Testing:	Please attach all relevant stack testing summary reports
	☐ Other:	
25.	Rationale for Requesting the Limit(s):	

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
City of Jerome	Jerome WWTP	

4. Brief Project Description:	The City of Jerome is proposing to upgrade the existing WWTP. Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1)

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	1GUH1-6GUH1
6.	EU ID Number:	1GUH1-6GUH1
7.	EU Type:	☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #: Date Issued:
8.	Manufacturer:	REZNOR
9.	Model:	UDBS
10..	Maximum Capacity:	60,000 BTU/HR
11.	Date of Construction:	2016
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:			
15. Date of Installation:		16. Date of Modification (if any):	
17. Manufacturer and Model Number:			
18. ID(s) of Emission Unit Controlled:			
19. Is operating schedule different than emission units(s) involved?	☐ Yes ☐ No		
20. Does the manufacturer guarantee the control efficiency of the control equipment?	☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)		

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	TBD
23.	Maximum Operation:	8760 HRS/YEAR

REQUESTED LIMITS

24.	Are you requesting any permit limits?	☐ Yes ☒ No (If Yes, indicate all that apply below)
	☐ Operation Hour Limit(s):	
	☐ Production Limit(s):	
	☐ Material Usage Limit(s):	
	☐ Limits Based on Stack Testing:	Please attach all relevant stack testing summary reports
	☐ Other:	
25.	Rationale for Requesting the Limit(s):	

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
City of Jerome	Jerome WWTP	

4. Brief Project Description:	The City of Jerome is proposing to upgrade the existing WWTP. Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1)

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	1GUH2-2GUH2
6.	EU ID Number:	1GUH2-2GUH2
7.	EU Type:	☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #: Date Issued:
8.	Manufacturer:	REZNOR
9.	Model:	UDBS
10..	Maximum Capacity:	120,000 BTU/HR
11.	Date of Construction:	2016
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:			
15. Date of Installation:		16. Date of Modification (if any):	
17. Manufacturer and Model Number:			
18. ID(s) of Emission Unit Controlled:			
19. Is operating schedule different than emission units(s) involved?	☐ Yes ☐ No		
20. Does the manufacturer guarantee the control efficiency of the control equipment?	☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)		

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	TBD
23.	Maximum Operation:	8760 HRS/YEAR

REQUESTED LIMITS

24.	Are you requesting any permit limits?	☐ Yes ☒ No (If Yes, indicate all that apply below)
	☐ Operation Hour Limit(s):	
	☐ Production Limit(s):	
	☐ Material Usage Limit(s):	
	☐ Limits Based on Stack Testing:	Please attach all relevant stack testing summary reports
	☐ Other:	
25.	Rationale for Requesting the Limit(s):	

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
City of Jerome	Jerome WWTP	

4. Brief Project Description:	The City of Jerome is proposing to upgrade the existing WWTP. Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1)

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	GUH3
6.	EU ID Number:	GUH3
7.	EU Type:	☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #: Date Issued:
8.	Manufacturer:	REZNOR
9.	Model:	UDAS
10..	Maximum Capacity:	45,000 BTU/HR
11.	Date of Construction:	2016
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:			
15. Date of Installation:		16. Date of Modification (if any):	
17. Manufacturer and Model Number:			
18. ID(s) of Emission Unit Controlled:			
19. Is operating schedule different than emission units(s) involved?	☐ Yes ☐ No		
20. Does the manufacturer guarantee the control efficiency of the control equipment?	☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)		

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	TBD
23.	Maximum Operation:	8760 HRS/YEAR

REQUESTED LIMITS

24.	Are you requesting any permit limits?	☐ Yes ☒ No (If Yes, indicate all that apply below)
	☐ Operation Hour Limit(s):	
	☐ Production Limit(s):	
	☐ Material Usage Limit(s):	
	☐ Limits Based on Stack Testing:	Please attach all relevant stack testing summary reports
	☐ Other:	
25.	Rationale for Requesting the Limit(s):	

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
City of Jerome	Jerome WWTP	

4. Brief Project Description:	The City of Jerome is proposing to upgrade the existing WWTP. Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1)

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	GUH4
6.	EU ID Number:	GUH4
7.	EU Type:	☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #: Date Issued:
8.	Manufacturer:	REZNOR
9.	Model:	UDAS
10..	Maximum Capacity:	105,000 BTU/HR
11.	Date of Construction:	2016
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:			
15. Date of Installation:		16. Date of Modification (if any):	
17. Manufacturer and Model Number:			
18. ID(s) of Emission Unit Controlled:			
19. Is operating schedule different than emission units(s) involved?	☐ Yes ☐ No		
20. Does the manufacturer guarantee the control efficiency of the control equipment?	☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)		

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	TBD
23.	Maximum Operation:	8760 HRS/YEAR

REQUESTED LIMITS

24.	Are you requesting any permit limits?	☐ Yes ☒ No (If Yes, indicate all that apply below)
	☐ Operation Hour Limit(s):	
	☐ Production Limit(s):	
	☐ Material Usage Limit(s):	
	☐ Limits Based on Stack Testing:	Please attach all relevant stack testing summary reports
	☐ Other:	
25.	Rationale for Requesting the Limit(s):	

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Units Industrial IC Engine Information - **Form EU1**
Revision 9
10/23/13

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name	2. Facility Name:
City of Jerome	Jerome WWTP

3. Brief Project Description:	The City of Jerome is proposing to upgrade the existing WWTP. Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1) biogas fired boiler, one (1) biogas flare, five (5) emergency generators and various small natural gas fired heaters. In addition, there are three (3) existing emergency generators that will be included in the modeling analyses and permit application

IC ENGINE DESCRIPTION AND SPECIFICATIONS

4. Type of unit:
- ☒ New unit ☐ Unpermitted existing unit ☐ Modification to an existing permitted unit? Permit number: _____
- ☐ Full-time operation (non-emergency standby use)?
- ☒ Emergency standby use only (operation limited to 100 hrs/yr for maintenance and testing and emergency use only)?
- ☐ Emergency fire pump use only?
- ☐ Stationary test cell/stand operation only (as defined in NSPS Subpart ZZZZ)?
- ☐ National security operation only (as defined in NSPS Subpart ZZZZ)?
- ☐ Institutional emergency standby IC engine (as defined in NSPS Subpart ZZZZ)?

IC ENGINE SPECIFICATIONS

Questions 5 through 15 apply to **all IC engines**.

5. IC Engine Manufacturer: Caterpillar 6. Model: DM8521 7. Date manufactured: 2016 8. Model year: 2016
9. Date of installation (if an existing IC engine): 2016-2017 10. IC Engine cylinder displacement: 3.02 liters per cylinder
11. Maximum rated horsepower (per the data plate/manufacturer specifications): 762 bhp
12. EPA Certification: Tier certification number 2 or ☐ None/not tier certified
13. Ignition type: ☐ Spark ☒ Compression
14. Fuel combusted in the IC engine? ☒ Distillate fuel oil ☐ Natural gas/LNG ☐ LPG/propane
    If distillate fuel oil (#1, #2, or a mixture) is used, what is the maximum sulfur content? ☒ 15 ppm (0.0015% by weight) ☐ 500 ppm (0.05% by weight)
15. IC engine exhaust stack parameters: Diameter 8 inches Height 6.83 feet Temperature 800 ºF Flow rate 3064.6 acfm

IC ENGINE EMISSIONS PARAMETERS

Questions 16 through 27 apply to **full-time** non-Tier certified IC engines or Tier certified IC engines manufactured prior to July 11, 2005. If you are proposing a Tier certified IC engine manufactured on and after July 11, 2005 or an emergency standby IC engine do not answer questions 17 through 27.

16. Testing schedule (for emergency standby IC engines only): 0.5 hrs/day _____ hrs/mon _____ hrs/qtr 100 hrs/yr
17. Maximum daily operation: _____ hrs/day 18. Maximum annual operation: _____ hrs/yr **Note:** These operational limits will be placed in the permit.
19. Will CO emissions be limited to a specific ppmvd (i.e. 49 or 23 ppmvd)? ☐ Yes ☐ No 20. What will the CO emissions limit be? _____ ppmvd
21. Will CO emissions be reduced by 70% or more? ☐ Yes ☐ No
22. Will a CEMS (Continuous Emissions Monitoring System) be used to measure pollutants in the IC engine exhaust stream? ☐ Yes ☐ No
23. Will a CPMS (Continuous Parameters Monitoring System) be used to measure parameters of the IC engine exhaust stream? ☐ Yes ☐ No
24. Will the IC engine be equipped with an oxidation catalyst? ☐ Yes ☐ No
25. If applicable, will the oxidation catalyst be equipped with a temperature measurement system to ensure it is operating properly? ☐ Yes ☐ No
26. Will the IC engine be equipped with a diesel particulate filter? ☐ Yes ☐ No
27. If applicable, will the diesel particulate filter be equipped with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached? ☐ Yes ☐ No

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Units Industrial IC Engine Information - **Form EU1**
Revision 9
10/23/13

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name	2. Facility Name:
City of Jerome	Jerome WWTP

3. Brief Project Description:	The City of Jerome is proposing to upgrade the existing WWTP. Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1) biogas fired boiler, one (1) biogas flare, five (5) emergency generators and various small natural gas fired heaters. In addition, there are three (3) existing emergency generators that will be included in the modeling analyses and permit application

IC ENGINE DESCRIPTION AND SPECIFICATIONS

4. Type of unit:
- ☐ New unit ☒ Unpermitted existing unit ☐ Modification to an existing permitted unit? Permit number: _____
- ☐ Full-time operation (non-emergency standby use)?
- ☒ Emergency standby use only (operation limited to 100 hrs/yr for maintenance and testing and emergency use only)?
- ☐ Emergency fire pump use only?
- ☐ Stationary test cell/stand operation only (as defined in NSPS Subpart ZZZZ)?
- ☐ National security operation only (as defined in NSPS Subpart ZZZZ)?
- ☐ Institutional emergency standby IC engine (as defined in NSPS Subpart ZZZZ)?

IC ENGINE SPECIFICATIONS

Questions 5 through 15 apply to **all IC engines**.

5. IC Engine Manufacturer: Generac 6. Model: 826255 7. Date manufactured: 2007 8. Model year: 2007
9. Date of installation (if an existing IC engine): 2007 10. IC Engine cylinder displacement: 2.53 liters per cylinder
11. Maximum rated horsepower (per the data plate/manufacturer specifications): 762 bhp
12. EPA Certification: Tier certification number 2 or ☐ None/not tier certified
13. Ignition type: ☐ Spark ☒ Compression
14. Fuel combusted in the IC engine? ☒ Distillate fuel oil ☐ Natural gas/LNG ☐ LPG/propane
    If distillate fuel oil (#1, #2, or a mixture) is used, what is the maximum sulfur content? ☒ 15 ppm (0.0015% by weight) ☐ 500 ppm (0.05% by weight)
15. IC engine exhaust stack parameters: Diameter 5 inches Height 8.66 feet Temperature 800 ºF Flow rate 1197.1 acfm

IC ENGINE EMISSIONS PARAMETERS

Questions 16 through 27 apply to **full-time** non-Tier certified IC engines or Tier certified IC engines manufactured prior to July 11, 2005. If you are proposing a Tier certified IC engine manufactured on and after July 11, 2005 or an emergency standby IC engine do not answer questions 17 through 27.

16. Testing schedule (for emergency standby IC engines only): 0.5 hrs/day _____ hrs/mon _____ hrs/qtr 100 hrs/yr
17. Maximum daily operation: _____ hrs/day 18. Maximum annual operation: _____ hrs/yr **Note:** These operational limits will be placed in the permit.
19. Will CO emissions be limited to a specific ppmvd (i.e. 49 or 23 ppmvd)? ☐ Yes ☐ No 20. What will the CO emissions limit be? _____ ppmvd
21. Will CO emissions be reduced by 70% or more? ☐ Yes ☐ No
22. Will a CEMS (Continuous Emissions Monitoring System) be used to measure pollutants in the IC engine exhaust stream? ☐ Yes ☐ No
23. Will a CPMS (Continuous Parameters Monitoring System) be used to measure parameters of the IC engine exhaust stream? ☐ Yes ☐ No
24. Will the IC engine be equipped with an oxidation catalyst? ☐ Yes ☐ No
25. If applicable, will the oxidation catalyst be equipped with a temperature measurement system to ensure it is operating properly? ☐ Yes ☐ No
26. Will the IC engine be equipped with a diesel particulate filter? ☐ Yes ☐ No
27. If applicable, will the diesel particulate filter be equipped with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached? ☐ Yes ☐ No

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Units - Industrial Boiler Information **Form EU5**
Revision 5
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3 Facility ID No:
City of Jerome	Jeome WWTP	

4. Brief Project Description: The City of Jerome is proposing to upgrade the existing WWTP. Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1)

EXEMPTION

Please see IDAPA 58.01.01.222 for a list of industrial boilers that are exempt from Permit to Construct requirements.

BOILER (EMISSION UNIT) DESCRIPTION AND SPECIFICATIONS

5. Type of Request: ☒ New Unit ☐ Unpermitted Existing Unit ☐ Modification to a Unit with Permit #:

6. Use of Boiler: ☒ % Used For Process ☐ % Used For Space Heat ☐ % Used For Generating Electricity ☐ Other:

7. Boiler ID Number: BIOBOIL	8. Rated Capacity: ☒ 2.93 Million British Thermal Units Per Hour (MMBtu/hr) ☐ 1,000 Pounds Steam Per Hour (1,000 lb steam/hr)	
9. Construction Date: 2016	10. Manufacturer: Burnham	11. Model: 4F-209
12. Date of Modification (if applicable): N/A	13. Serial Number (if available): TBD	14. Control Device (if any): N/A **Note: Attach applicable control equipment form(s)**

FUEL DESCRIPTION AND SPECIFICATIONS

15. Fuel Type	☐ Diesel Fuel (#) (gal/hr)	☐ Natural Gas (cf/hr)	☐ Coal (unit: /hr)	☒ Other Fuels (unit:2.93 MMBtu /hr)
16. Full Load Consumption Rate				2.93 MMBtu/hr
17. Actual Consumption Rate				TBD
18. Fuel Heat Content (Btu/unit, LHV)				550 Btu/scf
19. Sulfur Content wt%		2,000 gr/MMcf		0.1
20. Ash Content wt%		N/A		N/A

STEAM DESCRIPTION AND SPECIFICATIONS

21. Steam Heat Content	NA	NA		
22. Steam Temperature (^{o}F)	N/A	N/A		
23. Steam Pressure (psi)	N/A	N/A		
24 Steam Type	N/A	N/A	☐ Saturated ☐ Superheated	☐ Saturated ☐ Superheated

OPERATING LIMITS & SCHEDULE

25. Imposed Operating Limits (hours/year, or gallons fuel/year, etc.):	N/A
26. Operating Schedule (hours/day, months/year, etc.):	8760 hours/year
27. NSPS Applicability: ☐ Yes ☒ No	If Yes, which subpart:

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Units - Industrial Boiler Information **Form EU5**
Revision 5
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3 Facility ID No:
City of Jerome	Jeome WWTP	

4. Brief Project Description:	The City of Jerome is proposing to upgrade the existing WWTP. Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1)

EXEMPTION

Please see IDAPA 58.01.01.222 for a list of industrial boilers that are exempt from Permit to Construct requirements.

BOILER (EMISSION UNIT) DESCRIPTION AND SPECIFICATIONS

5. Type of Request: ☒ New Unit ☐ Unpermitted Existing Unit ☐ Modification to a Unit with Permit #:

6. Use of Boiler: ☒ % Used For Process ☐ % Used For Space Heat ☐ % Used For Generating Electricity ☐ Other:

7. Boiler ID Number: NGBOIL	8. Rated Capacity: ☒ 1.95 Million British Thermal Units Per Hour (MMBtu/hr) ☐ 1,000 Pounds Steam Per Hour (1,000 lb steam/hr)	
9. Construction Date: 2016	10. Manufacturer: Burnham	11. Model: 4F-209
12. Date of Modification (if applicable): N/A	13. Serial Number (if available): TBD	14. Control Device (if any): N/A **Note: Attach applicable control equipment form(s)**

FUEL DESCRIPTION AND SPECIFICATIONS

15. Fuel Type	☐ Diesel Fuel (#) (gal/hr)	☒ Natural Gas 1900 (cf/hr)	☐ Coal (unit: /hr)	☐ Other Fuels (unit: /hr)
16. Full Load Consumption Rate		1.95 MMBtu/hr		
17. Actual Consumption Rate		TBD		
18. Fuel Heat Content (Btu/unit, LHV)		1020 Btu/scf		
19. Sulfur Content wt%		2,000 gr/MMcf		
20. Ash Content wt%		N/A		

STEAM DESCRIPTION AND SPECIFICATIONS

21. Steam Heat Content	NA	NA		
22. Steam Temperature (^{o}F)	N/A	N/A		
23. Steam Pressure (psi)	N/A	N/A		
24 Steam Type	N/A	N/A	☐ Saturated ☐ Superheated	☐ Saturated ☐ Superheated

OPERATING LIMITS & SCHEDULE

25. Imposed Operating Limits (hours/year, or gallons fuel/year, etc.):	N/A
26. Operating Schedule (hours/day, months/year, etc.):	8760 hours/year
27. NSPS Applicability: ☐ Yes ☒ No	If Yes, which subpart:

IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Preapplication Meeting Information Form FRA (Federal Requirements Applicability) - Regulatory Review

In each box in the table below, CTRL+click on the blue underlined text for instructions and information.

IDENTIFICATION	
1. Company Name:	2. Facility Name:
City of Jerome	Jerome WWTP
3. Brief Project Description:	

APPLICABILITY DETERMINATION	
4. List all applicable subparts of the New Source Performance Standards (NSPS) (40 CFR part 60). List all non-applicable subparts of the NSPS which may appear to apply to the facility but do not. Examples of NSPS-affected emissions units include internal combustion engines, boilers, turbines, etc. Applicant must thoroughly review the list of affected emissions units.	List of all applicable subpart(s): Subpart IIII List of all non-applicable subpart(s) which may appear to apply but do not: ☐ Not Applicable
5. List applicable subpart(s) of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR part 61 and 40 CFR part 63). List all non-applicable subparts of the NESHAP which may appear to apply to the facility but do not. Examples of affected emission units include solvent cleaning operations, industrial cooling towers, paint stripping and miscellaneous surface coating. Reference EPA's webpage on NESHAPs for more information.	List of all applicable subpart(s): Subpart ZZZZ List of all non-applicable subpart(s) which may appear to apply but do not: ☐ Not Applicable
6. For each subpart identified above, conduct a complete regulatory analysis using the instructions and referencing the example on the following pages. **Note** - Regulatory reviews must be submitted with sufficient detail so that DEQ can verify applicability and document in legal terms why the regulation does or does not apply. Regulatory reviews submitted with insufficient detail will be determined incomplete.	☑ A detailed regulatory review is provided (Follow instructions and example). ☐ DEQ has already been provided a detailed regulatory review. Give a reference to the document including the date.

Subpart IIII—Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

WHAT THIS SUBPART COVERS

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§60.4200 Am I subject to this subpart?

(a) The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) and other persons as specified in paragraphs (a)(1) through (4) of this section. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.

(1) Manufacturers of stationary CI ICE with a displacement of less than 30 liters per cylinder where the model year is:

(i) 2007 or later, for engines that are not fire pump engines;

(ii) The model year listed in Table 3 to this subpart or later model year, for fire pump engines.

(2) Owners and operators of stationary CI ICE that commence construction after July 11, 2005, where the stationary CI ICE are:

(i) Manufactured after April 1, 2006, and are not fire pump engines, or

(ii) Manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006.

(3) Owners and operators of any stationary CI ICE that are modified or reconstructed after July 11, 2005 and any person that modifies or reconstructs any stationary CI ICE after July 11, 2005.

(4) The provisions of §60.4208 of this subpart are applicable to all owners and operators of stationary CI ICE that commence construction after July 11, 2005.

The Jerome WWTP will be the operator of eight CI ICE; three that were manufactured and commenced operation in 2007 and five that will commence construction in 2016 and are manufactured after April 1, 2006.

(b) The provisions of this subpart are not applicable to stationary CI ICE being tested at a stationary CI ICE test cell/stand.

(c) If you are an owner or operator of an area source subject to this subpart, you are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided you are

not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart applicable to area sources.

The Jerome WWTP is an area source of criteria pollutants and HAPs and therefore exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71.

(d) Stationary CI ICE may be eligible for exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C (or the exemptions described in 40 CFR part 89, subpart J and 40 CFR part 94, subpart J, for engines that would need to be certified to standards in those parts), except that owners and operators, as well as manufacturers, may be eligible to request an exemption for national security.

(e) Owners and operators of facilities with CI ICE that are acting as temporary replacement units and that are located at a stationary source for less than 1 year and that have been properly certified as meeting the standards that would be applicable to such engine under the appropriate nonroad engine provisions, are not required to meet any other provisions under this subpart with regard to such engines.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37967, June 28, 2011]

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EMISSION STANDARDS FOR MANUFACTURERS

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§60.4201 What emission standards must I meet for non-emergency engines if I am a stationary CI internal combustion engine manufacturer?

(a) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later non-emergency stationary CI ICE with a maximum engine power less than or equal to 2,237 kilowatt (KW) (3,000 horsepower (HP)) and a displacement of less than 10 liters per cylinder to the certification emission standards for new nonroad CI engines in 40 CFR 89.112, 40 CFR 89.113, 40 CFR 1039.101, 40 CFR 1039.102, 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, and 40 CFR 1039.115, as applicable, for all pollutants, for the same model year and maximum engine power.

(b) Stationary CI internal combustion engine manufacturers must certify their 2007 through 2010 model year non-emergency stationary CI ICE with a maximum engine power greater than 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder to the emission standards in table 1 to this subpart, for all pollutants, for the same maximum engine power.

(c) Stationary CI internal combustion engine manufacturers must certify their 2011 model year and later non-emergency stationary CI ICE with a maximum engine power greater than 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder to the certification emission standards for new nonroad CI engines in 40 CFR 1039.101, 40 CFR 1039.102, 40 CFR

1039.104, 40 CFR 1039.105, 40 CFR 1039.107, and 40 CFR 1039.115, as applicable, for all pollutants, for the same maximum engine power.

(d) Stationary CI internal combustion engine manufacturers must certify the following non-emergency stationary CI ICE to the certification emission standards for new marine CI engines in 40 CFR 94.8, as applicable, for all pollutants, for the same displacement and maximum engine power:

(1) Their 2007 model year through 2012 non-emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder;

(2) Their 2013 model year non-emergency stationary CI ICE with a maximum engine power greater than or equal to 3,700 KW (4,958 HP) and a displacement of greater than or equal to 10 liters per cylinder and less than 15 liters per cylinder; and

(3) Their 2013 model year non-emergency stationary CI ICE with a displacement of greater than or equal to 15 liters per cylinder and less than 30 liters per cylinder.

(e) Stationary CI internal combustion engine manufacturers must certify the following non-emergency stationary CI ICE to the certification emission standards and other requirements for new marine CI engines in 40 CFR 1042.101, 40 CFR 1042.107, 40 CFR 1042.110, 40 CFR 1042.115, 40 CFR 1042.120, and 40 CFR 1042.145, as applicable, for all pollutants, for the same displacement and maximum engine power:

(1) Their 2013 model year non-emergency stationary CI ICE with a maximum engine power less than 3,700 KW (4,958 HP) and a displacement of greater than or equal to 10 liters per cylinder and less than 15 liters per cylinder; and

(2) Their 2014 model year and later non-emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder.

(f) Notwithstanding the requirements in paragraphs (a) through (c) of this section, stationary non-emergency CI ICE identified in paragraphs (a) and (c) may be certified to the provisions of 40 CFR part 94 or, if Table 1 to 40 CFR 1042.1 identifies 40 CFR part 1042 as being applicable, 40 CFR part 1042, if the engines will be used solely in either or both of the following locations:

(1) Areas of Alaska not accessible by the Federal Aid Highway System (FAHS); and

(2) Marine offshore installations.

(g) Notwithstanding the requirements in paragraphs (a) through (f) of this section, stationary CI internal combustion engine manufacturers are not required to certify reconstructed engines; however manufacturers may elect to do so. The reconstructed engine must be certified to the emission standards specified in paragraphs (a) through (e) of this section that are applicable to the model year, maximum engine power, and displacement of the reconstructed stationary CI ICE.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37967, June 28, 2011]

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§60.4202 What emission standards must I meet for emergency engines if I am a stationary CI internal combustion engine manufacturer?

(a) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a maximum engine power less than or equal to 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder that are not fire pump engines to the emission standards specified in paragraphs (a)(1) through (2) of this section.

The emergency generators at the Jerome WWTP must meet these emissions standards per 60.4205(b).

(1) For engines with a maximum engine power less than 37 KW (50 HP):

(i) The certification emission standards for new nonroad CI engines for the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants for model year 2007 engines, and

(ii) The certification emission standards for new nonroad CI engines in 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, 40 CFR 1039.115, and table 2 to this subpart, for 2008 model year and later engines.

(2) For engines with a maximum engine power greater than or equal to 37 KW (50 HP), the certification emission standards for new nonroad CI engines for the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants beginning in model year 2007.

The emergency generators will have a maximum engine power of 568 kW and will be EPA Tier 2 certified, thus meeting the requirements in 40 CFR 89.112 and 89.113 for engines with rated power greater than 560 kW, manufactured after 2006.

(b) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a maximum engine power greater than 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder that are not fire pump engines to the emission standards specified in paragraphs (b)(1) through (2) of this section.

(1) For 2007 through 2010 model years, the emission standards in table 1 to this subpart, for all pollutants, for the same maximum engine power.

(2) For 2011 model year and later, the certification emission standards for new nonroad CI engines for engines of the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants.

(c) [Reserved]

(d) Beginning with the model years in table 3 to this subpart, stationary CI internal combustion engine manufacturers must certify their fire pump stationary CI ICE to the emission standards in table 4 to this subpart, for all pollutants, for the same model year and NFPA nameplate power.

(e) Stationary CI internal combustion engine manufacturers must certify the following emergency stationary CI ICE that are not fire pump engines to the certification emission standards for new marine CI engines in 40 CFR 94.8, as applicable, for all pollutants, for the same displacement and maximum engine power:

(1) Their 2007 model year through 2012 emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder;

(2) Their 2013 model year and later emergency stationary CI ICE with a maximum engine power greater than or equal to 3,700 KW (4,958 HP) and a displacement of greater than or equal to 10 liters per cylinder and less than 15 liters per cylinder;

(3) Their 2013 model year emergency stationary CI ICE with a displacement of greater than or equal to 15 liters per cylinder and less than 30 liters per cylinder; and

(4) Their 2014 model year and later emergency stationary CI ICE with a maximum engine power greater than or equal to 2,000 KW (2,682 HP) and a displacement of greater than or equal to 15 liters per cylinder and less than 30 liters per cylinder.

(f) Stationary CI internal combustion engine manufacturers must certify the following emergency stationary CI ICE to the certification emission standards and other requirements applicable to Tier 3 new marine CI engines in 40 CFR 1042.101, 40 CFR 1042.107, 40 CFR 1042.115, 40 CFR 1042.120, and 40 CFR 1042.145, for all pollutants, for the same displacement and maximum engine power:

(1) Their 2013 model year and later emergency stationary CI ICE with a maximum engine power less than 3,700 KW (4,958 HP) and a displacement of greater than or equal to 10 liters per cylinder and less than 15 liters per cylinder; and

(2) Their 2014 model year and later emergency stationary CI ICE with a maximum engine power less than 2,000 KW (2,682 HP) and a displacement of greater than or equal to 15 liters per cylinder and less than 30 liters per cylinder.

(g) Notwithstanding the requirements in paragraphs (a) through (d) of this section, stationary emergency CI internal combustion engines identified in paragraphs (a) and (c) may be certified to the provisions of 40 CFR part 94 or, if Table 2 to 40 CFR 1042.101 identifies Tier 3 standards as being applicable, the requirements applicable to Tier 3 engines in 40 CFR part 1042, if the engines will be used solely in either or both of the following locations:

(1) Areas of Alaska not accessible by the FAHS; and

(2) Marine offshore installations.

(h) Notwithstanding the requirements in paragraphs (a) through (f) of this section, stationary CI internal combustion engine manufacturers are not required to certify reconstructed engines; however manufacturers may elect to do so. The reconstructed engine must be certified to the emission standards specified in paragraphs (a) through (f) of this section that are applicable to the model year, maximum engine power and displacement of the reconstructed emergency stationary CI ICE.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37968, June 28, 2011]

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§60.4203 How long must my engines meet the emission standards if I am a manufacturer of stationary CI internal combustion engines?

Engines manufactured by stationary CI internal combustion engine manufacturers must meet the emission standards as required in §§60.4201 and 60.4202 during the certified emissions life of the engines.

[76 FR 37968, June 28, 2011]

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EMISSION STANDARDS FOR OWNERS AND OPERATORS

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§60.4204 What emission standards must I meet for non-emergency engines if I am an owner or operator of a stationary CI internal combustion engine?

(a) Owners and operators of pre-2007 model year non-emergency stationary CI ICE with a displacement of less than 10 liters per cylinder must comply with the emission standards in table 1 to this subpart. Owners and operators of pre-2007 model year non-emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder must comply with the emission standards in 40 CFR 94.8(a)(1).

(b) Owners and operators of 2007 model year and later non-emergency stationary CI ICE with a displacement of less than 30 liters per cylinder must comply with the emission standards for new CI engines in §60.4201 for their 2007 model year and later stationary CI ICE, as applicable.

(c) Owners and operators of non-emergency stationary CI engines with a displacement of greater than or equal to 30 liters per cylinder must meet the following requirements:

(1) For engines installed prior to January 1, 2012, limit the emissions of NO_x in the stationary CI internal combustion engine exhaust to the following:

(i) 17.0 grams per kilowatt-hour (g/KW-hr) (12.7 grams per horsepower-hr (g/HP-hr)) when maximum engine speed is less than 130 revolutions per minute (rpm);

(ii) $45 \cdot n^{-0.2}$ g/KW-hr ($34 \cdot n^{-0.2}$ g/HP-hr) when maximum engine speed is 130 or more but less than 2,000 rpm, where n is maximum engine speed; and

(iii) 9.8 g/KW-hr (7.3 g/HP-hr) when maximum engine speed is 2,000 rpm or more.

(2) For engines installed on or after January 1, 2012 and before January 1, 2016, limit the emissions of NO_x in the stationary CI internal combustion engine exhaust to the following:

(i) 14.4 g/KW-hr (10.7 g/HP-hr) when maximum engine speed is less than 130 rpm;

(ii) $44 \cdot n^{-0.23}$ g/KW-hr ($33 \cdot n^{-0.23}$ g/HP-hr) when maximum engine speed is greater than or equal to 130 but less than 2,000 rpm and where n is maximum engine speed; and

(iii) 7.7 g/KW-hr (5.7 g/HP-hr) when maximum engine speed is greater than or equal to 2,000 rpm.

(3) For engines installed on or after January 1, 2016, limit the emissions of NO_x in the stationary CI internal combustion engine exhaust to the following:

(i) 3.4 g/KW-hr (2.5 g/HP-hr) when maximum engine speed is less than 130 rpm;

(ii) $9.0 \cdot n^{-0.20}$ g/KW-hr ($6.7 \cdot n^{-0.20}$ g/HP-hr) where n (maximum engine speed) is 130 or more but less than 2,000 rpm; and

(iii) 2.0 g/KW-hr (1.5 g/HP-hr) where maximum engine speed is greater than or equal to 2,000 rpm.

(4) Reduce particulate matter (PM) emissions by 60 percent or more, or limit the emissions of PM in the stationary CI internal combustion engine exhaust to 0.15 g/KW-hr (0.11 g/HP-hr).

(d) Owners and operators of non-emergency stationary CI ICE with a displacement of less than 30 liters per cylinder who conduct performance tests in-use must meet the not-to-exceed (NTE) standards as indicated in §60.4212.

(e) Owners and operators of any modified or reconstructed non-emergency stationary CI ICE subject to this subpart must meet the emission standards applicable to the model year, maximum engine power, and displacement of the modified or reconstructed non-emergency stationary CI ICE that are specified in paragraphs (a) through (d) of this section.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37968, June 28, 2011]

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§60.4205 What emission standards must I meet for emergency engines if I am an owner or operator of a stationary CI internal combustion engine?

(a) Owners and operators of pre-2007 model year emergency stationary CI ICE with a displacement of less than 10 liters per cylinder that are not fire pump engines must comply with the emission standards in Table 1 to this subpart. Owners and operators of pre-2007 model year emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards in 40 CFR 94.8(a)(1).

(b) Owners and operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards for new nonroad CI engines in §60.4202, for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary CI ICE.

The emergency generators at the Jerome WWTP will be model year 2016 or later, and will have a displacement of 15.2 liters. They will comply with the emission standards for new nonroad CI engines in 60.4202 for the same model year and maximum engine power.

(c) Owners and operators of fire pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards in table 4 to this subpart, for all pollutants.

(d) Owners and operators of emergency stationary CI engines with a displacement of greater than or equal to 30 liters per cylinder must meet the requirements in this section.

(1) For engines installed prior to January 1, 2012, limit the emissions of NO_x in the stationary CI internal combustion engine exhaust to the following:

(i) 17.0 g/KW-hr (12.7 g/HP-hr) when maximum engine speed is less than 130 rpm;

(ii) $45 \cdot n^{-0.2}$ g/KW-hr ($34 \cdot n^{-0.2}$ g/HP-hr) when maximum engine speed is 130 or more but less than 2,000 rpm, where n is maximum engine speed; and

(iii) 9.8 g/kW-hr (7.3 g/HP-hr) when maximum engine speed is 2,000 rpm or more.

(2) For engines installed on or after January 1, 2012, limit the emissions of NO_x in the stationary CI internal combustion engine exhaust to the following:

(i) 14.4 g/KW-hr (10.7 g/HP-hr) when maximum engine speed is less than 130 rpm;

(ii) $44 \cdot n^{-0.23}$ g/KW-hr ($33 \cdot n^{-0.23}$ g/HP-hr) when maximum engine speed is greater than or equal to 130 but less than 2,000 rpm and where n is maximum engine speed; and

(iii) 7.7 g/KW-hr (5.7 g/HP-hr) when maximum engine speed is greater than or equal to 2,000 rpm.

(3) Limit the emissions of PM in the stationary CI internal combustion engine exhaust to 0.40 g/KW-hr (0.30 g/HP-hr).

(e) Owners and operators of emergency stationary CI ICE with a displacement of less than 30 liters per cylinder who conduct performance tests in-use must meet the NTE standards as indicated in §60.4212.

(f) Owners and operators of any modified or reconstructed emergency stationary CI ICE subject to this subpart must meet the emission standards applicable to the model year, maximum engine power, and displacement of the modified or reconstructed CI ICE that are specified in paragraphs (a) through (e) of this section.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37969, June 28, 2011]

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§60.4206 How long must I meet the emission standards if I am an owner or operator of a stationary CI internal combustion engine?

Owners and operators of stationary CI ICE must operate and maintain stationary CI ICE that achieve the emission standards as required in §§60.4204 and 60.4205 over the entire life of the engine.

The Jerome WWTP will operate and maintain the emergency generators according to the manufacturer's written instructions or procedures developed by the facility personnel that are approved by the engine manufacturer. The engines have been designed to meet the emissions standards in 40 CFR 89.112 and 40 CFR 89.113 over the life of the engines.

[76 FR 37969, June 28, 2011]

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FUEL REQUIREMENTS FOR OWNERS AND OPERATORS

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§60.4207 What fuel requirements must I meet if I am an owner or operator of a stationary CI internal combustion engine subject to this subpart?

(a) Beginning October 1, 2007, owners and operators of stationary CI ICE subject to this subpart that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 80.510(a).

(b) Beginning October 1, 2010, owners and operators of stationary CI ICE subject to this subpart with a displacement of less than 30 liters per cylinder that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 80.510(b) for nonroad diesel fuel, except that any existing diesel fuel purchased (or otherwise obtained) prior to October 1, 2010, may be used until depleted.

The engines will be operated on distillate fuel oil which meets ASTM Grades 1 or 2 or a mixture of AST Grades 1 and 2, and has a maximum sulfur content of 15 ppm by weight.

(c) [Reserved]

(d) Beginning June 1, 2012, owners and operators of stationary CI ICE subject to this subpart with a displacement of greater than or equal to 30 liters per cylinder are no longer subject to the requirements of paragraph (a) of this section, and must use fuel that meets a maximum per-gallon sulfur content of 1,000 parts per million (ppm).

(e) Stationary CI ICE that have a national security exemption under §60.4200(d) are also exempt from the fuel requirements in this section.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37969, June 28, 2011; 78 FR 6695, Jan. 30, 2013]

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OTHER REQUIREMENTS FOR OWNERS AND OPERATORS

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§60.4208 What is the deadline for importing or installing stationary CI ICE produced in previous model years?

(a) After December 31, 2008, owners and operators may not install stationary CI ICE (excluding fire pump engines) that do not meet the applicable requirements for 2007 model year engines.

The generators will be Tier 2 certified and will therefore meet the applicable requirements for 2007 model year engines.

(b) After December 31, 2009, owners and operators may not install stationary CI ICE with a maximum engine power of less than 19 KW (25 HP) (excluding fire pump engines) that do not meet the applicable requirements for 2008 model year engines.

(c) After December 31, 2014, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 19 KW (25 HP) and less than 56 KW (75 HP) that do not meet the applicable requirements for 2013 model year non-emergency engines.

(d) After December 31, 2013, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 56 KW (75 HP) and less than 130 KW (175 HP) that do not meet the applicable requirements for 2012 model year non-emergency engines.

(e) After December 31, 2012, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 130 KW (175 HP),

including those above 560 KW (750 HP), that do not meet the applicable requirements for 2011 model year non-emergency engines.

(f) After December 31, 2016, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 560 KW (750 HP) that do not meet the applicable requirements for 2015 model year non-emergency engines.

(g) After December 31, 2018, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power greater than or equal to 600 KW (804 HP) and less than 2,000 KW (2,680 HP) and a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder that do not meet the applicable requirements for 2017 model year non-emergency engines.

(h) In addition to the requirements specified in §§60.4201, 60.4202, 60.4204, and 60.4205, it is prohibited to import stationary CI ICE with a displacement of less than 30 liters per cylinder that do not meet the applicable requirements specified in paragraphs (a) through (g) of this section after the dates specified in paragraphs (a) through (g) of this section.

The emergency generators will have displacements of less than 30 liters per cylinder. Therefore the engines must meet the requirements specified in paragraph (a) through (g) as applicable. The engines will be Tier 2 certified and meet the requirements in paragraph (a).

(i) The requirements of this section do not apply to owners or operators of stationary CI ICE that have been modified, reconstructed, and do not apply to engines that were removed from one existing location and reinstalled at a new location.

If the facility decides to change out or replace the engines, they will meet the engine replacement requirements of 40 CFR 60.4208 at that time.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37969, June 28, 2011]

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§60.4209 What are the monitoring requirements if I am an owner or operator of a stationary CI internal combustion engine?

If you are an owner or operator, you must meet the monitoring requirements of this section. In addition, you must also meet the monitoring requirements specified in §60.4211.

(a) If you are an owner or operator of an emergency stationary CI internal combustion engine that does not meet the standards applicable to non-emergency engines, you must install a non-resettable hour meter prior to startup of the engine.

The engines will be equipped with a non-resettable hour meter.

(b) If you are an owner or operator of a stationary CI internal combustion engine equipped with a diesel particulate filter to comply with the emission standards in §60.4204, the diesel particulate filter must be installed with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37969, June 28, 2011]

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COMPLIANCE REQUIREMENTS

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§60.4210 What are my compliance requirements if I am a stationary CI internal combustion engine manufacturer?

(a) Stationary CI internal combustion engine manufacturers must certify their stationary CI ICE with a displacement of less than 10 liters per cylinder to the emission standards specified in §60.4201(a) through (c) and §60.4202(a), (b) and (d) using the certification procedures required in 40 CFR part 89, subpart B, or 40 CFR part 1039, subpart C, as applicable, and must test their engines as specified in those parts. For the purposes of this subpart, engines certified to the standards in table 1 to this subpart shall be subject to the same requirements as engines certified to the standards in 40 CFR part 89. For the purposes of this subpart, engines certified to the standards in table 4 to this subpart shall be subject to the same requirements as engines certified to the standards in 40 CFR part 89, except that engines with NFPA nameplate power of less than 37 KW (50 HP) certified to model year 2011 or later standards shall be subject to the same requirements as engines certified to the standards in 40 CFR part 1039.

(b) Stationary CI internal combustion engine manufacturers must certify their stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder to the emission standards specified in §60.4201(d) and (e) and §60.4202(e) and (f) using the certification procedures required in 40 CFR part 94, subpart C, or 40 CFR part 1042, subpart C, as applicable, and must test their engines as specified in 40 CFR part 94 or 1042, as applicable.

(c) Stationary CI internal combustion engine manufacturers must meet the requirements of 40 CFR 1039.120, 1039.125, 1039.130, and 1039.135, and 40 CFR part 1068 for engines that are certified to the emission standards in 40 CFR part 1039. Stationary CI internal combustion engine manufacturers must meet the corresponding provisions of 40 CFR part 89, 40 CFR part 94 or 40 CFR part 1042 for engines that would be covered by that part if they were nonroad (including marine) engines. Labels on such engines must refer to stationary engines, rather than or in addition to nonroad or marine engines, as appropriate. Stationary CI internal combustion engine manufacturers must label their engines according to paragraphs (c)(1) through (3) of this section.

(1) Stationary CI internal combustion engines manufactured from January 1, 2006 to March 31, 2006 (January 1, 2006 to June 30, 2006 for fire pump engines), other than those that are part

of certified engine families under the nonroad CI engine regulations, must be labeled according to 40 CFR 1039.20.

(2) Stationary CI internal combustion engines manufactured from April 1, 2006 to December 31, 2006 (or, for fire pump engines, July 1, 2006 to December 31 of the year preceding the year listed in table 3 to this subpart) must be labeled according to paragraphs (c)(2)(i) through (iii) of this section:

(i) Stationary CI internal combustion engines that are part of certified engine families under the nonroad regulations must meet the labeling requirements for nonroad CI engines, but do not have to meet the labeling requirements in 40 CFR 1039.20.

(ii) Stationary CI internal combustion engines that meet Tier 1 requirements (or requirements for fire pumps) under this subpart, but do not meet the requirements applicable to nonroad CI engines must be labeled according to 40 CFR 1039.20. The engine manufacturer may add language to the label clarifying that the engine meets Tier 1 requirements (or requirements for fire pumps) of this subpart.

(iii) Stationary CI internal combustion engines manufactured after April 1, 2006 that do not meet Tier 1 requirements of this subpart, or fire pumps engines manufactured after July 1, 2006 that do not meet the requirements for fire pumps under this subpart, may not be used in the U.S. If any such engines are manufactured in the U.S. after April 1, 2006 (July 1, 2006 for fire pump engines), they must be exported or must be brought into compliance with the appropriate standards prior to initial operation. The export provisions of 40 CFR 1068.230 would apply to engines for export and the manufacturers must label such engines according to 40 CFR 1068.230.

(3) Stationary CI internal combustion engines manufactured after January 1, 2007 (for fire pump engines, after January 1 of the year listed in table 3 to this subpart, as applicable) must be labeled according to paragraphs (c)(3)(i) through (iii) of this section.

(i) Stationary CI internal combustion engines that meet the requirements of this subpart and the corresponding requirements for nonroad (including marine) engines of the same model year and HP must be labeled according to the provisions in 40 CFR parts 89, 94, 1039 or 1042, as appropriate.

(ii) Stationary CI internal combustion engines that meet the requirements of this subpart, but are not certified to the standards applicable to nonroad (including marine) engines of the same model year and HP must be labeled according to the provisions in 40 CFR parts 89, 94, 1039 or 1042, as appropriate, but the words “stationary” must be included instead of “nonroad” or “marine” on the label. In addition, such engines must be labeled according to 40 CFR 1039.20.

(iii) Stationary CI internal combustion engines that do not meet the requirements of this subpart must be labeled according to 40 CFR 1068.230 and must be exported under the provisions of 40 CFR 1068.230.

(d) An engine manufacturer certifying an engine family or families to standards under this subpart that are identical to standards applicable under 40 CFR parts 89, 94, 1039 or 1042 for that model year may certify any such family that contains both nonroad (including marine) and stationary engines as a single engine family and/or may include any such family containing stationary engines in the averaging, banking and trading provisions applicable for such engines under those parts.

(e) Manufacturers of engine families discussed in paragraph (d) of this section may meet the labeling requirements referred to in paragraph (c) of this section for stationary CI ICE by either adding a separate label containing the information required in paragraph (c) of this section or by adding the words “and stationary” after the word “nonroad” or “marine,” as appropriate, to the label.

(f) Starting with the model years shown in table 5 to this subpart, stationary CI internal combustion engine manufacturers must add a permanent label stating that the engine is for stationary emergency use only to each new emergency stationary CI internal combustion engine greater than or equal to 19 KW (25 HP) that meets all the emission standards for emergency engines in §60.4202 but does not meet all the emission standards for non-emergency engines in §60.4201. The label must be added according to the labeling requirements specified in 40 CFR 1039.135(b). Engine manufacturers must specify in the owner's manual that operation of emergency engines is limited to emergency operations and required maintenance and testing.

(g) Manufacturers of fire pump engines may use the test cycle in table 6 to this subpart for testing fire pump engines and may test at the NFPA certified nameplate HP, provided that the engine is labeled as “Fire Pump Applications Only”.

(h) Engine manufacturers, including importers, may introduce into commerce uncertified engines or engines certified to earlier standards that were manufactured before the new or changed standards took effect until inventories are depleted, as long as such engines are part of normal inventory. For example, if the engine manufacturers' normal industry practice is to keep on hand a one-month supply of engines based on its projected sales, and a new tier of standards starts to apply for the 2009 model year, the engine manufacturer may manufacture engines based on the normal inventory requirements late in the 2008 model year, and sell those engines for installation. The engine manufacturer may not circumvent the provisions of §60.4201 or §60.4202 by stockpiling engines that are built before new or changed standards take effect. Stockpiling of such engines beyond normal industry practice is a violation of this subpart.

(i) The replacement engine provisions of 40 CFR 89.1003(b)(7), 40 CFR 94.1103(b)(3), 40 CFR 94.1103(b)(4) and 40 CFR 1068.240 are applicable to stationary CI engines replacing existing equipment that is less than 15 years old.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37969, June 28, 2011]

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§60.4211 What are my compliance requirements if I am an owner or operator of a stationary CI internal combustion engine?

(a) If you are an owner or operator and must comply with the emission standards specified in this subpart, you must do all of the following, except as permitted under paragraph (g) of this section:

(1) Operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions;

(2) Change only those emission-related settings that are permitted by the manufacturer; and

(3) Meet the requirements of 40 CFR parts 89, 94 and/or 1068, as they apply to you.

The generators will be operated and maintained according to the manufacturer's emission-related written instructions and no other settings than those emission-related settings that are permitted by the manufacturer or comply with paragraph (g) of this section will be changed. The requirements of 40 CFR Part 89 will be met as they apply.

(b) If you are an owner or operator of a pre-2007 model year stationary CI internal combustion engine and must comply with the emission standards specified in §§60.4204(a) or 60.4205(a), or if you are an owner or operator of a CI fire pump engine that is manufactured prior to the model years in table 3 to this subpart and must comply with the emission standards specified in §60.4205(c), you must demonstrate compliance according to one of the methods specified in paragraphs (b)(1) through (5) of this section.

(1) Purchasing an engine certified according to 40 CFR part 89 or 40 CFR part 94, as applicable, for the same model year and maximum engine power. The engine must be installed and configured according to the manufacturer's specifications.

(2) Keeping records of performance test results for each pollutant for a test conducted on a similar engine. The test must have been conducted using the same methods specified in this subpart and these methods must have been followed correctly.

(3) Keeping records of engine manufacturer data indicating compliance with the standards.

(4) Keeping records of control device vendor data indicating compliance with the standards.

(5) Conducting an initial performance test to demonstrate compliance with the emission standards according to the requirements specified in §60.4212, as applicable.

(c) If you are an owner or operator of a 2007 model year and later stationary CI internal combustion engine and must comply with the emission standards specified in §60.4204(b) or §60.4205(b), or if you are an owner or operator of a CI fire pump engine that is manufactured during or after the model year that applies to your fire pump engine power rating in table 3 to this subpart and must comply with the emission standards specified in §60.4205(c), you must comply by purchasing an engine certified to the emission standards in §60.4204(b), or §60.4205(b) or (c), as applicable, for the same model year and maximum (or in the case of fire pumps, NFPA nameplate) engine power. The engine must be installed and configured according

to the manufacturer's emission-related specifications, except as permitted in paragraph (g) of this section.

The generators meet the emission standards in 60.4205(b) for the latest model year and maximum engine power. The engines will be installed and configured according to the manufacturer's emission-related specifications.

(d) If you are an owner or operator and must comply with the emission standards specified in §60.4204(c) or §60.4205(d), you must demonstrate compliance according to the requirements specified in paragraphs (d)(1) through (3) of this section.

(1) Conducting an initial performance test to demonstrate initial compliance with the emission standards as specified in §60.4213.

(2) Establishing operating parameters to be monitored continuously to ensure the stationary internal combustion engine continues to meet the emission standards. The owner or operator must petition the Administrator for approval of operating parameters to be monitored continuously. The petition must include the information described in paragraphs (d)(2)(i) through (v) of this section.

(i) Identification of the specific parameters you propose to monitor continuously;

(ii) A discussion of the relationship between these parameters and NO_x and PM emissions, identifying how the emissions of these pollutants change with changes in these parameters, and how limitations on these parameters will serve to limit NO_x and PM emissions;

(iii) A discussion of how you will establish the upper and/or lower values for these parameters which will establish the limits on these parameters in the operating limitations;

(iv) A discussion identifying the methods and the instruments you will use to monitor these parameters, as well as the relative accuracy and precision of these methods and instruments; and

(v) A discussion identifying the frequency and methods for recalibrating the instruments you will use for monitoring these parameters.

(3) For non-emergency engines with a displacement of greater than or equal to 30 liters per cylinder, conducting annual performance tests to demonstrate continuous compliance with the emission standards as specified in §60.4213.

(e) If you are an owner or operator of a modified or reconstructed stationary CI internal combustion engine and must comply with the emission standards specified in §60.4204(e) or §60.4205(f), you must demonstrate compliance according to one of the methods specified in paragraphs (e)(1) or (2) of this section.

(1) Purchasing, or otherwise owning or operating, an engine certified to the emission standards in §60.4204(e) or §60.4205(f), as applicable.

(2) Conducting a performance test to demonstrate initial compliance with the emission standards according to the requirements specified in §60.4212 or §60.4213, as appropriate. The test must be conducted within 60 days after the engine commences operation after the modification or reconstruction.

(f) If you own or operate an emergency stationary ICE, you must operate the emergency stationary ICE according to the requirements in paragraphs (f)(1) through (3) of this section. In order for the engine to be considered an emergency stationary ICE under this subpart, any operation other than emergency operation, maintenance and testing, emergency demand response, and operation in non-emergency situations for 50 hours per year, as described in paragraphs (f)(1) through (3) of this section, is prohibited. If you do not operate the engine according to the requirements in paragraphs (f)(1) through (3) of this section, the engine will not be considered an emergency engine under this subpart and must meet all requirements for non-emergency engines.

(1) There is no time limit on the use of emergency stationary ICE in emergency situations.

(2) You may operate your emergency stationary ICE for any combination of the purposes specified in paragraphs (f)(2)(i) through (iii) of this section for a maximum of 100 hours per calendar year. Any operation for non-emergency situations as allowed by paragraph (f)(3) of this section counts as part of the 100 hours per calendar year allowed by this paragraph (f)(2).

(i) Emergency stationary ICE may be operated for maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that federal, state, or local standards require maintenance and testing of emergency ICE beyond 100 hours per calendar year.

(ii) Emergency stationary ICE may be operated for emergency demand response for periods in which the Reliability Coordinator under the North American Electric Reliability Corporation (NERC) Reliability Standard EOP-002-3, Capacity and Energy Emergencies (incorporated by reference, see §60.17), or other authorized entity as determined by the Reliability Coordinator, has declared an Energy Emergency Alert Level 2 as defined in the NERC Reliability Standard EOP-002-3.

(iii) Emergency stationary ICE may be operated for periods where there is a deviation of voltage or frequency of 5 percent or greater below standard voltage or frequency.

(3) Emergency stationary ICE may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing and emergency demand response provided in paragraph (f)(2) of this section. Except as provided in paragraph (f)(3)(i) of this section, the 50 hours per calendar year for non-emergency situations cannot be used for peak

shaving or non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity.

(i) The 50 hours per year for non-emergency situations can be used to supply power as part of a financial arrangement with another entity if all of the following conditions are met:

(A) The engine is dispatched by the local balancing authority or local transmission and distribution system operator;

(B) The dispatch is intended to mitigate local transmission and/or distribution limitations so as to avert potential voltage collapse or line overloads that could lead to the interruption of power supply in a local area or region.

(C) The dispatch follows reliability, emergency operation or similar protocols that follow specific NERC, regional, state, public utility commission or local standards or guidelines.

(D) The power is provided only to the facility itself or to support the local transmission and distribution system.

(E) The owner or operator identifies and records the entity that dispatches the engine and the specific NERC, regional, state, public utility commission or local standards or guidelines that are being followed for dispatching the engine. The local balancing authority or local transmission and distribution system operator may keep these records on behalf of the engine owner or operator.

The emergency generators will only be operated during emergency situations and for maintenance and testing. The engines will not be used for emergency demand response. Each engine will be limited to operation of 100 hours per year or less for maintenance and testing. The operation in non-emergency situations, not including maintenance and testing, will be limited to 50 hours of the 100 hours of operation per year.

(ii) [Reserved]

(g) If you do not install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, you must demonstrate compliance as follows:

(1) If you are an owner or operator of a stationary CI internal combustion engine with maximum engine power less than 100 HP, you must keep a maintenance plan and records of conducted maintenance to demonstrate compliance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, if you do not install and configure the engine and control device according to the manufacturer's emission-related written instructions, or you change the emission-related settings in a way that is not permitted by the manufacturer, you must conduct an

initial performance test to demonstrate compliance with the applicable emission standards within 1 year of such action.

(2) If you are an owner or operator of a stationary CI internal combustion engine greater than or equal to 100 HP and less than or equal to 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated, and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after you change emission-related settings in a way that is not permitted by the manufacturer.

(3) If you are an owner or operator of a stationary CI internal combustion engine greater than 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated, and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after you change emission-related settings in a way that is not permitted by the manufacturer. You must conduct subsequent performance testing every 8,760 hours of engine operation or 3 years, whichever comes first, thereafter to demonstrate compliance with the applicable emission standards.

The engines will be installed, configured, operated, and maintained according to the manufacturer's emission-related written instructions. If this is changed or the emission-related settings are changed in a way that is not permitted by the manufacturer, a maintenance plan and records of conducted maintenance will be kept and required performance testing will be conducted.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37970, June 28, 2011; 78 FR 6695, Jan. 30, 2013]

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TESTING REQUIREMENTS FOR OWNERS AND OPERATORS

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§60.4212 What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of less than 30 liters per cylinder?

Owners and operators of stationary CI ICE with a displacement of less than 30 liters per cylinder who conduct performance tests pursuant to this subpart must do so according to paragraphs (a) through (e) of this section.

(a) The performance test must be conducted according to the in-use testing procedures in 40 CFR part 1039, subpart F, for stationary CI ICE with a displacement of less than 10 liters per cylinder, and according to 40 CFR part 1042, subpart F, for stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder.

(b) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR part 1039 must not exceed the not-to-exceed (NTE) standards for the same model year and maximum engine power as required in 40 CFR 1039.101(e) and 40 CFR 1039.102(g)(1), except as specified in 40 CFR 1039.104(d). This requirement starts when NTE requirements take effect for nonroad diesel engines under 40 CFR part 1039.

(c) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR 89.112 or 40 CFR 94.8, as applicable, must not exceed the NTE numerical requirements, rounded to the same number of decimal places as the applicable standard in 40 CFR 89.112 or 40 CFR 94.8, as applicable, determined from the following equation:

$$\text{NTE requirement for each pollutant} = (1.25) \times (\text{STD}) \qquad \text{(Eq. 1)}$$

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Where:

STD = The standard specified for that pollutant in 40 CFR 89.112 or 40 CFR 94.8, as applicable.

Alternatively, stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR 89.112 or 40 CFR 94.8 may follow the testing procedures specified in §60.4213 of this subpart, as appropriate.

(d) Exhaust emissions from stationary CI ICE that are complying with the emission standards for pre-2007 model year engines in §60.4204(a), §60.4205(a), or §60.4205(c) must not exceed the NTE numerical requirements, rounded to the same number of decimal places as the applicable standard in §60.4204(a), §60.4205(a), or §60.4205(c), determined from the equation in paragraph (c) of this section.

Where:

STD = The standard specified for that pollutant in §60.4204(a), §60.4205(a), or §60.4205(c).

Alternatively, stationary CI ICE that are complying with the emission standards for pre-2007 model year engines in §60.4204(a), §60.4205(a), or §60.4205(c) may follow the testing procedures specified in §60.4213, as appropriate.

(e) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR part 1042 must not exceed the NTE standards for the same model year and maximum engine power as required in 40 CFR 1042.101(c).

[71 FR 39172, July 11, 2006, as amended at 76 FR 37971, June 28, 2011]

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§60.4213 What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of greater than or equal to 30 liters per cylinder?

Owners and operators of stationary CI ICE with a displacement of greater than or equal to 30 liters per cylinder must conduct performance tests according to paragraphs (a) through (f) of this section.

(a) Each performance test must be conducted according to the requirements in §60.8 and under the specific conditions that this subpart specifies in table 7. The test must be conducted within 10 percent of 100 percent peak (or the highest achievable) load.

(b) You may not conduct performance tests during periods of startup, shutdown, or malfunction, as specified in §60.8(c).

(c) You must conduct three separate test runs for each performance test required in this section, as specified in §60.8(f). Each test run must last at least 1 hour.

(d) To determine compliance with the percent reduction requirement, you must follow the requirements as specified in paragraphs (d)(1) through (3) of this section.

(1) You must use Equation 2 of this section to determine compliance with the percent reduction requirement:

$$\frac{C_i - C_o}{C_i} \times 100 = R \qquad \text{(Eq. 2)}$$

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Where:

C_i = concentration of NO_x or PM at the control device inlet,

C_o = concentration of NO_x or PM at the control device outlet, and

R = percent reduction of NO_x or PM emissions.

(2) You must normalize the NO_x or PM concentrations at the inlet and outlet of the control device to a dry basis and to 15 percent oxygen (O_2) using Equation 3 of this section, or an equivalent percent carbon dioxide (CO_2) using the procedures described in paragraph (d)(3) of this section.

$$C_{adj} = C_d \frac{5.9}{20.9 - \% O_2} \qquad \text{(Eq. 3)}$$

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Where:

C_{adj} = Calculated NO_x or PM concentration adjusted to 15 percent O_2.

C_d = Measured concentration of NO_x or PM, uncorrected.

5.9 = 20.9 percent O_2−15 percent O_2, the defined O_2 correction value, percent.

$\%O_2$ = Measured O_2 concentration, dry basis, percent.

(3) If pollutant concentrations are to be corrected to 15 percent O_2 and CO_2 concentration is measured in lieu of O_2concentration measurement, a CO_2 correction factor is needed. Calculate the CO_2 correction factor as described in paragraphs (d)(3)(i) through (iii) of this section.

(i) Calculate the fuel-specific F_o value for the fuel burned during the test using values obtained from Method 19, Section 5.2, and the following equation:

$$F_o = \frac{0.209 F_d}{F_c} \qquad \text{(Eq. 4)}$$

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Where:

F_o = Fuel factor based on the ratio of O_2 volume to the ultimate CO_2 volume produced by the fuel at zero percent excess air.

0.209 = Fraction of air that is O_2, percent/100.

F_d = Ratio of the volume of dry effluent gas to the gross calorific value of the fuel from Method 19, dsm^3/J ($dscf/10^6$ Btu).

F_c = Ratio of the volume of CO_2 produced to the gross calorific value of the fuel from Method 19, dsm^3/J ($dscf/10^6$ Btu).

(ii) Calculate the CO_2 correction factor for correcting measurement data to 15 percent O_2, as follows:

$$X_{CO_2} = \frac{5.9}{F_o} \qquad \text{(Eq. 5)}$$

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Where:

X_{CO2} = CO_2 correction factor, percent.

5.9 = 20.9 percent O_2−15 percent O_2, the defined O_2 correction value, percent.

(iii) Calculate the NO_x and PM gas concentrations adjusted to 15 percent O_2 using CO_2 as follows:

$$C_{adj} = C_d \frac{X_{CO_2}}{\%CO_2} \qquad \text{(Eq. 6)}$$

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Where:

C_{adj} = Calculated NO_x or PM concentration adjusted to 15 percent O_2.

C_d = Measured concentration of NO_x or PM, uncorrected.

$\%CO_2$ = Measured CO_2 concentration, dry basis, percent.

(e) To determine compliance with the NO_x mass per unit output emission limitation, convert the concentration of NO_xin the engine exhaust using Equation 7 of this section:

$$ER = \frac{C_d \times 1.912 \times 10^{-3} \times Q \times T}{\text{KW-hour}} \qquad \text{(Eq. 7)}$$

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Where:

ER = Emission rate in grams per KW-hour.

C_d = Measured NO_x concentration in ppm.

1.912×10^{-3} = Conversion constant for ppm NO_x to grams per standard cubic meter at 25 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meter per hour.

T = Time of test run, in hours.

KW-hour = Brake work of the engine, in KW-hour.

(f) To determine compliance with the PM mass per unit output emission limitation, convert the concentration of PM in the engine exhaust using Equation 8 of this section:

$$ER = \frac{C_{adj} \times Q \times T}{\text{KW-hour}} \qquad \text{(Eq. 8)}$$

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Where:

ER = Emission rate in grams per KW-hour.

C_{adj} = Calculated PM concentration in grams per standard cubic meter.

Q = Stack gas volumetric flow rate, in standard cubic meter per hour.

T = Time of test run, in hours.

KW-hour = Energy output of the engine, in KW.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37971, June 28, 2011]

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NOTIFICATION, REPORTS, AND RECORDS FOR OWNERS AND OPERATORS

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§60.4214 What are my notification, reporting, and recordkeeping requirements if I am an owner or operator of a stationary CI internal combustion engine?

(a) Owners and operators of non-emergency stationary CI ICE that are greater than 2,237 KW (3,000 HP), or have a displacement of greater than or equal to 10 liters per cylinder, or are pre-2007 model year engines that are greater than 130 KW (175 HP) and not certified, must meet the requirements of paragraphs (a)(1) and (2) of this section.

(1) Submit an initial notification as required in §60.7(a)(1). The notification must include the information in paragraphs (a)(1)(i) through (v) of this section.

(i) Name and address of the owner or operator;

(ii) The address of the affected source;

(iii) Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement;

(iv) Emission control equipment; and

(v) Fuel used.

(2) Keep records of the information in paragraphs (a)(2)(i) through (iv) of this section.

(i) All notifications submitted to comply with this subpart and all documentation supporting any notification.

(ii) Maintenance conducted on the engine.

(iii) If the stationary CI internal combustion is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards.

(iv) If the stationary CI internal combustion is not a certified engine, documentation that the engine meets the emission standards.

(b) If the stationary CI internal combustion engine is an emergency stationary internal combustion engine, the owner or operator is not required to submit an initial notification. Starting with the model years in table 5 to this subpart, if the emergency engine does not meet the standards applicable to non-emergency engines in the applicable model year, the owner or

operator must keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. The owner must record the time of operation of the engine and the reason the engine was in operation during that time.

Records of engine operation recorded through the non-resettable hour meter will be kept.

(c) If the stationary CI internal combustion engine is equipped with a diesel particulate filter, the owner or operator must keep records of any corrective action taken after the backpressure monitor has notified the owner or operator that the high backpressure limit of the engine is approached.

(d) If you own or operate an emergency stationary CI ICE with a maximum engine power more than 100 HP that operates or is contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §60.4211(f)(2)(ii) and (iii) or that operates for the purposes specified in §60.4211(f)(3)(i), you must submit an annual report according to the requirements in paragraphs (d)(1) through (3) of this section.

(1) The report must contain the following information:

(i) Company name and address where the engine is located.

(ii) Date of the report and beginning and ending dates of the reporting period.

(iii) Engine site rating and model year.

(iv) Latitude and longitude of the engine in decimal degrees reported to the fifth decimal place.

(v) Hours operated for the purposes specified in §60.4211(f)(2)(ii) and (iii), including the date, start time, and end time for engine operation for the purposes specified in §60.4211(f)(2)(ii) and (iii).

(vi) Number of hours the engine is contractually obligated to be available for the purposes specified in §60.4211(f)(2)(ii) and (iii).

(vii) Hours spent for operation for the purposes specified in §60.4211(f)(3)(i), including the date, start time, and end time for engine operation for the purposes specified in §60.4211(f)(3)(i). The report must also identify the entity that dispatched the engine and the situation that necessitated the dispatch of the engine.

(2) The first annual report must cover the calendar year 2015 and must be submitted no later than March 31, 2016. Subsequent annual reports for each calendar year must be submitted no later than March 31 of the following calendar year.

(3) The annual report must be submitted electronically using the subpart specific reporting form in the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (*www.epa.gov/cdx*). However, if the reporting form specific to this subpart is not available in CEDRI at the time that the report is due, the written report must be submitted to the Administrator at the appropriate address listed in §60.4.

[71 FR 39172, July 11, 2006, as amended at 78 FR 6696, Jan. 30, 2013]

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SPECIAL REQUIREMENTS

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§60.4215 What requirements must I meet for engines used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands?

(a) Stationary CI ICE with a displacement of less than 30 liters per cylinder that are used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands are required to meet the applicable emission standards in §§60.4202 and 60.4205.

(b) Stationary CI ICE that are used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands are not required to meet the fuel requirements in §60.4207.

(c) Stationary CI ICE with a displacement of greater than or equal to 30 liters per cylinder that are used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands are required to meet the following emission standards:

(1) For engines installed prior to January 1, 2012, limit the emissions of NO_x in the stationary CI internal combustion engine exhaust to the following:

(i) 17.0 g/KW-hr (12.7 g/HP-hr) when maximum engine speed is less than 130 rpm;

(ii) $45 \cdot n^{-0.2}$ g/KW-hr ($34 \cdot n^{-0.2}$ g/HP-hr) when maximum engine speed is 130 or more but less than 2,000 rpm, where n is maximum engine speed; and

(iii) 9.8 g/KW-hr (7.3 g/HP-hr) when maximum engine speed is 2,000 rpm or more.

(2) For engines installed on or after January 1, 2012, limit the emissions of NO_x in the stationary CI internal combustion engine exhaust to the following:

(i) 14.4 g/KW-hr (10.7 g/HP-hr) when maximum engine speed is less than 130 rpm;

(ii) $44 \cdot n^{-0.23}$ g/KW-hr ($33 \cdot n^{-0.23}$ g/HP-hr) when maximum engine speed is greater than or equal to 130 but less than 2,000 rpm and where n is maximum engine speed; and

(iii) 7.7 g/KW-hr (5.7 g/HP-hr) when maximum engine speed is greater than or equal to 2,000 rpm.

(3) Limit the emissions of PM in the stationary CI internal combustion engine exhaust to 0.40 g/KW-hr (0.30 g/HP-hr).

[71 FR 39172, July 11, 2006, as amended at 76 FR 37971, June 28, 2011]

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§60.4216 What requirements must I meet for engines used in Alaska?

(a) Prior to December 1, 2010, owners and operators of stationary CI ICE with a displacement of less than 30 liters per cylinder located in areas of Alaska not accessible by the FAHS should refer to 40 CFR part 69 to determine the diesel fuel requirements applicable to such engines.

(b) Except as indicated in paragraph (c) of this section, manufacturers, owners and operators of stationary CI ICE with a displacement of less than 10 liters per cylinder located in areas of Alaska not accessible by the FAHS may meet the requirements of this subpart by manufacturing and installing engines meeting the requirements of 40 CFR parts 94 or 1042, as appropriate, rather than the otherwise applicable requirements of 40 CFR parts 89 and 1039, as indicated in sections §§60.4201(f) and 60.4202(g) of this subpart.

(c) Manufacturers, owners and operators of stationary CI ICE that are located in areas of Alaska not accessible by the FAHS may choose to meet the applicable emission standards for emergency engines in §§60.4202 and 60.4205, and not those for non-emergency engines in §60.4201 and §60.4204, except that for 2014 model year and later non-emergency CI ICE, the owner or operator of any such engine that was not certified as meeting Tier 4 PM standards, must meet the applicable requirements for PM in §§60.4201 and 60.4204 or install a PM emission control device that achieves PM emission reductions of 85 percent, or 60 percent for engines with a displacement of greater than or equal to 30 liters per cylinder, compared to engine-out emissions.

(d) The provisions of §60.4207 do not apply to owners and operators of pre-2014 model year stationary CI ICE subject to this subpart that are located in areas of Alaska not accessible by the FAHS.

(e) The provisions of §60.4208(a) do not apply to owners and operators of stationary CI ICE subject to this subpart that are located in areas of Alaska not accessible by the FAHS until after December 31, 2009.

(f) The provisions of this section and §60.4207 do not prevent owners and operators of stationary CI ICE subject to this subpart that are located in areas of Alaska not accessible by the FAHS from using fuels mixed with used lubricating oil, in volumes of up to 1.75 percent of the total fuel. The sulfur content of the used lubricating oil must be less than 200 parts per million.

The used lubricating oil must meet the on-specification levels and properties for used oil in 40 CFR 279.11.

[76 FR 37971, June 28, 2011]

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§60.4217 What emission standards must I meet if I am an owner or operator of a stationary internal combustion engine using special fuels?

Owners and operators of stationary CI ICE that do not use diesel fuel may petition the Administrator for approval of alternative emission standards, if they can demonstrate that they use a fuel that is not the fuel on which the manufacturer of the engine certified the engine and that the engine cannot meet the applicable standards required in §60.4204 or §60.4205 using such fuels and that use of such fuel is appropriate and reasonably necessary, considering cost, energy, technical feasibility, human health and environmental, and other factors, for the operation of the engine.

[76 FR 37972, June 28, 2011]

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GENERAL PROVISIONS

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§60.4218 What parts of the General Provisions apply to me?

Table 8 to this subpart shows which parts of the General Provisions in §§60.1 through 60.19 apply to you.

DEFINITIONS

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§60.4219 What definitions apply to this subpart?

As used in this subpart, all terms not defined herein shall have the meaning given them in the CAA and in subpart A of this part.

Certified emissions life means the period during which the engine is designed to properly function in terms of reliability and fuel consumption, without being remanufactured, specified as a number of hours of operation or calendar years, whichever comes first. The values for certified emissions life for stationary CI ICE with a displacement of less than 10 liters per cylinder are given in 40 CFR 1039.101(g). The values for certified emissions life for stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder are given in 40 CFR 94.9(a).

Combustion turbine means all equipment, including but not limited to the turbine, the fuel, air, lubrication and exhaust gas systems, control systems (except emissions control equipment), and any ancillary components and sub-components comprising any simple cycle combustion turbine, any regenerative/recuperative cycle combustion turbine, the combustion turbine portion of any cogeneration cycle combustion system, or the combustion turbine portion of any combined cycle steam/electric generating system.

Compression ignition means relating to a type of stationary internal combustion engine that is not a spark ignition engine.

Date of manufacture means one of the following things:

(1) For freshly manufactured engines and modified engines, date of manufacture means the date the engine is originally produced.

(2) For reconstructed engines, date of manufacture means the date the engine was originally produced, except as specified in paragraph (3) of this definition.

(3) Reconstructed engines are assigned a new date of manufacture if the fixed capital cost of the new and refurbished components exceeds 75 percent of the fixed capital cost of a comparable entirely new facility. An engine that is produced from a previously used engine block does not retain the date of manufacture of the engine in which the engine block was previously used if the engine is produced using all new components except for the engine block. In these cases, the date of manufacture is the date of reconstruction or the date the new engine is produced.

Diesel fuel means any liquid obtained from the distillation of petroleum with a boiling point of approximately 150 to 360 degrees Celsius. One commonly used form is number 2 distillate oil.

Diesel particulate filter means an emission control technology that reduces PM emissions by trapping the particles in a flow filter substrate and periodically removes the collected particles by either physical action or by oxidizing (burning off) the particles in a process called regeneration.

Emergency stationary internal combustion engine means any stationary reciprocating internal combustion engine that meets all of the criteria in paragraphs (1) through (3) of this definition. All emergency stationary ICE must comply with the requirements specified in §60.4211(f) in order to be considered emergency stationary ICE. If the engine does not comply with the requirements specified in §60.4211(f), then it is not considered to be an emergency stationary ICE under this subpart.

(1) The stationary ICE is operated to provide electrical power or mechanical work during an emergency situation. Examples include stationary ICE used to produce power for critical networks or equipment (including power supplied to portions of a facility) when electric power from the local utility (or the normal power source, if the facility runs on its own power production) is interrupted, or stationary ICE used to pump water in the case of fire or flood, etc.

(2) The stationary ICE is operated under limited circumstances for situations not included in paragraph (1) of this definition, as specified in §60.4211(f).

(3) The stationary ICE operates as part of a financial arrangement with another entity in situations not included in paragraph (1) of this definition only as allowed in §60.4211(f)(2)(ii) or (iii) and §60.4211(f)(3)(i).

Engine manufacturer means the manufacturer of the engine. See the definition of "manufacturer" in this section.

Fire pump engine means an emergency stationary internal combustion engine certified to NFPA requirements that is used to provide power to pump water for fire suppression or protection.

Freshly manufactured engine means an engine that has not been placed into service. An engine becomes freshly manufactured when it is originally produced.

Installed means the engine is placed and secured at the location where it is intended to be operated.

Manufacturer has the meaning given in section 216(1) of the Act. In general, this term includes any person who manufactures a stationary engine for sale in the United States or otherwise introduces a new stationary engine into commerce in the United States. This includes importers who import stationary engines for sale or resale.

Maximum engine power means maximum engine power as defined in 40 CFR 1039.801.

Model year means the calendar year in which an engine is manufactured (see "date of manufacture"), except as follows:

(1) Model year means the annual new model production period of the engine manufacturer in which an engine is manufactured (see "date of manufacture"), if the annual new model production period is different than the calendar year and includes January 1 of the calendar year for which the model year is named. It may not begin before January 2 of the previous calendar year and it must end by December 31 of the named calendar year.

(2) For an engine that is converted to a stationary engine after being placed into service as a nonroad or other non-stationary engine, model year means the calendar year or new model production period in which the engine was manufactured (see "date of manufacture").

Other internal combustion engine means any internal combustion engine, except combustion turbines, which is not a reciprocating internal combustion engine or rotary internal combustion engine.

Reciprocating internal combustion engine means any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work.

Rotary internal combustion engine means any internal combustion engine which uses rotary motion to convert heat energy into mechanical work.

Spark ignition means relating to a gasoline, natural gas, or liquefied petroleum gas fueled engine or any other type of engine with a spark plug (or other sparking device) and with operating characteristics significantly similar to the theoretical Otto combustion cycle. Spark ignition engines usually use a throttle to regulate intake air flow to control power during normal operation. Dual-fuel engines in which a liquid fuel (typically diesel fuel) is used for CI and gaseous fuel (typically natural gas) is used as the primary fuel at an annual average ratio of less than 2 parts diesel fuel to 100 parts total fuel on an energy equivalent basis are spark ignition engines.

Stationary internal combustion engine means any internal combustion engine, except combustion turbines, that converts heat energy into mechanical work and is not mobile. Stationary ICE differ from mobile ICE in that a stationary internal combustion engine is not a nonroad engine as defined at 40 CFR 1068.30 (excluding paragraph (2)(ii) of that definition), and is not used to propel a motor vehicle, aircraft, or a vehicle used solely for competition. Stationary ICE include reciprocating ICE, rotary ICE, and other ICE, except combustion turbines.

Subpart means 40 CFR part 60, subpart IIII.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37972, June 28, 2011; 78 FR 6696, Jan. 30, 2013]

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Table 1 to Subpart IIII of Part 60—Emission Standards for Stationary Pre-2007 Model Year Engines With a Displacement of <10 Liters per Cylinder and 2007-2010 Model Year Engines >2,237 KW (3,000 HP) and With a Displacement of <10 Liters per Cylinder

[As stated in §§60.4201(b), 60.4202(b), 60.4204(a), and 60.4205(a), you must comply with the following emission standards]

Maximum engine power	Emission standards for stationary pre-2007 model year engines with a displacement of <10 liters per cylinder and 2007-2010 model year engines >2,237 KW (3,000 HP) and with a displacement of <10 liters per cylinder in g/KW-hr (g/HP-hr)				
	NMHC + NO_x	HC	NO_x	CO	PM
KW<8 (HP<11)	10.5 (7.8)			8.0 (6.0)	1.0 (0.75)
8≤KW<19 (11≤HP<25)	9.5 (7.1)			6.6 (4.9)	0.80 (0.60)
19≤KW<37 (25≤HP<50)	9.5 (7.1)			5.5 (4.1)	0.80 (0.60)

37≤KW<56 (50≤HP<75)			9.2 (6.9)		
56≤KW<75 (75≤HP<100)			9.2 (6.9)		
75≤KW<130 (100≤HP<175)			9.2 (6.9)		
130≤KW<225 (175≤HP<300)		1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.40)
225≤KW<450 (300≤HP<600)		1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.40)
450≤KW≤560 (600≤HP≤750)		1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.40)
KW>560 (HP>750)		1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.40)

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Table 2 to Subpart IIII of Part 60—Emission Standards for 2008 Model Year and Later Emergency Stationary CI ICE <37 KW (50 HP) With a Displacement of <10 Liters per Cylinder

[As stated in §60.4202(a)(1), you must comply with the following emission standards]

Engine power	Emission standards for 2008 model year and later emergency stationary CI ICE <37 KW (50 HP) with a displacement of <10 liters per cylinder in g/KW-hr (g/HP-hr)			
	Model year(s)	NO_x + NMHC	CO	PM
KW<8 (HP<11)	2008 +	7.5 (5.6)	8.0 (6.0)	0.40 (0.30)
8≤KW<19 (11≤HP<25)	2008 +	7.5 (5.6)	6.6 (4.9)	0.40 (0.30)
19≤KW<37 (25≤HP<50)	2008 +	7.5 (5.6)	5.5 (4.1)	0.30 (0.22)

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Table 3 to Subpart IIII of Part 60—Certification Requirements for Stationary Fire Pump Engines

As stated in §60.4202(d), you must certify new stationary fire pump engines beginning with the following model years:

Engine power	Starting model year engine manufacturers must certify new stationary fire pump engines according to §60.4202(d)[1]
KW<75 (HP<100)	2011
75≤KW<130 (100≤HP<175)	2010
130≤KW≤560 (175≤HP≤750)	2009
KW>560 (HP>750)	2008

[1]Manufacturers of fire pump stationary CI ICE with a maximum engine power greater than or equal to 37 kW (50 HP) and less than 450 KW (600 HP) and a rated speed of greater than 2,650 revolutions per minute (rpm) are not required to certify such engines until three model years following the model year indicated in this Table 3 for engines in the applicable engine power category.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37972, June 28, 2011]

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Table 4 to Subpart IIII of Part 60—Emission Standards for Stationary Fire Pump Engines

[As stated in §§60.4202(d) and 60.4205(c), you must comply with the following emission standards for stationary fire pump engines]

Maximum engine power	Model year(s)	NMHC + NO_x	CO	PM
KW<8 (HP<11)	2010 and earlier	10.5 (7.8)	8.0 (6.0)	1.0 (0.75)
	2011 +	7.5 (5.6)		0.40 (0.30)
8≤KW<19 (11≤HP<25)	2010 and earlier	9.5 (7.1)	6.6 (4.9)	0.80 (0.60)
	2011 +	7.5 (5.6)		0.40 (0.30)
19≤KW<37 (25≤HP<50)	2010 and earlier	9.5 (7.1)	5.5 (4.1)	0.80 (0.60)
	2011 +	7.5 (5.6)		0.30 (0.22)
37≤KW<56 (50≤HP<75)	2010 and earlier	10.5 (7.8)	5.0 (3.7)	0.80 (0.60)

	2011 +[1]	4.7 (3.5)		0.40 (0.30)
56≤KW<75 (75≤HP<100)	2010 and earlier	10.5 (7.8)	5.0 (3.7)	0.80 (0.60)
	2011 +[1]	4.7 (3.5)		0.40 (0.30)
75≤KW<130 (100≤HP<175)	2009 and earlier	10.5 (7.8)	5.0 (3.7)	0.80 (0.60)
	2010 +[2]	4.0 (3.0)		0.30 (0.22)
130≤KW<225 (175≤HP<300)	2008 and earlier	10.5 (7.8)	3.5 (2.6)	0.54 (0.40)
	2009 +[3]	4.0 (3.0)		0.20 (0.15)
225≤KW<450 (300≤HP<600)	2008 and earlier	10.5 (7.8)	3.5 (2.6)	0.54 (0.40)
	2009 +[3]	4.0 (3.0)		0.20 (0.15)
450≤KW≤560 (600≤HP≤750)	2008 and earlier	10.5 (7.8)	3.5 (2.6)	0.54 (0.40)
	2009 +	4.0 (3.0)		0.20 (0.15)
KW>560 (HP>750)	2007 and earlier	10.5 (7.8)	3.5 (2.6)	0.54 (0.40)
	2008 +	6.4 (4.8)		0.20 (0.15)

[1]For model years 2011-2013, manufacturers, owners and operators of fire pump stationary CI ICE in this engine power category with a rated speed of greater than 2,650 revolutions per minute (rpm) may comply with the emission limitations for 2010 model year engines.

[2]For model years 2010-2012, manufacturers, owners and operators of fire pump stationary CI ICE in this engine power category with a rated speed of greater than 2,650 rpm may comply with the emission limitations for 2009 model year engines.

[3]In model years 2009-2011, manufacturers of fire pump stationary CI ICE in this engine power category with a rated speed of greater than 2,650 rpm may comply with the emission limitations for 2008 model year engines.

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Table 5 to Subpart IIII of Part 60—Labeling and Recordkeeping Requirements for New Stationary Emergency Engines

[You must comply with the labeling requirements in §60.4210(f) and the recordkeeping requirements in §60.4214(b) for new emergency stationary CI ICE beginning in the following model years:]

Engine power	Starting model year
19≤KW<56 (25≤HP<75)	2013
56≤KW<130 (75≤HP<175)	2012

KW≥130 (HP≥175)	2011

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Table 6 to Subpart IIII of Part 60—Optional 3-Mode Test Cycle for Stationary Fire Pump Engines

[As stated in §60.4210(g), manufacturers of fire pump engines may use the following test cycle for testing fire pump engines:]

Mode No.	Engine speed[1]	Torque (percent)[2]	Weighting factors
1	Rated	100	0.30
2	Rated	75	0.50
3	Rated	50	0.20

[1]Engine speed: ±2 percent of point.

[2]Torque: NFPA certified nameplate HP for 100 percent point. All points should be ±2 percent of engine percent load value.

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Table 7 to Subpart IIII of Part 60—Requirements for Performance Tests for Stationary CI ICE With a Displacement of ≥30 Liters per Cylinder

As stated in §60.4213, you must comply with the following requirements for performance tests for stationary CI ICE with a displacement of ≥30 liters per cylinder:

Each	Complying with the requirement to	You must	Using	According to the following requirements
1. Stationary CI internal combustion engine with a displacement of ≥ 30 liters per cylinder	a. Reduce NO_x emissions by 90 percent or more;	i. Select the sampling port location and number/location of traverse points at the inlet and outlet of the control device;		(a) For NO_x, O_2, and moisture measurement, ducts ≤6 inches in diameter may be sampled at a single point located at the duct centroid and ducts >6 and ≤12 inches in diameter may be sampled at 3 traverse points located at 16.7, 50.0, and 83.3% of the measurement line ('3-point

				long line'). If the duct is >12 inches in diameter *and* the sampling port location meets the two and half-diameter criterion of Section 11.1.1 of Method 1 of 40 CFR part 60, appendix A-1, the duct may be sampled at '3-point long line'; otherwise, conduct the stratification testing and select sampling points according to Section 8.1.2 of Method 7E of 40 CFR part 60, appendix A-4.
		ii. Measure O_2 at the inlet and outlet of the control device;	(1) Method 3, 3A, or 3B of 40 CFR part 60, appendix A-2	(b) Measurements to determine O_2 concentration must be made at the same time as the measurements for NO_x concentration.
		iii. If necessary, measure moisture content at the inlet and outlet of the control device; and	(2) Method 4 of 40 CFR part 60, appendix A-3, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348-03 (incorporated by reference, see §60.17)	(c) Measurements to determine moisture content must be made at the same time as the measurements for NO_x concentration.
		iv. Measure NO_x at the inlet and outlet of the control device.	(3) Method 7E of 40 CFR part 60, appendix A-4, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348-03 (incorporated by reference, see §60.17)	(d) NO_x concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.

	b. Limit the concentration of NO_x in the stationary CI internal combustion engine exhaust.	i. Select the sampling port location and number/location of traverse points at the exhaust of the stationary internal combustion engine;		(a) For NO_x, O_2, and moisture measurement, ducts ≤6 inches in diameter may be sampled at a single point located at the duct centroid and ducts >6 and ≤12 inches in diameter may be sampled at 3 traverse points located at 16.7, 50.0, and 83.3% of the measurement line ('3-point long line'). If the duct is >12 inches in diameter *and* the sampling port location meets the two and half-diameter criterion of Section 11.1.1 of Method 1 of 40 CFR part 60, appendix A-1, the duct may be sampled at '3-point long line'; otherwise, conduct the stratification testing and select sampling points according to Section 8.1.2 of Method 7E of 40 CFR part 60, appendix A-4.
		ii. Determine the O_2concentration of the stationary internal combustion engine exhaust at the sampling port location;	(1) Method 3, 3A, or 3B of 40 CFR part 60, appendix A-2	(b) Measurements to determine O_2 concentration must be made at the same time as the measurement for NO_xconcentration.
		iii. If necessary, measure moisture content of the stationary internal combustion engine exhaust at the sampling port location; and	(2) Method 4 of 40 CFR part 60, appendix A-3, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348-03 (incorporated by reference, see §60.17)	(c) Measurements to determine moisture content must be made at the same time as the measurement for NO_xconcentration.

		iv. Measure NO_x at the exhaust of the stationary internal combustion engine; if using a control device, the sampling site must be located at the outlet of the control device.	(3) Method 7E of 40 CFR part 60, appendix A-4, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348-03 (incorporated by reference, see §60.17)	(d) NO_x concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.
	c. Reduce PM emissions by 60 percent or more	i. Select the sampling port location and the number of traverse points;	(1) Method 1 or 1A of 40 CFR part 60, appendix A-1	(a) Sampling sites must be located at the inlet and outlet of the control device.
		ii. Measure O_2at the inlet and outlet of the control device;	(2) Method 3, 3A, or 3B of 40 CFR part 60, appendix A-2	(b) Measurements to determine O_2 concentration must be made at the same time as the measurements for PM concentration.
		iii. If necessary, measure moisture content at the inlet and outlet of the control device; and	(3) Method 4 of 40 CFR part 60, appendix A-3	(c) Measurements to determine and moisture content must be made at the same time as the measurements for PM concentration.
		iv. Measure PM at the inlet and outlet of the control device.	(4) Method 5 of 40 CFR part 60, appendix A-3	(d) PM concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.
	d. Limit the concentration of PM in the stationary CI internal combustion engine exhaust	i. Select the sampling port location and the number of traverse points;	(1) Method 1 or 1A of 40 CFR part 60, appendix A-1	(a) If using a control device, the sampling site must be located at the outlet of the control device.
		ii. Determine the O_2concentration of	(2) Method 3, 3A, or 3B of 40	(b) Measurements to determine

		the stationary internal combustion engine exhaust at the sampling port location;	CFR part 60, appendix A-2	O_2 concentration must be made at the same time as the measurements for PM concentration.
		iii. If necessary, measure moisture content of the stationary internal combustion engine exhaust at the sampling port location; and	(3) Method 4 of 40 CFR part 60, appendix A-3	(c) Measurements to determine moisture content must be made at the same time as the measurements for PM concentration.
		iv. Measure PM at the exhaust of the stationary internal combustion engine.	(4) Method 5 of 40 CFR part 60, appendix A-3	(d) PM concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.

[79 FR 11251, Feb. 27, 2014]

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Table 8 to Subpart IIII of Part 60—Applicability of General Provisions to Subpart IIII

[As stated in §60.4218, you must comply with the following applicable General Provisions:]

General Provisions citation	Subject of citation	Applies to subpart	Explanation
§60.1	General applicability of the General Provisions	Yes	
§60.2	Definitions	Yes	Additional terms defined in §60.4219.
§60.3	Units and abbreviations	Yes	
§60.4	Address	Yes	
§60.5	Determination of construction or modification	Yes	
§60.6	Review of plans	Yes	

§60.7	Notification and Recordkeeping	Yes	Except that §60.7 only applies as specified in §60.4214(a).
§60.8	Performance tests	Yes	Except that §60.8 only applies to stationary CI ICE with a displacement of (≥30 liters per cylinder and engines that are not certified.
§60.9	Availability of information	Yes	
§60.10	State Authority	Yes	
§60.11	Compliance with standards and maintenance requirements	No	Requirements are specified in subpart IIII.
§60.12	Circumvention	Yes	
§60.13	Monitoring requirements	Yes	Except that §60.13 only applies to stationary CI ICE with a displacement of (≥30 liters per cylinder.
§60.14	Modification	Yes	
§60.15	Reconstruction	Yes	
§60.16	Priority list	Yes	
§60.17	Incorporations by reference	Yes	
§60.18	General control device requirements	No	
§60.19	General notification and reporting requirements	Yes	

Subpart ZZZZ—National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

WHAT THIS SUBPART COVERS

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§63.6580 What is the purpose of subpart ZZZZ?

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

[73 FR 3603, Jan. 18, 2008]

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§63.6585 Am I subject to this subpart?

You are subject to this subpart if you own or operate a stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand.

(a) A stationary RICE is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a non-road engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition.

The emergency generators at the Jerome WWTP meet the definition of stationary RICE and will be located at an area source of HAPs.

(b) A major source of HAP emissions is a plant site that emits or has the potential to emit any single HAP at a rate of 10 tons (9.07 megagrams) or more per year or any combination of HAP at a rate of 25 tons (22.68 megagrams) or more per year, except that for oil and gas production facilities, a major source of HAP emissions is determined for each surface site.

(c) An area source of HAP emissions is a source that is not a major source.

HAPs emissions at the Jerome WWTP will be less than 10 tpy of any individual HAP and less than 25 tpy of all HAPs in aggregate.

(d) If you are an owner or operator of an area source subject to this subpart, your status as an entity subject to a standard or other requirements under this subpart does not subject you to the obligation to obtain a permit under 40 CFR part 70 or 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart as applicable.

The Jerome WWTP is an area source of criteria pollutants and HAPs and therefore exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71

(e) If you are an owner or operator of a stationary RICE used for national security purposes, you may be eligible to request an exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C.

(f) The emergency stationary RICE listed in paragraphs (f)(1) through (3) of this section are not subject to this subpart. The stationary RICE must meet the definition of an emergency stationary RICE in §63.6675, which includes operating according to the provisions specified in §63.6640(f).

(1) Existing residential emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in §63.6640(f)(4)(ii).

(2) Existing commercial emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in §63.6640(f)(4)(ii).

(3) Existing institutional emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in §63.6640(f)(4)(ii).

[69 FR 33506, June 15, 2004, as amended at 73 FR 3603, Jan. 18, 2008; 78 FR 6700, Jan. 30, 2013]

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§63.6590 What parts of my plant does this subpart cover?

This subpart applies to each affected source.

(a) *Affected source.* An affected source is any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions, excluding stationary RICE being tested at a stationary RICE test cell/stand.

The existing and new emergency generators will be affected sources.

(1) *Existing stationary RICE.*

(i) For stationary RICE with a site rating of more than 500 brake horsepower (HP) located at a major source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before December 19, 2002.

(ii) For stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006.

(iii) For stationary RICE located at an area source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006.

(iv) A change in ownership of an existing stationary RICE does not make that stationary RICE a new or reconstructed stationary RICE.

(2) *New stationary RICE.* (i) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions is new if you commenced construction of the stationary RICE on or after December 19, 2002.

(ii) A stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.

(iii) A stationary RICE located at an area source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.

The new emergency generators will be model year 2016 and will be installed at the facility in 2016-2017. The existing emergency generators are model year 2007 and were installed in 2007.

(3) *Reconstructed stationary RICE.* (i) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions is reconstructed if you meet the definition of reconstruction in §63.2 and reconstruction is commenced on or after December 19, 2002.

(ii) A stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions is reconstructed if you meet the definition of reconstruction in §63.2 and reconstruction is commenced on or after June 12, 2006.

(iii) A stationary RICE located at an area source of HAP emissions is reconstructed if you meet the definition of reconstruction in §63.2 and reconstruction is commenced on or after June 12, 2006.

(b) *Stationary RICE subject to limited requirements.* (1) An affected source which meets either of the criteria in paragraphs (b)(1)(i) through (ii) of this section does not have to meet the requirements of this subpart and of subpart A of this part except for the initial notification requirements of §63.6645(f).

(i) The stationary RICE is a new or reconstructed emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that does not operate or is not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii).

(ii) The stationary RICE is a new or reconstructed limited use stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions.

(2) A new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis must meet the initial notification requirements of §63.6645(f) and the requirements of §§63.6625(c), 63.6650(g), and 63.6655(c). These stationary RICE do not have to meet the emission limitations and operating limitations of this subpart.

(3) The following stationary RICE do not have to meet the requirements of this subpart and of subpart A of this part, including initial notification requirements:

(i) Existing spark ignition 2 stroke lean burn (2SLB) stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(ii) Existing spark ignition 4 stroke lean burn (4SLB) stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(iii) Existing emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that does not operate or is not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii).

(iv) Existing limited use stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(v) Existing stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis;

(c) *Stationary RICE subject to Regulations under 40 CFR Part 60.* An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.

(1) A new or reconstructed stationary RICE located at an area source;

The emergency generators meet the criteria of paragraph (c)(1) and therefore will comply with this subpart by meeting the requirements of 40 CFR Part 60 Subpart IIII.

(2) A new or reconstructed 2SLB stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(3) A new or reconstructed 4SLB stationary RICE with a site rating of less than 250 brake HP located at a major source of HAP emissions;

(4) A new or reconstructed spark ignition 4 stroke rich burn (4SRB) stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(5) A new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis;

(6) A new or reconstructed emergency or limited use stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(7) A new or reconstructed compression ignition (CI) stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions.

[69 FR 33506, June 15, 2004, as amended at 73 FR 3604, Jan. 18, 2008; 75 FR 9674, Mar. 3, 2010; 75 FR 37733, June 30, 2010; 75 FR 51588, Aug. 20, 2010; 78 FR 6700, Jan. 30, 2013]

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§63.6595 When do I have to comply with this subpart?

(a) *Affected sources.* (1) If you have an existing stationary RICE, excluding existing non-emergency CI stationary RICE, with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must comply with the applicable emission limitations, operating limitations and other requirements no later than June 15, 2007. If you have an existing non-emergency CI stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, an existing stationary CI RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, or an existing stationary CI RICE located at an area source of HAP emissions, you must comply with the applicable emission limitations, operating limitations, and other requirements no later than May 3, 2013. If you have an existing stationary SI RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, or an existing stationary SI RICE located at an area source of HAP emissions, you must comply with the applicable emission limitations, operating limitations, and other requirements no later than October 19, 2013.

(2) If you start up your new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions before August 16, 2004, you must comply with the applicable emission limitations and operating limitations in this subpart no later than August 16, 2004.

(3) If you start up your new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions after August 16, 2004, you must comply with the applicable emission limitations and operating limitations in this subpart upon startup of your affected source.

(4) If you start up your new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions before January 18, 2008, you must comply with the applicable emission limitations and operating limitations in this subpart no later than January 18, 2008.

(5) If you start up your new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions after January 18, 2008, you must comply with the applicable emission limitations and operating limitations in this subpart upon startup of your affected source.

(6) If you start up your new or reconstructed stationary RICE located at an area source of HAP emissions before January 18, 2008, you must comply with the applicable emission limitations and operating limitations in this subpart no later than January 18, 2008.

(7) If you start up your new or reconstructed stationary RICE located at an area source of HAP emissions after January 18, 2008, you must comply with the applicable emission limitations and operating limitations in this subpart upon startup of your affected source.

The emergency generators will be installed and started in 2016 and will comply with the applicable emission limitations and operating limitations in this subpart upon startup.

(b) *Area sources that become major sources.* If you have an area source that increases its emissions or its potential to emit such that it becomes a major source of HAP, the compliance dates in paragraphs (b)(1) and (2) of this section apply to you.

(1) Any stationary RICE for which construction or reconstruction is commenced after the date when your area source becomes a major source of HAP must be in compliance with this subpart upon startup of your affected source.

(2) Any stationary RICE for which construction or reconstruction is commenced before your area source becomes a major source of HAP must be in compliance with the provisions of this subpart that are

applicable to RICE located at major sources within 3 years after your area source becomes a major source of HAP.

(c) If you own or operate an affected source, you must meet the applicable notification requirements in §63.6645 and in 40 CFR part 63, subpart A.

[69 FR 33506, June 15, 2004, as amended at 73 FR 3604, Jan. 18, 2008; 75 FR 9675, Mar. 3, 2010; 75 FR 51589, Aug. 20, 2010; 78 FR 6701, Jan. 30, 2013]

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EMISSION AND OPERATING LIMITATIONS

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§63.6600 What emission limitations and operating limitations must I meet if I own or operate a stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions?

Compliance with the numerical emission limitations established in this subpart is based on the results of testing the average of three 1-hour runs using the testing requirements and procedures in §63.6620 and Table 4 to this subpart.

(a) If you own or operate an existing, new, or reconstructed spark ignition 4SRB stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must comply with the emission limitations in Table 1a to this subpart and the operating limitations in Table 1b to this subpart which apply to you.

(b) If you own or operate a new or reconstructed 2SLB stationary RICE with a site rating of more than 500 brake HP located at major source of HAP emissions, a new or reconstructed 4SLB stationary RICE with a site rating of more than 500 brake HP located at major source of HAP emissions, or a new or reconstructed CI stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must comply with the emission limitations in Table 2a to this subpart and the operating limitations in Table 2b to this subpart which apply to you.

(c) If you own or operate any of the following stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with the emission limitations in Tables 1a, 2a, 2c, and 2d to this subpart or operating limitations in Tables 1b and 2b to this subpart: an existing 2SLB stationary RICE; an existing 4SLB stationary RICE; a stationary RICE that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis; an emergency stationary RICE; or a limited use stationary RICE.

(d) If you own or operate an existing non-emergency stationary CI RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must comply with the emission limitations in Table 2c to this subpart and the operating limitations in Table 2b to this subpart which apply to you.

[73 FR 3605, Jan. 18, 2008, as amended at 75 FR 9675, Mar. 3, 2010]

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§63.6601 What emission limitations must I meet if I own or operate a new or reconstructed 4SLB stationary RICE with a site rating of greater than or equal to 250 brake HP and less than or equal to 500 brake HP located at a major source of HAP emissions?

Compliance with the numerical emission limitations established in this subpart is based on the results of testing the average of three 1-hour runs using the testing requirements and procedures in §63.6620 and Table 4 to this subpart. If you own or operate a new or reconstructed 4SLB stationary RICE with a site rating of greater than or equal to 250 and less than or equal to 500 brake HP located at major source of HAP emissions manufactured on or after January 1, 2008, you must comply with the emission limitations in Table 2a to this subpart and the operating limitations in Table 2b to this subpart which apply to you.

[73 FR 3605, Jan. 18, 2008, as amended at 75 FR 9675, Mar. 3, 2010; 75 FR 51589, Aug. 20, 2010]

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§63.6602 What emission limitations and other requirements must I meet if I own or operate an existing stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions?

If you own or operate an existing stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions, you must comply with the emission limitations and other requirements in Table 2c to this subpart which apply to you. Compliance with the numerical emission limitations established in this subpart is based on the results of testing the average of three 1-hour runs using the testing requirements and procedures in §63.6620 and Table 4 to this subpart.

[78 FR 6701, Jan. 30, 2013]

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§63.6603 What emission limitations, operating limitations, and other requirements must I meet if I own or operate an existing stationary RICE located at an area source of HAP emissions?

Compliance with the numerical emission limitations established in this subpart is based on the results of testing the average of three 1-hour runs using the testing requirements and procedures in §63.6620 and Table 4 to this subpart.

(a) If you own or operate an existing stationary RICE located at an area source of HAP emissions, you must comply with the requirements in Table 2d to this subpart and the operating limitations in Table 2b to this subpart that apply to you.

(b) If you own or operate an existing stationary non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP that meets either paragraph (b)(1) or (2) of this section, you do not have to meet the numerical CO emission limitations specified in Table 2d of this subpart. Existing stationary non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP that meet either paragraph (b)(1) or (2) of this section must meet the management practices that are shown for stationary non-emergency CI RICE with a site rating of less than or equal to 300 HP in Table 2d of this subpart.

(1) The area source is located in an area of Alaska that is not accessible by the Federal Aid Highway System (FAHS).

(2) The stationary RICE is located at an area source that meets paragraphs (b)(2)(i), (ii), and (iii) of this section.

(i) The only connection to the FAHS is through the Alaska Marine Highway System (AMHS), or the stationary RICE operation is within an isolated grid in Alaska that is not connected to the statewide electrical grid referred to as the Alaska Railbelt Grid.

(ii) At least 10 percent of the power generated by the stationary RICE on an annual basis is used for residential purposes.

(iii) The generating capacity of the area source is less than 12 megawatts, or the stationary RICE is used exclusively for backup power for renewable energy.

(c) If you own or operate an existing stationary non-emergency CI RICE with a site rating of more than 300 HP located on an offshore vessel that is an area source of HAP and is a nonroad vehicle that is an Outer Continental Shelf (OCS) source as defined in 40 CFR 55.2, you do not have to meet the numerical CO emission limitations specified in Table 2d of this subpart. You must meet all of the following management practices:

(1) Change oil every 1,000 hours of operation or annually, whichever comes first. Sources have the option to utilize an oil analysis program as described in §63.6625(i) in order to extend the specified oil change requirement.

(2) Inspect and clean air filters every 750 hours of operation or annually, whichever comes first, and replace as necessary.

(3) Inspect fuel filters and belts, if installed, every 750 hours of operation or annually, whichever comes first, and replace as necessary.

(4) Inspect all flexible hoses every 1,000 hours of operation or annually, whichever comes first, and replace as necessary.

(d) If you own or operate an existing non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions that is certified to the Tier 1 or Tier 2 emission standards in Table 1 of 40 CFR 89.112 and that is subject to an enforceable state or local standard that requires the engine to be replaced no later than June 1, 2018, you may until January 1, 2015, or 12 years after the installation date of the engine (whichever is later), but not later than June 1, 2018, choose to comply with the management practices that are shown for stationary non-emergency CI RICE with a site rating of less than or equal to 300 HP in Table 2d of this subpart instead of the applicable emission limitations in Table 2d, operating limitations in Table 2b, and crankcase ventilation system requirements in §63.6625(g). You must comply with the emission limitations in Table 2d and operating limitations in Table 2b that apply for non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions by January 1, 2015, or 12 years after the installation date of the engine (whichever is later), but not later than June 1, 2018. You must also comply with the crankcase ventilation system requirements in §63.6625(g) by January 1, 2015, or 12 years after the installation date of the engine (whichever is later), but not later than June 1, 2018.

(e) If you own or operate an existing non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions that is certified to the Tier 3 (Tier 2 for engines above 560 kilowatt (kW)) emission standards in Table 1 of 40 CFR 89.112, you may comply with the requirements under this part by meeting the requirements for Tier 3 engines (Tier 2 for engines above 560 kW) in 40 CFR part 60 subpart IIII instead of the emission limitations and other requirements that would otherwise apply under this part for existing non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions.

(f) An existing non-emergency SI 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at area sources of HAP must meet the definition of remote stationary RICE in §63.6675 on the initial compliance date for the engine, October 19, 2013, in order to be considered a remote stationary RICE under this subpart. Owners and operators of existing non-emergency SI 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at area sources of HAP that meet the definition of remote stationary RICE in §63.6675 of this subpart as of October 19, 2013 must evaluate the status of their stationary RICE every 12 months. Owners and operators must keep records of the initial and annual evaluation of the status of the engine. If the evaluation indicates that the stationary RICE no longer meets the definition of remote stationary RICE in §63.6675 of this subpart, the owner or operator must comply with all of the requirements for existing non-emergency SI 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at area sources of HAP that are not remote stationary RICE within 1 year of the evaluation.

[75 FR 9675, Mar. 3, 2010, as amended at 75 FR 51589, Aug. 20, 2010; 76 FR 12866, Mar. 9, 2011; 78 FR 6701, Jan. 30, 2013]

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§63.6604 What fuel requirements must I meet if I own or operate a stationary CI RICE?

(a) If you own or operate an existing non-emergency, non-black start CI stationary RICE with a site rating of more than 300 brake HP with a displacement of less than 30 liters per cylinder that uses diesel fuel, you must use diesel fuel that meets the requirements in 40 CFR 80.510(b) for nonroad diesel fuel.

(b) Beginning January 1, 2015, if you own or operate an existing emergency CI stationary RICE with a site rating of more than 100 brake HP and a displacement of less than 30 liters per cylinder that uses diesel fuel and operates or is contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) or that operates for the purpose specified in §63.6640(f)(4)(ii), you must use diesel fuel that meets the requirements in 40 CFR 80.510(b) for nonroad diesel fuel, except that any existing diesel fuel purchased (or otherwise obtained) prior to January 1, 2015, may be used until depleted.

(c) Beginning January 1, 2015, if you own or operate a new emergency CI stationary RICE with a site rating of more than 500 brake HP and a displacement of less than 30 liters per cylinder located at a major source of HAP that uses diesel fuel and operates or is contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii), you must use diesel fuel that meets the requirements in 40 CFR 80.510(b) for nonroad diesel fuel, except that any existing diesel fuel purchased (or otherwise obtained) prior to January 1, 2015, may be used until depleted.

(d) Existing CI stationary RICE located in Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, at area sources in areas of Alaska that meet either §63.6603(b)(1) or §63.6603(b)(2), or are on offshore vessels that meet §63.6603(c) are exempt from the requirements of this section.

[78 FR 6702, Jan. 30, 2013]

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GENERAL COMPLIANCE REQUIREMENTS

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§63.6605 What are my general requirements for complying with this subpart?

(a) You must be in compliance with the emission limitations, operating limitations, and other requirements in this subpart that apply to you at all times.

(b) At all times you must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. The general duty to minimize emissions does not require you to make any further efforts to reduce emissions if levels required by this standard have been achieved. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source.

[75 FR 9675, Mar. 3, 2010, as amended at 78 FR 6702, Jan. 30, 2013]

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TESTING AND INITIAL COMPLIANCE REQUIREMENTS

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§63.6610 By what date must I conduct the initial performance tests or other initial compliance demonstrations if I own or operate a stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions?

If you own or operate a stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions you are subject to the requirements of this section.

(a) You must conduct the initial performance test or other initial compliance demonstrations in Table 4 to this subpart that apply to you within 180 days after the compliance date that is specified for your stationary RICE in §63.6595 and according to the provisions in §63.7(a)(2).

(b) If you commenced construction or reconstruction between December 19, 2002 and June 15, 2004 and own or operate stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must demonstrate initial compliance with either the proposed emission limitations or the promulgated emission limitations no later than February 10, 2005 or no later than 180 days after startup of the source, whichever is later, according to §63.7(a)(2)(ix).

(c) If you commenced construction or reconstruction between December 19, 2002 and June 15, 2004 and own or operate stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, and you chose to comply with the proposed emission limitations when demonstrating initial compliance, you must conduct a second performance test to demonstrate compliance with the promulgated emission limitations by December 13, 2007 or after startup of the source, whichever is later, according to §63.7(a)(2)(ix).

(d) An owner or operator is not required to conduct an initial performance test on units for which a performance test has been previously conducted, but the test must meet all of the conditions described in paragraphs (d)(1) through (5) of this section.

(1) The test must have been conducted using the same methods specified in this subpart, and these methods must have been followed correctly.

(2) The test must not be older than 2 years.

(3) The test must be reviewed and accepted by the Administrator.

(4) Either no process or equipment changes must have been made since the test was performed, or the owner or operator must be able to demonstrate that the results of the performance test, with or without adjustments, reliably demonstrate compliance despite process or equipment changes.

(5) The test must be conducted at any load condition within plus or minus 10 percent of 100 percent load.

[69 FR 33506, June 15, 2004, as amended at 73 FR 3605, Jan. 18, 2008]

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§63.6611 By what date must I conduct the initial performance tests or other initial compliance demonstrations if I own or operate a new or reconstructed 4SLB SI stationary RICE with a site rating of greater than or equal to 250 and less than or equal to 500 brake HP located at a major source of HAP emissions?

If you own or operate a new or reconstructed 4SLB stationary RICE with a site rating of greater than or equal to 250 and less than or equal to 500 brake HP located at a major source of HAP emissions, you must conduct an initial performance test within 240 days after the compliance date that is specified for your stationary RICE in §63.6595 and according to the provisions specified in Table 4 to this subpart, as appropriate.

[73 FR 3605, Jan. 18, 2008, as amended at 75 FR 51589, Aug. 20, 2010]

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§63.6612 By what date must I conduct the initial performance tests or other initial compliance demonstrations if I own or operate an existing stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions or an existing stationary RICE located at an area source of HAP emissions?

If you own or operate an existing stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions or an existing stationary RICE located at an area source of HAP emissions you are subject to the requirements of this section.

(a) You must conduct any initial performance test or other initial compliance demonstration according to Tables 4 and 5 to this subpart that apply to you within 180 days after the compliance date that is specified for your stationary RICE in §63.6595 and according to the provisions in §63.7(a)(2).

(b) An owner or operator is not required to conduct an initial performance test on a unit for which a performance test has been previously conducted, but the test must meet all of the conditions described in paragraphs (b)(1) through (4) of this section.

(1) The test must have been conducted using the same methods specified in this subpart, and these methods must have been followed correctly.

(2) The test must not be older than 2 years.

(3) The test must be reviewed and accepted by the Administrator.

(4) Either no process or equipment changes must have been made since the test was performed, or the owner or operator must be able to demonstrate that the results of the performance test, with or without adjustments, reliably demonstrate compliance despite process or equipment changes.

[75 FR 9676, Mar. 3, 2010, as amended at 75 FR 51589, Aug. 20, 2010]

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§63.6615 When must I conduct subsequent performance tests?

If you must comply with the emission limitations and operating limitations, you must conduct subsequent performance tests as specified in Table 3 of this subpart.

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§63.6620 What performance tests and other procedures must I use?

(a) You must conduct each performance test in Tables 3 and 4 of this subpart that applies to you.

(b) Each performance test must be conducted according to the requirements that this subpart specifies in Table 4 to this subpart. If you own or operate a non-operational stationary RICE that is subject to performance testing, you do not need to start up the engine solely to conduct the performance test. Owners and operators of a non-operational engine can conduct the performance test when the engine is started up again. The test must be conducted at any load condition within plus or minus 10 percent of 100 percent load for the stationary RICE listed in paragraphs (b)(1) through (4) of this section.

(1) Non-emergency 4SRB stationary RICE with a site rating of greater than 500 brake HP located at a major source of HAP emissions.

(2) New non-emergency 4SLB stationary RICE with a site rating of greater than or equal to 250 brake HP located at a major source of HAP emissions.

(3) New non-emergency 2SLB stationary RICE with a site rating of greater than 500 brake HP located at a major source of HAP emissions.

(4) New non-emergency CI stationary RICE with a site rating of greater than 500 brake HP located at a major source of HAP emissions.

(c) [Reserved]

(d) You must conduct three separate test runs for each performance test required in this section, as specified in §63.7(e)(3). Each test run must last at least 1 hour, unless otherwise specified in this subpart.

(e)(1) You must use Equation 1 of this section to determine compliance with the percent reduction requirement:

$$\frac{C_i - C_o}{C_i} \times 100 = R \quad (Eq.\ 1)$$

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Where:

C_i = concentration of carbon monoxide (CO), total hydrocarbons (THC), or formaldehyde at the control device inlet,

C_o = concentration of CO, THC, or formaldehyde at the control device outlet, and

R = percent reduction of CO, THC, or formaldehyde emissions.

(2) You must normalize the CO, THC, or formaldehyde concentrations at the inlet and outlet of the control device to a dry basis and to 15 percent oxygen, or an equivalent percent carbon dioxide (CO_2). If pollutant concentrations are to be corrected to 15 percent oxygen and CO_2 concentration is measured in lieu of oxygen concentration measurement, a CO_2correction factor is needed. Calculate the CO_2 correction factor as described in paragraphs (e)(2)(i) through (iii) of this section.

(i) Calculate the fuel-specific F_o value for the fuel burned during the test using values obtained from Method 19, Section 5.2, and the following equation:

$$F_o = \frac{0.209\ F_d}{F_c} \quad (Eq.\ 2)$$

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Where:

F_o = Fuel factor based on the ratio of oxygen volume to the ultimate CO_2 volume produced by the fuel at zero percent excess air.

0.209 = Fraction of air that is oxygen, percent/100.

F_d = Ratio of the volume of dry effluent gas to the gross calorific value of the fuel from Method 19, dsm^3/J ($dscf/10^6$ Btu).

F_c = Ratio of the volume of CO_2 produced to the gross calorific value of the fuel from Method 19, dsm^3/J ($dscf/10^6$ Btu)

(ii) Calculate the CO_2 correction factor for correcting measurement data to 15 percent O_2, as follows:

$$X_{CO2} = \frac{5.9}{F_o} \quad (Eq.\ 3)$$

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Where:

X_{CO2} = CO_2 correction factor, percent.

5.9 = 20.9 percent O_2—15 percent O_2, the defined O_2 correction value, percent.

(iii) Calculate the CO, THC, and formaldehyde gas concentrations adjusted to 15 percent O_2 using CO_2 as follows:

$$C_{adj} = C_d \frac{X_{CO2}}{\%CO_2} \quad (Eq.\ 4)$$

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Where:

C_{adj} = Calculated concentration of CO, THC, or formaldehyde adjusted to 15 percent O_2.

C_d = Measured concentration of CO, THC, or formaldehyde, uncorrected.

X_{CO2} = CO_2 correction factor, percent.

%CO_2 = Measured CO_2 concentration measured, dry basis, percent.

(f) If you comply with the emission limitation to reduce CO and you are not using an oxidation catalyst, if you comply with the emission limitation to reduce formaldehyde and you are not using NSCR, or if you comply with the emission limitation to limit the concentration of formaldehyde in the stationary RICE exhaust and you are not using an oxidation catalyst or NSCR, you must petition the Administrator for operating limitations to be established during the initial performance test and continuously monitored thereafter; or for approval of no operating limitations. You must not conduct the initial performance test until after the petition has been approved by the Administrator.

(g) If you petition the Administrator for approval of operating limitations, your petition must include the information described in paragraphs (g)(1) through (5) of this section.

(1) Identification of the specific parameters you propose to use as operating limitations;

(2) A discussion of the relationship between these parameters and HAP emissions, identifying how HAP emissions change with changes in these parameters, and how limitations on these parameters will serve to limit HAP emissions;

(3) A discussion of how you will establish the upper and/or lower values for these parameters which will establish the limits on these parameters in the operating limitations;

(4) A discussion identifying the methods you will use to measure and the instruments you will use to monitor these parameters, as well as the relative accuracy and precision of these methods and instruments; and

(5) A discussion identifying the frequency and methods for recalibrating the instruments you will use for monitoring these parameters.

(h) If you petition the Administrator for approval of no operating limitations, your petition must include the information described in paragraphs (h)(1) through (7) of this section.

(1) Identification of the parameters associated with operation of the stationary RICE and any emission control device which could change intentionally (*e.g.,* operator adjustment, automatic controller adjustment, etc.) or unintentionally (*e.g.,*wear and tear, error, etc.) on a routine basis or over time;

(2) A discussion of the relationship, if any, between changes in the parameters and changes in HAP emissions;

(3) For the parameters which could change in such a way as to increase HAP emissions, a discussion of whether establishing limitations on the parameters would serve to limit HAP emissions;

(4) For the parameters which could change in such a way as to increase HAP emissions, a discussion of how you could establish upper and/or lower values for the parameters which would establish limits on the parameters in operating limitations;

(5) For the parameters, a discussion identifying the methods you could use to measure them and the instruments you could use to monitor them, as well as the relative accuracy and precision of the methods and instruments;

(6) For the parameters, a discussion identifying the frequency and methods for recalibrating the instruments you could use to monitor them; and

(7) A discussion of why, from your point of view, it is infeasible or unreasonable to adopt the parameters as operating limitations.

(i) The engine percent load during a performance test must be determined by documenting the calculations, assumptions, and measurement devices used to measure or estimate the percent load in a specific application. A written report of the average percent load determination must be included in the notification of compliance status. The following information must be included in the written report: the engine model number, the engine manufacturer, the year of purchase, the manufacturer's site-rated brake horsepower, the ambient temperature, pressure, and humidity during the performance test, and all assumptions that were made to estimate or calculate percent load during the performance test must be clearly explained. If measurement devices such as flow meters, kilowatt meters, beta analyzers, stain gauges, etc. are used, the model number of the measurement device, and an estimate of its accurate in percentage of true value must be provided.

[69 FR 33506, June 15, 2004, as amended at 75 FR 9676, Mar. 3, 2010; 78 FR 6702, Jan. 30, 2013]

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§63.6625 What are my monitoring, installation, collection, operation, and maintenance requirements?

(a) If you elect to install a CEMS as specified in Table 5 of this subpart, you must install, operate, and maintain a CEMS to monitor CO and either O_2 or CO_2 according to the requirements in paragraphs (a)(1) through (4) of this section. If you are meeting a requirement to reduce CO emissions, the CEMS must be installed at both the inlet and outlet of the control device. If you are meeting a requirement to limit the concentration of CO, the CEMS must be installed at the outlet of the control device.

(1) Each CEMS must be installed, operated, and maintained according to the applicable performance specifications of 40 CFR part 60, appendix B.

(2) You must conduct an initial performance evaluation and an annual relative accuracy test audit (RATA) of each CEMS according to the requirements in §63.8 and according to the applicable performance specifications of 40 CFR part 60, appendix B as well as daily and periodic data quality checks in accordance with 40 CFR part 60, appendix F, procedure 1.

(3) As specified in §63.8(c)(4)(ii), each CEMS must complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period. You must have at least two data points, with each representing a different 15-minute period, to have a valid hour of data.

(4) The CEMS data must be reduced as specified in §63.8(g)(2) and recorded in parts per million or parts per billion (as appropriate for the applicable limitation) at 15 percent oxygen or the equivalent CO_2 concentration.

(b) If you are required to install a continuous parameter monitoring system (CPMS) as specified in Table 5 of this subpart, you must install, operate, and maintain each CPMS according to the requirements in paragraphs (b)(1) through (6) of this section. For an affected source that is complying with the emission

limitations and operating limitations on March 9, 2011, the requirements in paragraph (b) of this section are applicable September 6, 2011.

(1) You must prepare a site-specific monitoring plan that addresses the monitoring system design, data collection, and the quality assurance and quality control elements outlined in paragraphs (b)(1)(i) through (v) of this section and in §63.8(d). As specified in §63.8(f)(4), you may request approval of monitoring system quality assurance and quality control procedures alternative to those specified in paragraphs (b)(1) through (5) of this section in your site-specific monitoring plan.

(i) The performance criteria and design specifications for the monitoring system equipment, including the sample interface, detector signal analyzer, and data acquisition and calculations;

(ii) Sampling interface (*e.g.,* thermocouple) location such that the monitoring system will provide representative measurements;

(iii) Equipment performance evaluations, system accuracy audits, or other audit procedures;

(iv) Ongoing operation and maintenance procedures in accordance with provisions in §63.8(c)(1)(ii) and (c)(3); and

(v) Ongoing reporting and recordkeeping procedures in accordance with provisions in §63.10(c), (e)(1), and (e)(2)(i).

(2) You must install, operate, and maintain each CPMS in continuous operation according to the procedures in your site-specific monitoring plan.

(3) The CPMS must collect data at least once every 15 minutes (see also §63.6635).

(4) For a CPMS for measuring temperature range, the temperature sensor must have a minimum tolerance of 2.8 degrees Celsius (5 degrees Fahrenheit) or 1 percent of the measurement range, whichever is larger.

(5) You must conduct the CPMS equipment performance evaluation, system accuracy audits, or other audit procedures specified in your site-specific monitoring plan at least annually.

(6) You must conduct a performance evaluation of each CPMS in accordance with your site-specific monitoring plan.

(c) If you are operating a new or reconstructed stationary RICE which fires landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, you must monitor and record your fuel usage daily with separate fuel meters to measure the volumetric flow rate of each fuel. In addition, you must operate your stationary RICE in a manner which reasonably minimizes HAP emissions.

(d) If you are operating a new or reconstructed emergency 4SLB stationary RICE with a site rating of greater than or equal to 250 and less than or equal to 500 brake HP located at a major source of HAP emissions, you must install a non-resettable hour meter prior to the startup of the engine.

(e) If you own or operate any of the following stationary RICE, you must operate and maintain the stationary RICE and after-treatment control device (if any) according to the manufacturer's emission-related written instructions or develop your own maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions:

(1) An existing stationary RICE with a site rating of less than 100 HP located at a major source of HAP emissions;

(2) An existing emergency or black start stationary RICE with a site rating of less than or equal to 500 HP located at a major source of HAP emissions;

(3) An existing emergency or black start stationary RICE located at an area source of HAP emissions;

(4) An existing non-emergency, non-black start stationary CI RICE with a site rating less than or equal to 300 HP located at an area source of HAP emissions;

(5) An existing non-emergency, non-black start 2SLB stationary RICE located at an area source of HAP emissions;

(6) An existing non-emergency, non-black start stationary RICE located at an area source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis.

(7) An existing non-emergency, non-black start 4SLB stationary RICE with a site rating less than or equal to 500 HP located at an area source of HAP emissions;

(8) An existing non-emergency, non-black start 4SRB stationary RICE with a site rating less than or equal to 500 HP located at an area source of HAP emissions;

(9) An existing, non-emergency, non-black start 4SLB stationary RICE with a site rating greater than 500 HP located at an area source of HAP emissions that is operated 24 hours or less per calendar year; and

(10) An existing, non-emergency, non-black start 4SRB stationary RICE with a site rating greater than 500 HP located at an area source of HAP emissions that is operated 24 hours or less per calendar year.

(f) If you own or operate an existing emergency stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions or an existing emergency stationary RICE located at an area source of HAP emissions, you must install a non-resettable hour meter if one is not already installed.

(g) If you own or operate an existing non-emergency, non-black start CI engine greater than or equal to 300 HP that is not equipped with a closed crankcase ventilation system, you must comply with either paragraph (g)(1) or paragraph (2) of this section. Owners and operators must follow the manufacturer's specified maintenance requirements for operating and maintaining the open or closed crankcase ventilation systems and replacing the crankcase filters, or can request the Administrator to approve different maintenance requirements that are as protective as manufacturer requirements. Existing CI engines located at area sources in areas of Alaska that meet either §63.6603(b)(1) or §63.6603(b)(2) do not have to meet the requirements of this paragraph (g). Existing CI engines located on offshore vessels that meet §63.6603(c) do not have to meet the requirements of this paragraph (g).

(1) Install a closed crankcase ventilation system that prevents crankcase emissions from being emitted to the atmosphere, or

(2) Install an open crankcase filtration emission control system that reduces emissions from the crankcase by filtering the exhaust stream to remove oil mist, particulates and metals.

(h) If you operate a new, reconstructed, or existing stationary engine, you must minimize the engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the emission standards applicable to all times other than startup in Tables 1a, 2a, 2c, and 2d to this subpart apply.

(i) If you own or operate a stationary CI engine that is subject to the work, operation or management practices in items 1 or 2 of Table 2c to this subpart or in items 1 or 4 of Table 2d to this subpart, you have the option of utilizing an oil analysis program in order to extend the specified oil change requirement in Tables 2c and 2d to this subpart. The oil analysis must be performed at the same frequency specified for changing the oil in Table 2c or 2d to this subpart. The analysis program must at a minimum analyze the following three parameters: Total Base Number, viscosity, and percent water content. The condemning limits for these parameters are as follows: Total Base Number is less than 30 percent of the Total Base Number of the oil when new; viscosity of the oil has changed by more than 20 percent from the viscosity of the oil when new; or percent water content (by volume) is greater than 0.5. If all of these condemning limits are not exceeded, the engine owner or operator is not required to change the oil. If any of the limits are exceeded, the engine owner or operator must change the oil within 2 business days of receiving the results of the analysis; if the engine is not in operation when the results of the analysis are received, the engine owner or operator must change the oil within 2 business days or before commencing operation, whichever is later. The owner or operator must keep records of the parameters that are analyzed as part of the program, the results of the analysis, and the oil changes for the engine. The analysis program must be part of the maintenance plan for the engine.

(j) If you own or operate a stationary SI engine that is subject to the work, operation or management practices in items 6, 7, or 8 of Table 2c to this subpart or in items 5, 6, 7, 9, or 11 of Table 2d to this subpart, you have the option of utilizing an oil analysis program in order to extend the specified oil change requirement in Tables 2c and 2d to this subpart. The oil analysis must be performed at the same frequency specified for changing the oil in Table 2c or 2d to this subpart. The analysis program must at a minimum analyze the following three parameters: Total Acid Number, viscosity, and percent water content. The condemning limits for these parameters are as follows: Total Acid Number increases by more than 3.0 milligrams of potassium hydroxide (KOH) per gram from Total Acid Number of the oil when new; viscosity of the oil has changed by more than 20 percent from the viscosity of the oil when new; or percent water content (by volume) is greater than 0.5. If all of these condemning limits are not exceeded, the engine owner or operator is not required to change the oil. If any of the limits are exceeded, the engine owner or operator must change the oil within 2 business days of receiving the results of the analysis; if the engine is not in operation when the results of the analysis are received, the engine owner or operator must change the oil within 2 business days or before commencing operation, whichever is later. The owner or operator must keep records of the parameters that are analyzed as part of the program, the results of the analysis, and the oil changes for the engine. The analysis program must be part of the maintenance plan for the engine.

[69 FR 33506, June 15, 2004, as amended at 73 FR 3606, Jan. 18, 2008; 75 FR 9676, Mar. 3, 2010; 75 FR 51589, Aug. 20, 2010; 76 FR 12866, Mar. 9, 2011; 78 FR 6703, Jan. 30, 2013]

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§63.6630 How do I demonstrate initial compliance with the emission limitations, operating limitations, and other requirements?

(a) You must demonstrate initial compliance with each emission limitation, operating limitation, and other requirement that applies to you according to Table 5 of this subpart.

(b) During the initial performance test, you must establish each operating limitation in Tables 1b and 2b of this subpart that applies to you.

(c) You must submit the Notification of Compliance Status containing the results of the initial compliance demonstration according to the requirements in §63.6645.

(d) Non-emergency 4SRB stationary RICE complying with the requirement to reduce formaldehyde emissions by 76 percent or more can demonstrate initial compliance with the formaldehyde emission limit by testing for THC instead of formaldehyde. The testing must be conducted according to the requirements in Table 4 of this subpart. The average reduction of emissions of THC determined from the performance test must be equal to or greater than 30 percent.

(e) The initial compliance demonstration required for existing non-emergency 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year must be conducted according to the following requirements:

(1) The compliance demonstration must consist of at least three test runs.

(2) Each test run must be of at least 15 minute duration, except that each test conducted using the method in appendix A to this subpart must consist of at least one measurement cycle and include at least 2 minutes of test data phase measurement.

(3) If you are demonstrating compliance with the CO concentration or CO percent reduction requirement, you must measure CO emissions using one of the CO measurement methods specified in Table 4 of this subpart, or using appendix A to this subpart.

(4) If you are demonstrating compliance with the THC percent reduction requirement, you must measure THC emissions using Method 25A, reported as propane, of 40 CFR part 60, appendix A.

(5) You must measure O_2 using one of the O_2 measurement methods specified in Table 4 of this subpart. Measurements to determine O_2 concentration must be made at the same time as the measurements for CO or THC concentration.

(6) If you are demonstrating compliance with the CO or THC percent reduction requirement, you must measure CO or THC emissions and O_2 emissions simultaneously at the inlet and outlet of the control device.

[69 FR 33506, June 15, 2004, as amended at 78 FR 6704, Jan. 30, 2013]

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CONTINUOUS COMPLIANCE REQUIREMENTS

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§63.6635 How do I monitor and collect data to demonstrate continuous compliance?

(a) If you must comply with emission and operating limitations, you must monitor and collect data according to this section.

(b) Except for monitor malfunctions, associated repairs, required performance evaluations, and required quality assurance or control activities, you must monitor continuously at all times that the stationary RICE is operating. A monitoring malfunction is any sudden, infrequent, not reasonably

preventable failure of the monitoring to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not malfunctions.

(c) You may not use data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities in data averages and calculations used to report emission or operating levels. You must, however, use all the valid data collected during all other periods.

[69 FR 33506, June 15, 2004, as amended at 76 FR 12867, Mar. 9, 2011]

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§63.6640 How do I demonstrate continuous compliance with the emission limitations, operating limitations, and other requirements?

(a) You must demonstrate continuous compliance with each emission limitation, operating limitation, and other requirements in Tables 1a and 1b, Tables 2a and 2b, Table 2c, and Table 2d to this subpart that apply to you according to methods specified in Table 6 to this subpart.

(b) You must report each instance in which you did not meet each emission limitation or operating limitation in Tables 1a and 1b, Tables 2a and 2b, Table 2c, and Table 2d to this subpart that apply to you. These instances are deviations from the emission and operating limitations in this subpart. These deviations must be reported according to the requirements in §63.6650. If you change your catalyst, you must reestablish the values of the operating parameters measured during the initial performance test. When you reestablish the values of your operating parameters, you must also conduct a performance test to demonstrate that you are meeting the required emission limitation applicable to your stationary RICE.

(c) The annual compliance demonstration required for existing non-emergency 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year must be conducted according to the following requirements:

(1) The compliance demonstration must consist of at least one test run.

(2) Each test run must be of at least 15 minute duration, except that each test conducted using the method in appendix A to this subpart must consist of at least one measurement cycle and include at least 2 minutes of test data phase measurement.

(3) If you are demonstrating compliance with the CO concentration or CO percent reduction requirement, you must measure CO emissions using one of the CO measurement methods specified in Table 4 of this subpart, or using appendix A to this subpart.

(4) If you are demonstrating compliance with the THC percent reduction requirement, you must measure THC emissions using Method 25A, reported as propane, of 40 CFR part 60, appendix A.

(5) You must measure O_2 using one of the O_2 measurement methods specified in Table 4 of this subpart. Measurements to determine O_2 concentration must be made at the same time as the measurements for CO or THC concentration.

(6) If you are demonstrating compliance with the CO or THC percent reduction requirement, you must measure CO or THC emissions and O_2 emissions simultaneously at the inlet and outlet of the control device.

(7) If the results of the annual compliance demonstration show that the emissions exceed the levels specified in Table 6 of this subpart, the stationary RICE must be shut down as soon as safely possible, and appropriate corrective action must be taken (e.g., repairs, catalyst cleaning, catalyst replacement). The stationary RICE must be retested within 7 days of being restarted and the emissions must meet the levels specified in Table 6 of this subpart. If the retest shows that the emissions continue to exceed the specified levels, the stationary RICE must again be shut down as soon as safely possible, and the stationary RICE may not operate, except for purposes of startup and testing, until the owner/operator demonstrates through testing that the emissions do not exceed the levels specified in Table 6 of this subpart.

(d) For new, reconstructed, and rebuilt stationary RICE, deviations from the emission or operating limitations that occur during the first 200 hours of operation from engine startup (engine burn-in period) are not violations. Rebuilt stationary RICE means a stationary RICE that has been rebuilt as that term is defined in 40 CFR 94.11(a).

(e) You must also report each instance in which you did not meet the requirements in Table 8 to this subpart that apply to you. If you own or operate a new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions (except new or reconstructed 4SLB engines greater than or equal to 250 and less than or equal to 500 brake HP), a new or reconstructed stationary RICE located at an area source of HAP emissions, or any of the following RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with the requirements in Table 8 to this subpart: An existing 2SLB stationary RICE, an existing 4SLB stationary RICE, an existing emergency stationary RICE, an existing limited use stationary RICE, or an existing stationary RICE which fires landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis. If you own or operate any of the following RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with the requirements in Table 8 to this subpart, except for the initial notification requirements: a new or reconstructed stationary RICE that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, a new or reconstructed emergency stationary RICE, or a new or reconstructed limited use stationary RICE.

(f) If you own or operate an emergency stationary RICE, you must operate the emergency stationary RICE according to the requirements in paragraphs (f)(1) through (4) of this section. In order for the engine to be considered an emergency stationary RICE under this subpart, any operation other than emergency operation, maintenance and testing, emergency demand response, and operation in non-emergency situations for 50 hours per year, as described in paragraphs (f)(1) through (4) of this section, is prohibited. If you do not operate the engine according to the requirements in paragraphs (f)(1) through (4) of this section, the engine will not be considered an emergency engine under this subpart and must meet all requirements for non-emergency engines.

(1) There is no time limit on the use of emergency stationary RICE in emergency situations.

(2) You may operate your emergency stationary RICE for any combination of the purposes specified in paragraphs (f)(2)(i) through (iii) of this section for a maximum of 100 hours per calendar year. Any operation for non-emergency situations as allowed by paragraphs (f)(3) and (4) of this section counts as part of the 100 hours per calendar year allowed by this paragraph (f)(2).

(i) Emergency stationary RICE may be operated for maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that federal, state, or local standards require maintenance and testing of emergency RICE beyond 100 hours per calendar year.

(ii) Emergency stationary RICE may be operated for emergency demand response for periods in which the Reliability Coordinator under the North American Electric Reliability Corporation (NERC) Reliability Standard EOP-002-3, Capacity and Energy Emergencies (incorporated by reference, see §63.14), or other authorized entity as determined by the Reliability Coordinator, has declared an Energy Emergency Alert Level 2 as defined in the NERC Reliability Standard EOP-002-3.

(iii) Emergency stationary RICE may be operated for periods where there is a deviation of voltage or frequency of 5 percent or greater below standard voltage or frequency.

(3) Emergency stationary RICE located at major sources of HAP may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing and emergency demand response provided in paragraph (f)(2) of this section. The 50 hours per year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to supply power to an electric grid or otherwise supply power as part of a financial arrangement with another entity.

(4) Emergency stationary RICE located at area sources of HAP may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing and emergency demand response provided in paragraph (f)(2) of this section. Except as provided in paragraphs (f)(4)(i) and (ii) of this section, the 50 hours per year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity.

(i) Prior to May 3, 2014, the 50 hours per year for non-emergency situations can be used for peak shaving or non-emergency demand response to generate income for a facility, or to otherwise supply power as part of a financial arrangement with another entity if the engine is operated as part of a peak shaving (load management program) with the local distribution system operator and the power is provided only to the facility itself or to support the local distribution system.

(ii) The 50 hours per year for non-emergency situations can be used to supply power as part of a financial arrangement with another entity if all of the following conditions are met:

(A) The engine is dispatched by the local balancing authority or local transmission and distribution system operator.

(B) The dispatch is intended to mitigate local transmission and/or distribution limitations so as to avert potential voltage collapse or line overloads that could lead to the interruption of power supply in a local area or region.

(C) The dispatch follows reliability, emergency operation or similar protocols that follow specific NERC, regional, state, public utility commission or local standards or guidelines.

(D) The power is provided only to the facility itself or to support the local transmission and distribution system.

(E) The owner or operator identifies and records the entity that dispatches the engine and the specific NERC, regional, state, public utility commission or local standards or guidelines that are being followed for dispatching the engine. The local balancing authority or local transmission and distribution system operator may keep these records on behalf of the engine owner or operator.

[69 FR 33506, June 15, 2004, as amended at 71 FR 20467, Apr. 20, 2006; 73 FR 3606, Jan. 18, 2008; 75 FR 9676, Mar. 3, 2010; 75 FR 51591, Aug. 20, 2010; 78 FR 6704, Jan. 30, 2013]

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NOTIFICATIONS, REPORTS, AND RECORDS

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§63.6645 What notifications must I submit and when?

(a) You must submit all of the notifications in §§63.7(b) and (c), 63.8(e), (f)(4) and (f)(6), 63.9(b) through (e), and (g) and (h) that apply to you by the dates specified if you own or operate any of the following;

(1) An existing stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions.

(2) An existing stationary RICE located at an area source of HAP emissions.

(3) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions.

(4) A new or reconstructed 4SLB stationary RICE with a site rating of greater than or equal to 250 HP located at a major source of HAP emissions.

(5) This requirement does not apply if you own or operate an existing stationary RICE less than 100 HP, an existing stationary emergency RICE, or an existing stationary RICE that is not subject to any numerical emission standards.

(b) As specified in §63.9(b)(2), if you start up your stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions before the effective date of this subpart, you must submit an Initial Notification not later than December 13, 2004.

(c) If you start up your new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions on or after August 16, 2004, you must submit an Initial Notification not later than 120 days after you become subject to this subpart.

(d) As specified in §63.9(b)(2), if you start up your stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions before the effective date of this subpart and you are required to submit an initial notification, you must submit an Initial Notification not later than July 16, 2008.

(e) If you start up your new or reconstructed stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions on or after March 18, 2008 and you are required to submit an initial notification, you must submit an Initial Notification not later than 120 days after you become subject to this subpart.

(f) If you are required to submit an Initial Notification but are otherwise not affected by the requirements of this subpart, in accordance with §63.6590(b), your notification should include the information in §63.9(b)(2)(i) through (v), and a statement that your stationary RICE has no additional requirements and explain the basis of the exclusion (for example, that it operates exclusively as an emergency stationary RICE if it has a site rating of more than 500 brake HP located at a major source of HAP emissions).

(g) If you are required to conduct a performance test, you must submit a Notification of Intent to conduct a performance test at least 60 days before the performance test is scheduled to begin as required in §63.7(b)(1).

(h) If you are required to conduct a performance test or other initial compliance demonstration as specified in Tables 4 and 5 to this subpart, you must submit a Notification of Compliance Status according to §63.9(h)(2)(ii).

(1) For each initial compliance demonstration required in Table 5 to this subpart that does not include a performance test, you must submit the Notification of Compliance Status before the close of business on the 30th day following the completion of the initial compliance demonstration.

(2) For each initial compliance demonstration required in Table 5 to this subpart that includes a performance test conducted according to the requirements in Table 3 to this subpart, you must submit the Notification of Compliance Status, including the performance test results, before the close of business on the 60th day following the completion of the performance test according to §63.10(d)(2).

(i) If you own or operate an existing non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions that is certified to the Tier 1 or Tier 2 emission standards in Table 1 of 40 CFR 89.112 and subject to an enforceable state or local standard requiring engine replacement and you intend to meet management practices rather than emission limits, as specified in §63.6603(d), you must submit a notification by March 3, 2013, stating that you intend to use the provision in §63.6603(d) and identifying the state or local regulation that the engine is subject to.

[73 FR 3606, Jan. 18, 2008, as amended at 75 FR 9677, Mar. 3, 2010; 75 FR 51591, Aug. 20, 2010; 78 FR 6705, Jan. 30, 2013]

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§63.6650 What reports must I submit and when?

(a) You must submit each report in Table 7 of this subpart that applies to you.

(b) Unless the Administrator has approved a different schedule for submission of reports under §63.10(a), you must submit each report by the date in Table 7 of this subpart and according to the requirements in paragraphs (b)(1) through (b)(9) of this section.

(1) For semiannual Compliance reports, the first Compliance report must cover the period beginning on the compliance date that is specified for your affected source in §63.6595 and ending on June 30 or December 31, whichever date is the first date following the end of the first calendar half after the compliance date that is specified for your source in §63.6595.

(2) For semiannual Compliance reports, the first Compliance report must be postmarked or delivered no later than July 31 or January 31, whichever date follows the end of the first calendar half after the compliance date that is specified for your affected source in §63.6595.

(3) For semiannual Compliance reports, each subsequent Compliance report must cover the semiannual reporting period from January 1 through June 30 or the semiannual reporting period from July 1 through December 31.

(4) For semiannual Compliance reports, each subsequent Compliance report must be postmarked or delivered no later than July 31 or January 31, whichever date is the first date following the end of the semiannual reporting period.

(5) For each stationary RICE that is subject to permitting regulations pursuant to 40 CFR part 70 or 71, and if the permitting authority has established dates for submitting semiannual reports pursuant to 40 CFR 70.6(a)(3)(iii)(A) or 40 CFR 71.6 (a)(3)(iii)(A), you may submit the first and subsequent Compliance reports according to the dates the permitting authority has established instead of according to the dates in paragraphs (b)(1) through (b)(4) of this section.

(6) For annual Compliance reports, the first Compliance report must cover the period beginning on the compliance date that is specified for your affected source in §63.6595 and ending on December 31.

(7) For annual Compliance reports, the first Compliance report must be postmarked or delivered no later than January 31 following the end of the first calendar year after the compliance date that is specified for your affected source in §63.6595.

(8) For annual Compliance reports, each subsequent Compliance report must cover the annual reporting period from January 1 through December 31.

(9) For annual Compliance reports, each subsequent Compliance report must be postmarked or delivered no later than January 31.

(c) The Compliance report must contain the information in paragraphs (c)(1) through (6) of this section.

(1) Company name and address.

(2) Statement by a responsible official, with that official's name, title, and signature, certifying the accuracy of the content of the report.

(3) Date of report and beginning and ending dates of the reporting period.

(4) If you had a malfunction during the reporting period, the compliance report must include the number, duration, and a brief description for each type of malfunction which occurred during the reporting period and which caused or may have caused any applicable emission limitation to be exceeded. The report must also include a description of actions taken by an owner or operator during a malfunction of an affected source to minimize emissions in accordance with §63.6605(b), including actions taken to correct a malfunction.

(5) If there are no deviations from any emission or operating limitations that apply to you, a statement that there were no deviations from the emission or operating limitations during the reporting period.

(6) If there were no periods during which the continuous monitoring system (CMS), including CEMS and CPMS, was out-of-control, as specified in §63.8(c)(7), a statement that there were no periods during which the CMS was out-of-control during the reporting period.

(d) For each deviation from an emission or operating limitation that occurs for a stationary RICE where you are not using a CMS to comply with the emission or operating limitations in this subpart, the Compliance report must contain the information in paragraphs (c)(1) through (4) of this section and the information in paragraphs (d)(1) and (2) of this section.

(1) The total operating time of the stationary RICE at which the deviation occurred during the reporting period.

(2) Information on the number, duration, and cause of deviations (including unknown cause, if applicable), as applicable, and the corrective action taken.

(e) For each deviation from an emission or operating limitation occurring for a stationary RICE where you are using a CMS to comply with the emission and operating limitations in this subpart, you must include information in paragraphs (c)(1) through (4) and (e)(1) through (12) of this section.

(1) The date and time that each malfunction started and stopped.

(2) The date, time, and duration that each CMS was inoperative, except for zero (low-level) and high-level checks.

(3) The date, time, and duration that each CMS was out-of-control, including the information in §63.8(c)(8).

(4) The date and time that each deviation started and stopped, and whether each deviation occurred during a period of malfunction or during another period.

(5) A summary of the total duration of the deviation during the reporting period, and the total duration as a percent of the total source operating time during that reporting period.

(6) A breakdown of the total duration of the deviations during the reporting period into those that are due to control equipment problems, process problems, other known causes, and other unknown causes.

(7) A summary of the total duration of CMS downtime during the reporting period, and the total duration of CMS downtime as a percent of the total operating time of the stationary RICE at which the CMS downtime occurred during that reporting period.

(8) An identification of each parameter and pollutant (CO or formaldehyde) that was monitored at the stationary RICE.

(9) A brief description of the stationary RICE.

(10) A brief description of the CMS.

(11) The date of the latest CMS certification or audit.

(12) A description of any changes in CMS, processes, or controls since the last reporting period.

(f) Each affected source that has obtained a title V operating permit pursuant to 40 CFR part 70 or 71 must report all deviations as defined in this subpart in the semiannual monitoring report required by 40 CFR 70.6 (a)(3)(iii)(A) or 40 CFR 71.6(a)(3)(iii)(A). If an affected source submits a Compliance report pursuant to Table 7 of this subpart along with, or as part of, the semiannual monitoring report required by 40 CFR 70.6(a)(3)(iii)(A) or 40 CFR 71.6(a)(3)(iii)(A), and the Compliance report includes all required information concerning deviations from any emission or operating limitation in this subpart, submission of the Compliance report shall be deemed to satisfy any obligation to report the same deviations in the semiannual monitoring report. However, submission of a Compliance report shall not otherwise affect any obligation the affected source may have to report deviations from permit requirements to the permit authority.

(g) If you are operating as a new or reconstructed stationary RICE which fires landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, you must submit an annual report according to Table 7 of this subpart by the date specified unless the Administrator has

approved a different schedule, according to the information described in paragraphs (b)(1) through (b)(5) of this section. You must report the data specified in (g)(1) through (g)(3) of this section.

(1) Fuel flow rate of each fuel and the heating values that were used in your calculations. You must also demonstrate that the percentage of heat input provided by landfill gas or digester gas is equivalent to 10 percent or more of the total fuel consumption on an annual basis.

(2) The operating limits provided in your federally enforceable permit, and any deviations from these limits.

(3) Any problems or errors suspected with the meters.

(h) If you own or operate an emergency stationary RICE with a site rating of more than 100 brake HP that operates or is contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) or that operates for the purpose specified in §63.6640(f)(4)(ii), you must submit an annual report according to the requirements in paragraphs (h)(1) through (3) of this section.

(1) The report must contain the following information:

(i) Company name and address where the engine is located.

(ii) Date of the report and beginning and ending dates of the reporting period.

(iii) Engine site rating and model year.

(iv) Latitude and longitude of the engine in decimal degrees reported to the fifth decimal place.

(v) Hours operated for the purposes specified in §63.6640(f)(2)(ii) and (iii), including the date, start time, and end time for engine operation for the purposes specified in §63.6640(f)(2)(ii) and (iii).

(vi) Number of hours the engine is contractually obligated to be available for the purposes specified in §63.6640(f)(2)(ii) and (iii).

(vii) Hours spent for operation for the purpose specified in §63.6640(f)(4)(ii), including the date, start time, and end time for engine operation for the purposes specified in §63.6640(f)(4)(ii). The report must also identify the entity that dispatched the engine and the situation that necessitated the dispatch of the engine.

(viii) If there were no deviations from the fuel requirements in §63.6604 that apply to the engine (if any), a statement that there were no deviations from the fuel requirements during the reporting period.

(ix) If there were deviations from the fuel requirements in §63.6604 that apply to the engine (if any), information on the number, duration, and cause of deviations, and the corrective action taken.

(2) The first annual report must cover the calendar year 2015 and must be submitted no later than March 31, 2016. Subsequent annual reports for each calendar year must be submitted no later than March 31 of the following calendar year.

(3) The annual report must be submitted electronically using the subpart specific reporting form in the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (*www.epa.gov/cdx*). However, if the reporting form specific to this subpart is not

available in CEDRI at the time that the report is due, the written report must be submitted to the Administrator at the appropriate address listed in §63.13.

[69 FR 33506, June 15, 2004, as amended at 75 FR 9677, Mar. 3, 2010; 78 FR 6705, Jan. 30, 2013]

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§63.6655 What records must I keep?

(a) If you must comply with the emission and operating limitations, you must keep the records described in paragraphs (a)(1) through (a)(5), (b)(1) through (b)(3) and (c) of this section.

(1) A copy of each notification and report that you submitted to comply with this subpart, including all documentation supporting any Initial Notification or Notification of Compliance Status that you submitted, according to the requirement in §63.10(b)(2)(xiv).

(2) Records of the occurrence and duration of each malfunction of operation (*i.e.,* process equipment) or the air pollution control and monitoring equipment.

(3) Records of performance tests and performance evaluations as required in §63.10(b)(2)(viii).

(4) Records of all required maintenance performed on the air pollution control and monitoring equipment.

(5) Records of actions taken during periods of malfunction to minimize emissions in accordance with §63.6605(b), including corrective actions to restore malfunctioning process and air pollution control and monitoring equipment to its normal or usual manner of operation.

(b) For each CEMS or CPMS, you must keep the records listed in paragraphs (b)(1) through (3) of this section.

(1) Records described in §63.10(b)(2)(vi) through (xi).

(2) Previous (*i.e.,* superseded) versions of the performance evaluation plan as required in §63.8(d)(3).

(3) Requests for alternatives to the relative accuracy test for CEMS or CPMS as required in §63.8(f)(6)(i), if applicable.

(c) If you are operating a new or reconstructed stationary RICE which fires landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, you must keep the records of your daily fuel usage monitors.

(d) You must keep the records required in Table 6 of this subpart to show continuous compliance with each emission or operating limitation that applies to you.

(e) You must keep records of the maintenance conducted on the stationary RICE in order to demonstrate that you operated and maintained the stationary RICE and after-treatment control device (if any) according to your own maintenance plan if you own or operate any of the following stationary RICE;

(1) An existing stationary RICE with a site rating of less than 100 brake HP located at a major source of HAP emissions.

(2) An existing stationary emergency RICE.

(3) An existing stationary RICE located at an area source of HAP emissions subject to management practices as shown in Table 2d to this subpart.

(f) If you own or operate any of the stationary RICE in paragraphs (f)(1) through (2) of this section, you must keep records of the hours of operation of the engine that is recorded through the non-resettable hour meter. The owner or operator must document how many hours are spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation. If the engine is used for the purposes specified in §63.6640(f)(2)(ii) or (iii) or §63.6640(f)(4)(ii), the owner or operator must keep records of the notification of the emergency situation, and the date, start time, and end time of engine operation for these purposes.

(1) An existing emergency stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions that does not meet the standards applicable to non-emergency engines.

(2) An existing emergency stationary RICE located at an area source of HAP emissions that does not meet the standards applicable to non-emergency engines.

[69 FR 33506, June 15, 2004, as amended at 75 FR 9678, Mar. 3, 2010; 75 FR 51592, Aug. 20, 2010; 78 FR 6706, Jan. 30, 2013]

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§63.6660 In what form and how long must I keep my records?

(a) Your records must be in a form suitable and readily available for expeditious review according to §63.10(b)(1).

(b) As specified in §63.10(b)(1), you must keep each record for 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record.

(c) You must keep each record readily accessible in hard copy or electronic form for at least 5 years after the date of each occurrence, measurement, maintenance, corrective action, report, or record, according to §63.10(b)(1).

[69 FR 33506, June 15, 2004, as amended at 75 FR 9678, Mar. 3, 2010]

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OTHER REQUIREMENTS AND INFORMATION

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§63.6665 What parts of the General Provisions apply to me?

Table 8 to this subpart shows which parts of the General Provisions in §§63.1 through 63.15 apply to you. If you own or operate a new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions (except new or reconstructed 4SLB engines greater than or equal to 250 and less than or equal to 500 brake HP), a new or reconstructed stationary RICE located at an area source of HAP emissions, or any of the following RICE with a site

rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with any of the requirements of the General Provisions specified in Table 8: An existing 2SLB stationary RICE, an existing 4SLB stationary RICE, an existing stationary RICE that combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, an existing emergency stationary RICE, or an existing limited use stationary RICE. If you own or operate any of the following RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with the requirements in the General Provisions specified in Table 8 except for the initial notification requirements: A new stationary RICE that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, a new emergency stationary RICE, or a new limited use stationary RICE.

[75 FR 9678, Mar. 3, 2010]

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§63.6670 Who implements and enforces this subpart?

(a) This subpart is implemented and enforced by the U.S. EPA, or a delegated authority such as your State, local, or tribal agency. If the U.S. EPA Administrator has delegated authority to your State, local, or tribal agency, then that agency (as well as the U.S. EPA) has the authority to implement and enforce this subpart. You should contact your U.S. EPA Regional Office to find out whether this subpart is delegated to your State, local, or tribal agency.

(b) In delegating implementation and enforcement authority of this subpart to a State, local, or tribal agency under 40 CFR part 63, subpart E, the authorities contained in paragraph (c) of this section are retained by the Administrator of the U.S. EPA and are not transferred to the State, local, or tribal agency.

(c) The authorities that will not be delegated to State, local, or tribal agencies are:

(1) Approval of alternatives to the non-opacity emission limitations and operating limitations in §63.6600 under §63.6(g).

(2) Approval of major alternatives to test methods under §63.7(e)(2)(ii) and (f) and as defined in §63.90.

(3) Approval of major alternatives to monitoring under §63.8(f) and as defined in §63.90.

(4) Approval of major alternatives to recordkeeping and reporting under §63.10(f) and as defined in §63.90.

(5) Approval of a performance test which was conducted prior to the effective date of the rule, as specified in §63.6610(b).

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§63.6675 What definitions apply to this subpart?

Terms used in this subpart are defined in the Clean Air Act (CAA); in 40 CFR 63.2, the General Provisions of this part; and in this section as follows:

Alaska Railbelt Grid means the service areas of the six regulated public utilities that extend from Fairbanks to Anchorage and the Kenai Peninsula. These utilities are Golden Valley Electric Association;

Chugach Electric Association; Matanuska Electric Association; Homer Electric Association; Anchorage Municipal Light & Power; and the City of Seward Electric System.

Area source means any stationary source of HAP that is not a major source as defined in part 63.

Associated equipment as used in this subpart and as referred to in section 112(n)(4) of the CAA, means equipment associated with an oil or natural gas exploration or production well, and includes all equipment from the well bore to the point of custody transfer, except glycol dehydration units, storage vessels with potential for flash emissions, combustion turbines, and stationary RICE.

Backup power for renewable energy means an engine that provides backup power to a facility that generates electricity from renewable energy resources, as that term is defined in Alaska Statute 42.45.045(l)(5) (incorporated by reference, see §63.14).

Black start engine means an engine whose only purpose is to start up a combustion turbine.

CAA means the Clean Air Act (42 U.S.C. 7401 *et seq.,* as amended by Public Law 101-549, 104 Stat. 2399).

Commercial emergency stationary RICE means an emergency stationary RICE used in commercial establishments such as office buildings, hotels, stores, telecommunications facilities, restaurants, financial institutions such as banks, doctor's offices, and sports and performing arts facilities.

Compression ignition means relating to a type of stationary internal combustion engine that is not a spark ignition engine.

Custody transfer means the transfer of hydrocarbon liquids or natural gas: After processing and/or treatment in the producing operations, or from storage vessels or automatic transfer facilities or other such equipment, including product loading racks, to pipelines or any other forms of transportation. For the purposes of this subpart, the point at which such liquids or natural gas enters a natural gas processing plant is a point of custody transfer.

Deviation means any instance in which an affected source subject to this subpart, or an owner or operator of such a source:

(1) Fails to meet any requirement or obligation established by this subpart, including but not limited to any emission limitation or operating limitation;

(2) Fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit; or

(3) Fails to meet any emission limitation or operating limitation in this subpart during malfunction, regardless or whether or not such failure is permitted by this subpart.

(4) Fails to satisfy the general duty to minimize emissions established by §63.6(e)(1)(i).

Diesel engine means any stationary RICE in which a high boiling point liquid fuel injected into the combustion chamber ignites when the air charge has been compressed to a temperature sufficiently high for auto-ignition. This process is also known as compression ignition.

Diesel fuel means any liquid obtained from the distillation of petroleum with a boiling point of approximately 150 to 360 degrees Celsius. One commonly used form is fuel oil number 2. Diesel fuel also

includes any non-distillate fuel with comparable physical and chemical properties (*e.g.* biodiesel) that is suitable for use in compression ignition engines.

Digester gas means any gaseous by-product of wastewater treatment typically formed through the anaerobic decomposition of organic waste materials and composed principally of methane and CO_2.

Dual-fuel engine means any stationary RICE in which a liquid fuel (typically diesel fuel) is used for compression ignition and gaseous fuel (typically natural gas) is used as the primary fuel.

Emergency stationary RICE means any stationary reciprocating internal combustion engine that meets all of the criteria in paragraphs (1) through (3) of this definition. All emergency stationary RICE must comply with the requirements specified in §63.6640(f) in order to be considered emergency stationary RICE. If the engine does not comply with the requirements specified in §63.6640(f), then it is not considered to be an emergency stationary RICE under this subpart.

(1) The stationary RICE is operated to provide electrical power or mechanical work during an emergency situation. Examples include stationary RICE used to produce power for critical networks or equipment (including power supplied to portions of a facility) when electric power from the local utility (or the normal power source, if the facility runs on its own power production) is interrupted, or stationary RICE used to pump water in the case of fire or flood, etc.

(2) The stationary RICE is operated under limited circumstances for situations not included in paragraph (1) of this definition, as specified in §63.6640(f).

(3) The stationary RICE operates as part of a financial arrangement with another entity in situations not included in paragraph (1) of this definition only as allowed in §63.6640(f)(2)(ii) or (iii) and §63.6640(f)(4)(i) or (ii).

Engine startup means the time from initial start until applied load and engine and associated equipment reaches steady state or normal operation. For stationary engine with catalytic controls, engine startup means the time from initial start until applied load and engine and associated equipment, including the catalyst, reaches steady state or normal operation.

Four-stroke engine means any type of engine which completes the power cycle in two crankshaft revolutions, with intake and compression strokes in the first revolution and power and exhaust strokes in the second revolution.

Gaseous fuel means a material used for combustion which is in the gaseous state at standard atmospheric temperature and pressure conditions.

Gasoline means any fuel sold in any State for use in motor vehicles and motor vehicle engines, or nonroad or stationary engines, and commonly or commercially known or sold as gasoline.

Glycol dehydration unit means a device in which a liquid glycol (including, but not limited to, ethylene glycol, diethylene glycol, or triethylene glycol) absorbent directly contacts a natural gas stream and absorbs water in a contact tower or absorption column (absorber). The glycol contacts and absorbs water vapor and other gas stream constituents from the natural gas and becomes “rich” glycol. This glycol is then regenerated in the glycol dehydration unit reboiler. The “lean” glycol is then recycled.

Hazardous air pollutants (HAP) means any air pollutants listed in or pursuant to section 112(b) of the CAA.

Institutional emergency stationary RICE means an emergency stationary RICE used in institutional establishments such as medical centers, nursing homes, research centers, institutions of higher education, correctional facilities, elementary and secondary schools, libraries, religious establishments, police stations, and fire stations.

ISO standard day conditions means 288 degrees Kelvin (15 degrees Celsius), 60 percent relative humidity and 101.3 kilopascals pressure.

Landfill gas means a gaseous by-product of the land application of municipal refuse typically formed through the anaerobic decomposition of waste materials and composed principally of methane and CO_2.

Lean burn engine means any two-stroke or four-stroke spark ignited engine that does not meet the definition of a rich burn engine.

Limited use stationary RICE means any stationary RICE that operates less than 100 hours per year.

Liquefied petroleum gas means any liquefied hydrocarbon gas obtained as a by-product in petroleum refining of natural gas production.

Liquid fuel means any fuel in liquid form at standard temperature and pressure, including but not limited to diesel, residual/crude oil, kerosene/naphtha (jet fuel), and gasoline.

Major Source, as used in this subpart, shall have the same meaning as in §63.2, except that:

(1) Emissions from any oil or gas exploration or production well (with its associated equipment (as defined in this section)) and emissions from any pipeline compressor station or pump station shall not be aggregated with emissions from other similar units, to determine whether such emission points or stations are major sources, even when emission points are in a contiguous area or under common control;

(2) For oil and gas production facilities, emissions from processes, operations, or equipment that are not part of the same oil and gas production facility, as defined in §63.1271 of subpart HHH of this part, shall not be aggregated;

(3) For production field facilities, only HAP emissions from glycol dehydration units, storage vessel with the potential for flash emissions, combustion turbines and reciprocating internal combustion engines shall be aggregated for a major source determination; and

(4) Emissions from processes, operations, and equipment that are not part of the same natural gas transmission and storage facility, as defined in §63.1271 of subpart HHH of this part, shall not be aggregated.

Malfunction means any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner which causes, or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

Natural gas means a naturally occurring mixture of hydrocarbon and non-hydrocarbon gases found in geologic formations beneath the Earth's surface, of which the principal constituent is methane. Natural gas may be field or pipeline quality.

Non-selective catalytic reduction (NSCR) means an add-on catalytic nitrogen oxides (NO_x) control device for rich burn engines that, in a two-step reaction, promotes the conversion of excess oxygen, NO_x, CO, and volatile organic compounds (VOC) into CO_2, nitrogen, and water.

Oil and gas production facility as used in this subpart means any grouping of equipment where hydrocarbon liquids are processed, upgraded (*i.e.,* remove impurities or other constituents to meet contract specifications), or stored prior to the point of custody transfer; or where natural gas is processed, upgraded, or stored prior to entering the natural gas transmission and storage source category. For purposes of a major source determination, facility (including a building, structure, or installation) means oil and natural gas production and processing equipment that is located within the boundaries of an individual surface site as defined in this section. Equipment that is part of a facility will typically be located within close proximity to other equipment located at the same facility. Pieces of production equipment or groupings of equipment located on different oil and gas leases, mineral fee tracts, lease tracts, subsurface or surface unit areas, surface fee tracts, surface lease tracts, or separate surface sites, whether or not connected by a road, waterway, power line or pipeline, shall not be considered part of the same facility. Examples of facilities in the oil and natural gas production source category include, but are not limited to, well sites, satellite tank batteries, central tank batteries, a compressor station that transports natural gas to a natural gas processing plant, and natural gas processing plants.

Oxidation catalyst means an add-on catalytic control device that controls CO and VOC by oxidation.

Peaking unit or engine means any standby engine intended for use during periods of high demand that are not emergencies.

Percent load means the fractional power of an engine compared to its maximum manufacturer's design capacity at engine site conditions. Percent load may range between 0 percent to above 100 percent.

Potential to emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the stationary source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable. For oil and natural gas production facilities subject to subpart HH of this part, the potential to emit provisions in §63.760(a) may be used. For natural gas transmission and storage facilities subject to subpart HHH of this part, the maximum annual facility gas throughput for storage facilities may be determined according to §63.1270(a)(1) and the maximum annual throughput for transmission facilities may be determined according to §63.1270(a)(2).

Production field facility means those oil and gas production facilities located prior to the point of custody transfer.

Production well means any hole drilled in the earth from which crude oil, condensate, or field natural gas is extracted.

Propane means a colorless gas derived from petroleum and natural gas, with the molecular structure C_3H_8.

Remote stationary RICE means stationary RICE meeting any of the following criteria:

(1) Stationary RICE located in an offshore area that is beyond the line of ordinary low water along that portion of the coast of the United States that is in direct contact with the open seas and beyond the line marking the seaward limit of inland waters.

(2) Stationary RICE located on a pipeline segment that meets both of the criteria in paragraphs (2)(i) and (ii) of this definition.

(i) A pipeline segment with 10 or fewer buildings intended for human occupancy and no buildings with four or more stories within 220 yards (200 meters) on either side of the centerline of any continuous 1-mile (1.6 kilometers) length of pipeline. Each separate dwelling unit in a multiple dwelling unit building is counted as a separate building intended for human occupancy.

(ii) The pipeline segment does not lie within 100 yards (91 meters) of either a building or a small, well-defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period. The days and weeks need not be consecutive. The building or area is considered occupied for a full day if it is occupied for any portion of the day.

(iii) For purposes of this paragraph (2), the term pipeline segment means all parts of those physical facilities through which gas moves in transportation, including but not limited to pipe, valves, and other appurtenance attached to pipe, compressor units, metering stations, regulator stations, delivery stations, holders, and fabricated assemblies. Stationary RICE located within 50 yards (46 meters) of the pipeline segment providing power for equipment on a pipeline segment are part of the pipeline segment. Transportation of gas means the gathering, transmission, or distribution of gas by pipeline, or the storage of gas. A building is intended for human occupancy if its primary use is for a purpose involving the presence of humans.

(3) Stationary RICE that are not located on gas pipelines and that have 5 or fewer buildings intended for human occupancy and no buildings with four or more stories within a 0.25 mile radius around the engine. A building is intended for human occupancy if its primary use is for a purpose involving the presence of humans.

Residential emergency stationary RICE means an emergency stationary RICE used in residential establishments such as homes or apartment buildings.

Responsible official means responsible official as defined in 40 CFR 70.2.

Rich burn engine means any four-stroke spark ignited engine where the manufacturer's recommended operating air/fuel ratio divided by the stoichiometric air/fuel ratio at full load conditions is less than or equal to 1.1. Engines originally manufactured as rich burn engines, but modified prior to December 19, 2002 with passive emission control technology for NO_x (such as pre-combustion chambers) will be considered lean burn engines. Also, existing engines where there are no manufacturer's recommendations regarding air/fuel ratio will be considered a rich burn engine if the excess oxygen content of the exhaust at full load conditions is less than or equal to 2 percent.

Site-rated HP means the maximum manufacturer's design capacity at engine site conditions.

Spark ignition means relating to either: A gasoline-fueled engine; or any other type of engine with a spark plug (or other sparking device) and with operating characteristics significantly similar to the theoretical Otto combustion cycle. Spark ignition engines usually use a throttle to regulate intake air flow to control power during normal operation. Dual-fuel engines in which a liquid fuel (typically diesel fuel) is used for CI and gaseous fuel (typically natural gas) is used as the primary fuel at an annual average ratio of less than 2 parts diesel fuel to 100 parts total fuel on an energy equivalent basis are spark ignition engines.

Stationary reciprocating internal combustion engine (RICE) means any reciprocating internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a non-road engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition.

Stationary RICE test cell/stand means an engine test cell/stand, as defined in subpart PPPPP of this part, that tests stationary RICE.

Stoichiometric means the theoretical air-to-fuel ratio required for complete combustion.

Storage vessel with the potential for flash emissions means any storage vessel that contains a hydrocarbon liquid with a stock tank gas-to-oil ratio equal to or greater than 0.31 cubic meters per liter and an American Petroleum Institute gravity equal to or greater than 40 degrees and an actual annual average hydrocarbon liquid throughput equal to or greater than 79,500 liters per day. Flash emissions occur when dissolved hydrocarbons in the fluid evolve from solution when the fluid pressure is reduced.

Subpart means 40 CFR part 63, subpart ZZZZ.

Surface site means any combination of one or more graded pad sites, gravel pad sites, foundations, platforms, or the immediate physical location upon which equipment is physically affixed.

Two-stroke engine means a type of engine which completes the power cycle in single crankshaft revolution by combining the intake and compression operations into one stroke and the power and exhaust operations into a second stroke. This system requires auxiliary scavenging and inherently runs lean of stoichiometric.

[69 FR 33506, June 15, 2004, as amended at 71 FR 20467, Apr. 20, 2006; 73 FR 3607, Jan. 18, 2008; 75 FR 9679, Mar. 3, 2010; 75 FR 51592, Aug. 20, 2010; 76 FR 12867, Mar. 9, 2011; 78 FR 6706, Jan. 30, 2013]

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Table 1a to Subpart ZZZZ of Part 63—Emission Limitations for Existing, New, and Reconstructed Spark Ignition, 4SRB Stationary RICE >500 HP Located at a Major Source of HAP Emissions

As stated in §§63.6600 and 63.6640, you must comply with the following emission limitations at 100 percent load plus or minus 10 percent for existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions:

For each . . .	You must meet the following emission limitation, except during periods of startup . . .	During periods of startup you must . . .
1. 4SRB stationary RICE	a. Reduce formaldehyde emissions by 76 percent or more. If you commenced construction or reconstruction between December 19, 2002 and June 15, 2004, you may reduce formaldehyde emissions by 75 percent or more until June 15, 2007 or	Minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply.[1]
	b. Limit the concentration of formaldehyde in the stationary RICE exhaust to 350 ppbvd or less at 15 percent O_2	

[1] Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.

[75 FR 9679, Mar. 3, 2010, as amended at 75 FR 51592, Aug. 20, 2010]

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Table 1b to Subpart ZZZZ of Part 63—Operating Limitations for Existing, New, and Reconstructed SI 4SRB Stationary RICE >500 HP Located at a Major Source of HAP Emissions

As stated in §§63.6600, 63.6603, 63.6630 and 63.6640, you must comply with the following operating limitations for existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions:

For each . . .	You must meet the following operating limitation, except during periods of startup . . .
1. existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions complying with the requirement to reduce formaldehyde emissions by 76 percent or more (or by 75 percent or more, if applicable) and using NSCR; or existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions complying with the requirement to limit the concentration of formaldehyde in the stationary RICE exhaust to 350 ppbvd or less at 15 percent O_2 and using NSCR;	a. maintain your catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water at 100 percent load plus or minus 10 percent from the pressure drop across the catalyst measured during the initial performance test; and b. maintain the temperature of your stationary RICE exhaust so that the catalyst inlet temperature is greater than or equal to 750 °F and less than or equal to 1250 °F.[1]
2. existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions complying with the requirement to reduce formaldehyde emissions by 76 percent or more (or by 75 percent or more, if applicable) and not using NSCR; or	Comply with any operating limitations approved by the Administrator.
existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions complying with the requirement to limit the concentration of formaldehyde in the stationary RICE exhaust to 350 ppbvd or less at 15 percent O_2 and not using NSCR.	

[1]Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.8(f) for a different temperature range.

[78 FR 6706, Jan. 30, 2013]

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Table 2a to Subpart ZZZZ of Part 63—Emission Limitations for New and Reconstructed 2SLB and Compression Ignition Stationary RICE >500 HP and New and Reconstructed 4SLB Stationary RICE ≥250 HP Located at a Major Source of HAP Emissions

As stated in §§63.6600 and 63.6640, you must comply with the following emission limitations for new and reconstructed lean burn and new and reconstructed compression ignition stationary RICE at 100 percent load plus or minus 10 percent:

For each . . .	You must meet the following emission limitation, except during periods of startup . . .	During periods of startup you must . . .
1. 2SLB stationary RICE	a. Reduce CO emissions by 58 percent or more; or b. Limit concentration of formaldehyde in the stationary RICE exhaust to 12 ppmvd or less at 15 percent O_2. If you commenced construction or reconstruction between December 19, 2002 and June 15, 2004, you may limit concentration of formaldehyde to 17 ppmvd or less at 15 percent O_2 until June 15, 2007	Minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply.[1]
2. 4SLB stationary RICE	a. Reduce CO emissions by 93 percent or more; or	
	b. Limit concentration of formaldehyde in the stationary RICE exhaust to 14 ppmvd or less at 15 percent O_2	
3. CI stationary RICE	a. Reduce CO emissions by 70 percent or more; or	
	b. Limit concentration of formaldehyde in the stationary RICE exhaust to 580 ppbvd or less at 15 percent O_2	

[1]Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.

[75 FR 9680, Mar. 3, 2010]

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Table 2b to Subpart ZZZZ of Part 63—Operating Limitations for New and Reconstructed 2SLB and CI Stationary RICE >500 HP Located at a Major Source of HAP Emissions, New and Reconstructed 4SLB Stationary RICE ≥250 HP Located at a Major Source of HAP Emissions, Existing CI Stationary RICE >500 HP

As stated in §§63.6600, 63.6601, 63.6603, 63.6630, and 63.6640, you must comply with the following operating limitations for new and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions; new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source of HAP emissions; and existing CI stationary RICE >500 HP:

For each . . .	You must meet the following operating limitation, except during periods of startup . . .
1. New and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions and new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source of HAP emissions complying with the requirement to reduce CO emissions and using an oxidation catalyst; and New and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions and new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source of HAP emissions complying with the requirement to limit the concentration of formaldehyde in the stationary RICE exhaust and using an oxidation catalyst.	a. maintain your catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water at 100 percent load plus or minus 10 percent from the pressure drop across the catalyst that was measured during the initial performance test; and b. maintain the temperature of your stationary RICE exhaust so that the catalyst inlet temperature is greater than or equal to 450 °F and less than or equal to 1350 °F.[1]
2. Existing CI stationary RICE >500 HP complying with the requirement to limit or reduce the concentration of CO in the stationary RICE exhaust and using an oxidation catalyst	a. maintain your catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water from the pressure drop across the catalyst that was measured during the initial performance test; and
	b. maintain the temperature of your stationary RICE exhaust so that the catalyst inlet temperature is greater than or equal to 450 °F and less than or equal to 1350 °F.[1]
3. New and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions and new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source of HAP emissions complying with the requirement to reduce CO emissions and not using an oxidation catalyst; and	Comply with any operating limitations approved by the Administrator.
New and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions and new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source	

of HAP emissions complying with the requirement to limit the concentration of formaldehyde in the stationary RICE exhaust and not using an oxidation catalyst; and	
existing CI stationary RICE >500 HP complying with the requirement to limit or reduce the concentration of CO in the stationary RICE exhaust and not using an oxidation catalyst.	

[1]Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.8(f) for a different temperature range.

[78 FR 6707, Jan. 30, 2013]

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Table 2c to Subpart ZZZZ of Part 63—Requirements for Existing Compression Ignition Stationary RICE Located at a Major Source of HAP Emissions and Existing Spark Ignition Stationary RICE ≤500 HP Located at a Major Source of HAP Emissions

As stated in §§63.6600, 63.6602, and 63.6640, you must comply with the following requirements for existing compression ignition stationary RICE located at a major source of HAP emissions and existing spark ignition stationary RICE ≤500 HP located at a major source of HAP emissions:

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
1. Emergency stationary CI RICE and black start stationary CI RICE[1]	a. Change oil and filter every 500 hours of operation or annually, whichever comes first.[2] b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary; c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.[3]	Minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply.[3]
2. Non-Emergency, non-black start stationary CI RICE <100 HP	a. Change oil and filter every 1,000 hours of operation or annually,	

	whichever comes first.[2] b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary; c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.[3]	
3. Non-Emergency, non-black start CI stationary RICE 100≤HP≤300 HP	Limit concentration of CO in the stationary RICE exhaust to 230 ppmvd or less at 15 percent O_2.	
4. Non-Emergency, non-black start CI stationary RICE 300<HP≤500	a. Limit concentration of CO in the stationary RICE exhaust to 49 ppmvd or less at 15 percent O_2; or b. Reduce CO emissions by 70 percent or more.	
5. Non-Emergency, non-black start stationary CI RICE >500 HP	a. Limit concentration of CO in the stationary RICE exhaust to 23 ppmvd or less at 15 percent O_2; or b. Reduce CO emissions by 70 percent or more.	
6. Emergency stationary SI RICE and black start stationary SI RICE.[1]	a. Change oil and filter every 500 hours of operation or annually, whichever comes first;[2] b. Inspect spark plugs every 1,000 hours of operation or annually, whichever comes first, and replace as necessary; c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.[3]	

7. Non-Emergency, non-black start stationary SI RICE <100 HP that are not 2SLB stationary RICE	a. Change oil and filter every 1,440 hours of operation or annually, whichever comes first;[2] b. Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary;	
	c. Inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first, and replace as necessary.[3]	
8. Non-Emergency, non-black start 2SLB stationary SI RICE <100 HP	a. Change oil and filter every 4,320 hours of operation or annually, whichever comes first;[2] b. Inspect spark plugs every 4,320 hours of operation or annually, whichever comes first, and replace as necessary;	
	c. Inspect all hoses and belts every 4,320 hours of operation or annually, whichever comes first, and replace as necessary.[3]	
9. Non-emergency, non-black start 2SLB stationary RICE 100≤HP≤500	Limit concentration of CO in the stationary RICE exhaust to 225 ppmvd or less at 15 percent O_2.	
10. Non-emergency, non-black start 4SLB stationary RICE 100≤HP≤500	Limit concentration of CO in the stationary RICE exhaust to 47 ppmvd or less at 15 percent O_2.	
11. Non-emergency, non-black start 4SRB stationary RICE 100≤HP≤500	Limit concentration of formaldehyde in the stationary RICE exhaust to 10.3 ppmvd or less at 15 percent O_2.	

12. Non-emergency, non-black start stationary RICE 100≤HP≤500 which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis	Limit concentration of CO in the stationary RICE exhaust to 177 ppmvd or less at 15 percent O_2.	

[1]If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the work practice requirements on the schedule required in Table 2c of this subpart, or if performing the work practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the work practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The work practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the work practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

[2]Sources have the option to utilize an oil analysis program as described in §63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2c of this subpart.

[3]Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.

[78 FR 6708, Jan. 30, 2013, as amended at 78 FR 14457, Mar. 6, 2013]

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Table 2d to Subpart ZZZZ of Part 63—Requirements for Existing Stationary RICE Located at Area Sources of HAP Emissions

As stated in §§63.6603 and 63.6640, you must comply with the following requirements for existing stationary RICE located at area sources of HAP emissions:

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
1. Non-Emergency, non-black start CI stationary RICE ≤300 HP	a. Change oil and filter every 1,000 hours of operation or annually, whichever comes first;[1] b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary;	Minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply.

	c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.	
2. Non-Emergency, non-black start CI stationary RICE 300<HP≤500	a. Limit concentration of CO in the stationary RICE exhaust to 49 ppmvd at 15 percent O_2; or	
	b. Reduce CO emissions by 70 percent or more.	
3. Non-Emergency, non-black start CI stationary RICE >500 HP	a. Limit concentration of CO in the stationary RICE exhaust to 23 ppmvd at 15 percent O_2; or	
	b. Reduce CO emissions by 70 percent or more.	
4. Emergency stationary CI RICE and black start stationary CI RICE.[2]	a. Change oil and filter every 500 hours of operation or annually, whichever comes first;[1]	
	b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.	
5. Emergency stationary SI RICE; black start stationary SI RICE; non-emergency, non-black start 4SLB stationary RICE >500 HP that operate	a. Change oil and filter every 500 hours of operation or annually, whichever comes	

24 hours or less per calendar year; non-emergency, non-black start 4SRB stationary RICE >500 HP that operate 24 hours or less per calendar year.[2]	first;[1]; b. Inspect spark plugs every 1,000 hours of operation or annually, whichever comes first, and replace as necessary; and c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.	
6. Non-emergency, non-black start 2SLB stationary RICE	a. Change oil and filter every 4,320 hours of operation or annually, whichever comes first;[1]	
	b. Inspect spark plugs every 4,320 hours of operation or annually, whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 4,320 hours of operation or annually, whichever comes first, and replace as necessary.	
7. Non-emergency, non-black start 4SLB stationary RICE ≤500 HP	a. Change oil and filter every 1,440 hours of operation or annually, whichever comes first;[1]	
	b. Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 1,440 hours of operation or annually, whichever	

	comes first, and replace as necessary.	
8. Non-emergency, non-black start 4SLB remote stationary RICE >500 HP	a. Change oil and filter every 2,160 hours of operation or annually, whichever comes first;[1]	
	b. Inspect spark plugs every 2,160 hours of operation or annually, whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 2,160 hours of operation or annually, whichever comes first, and replace as necessary.	
9. Non-emergency, non-black start 4SLB stationary RICE >500 HP that are not remote stationary RICE and that operate more than 24 hours per calendar year	Install an oxidation catalyst to reduce HAP emissions from the stationary RICE.	
10. Non-emergency, non-black start 4SRB stationary RICE ≤500 HP	a. Change oil and filter every 1,440 hours of operation or annually, whichever comes first;[1]	
	b. Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first, and replace as necessary.	
11. Non-emergency, non-black start 4SRB remote stationary RICE >500 HP	a. Change oil and filter every 2,160 hours of	

	operation or annually, whichever comes first;[1]	
	b. Inspect spark plugs every 2,160 hours of operation or annually, whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 2,160 hours of operation or annually, whichever comes first, and replace as necessary.	
12. Non-emergency, non-black start 4SRB stationary RICE >500 HP that are not remote stationary RICE and that operate more than 24 hours per calendar year	Install NSCR to reduce HAP emissions from the stationary RICE.	
13. Non-emergency, non-black start stationary RICE which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis	a. Change oil and filter every 1,440 hours of operation or annually, whichever comes first;[1] b. Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first, and replace as necessary.	

[1]Sources have the option to utilize an oil analysis program as described in §63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2d of this subpart.

[2]If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements on the schedule required in Table 2d of this subpart, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the

unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

[78 FR 6709, Jan. 30, 2013]

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Table 3 to Subpart ZZZZ of Part 63—Subsequent Performance Tests

As stated in §§63.6615 and 63.6620, you must comply with the following subsequent performance test requirements:

For each . . .	Complying with the requirement to . . .	You must . . .
1. New or reconstructed 2SLB stationary RICE >500 HP located at major sources; new or reconstructed 4SLB stationary RICE ≥250 HP located at major sources; and new or reconstructed CI stationary RICE >500 HP located at major sources	Reduce CO emissions and not using a CEMS	Conduct subsequent performance tests semiannually.[1]
2. 4SRB stationary RICE ≥5,000 HP located at major sources	Reduce formaldehyde emissions	Conduct subsequent performance tests semiannually.[1]
3. Stationary RICE >500 HP located at major sources and new or reconstructed 4SLB stationary RICE 250≤HP≤500 located at major sources	Limit the concentration of formaldehyde in the stationary RICE exhaust	Conduct subsequent performance tests semiannually.[1]
4. Existing non-emergency, non-black start CI stationary RICE >500 HP that are not limited use stationary RICE	Limit or reduce CO emissions and not using a CEMS	Conduct subsequent performance tests every 8,760 hours or 3 years, whichever comes first.
5. Existing non-emergency, non-black start CI stationary RICE >500 HP that are limited use stationary RICE	Limit or reduce CO emissions and not using a CEMS	Conduct subsequent performance tests every 8,760 hours or 5 years, whichever comes first.

[1]After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.

[78 FR 6711, Jan. 30, 2013]

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Table 4 to Subpart ZZZZ of Part 63—Requirements for Performance Tests

As stated in §§63.6610, 63.6611, 63.6620, and 63.6640, you must comply with the following requirements for performance tests for stationary RICE:

For each . . .	Complying with the requirement to . . .	You must . . .	Using . . .	According to the following requirements . . .
1. 2SLB, 4SLB, and CI stationary RICE	a. reduce CO emissions	i. Select the sampling port location and the number/location of traverse points at the inlet and outlet of the control device; and		(a) For CO and O_2 measurement, ducts ≤6 inches in diameter may be sampled at a single point located at the duct centroid and ducts >6 and ≤12 inches in diameter may be sampled at 3 traverse points located at 16.7, 50.0, and 83.3% of the measurement line (`3-point long line'). If the duct is >12 inches in diameter *and* the sampling port location meets the two and half-diameter criterion of Section 11.1.1 of Method 1 of 40 CFR part 60, appendix A-1, the duct may be sampled at `3-point long line'; otherwise, conduct the stratification testing and select sampling points according to Section 8.1.2 of Method 7E of 40 CFR part 60, appendix A-4.
		ii. Measure the O_2 at the inlet and outlet of the control device; and	(1) Method 3 or 3A or 3B of 40 CFR part 60, appendix A-2, or ASTM Method D6522-00 (Reapproved	(b) Measurements to determine O_2 must be made at the same time as the measurements for CO concentration.

			2005)[ac] (heated probe not necessary)	
		iii. Measure the CO at the inlet and the outlet of the control device	(1) ASTM D6522-00 (Reapproved 2005)[abc] (heated probe not necessary) or Method 10 of 40 CFR part 60, appendix A-4	(c) The CO concentration must be at 15 percent O_2, dry basis.
2. 4SRB stationary RICE	a. reduce formaldehyde emissions	i. Select the sampling port location and the number/location of traverse points at the inlet and outlet of the control device; and		(a) For formaldehyde, O_2, and moisture measurement, ducts ≤6 inches in diameter may be sampled at a single point located at the duct centroid and ducts >6 and ≤12 inches in diameter may be sampled at 3 traverse points located at 16.7, 50.0, and 83.3% of the measurement line (`3-point long line'). If the duct is >12 inches in diameter *and* the sampling port location meets the two and half-diameter criterion of Section 11.1.1 of Method 1 of 40 CFR part 60, appendix A, the duct may be sampled at `3-point long line'; otherwise, conduct the stratification testing and select sampling points according to Section 8.1.2 of Method 7E of 40 CFR part 60, appendix A.
		ii. Measure O_2at the inlet and outlet of the control device; and	(1) Method 3 or 3A or 3B of 40 CFR part 60, appendix A-2, or ASTM Method D6522-00 (Reapproved	(a) Measurements to determine O_2 concentration must be made at the same time as the measurements for

			2005)[a] (heated probe not necessary)	formaldehyde or THC concentration.
		iii. Measure moisture content at the inlet and outlet of the control device; and	(1) Method 4 of 40 CFR part 60, appendix A-3, or Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348-03[a]	(a) Measurements to determine moisture content must be made at the same time and location as the measurements for formaldehyde or THC concentration.
		iv. If demonstrating compliance with the formaldehyde percent reduction requirement, measure formalde-hyde at the inlet and the outlet of the control device	(1) Method 320 or 323 of 40 CFR part 63, appendix A; or ASTM D6348-03[a], provided in ASTM D6348-03 Annex A5 (Analyte Spiking Technique), the percent R must be greater than or equal to 70 and less than or equal to 130	(a) Formaldehyde concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.
		v. If demonstrating compliance with the THC percent reduction requirement, measure THC at the inlet and the outlet of the control device	(1) Method 25A, reported as propane, of 40 CFR part 60, appendix A-7	(a) THC concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.
3. Stationary RICE	a. limit the concentra-tion of formalde-hyde or CO in the stationary RICE exhaust	i. Select the sampling port location and the number/location of traverse points at the exhaust of the stationary RICE; and		(a) For formaldehyde, CO, O_2, and moisture measurement, ducts ≤6 inches in diameter may be sampled at a single point located at the duct centroid and ducts >6 and ≤12 inches in diameter may be sampled at 3 traverse points located at 16.7, 50.0, and 83.3% of the measurement line (`3-point long line'). If the duct is >12 inches in

				diameter *and* the sampling port location meets the two and half-diameter criterion of Section 11.1.1 of Method 1 of 40 CFR part 60, appendix A, the duct may be sampled at `3-point long line'; otherwise, conduct the stratification testing and select sampling points according to Section 8.1.2 of Method 7E of 40 CFR part 60, appendix A. If using a control device, the sampling site must be located at the outlet of the control device.
		ii. Determine the O_2concentration of the stationary RICE exhaust at the sampling port location; and	(1) Method 3 or 3A or 3B of 40 CFR part 60, appendix A-2, or ASTM Method D6522-00 (Reapproved 2005)[a] (heated probe not necessary)	(a) Measurements to determine O_2 concentration must be made at the same time and location as the measurements for formaldehyde or CO concentration.
		iii. Measure moisture content of the station-ary RICE exhaust at the sampling port location; and	(1) Method 4 of 40 CFR part 60, appendix A-3, or Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348-03[a]	(a) Measurements to determine moisture content must be made at the same time and location as the measurements for formaldehyde or CO concentration.
		iv. Measure formalde-hyde at the exhaust of the station-ary RICE; or	(1) Method 320 or 323 of 40 CFR part 63, appendix A; or ASTM D6348-03[a], provided in ASTM D6348-03 Annex A5 (Analyte Spiking Technique), the percent R must be	(a) Formaldehyde concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.

			greater than or equal to 70 and less than or equal to 130	
		v. measure CO at the exhaust of the station-ary RICE	(1) Method 10 of 40 CFR part 60, appendix A-4, ASTM Method D6522-00 (2005)[ac], Method 320 of 40 CFR part 63, appendix A, or ASTM D6348-03[a]	(a) CO concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.

[a]You may also use Methods 3A and 10 as options to ASTM-D6522-00 (2005). You may obtain a copy of ASTM-D6522-00 (2005) from at least one of the following addresses: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, or University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106.

[b]You may obtain a copy of ASTM-D6348-03 from at least one of the following addresses: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, or University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106.

[79 FR 11290, Feb. 27, 2014]

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Table 5 to Subpart ZZZZ of Part 63—Initial Compliance With Emission Limitations, Operating Limitations, and Other Requirements

As stated in §§63.6612, 63.6625 and 63.6630, you must initially comply with the emission and operating limitations as required by the following:

For each . . .	Complying with the requirement to . . .	You have demonstrated initial compliance if . . .
1. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP	a. Reduce CO emissions and using oxidation catalyst, and using a CPMS	i. The average reduction of emissions of CO determined from the initial performance test achieves the required CO percent reduction; and ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in §63.6625(b); and iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test.

2. Non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP	a. Limit the concentration of CO, using oxidation catalyst, and using a CPMS	i. The average CO concentration determined from the initial performance test is less than or equal to the CO emission limitation; and
		ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in §63.6625(b); and
		iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test.
3. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP	a. Reduce CO emissions and not using oxidation catalyst	i. The average reduction of emissions of CO determined from the initial performance test achieves the required CO percent reduction; and ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in §63.6625(b); and iii. You have recorded the approved operating parameters (if any) during the initial performance test.
4. Non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP	a. Limit the concentration of CO, and not using oxidation catalyst	i. The average CO concentration determined from the initial performance test is less than or equal to the CO emission limitation; and ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in §63.6625(b); and
		iii. You have recorded the approved operating parameters (if any) during the initial performance test.
5. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of	a. Reduce CO emissions, and using a CEMS	i. You have installed a CEMS to continuously monitor CO and either O_2 or CO_2 at both the inlet and outlet of the oxidation catalyst according to the requirements in §63.6625(a); and ii. You have conducted a

HAP, non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP		performance evaluation of your CEMS using PS 3 and 4A of 40 CFR part 60, appendix B; and
		iii. The average reduction of CO calculated using §63.6620 equals or exceeds the required percent reduction. The initial test comprises the first 4-hour period after successful validation of the CEMS. Compliance is based on the average percent reduction achieved during the 4-hour period.
6. Non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP	a. Limit the concentration of CO, and using a CEMS	i. You have installed a CEMS to continuously monitor CO and either O_2 or CO_2 at the outlet of the oxidation catalyst according to the requirements in §63.6625(a); and
		ii. You have conducted a performance evaluation of your CEMS using PS 3 and 4A of 40 CFR part 60, appendix B; and
		iii. The average concentration of CO calculated using §63.6620 is less than or equal to the CO emission limitation. The initial test comprises the first 4-hour period after successful validation of the CEMS. Compliance is based on the average concentration measured during the 4-hour period.
7. Non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP	a. Reduce formaldehyde emissions and using NSCR	i. The average reduction of emissions of formaldehyde determined from the initial performance test is equal to or greater than the required formaldehyde percent reduction, or the average reduction of emissions of THC determined from the initial performance test is equal to or greater than 30 percent; and
		ii. You have installed a CPMS to continuously monitor catalyst inlet

		temperature according to the requirements in §63.6625(b); and
		iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test.
8. Non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP	a. Reduce formaldehyde emissions and not using NSCR	i. The average reduction of emissions of formaldehyde determined from the initial performance test is equal to or greater than the required formaldehyde percent reduction or the average reduction of emissions of THC determined from the initial performance test is equal to or greater than 30 percent; and
		ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in §63.6625(b); and
		iii. You have recorded the approved operating parameters (if any) during the initial performance test.
9. New or reconstructed non-emergency stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE 250≤HP≤500 located at a major source of HAP, and existing non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP	a. Limit the concentration of formaldehyde in the stationary RICE exhaust and using oxidation catalyst or NSCR	i. The average formaldehyde concentration, corrected to 15 percent O_2, dry basis, from the three test runs is less than or equal to the formaldehyde emission limitation; and ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in §63.6625(b); and
		iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test.
10. New or reconstructed non-emergency stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE 250≤HP≤500	a. Limit the concentration of formaldehyde in the stationary RICE exhaust and not	i. The average formaldehyde concentration, corrected to 15 percent O_2, dry basis, from the three test runs is less than or equal to the formaldehyde emission limitation;

located at a major source of HAP, and existing non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP	using oxidation catalyst or NSCR	and ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in §63.6625(b); and
		iii. You have recorded the approved operating parameters (if any) during the initial performance test.
11. Existing non-emergency stationary RICE 100≤HP≤500 located at a major source of HAP, and existing non-emergency stationary CI RICE 300<HP≤500 located at an area source of HAP	a. Reduce CO emissions	i. The average reduction of emissions of CO or formaldehyde, as applicable determined from the initial performance test is equal to or greater than the required CO or formaldehyde, as applicable, percent reduction.
12. Existing non-emergency stationary RICE 100≤HP≤500 located at a major source of HAP, and existing non-emergency stationary CI RICE 300<HP≤500 located at an area source of HAP	a. Limit the concentration of formaldehyde or CO in the stationary RICE exhaust	i. The average formaldehyde or CO concentration, as applicable, corrected to 15 percent O_2, dry basis, from the three test runs is less than or equal to the formaldehyde or CO emission limitation, as applicable.
13. Existing non-emergency 4SLB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year	a. Install an oxidation catalyst	i. You have conducted an initial compliance demonstration as specified in §63.6630(e) to show that the average reduction of emissions of CO is 93 percent or more, or the average CO concentration is less than or equal to 47 ppmvd at 15 percent O_2;
		ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in §63.6625(b), or you have installed equipment to automatically shut down the engine if the catalyst inlet temperature exceeds 1350 °F.
14. Existing non-emergency 4SRB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that are	a. Install NSCR	i. You have conducted an initial compliance demonstration as specified in §63.6630(e) to show that the average reduction of emissions of CO is 75 percent or more, the

operated more than 24 hours per calendar year		average CO concentration is less than or equal to 270 ppmvd at 15 percent O_2, or the average reduction of emissions of THC is 30 percent or more;
		ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in §63.6625(b), or you have installed equipment to automatically shut down the engine if the catalyst inlet temperature exceeds 1250 °F.

[78 FR 6712, Jan. 30, 2013]

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Table 6 to Subpart ZZZZ of Part 63—Continuous Compliance With Emission Limitations, and Other Requirements

As stated in §63.6640, you must continuously comply with the emissions and operating limitations and work or management practices as required by the following:

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
1. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, and new or reconstructed non-emergency CI stationary RICE >500 HP located at a major source of HAP	a. Reduce CO emissions and using an oxidation catalyst, and using a CPMS	i. Conducting semiannual performance tests for CO to demonstrate that the required CO percent reduction is achieved[a]; and ii. Collecting the catalyst inlet temperature data according to §63.6625(b); and iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and
		v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the

		operating limitation established during the performance test.
2. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, and new or reconstructed non-emergency CI stationary RICE >500 HP located at a major source of HAP	a. Reduce CO emissions and not using an oxidation catalyst, and using a CPMS	i. Conducting semiannual performance tests for CO to demonstrate that the required CO percent reduction is achieved[a]; and ii. Collecting the approved operating parameter (if any) data according to §63.6625(b); and iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test.
3. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, new or reconstructed non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP	a. Reduce CO emissions or limit the concentration of CO in the stationary RICE exhaust, and using a CEMS	i. Collecting the monitoring data according to §63.6625(a), reducing the measurements to 1-hour averages, calculating the percent reduction or concentration of CO emissions according to §63.6620; and ii. Demonstrating that the catalyst achieves the required percent reduction of CO emissions over the 4-hour averaging period, or that the emission remain at or below the CO concentration limit; and
		iii. Conducting an annual RATA of your CEMS using PS 3 and 4A of 40 CFR part 60, appendix B, as well as daily and periodic data quality checks in accordance with 40 CFR part 60, appendix F, procedure 1.
4. Non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP	a. Reduce formaldehyde emissions and using NSCR	i. Collecting the catalyst inlet temperature data according to §63.6625(b); and
		ii. Reducing these data to 4-hour rolling averages; and

		iii. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and
		iv. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test.
5. Non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP	a. Reduce formaldehyde emissions and not using NSCR	i. Collecting the approved operating parameter (if any) data according to §63.6625(b); and
		ii. Reducing these data to 4-hour rolling averages; and
		iii. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test.
6. Non-emergency 4SRB stationary RICE with a brake HP ≥5,000 located at a major source of HAP	a. Reduce formaldehyde emissions	Conducting semiannual performance tests for formaldehyde to demonstrate that the required formaldehyde percent reduction is achieved, or to demonstrate that the average reduction of emissions of THC determined from the performance test is equal to or greater than 30 percent.[a]
7. New or reconstructed non-emergency stationary RICE >500 HP located at a major source of HAP and new or reconstructed non-emergency 4SLB stationary RICE 250≤HP≤500 located at a major source of HAP	a. Limit the concentration of formaldehyde in the stationary RICE exhaust and using oxidation catalyst or NSCR	i. Conducting semiannual performance tests for formaldehyde to demonstrate that your emissions remain at or below the formaldehyde concentration limit[a]; and ii. Collecting the catalyst inlet temperature data according to §63.6625(b); and
		iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within the operating

		limitations for the catalyst inlet temperature; and
		v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test.
8. New or reconstructed non-emergency stationary RICE >500 HP located at a major source of HAP and new or reconstructed non-emergency 4SLB stationary RICE 250≤HP≤500 located at a major source of HAP	a. Limit the concentration of formaldehyde in the stationary RICE exhaust and not using oxidation catalyst or NSCR	i. Conducting semiannual performance tests for formaldehyde to demonstrate that your emissions remain at or below the formaldehyde concentration limit[a]; and ii. Collecting the approved operating parameter (if any) data according to §63.6625(b); and
		iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test.
9. Existing emergency and black start stationary RICE ≤500 HP located at a major source of HAP, existing non-emergency stationary RICE <100 HP located at a major source of HAP, existing emergency and black start stationary RICE located at an area source of HAP, existing non-emergency stationary CI RICE ≤300 HP located at an area source of HAP, existing non-emergency 2SLB stationary RICE located at an area source of HAP, existing non-emergency stationary SI RICE located at an area source of HAP which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, existing non-emergency 4SLB and 4SRB	a. Work or Management practices	i. Operating and maintaining the stationary RICE according to the manufacturer's emission-related operation and maintenance instructions; or ii. Develop and follow your own maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions.

stationary RICE ≤500 HP located at an area source of HAP, existing non-emergency 4SLB and 4SRB stationary RICE >500 HP located at an area source of HAP that operate 24 hours or less per calendar year, and existing non-emergency 4SLB and 4SRB stationary RICE >500 HP located at an area source of HAP that are remote stationary RICE		
10. Existing stationary CI RICE >500 HP that are not limited use stationary RICE	a. Reduce CO emissions, or limit the concentration of CO in the stationary RICE exhaust, and using oxidation catalyst	i. Conducting performance tests every 8,760 hours or 3 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as appropriate, percent reduction is achieved or that your emissions remain at or below the CO or formaldehyde concentration limit; and
		ii. Collecting the catalyst inlet temperature data according to §63.6625(b); and
		iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and
		v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test.
11. Existing stationary CI RICE >500 HP that are not limited use stationary RICE	a. Reduce CO emissions, or limit the concentration of CO in the stationary RICE exhaust, and not using oxidation catalyst	i. Conducting performance tests every 8,760 hours or 3 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as appropriate, percent reduction is achieved or that your emissions remain at or below

		the CO or formaldehyde concentration limit; and
		ii. Collecting the approved operating parameter (if any) data according to §63.6625(b); and
		iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test.
12. Existing limited use CI stationary RICE >500 HP	a. Reduce CO emissions or limit the concentration of CO in the stationary RICE exhaust, and using an oxidation catalyst	i. Conducting performance tests every 8,760 hours or 5 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as appropriate, percent reduction is achieved or that your emissions remain at or below the CO or formaldehyde concentration limit; and
		ii. Collecting the catalyst inlet temperature data according to §63.6625(b); and
		iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and
		v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test.
13. Existing limited use CI stationary RICE >500 HP	a. Reduce CO emissions or limit the concentration of CO in the stationary	i. Conducting performance tests every 8,760 hours or 5 years, whichever comes first, for CO or formaldehyde, as appropriate, to

	RICE exhaust, and not using an oxidation catalyst	demonstrate that the required CO or formaldehyde, as appropriate, percent reduction is achieved or that your emissions remain at or below the CO or formaldehyde concentration limit; and
		ii. Collecting the approved operating parameter (if any) data according to §63.6625(b); and
		iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test.
14. Existing non-emergency 4SLB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year	a. Install an oxidation catalyst	i. Conducting annual compliance demonstrations as specified in §63.6640(c) to show that the average reduction of emissions of CO is 93 percent or more, or the average CO concentration is less than or equal to 47 ppmvd at 15 percent O_2; and either ii. Collecting the catalyst inlet temperature data according to §63.6625(b), reducing these data to 4-hour rolling averages; and maintaining the 4-hour rolling averages within the limitation of greater than 450 °F and less than or equal to 1350 °F for the catalyst inlet temperature; or iii. Immediately shutting down the engine if the catalyst inlet temperature exceeds 1350 °F.
15. Existing non-emergency 4SRB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year	a. Install NSCR	i. Conducting annual compliance demonstrations as specified in §63.6640(c) to show that the average reduction of emissions of CO is 75 percent or more, the average CO concentration is less than or equal to 270 ppmvd at 15 percent O_2, or the

		average reduction of emissions of THC is 30 percent or more; and either ii. Collecting the catalyst inlet temperature data according to §63.6625(b), reducing these data to 4-hour rolling averages; and maintaining the 4-hour rolling averages within the limitation of greater than or equal to 750 °F and less than or equal to 1250 °F for the catalyst inlet temperature; or iii. Immediately shutting down the engine if the catalyst inlet temperature exceeds 1250 °F.

[a]After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.

[78 FR 6715, Jan. 30, 2013]

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Table 7 to Subpart ZZZZ of Part 63—Requirements for Reports

As stated in §63.6650, you must comply with the following requirements for reports:

For each . . .	You must submit a . . .	The report must contain . . .	You must submit the report . . .
1. Existing non-emergency, non-black start stationary RICE 100≤HP≤500 located at a major source of HAP; existing non-emergency, non-black start stationary CI RICE >500 HP located at a major source of HAP; existing non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP; existing non-emergency, non-black start stationary CI RICE >300 HP located at an area source of	Compliance report	a. If there are no deviations from any emission limitations or operating limitations that apply to you, a statement that there were no deviations from the emission limitations or operating limitations during the reporting period. If there were no periods during which the CMS, including CEMS and CPMS, was out-of-control, as specified in §63.8(c)(7), a statement that	i. Semiannually according to the requirements in §63.6650(b)(1)-(5) for engines that are not limited use stationary RICE subject to numerical emission limitations; and ii. Annually according to the requirements in §63.6650(b)(6)-(9) for engines that are limited use stationary

HAP; new or reconstructed non-emergency stationary RICE >500 HP located at a major source of HAP; and new or reconstructed non-emergency 4SLB stationary RICE 250≤HP≤500 located at a major source of HAP		there were not periods during which the CMS was out-of-control during the reporting period; or	RICE subject to numerical emission limitations.
		b. If you had a deviation from any emission limitation or operating limitation during the reporting period, the information in §63.6650(d). If there were periods during which the CMS, including CEMS and CPMS, was out-of-control, as specified in §63.8(c)(7), the information in §63.6650(e); or	i. Semiannually according to the requirements in §63.6650(b).
		c. If you had a malfunction during the reporting period, the information in §63.6650(c)(4).	i. Semiannually according to the requirements in §63.6650(b).
2. New or reconstructed non-emergency stationary RICE that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis	Report	a. The fuel flow rate of each fuel and the heating values that were used in your calculations, and you must demonstrate that the percentage of heat input provided by landfill gas or digester gas, is equivalent to 10 percent or more of the gross heat input on an annual basis; and	i. Annually, according to the requirements in §63.6650.
		b. The operating limits provided in your federally enforceable permit, and any deviations from these limits; and	i. See item 2.a.i.
		c. Any problems or errors suspected with the meters.	i. See item 2.a.i.

3. Existing non-emergency, non-black start 4SLB and 4SRB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that operate more than 24 hours per calendar year	Compliance report	a. The results of the annual compliance demonstration, if conducted during the reporting period.	i. Semiannually according to the requirements in §63.6650(b)(1)-(5).
4. Emergency stationary RICE that operate or are contractually obligated to be available for more than 15 hours per year for the purposes specified in §63.6640(f)(2)(ii) and (iii) or that operate for the purposes specified in §63.6640(f)(4)(ii)	Report	a. The information in §63.6650(h)(1)	i. annually according to the requirements in §63.6650(h)(2)-(3).

[78 FR 6719, Jan. 30, 2013]

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Table 8 to Subpart ZZZZ of Part 63—Applicability of General Provisions to Subpart ZZZZ.

As stated in §63.6665, you must comply with the following applicable general provisions.

General provisions citation	Subject of citation	Applies to subpart	Explanation
§63.1	General applicability of the General Provisions	Yes.	
§63.2	Definitions	Yes	Additional terms defined in §63.6675.
§63.3	Units and abbreviations	Yes.	
§63.4	Prohibited activities and circumvention	Yes.	
§63.5	Construction and reconstruction	Yes.	
§63.6(a)	Applicability	Yes.	
§63.6(b)(1)-(4)	Compliance dates for new and reconstructed sources	Yes.	

§63.6(b)(5)	Notification	Yes.	
§63.6(b)(6)	[Reserved]		
§63.6(b)(7)	Compliance dates for new and reconstructed area sources that become major sources	Yes.	
§63.6(c)(1)-(2)	Compliance dates for existing sources	Yes.	
§63.6(c)(3)-(4)	[Reserved]		
§63.6(c)(5)	Compliance dates for existing area sources that become major sources	Yes.	
§63.6(d)	[Reserved]		
§63.6(e)	Operation and maintenance	No.	
§63.6(f)(1)	Applicability of standards	No.	
§63.6(f)(2)	Methods for determining compliance	Yes.	
§63.6(f)(3)	Finding of compliance	Yes.	
§63.6(g)(1)-(3)	Use of alternate standard	Yes.	
§63.6(h)	Opacity and visible emission standards	No	Subpart ZZZZ does not contain opacity or visible emission standards.
§63.6(i)	Compliance extension procedures and criteria	Yes.	
§63.6(j)	Presidential compliance exemption	Yes.	
§63.7(a)(1)-(2)	Performance test dates	Yes	Subpart ZZZZ contains performance test dates at §§63.6610, 63.6611, and 63.6612.
§63.7(a)(3)	CAA section 114 authority	Yes.	
§63.7(b)(1)	Notification of performance test	Yes	Except that §63.7(b)(1) only applies as specified in §63.6645.
§63.7(b)(2)	Notification of rescheduling	Yes	Except that §63.7(b)(2) only applies as specified in §63.6645.

§63.7(c)	Quality assurance/test plan	Yes	Except that §63.7(c) only applies as specified in §63.6645.
§63.7(d)	Testing facilities	Yes.	
§63.7(e)(1)	Conditions for conducting performance tests	No.	Subpart ZZZZ specifies conditions for conducting performance tests at §63.6620.
§63.7(e)(2)	Conduct of performance tests and reduction of data	Yes	Subpart ZZZZ specifies test methods at §63.6620.
§63.7(e)(3)	Test run duration	Yes.	
§63.7(e)(4)	Administrator may require other testing under section 114 of the CAA	Yes.	
§63.7(f)	Alternative test method provisions	Yes.	
§63.7(g)	Performance test data analysis, recordkeeping, and reporting	Yes.	
§63.7(h)	Waiver of tests	Yes.	
§63.8(a)(1)	Applicability of monitoring requirements	Yes	Subpart ZZZZ contains specific requirements for monitoring at §63.6625.
§63.8(a)(2)	Performance specifications	Yes.	
§63.8(a)(3)	[Reserved]		
§63.8(a)(4)	Monitoring for control devices	No.	
§63.8(b)(1)	Monitoring	Yes.	
§63.8(b)(2)-(3)	Multiple effluents and multiple monitoring systems	Yes.	
§63.8(c)(1)	Monitoring system operation and maintenance	Yes.	
§63.8(c)(1)(i)	Routine and predictable SSM	No	
§63.8(c)(1)(ii)	SSM not in Startup Shutdown Malfunction Plan	Yes.	
§63.8(c)(1)(iii)	Compliance with operation and maintenance requirements	No	
§63.8(c)(2)-(3)	Monitoring system installation	Yes.	

§63.8(c)(4)	Continuous monitoring system (CMS) requirements	Yes	Except that subpart ZZZZ does not require Continuous Opacity Monitoring System (COMS).
§63.8(c)(5)	COMS minimum procedures	No	Subpart ZZZZ does not require COMS.
§63.8(c)(6)-(8)	CMS requirements	Yes	Except that subpart ZZZZ does not require COMS.
§63.8(d)	CMS quality control	Yes.	
§63.8(e)	CMS performance evaluation	Yes	Except for §63.8(e)(5)(ii), which applies to COMS.
		Except that §63.8(e) only applies as specified in §63.6645.	
§63.8(f)(1)-(5)	Alternative monitoring method	Yes	Except that §63.8(f)(4) only applies as specified in §63.6645.
§63.8(f)(6)	Alternative to relative accuracy test	Yes	Except that §63.8(f)(6) only applies as specified in §63.6645.
§63.8(g)	Data reduction	Yes	Except that provisions for COMS are not applicable. Averaging periods for demonstrating compliance are specified at §§63.6635 and 63.6640.
§63.9(a)	Applicability and State delegation of notification requirements	Yes.	
§63.9(b)(1)-(5)	Initial notifications	Yes	Except that §63.9(b)(3) is reserved.
		Except that §63.9(b) only applies as specified in §63.6645.	

§63.9(c)	Request for compliance extension	Yes	Except that §63.9(c) only applies as specified in §63.6645.
§63.9(d)	Notification of special compliance requirements for new sources	Yes	Except that §63.9(d) only applies as specified in §63.6645.
§63.9(e)	Notification of performance test	Yes	Except that §63.9(e) only applies as specified in §63.6645.
§63.9(f)	Notification of visible emission (VE)/opacity test	No	Subpart ZZZZ does not contain opacity or VE standards.
§63.9(g)(1)	Notification of performance evaluation	Yes	Except that §63.9(g) only applies as specified in §63.6645.
§63.9(g)(2)	Notification of use of COMS data	No	Subpart ZZZZ does not contain opacity or VE standards.
§63.9(g)(3)	Notification that criterion for alternative to RATA is exceeded	Yes	If alternative is in use.
		Except that §63.9(g) only applies as specified in §63.6645.	
§63.9(h)(1)-(6)	Notification of compliance status	Yes	Except that notifications for sources using a CEMS are due 30 days after completion of performance evaluations. §63.9(h)(4) is reserved.
			Except that §63.9(h) only applies as specified in §63.6645.
§63.9(i)	Adjustment of submittal deadlines	Yes.	
§63.9(j)	Change in previous information	Yes.	

§63.10(a)	Administrative provisions for recordkeeping/reporting	Yes.	
§63.10(b)(1)	Record retention	Yes	Except that the most recent 2 years of data do not have to be retained on site.
§63.10(b)(2)(i)-(v)	Records related to SSM	No.	
§63.10(b)(2)(vi)-(xi)	Records	Yes.	
§63.10(b)(2)(xii)	Record when under waiver	Yes.	
§63.10(b)(2)(xiii)	Records when using alternative to RATA	Yes	For CO standard if using RATA alternative.
§63.10(b)(2)(xiv)	Records of supporting documentation	Yes.	
§63.10(b)(3)	Records of applicability determination	Yes.	
§63.10(c)	Additional records for sources using CEMS	Yes	Except that §63.10(c)(2)-(4) and (9) are reserved.
§63.10(d)(1)	General reporting requirements	Yes.	
§63.10(d)(2)	Report of performance test results	Yes.	
§63.10(d)(3)	Reporting opacity or VE observations	No	Subpart ZZZZ does not contain opacity or VE standards.
§63.10(d)(4)	Progress reports	Yes.	
§63.10(d)(5)	Startup, shutdown, and malfunction reports	No.	
§63.10(e)(1) and (2)(i)	Additional CMS Reports	Yes.	
§63.10(e)(2)(ii)	COMS-related report	No	Subpart ZZZZ does not require COMS.
§63.10(e)(3)	Excess emission and parameter exceedances reports	Yes.	Except that §63.10(e)(3)(i)(C) is reserved.
§63.10(e)(4)	Reporting COMS data	No	Subpart ZZZZ does not require COMS.

§63.10(f)	Waiver for recordkeeping/reporting	Yes.	
§63.11	Flares	No.	
§63.12	State authority and delegations	Yes.	
§63.13	Addresses	Yes.	
§63.14	Incorporation by reference	Yes.	
§63.15	Availability of information	Yes.	

[75 FR 9688, Mar. 3, 2010, as amended at 78 FR 6720, Jan. 30, 2013]

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Appendix A to Subpart ZZZZ of Part 63—Protocol for Using an Electrochemical Analyzer to Determine Oxygen and Carbon Monoxide Concentrations From Certain Engines

1.0 SCOPE AND APPLICATION. WHAT IS THIS PROTOCOL?

This protocol is a procedure for using portable electrochemical (EC) cells for measuring carbon monoxide (CO) and oxygen (O_2) concentrations in controlled and uncontrolled emissions from existing stationary 4-stroke lean burn and 4-stroke rich burn reciprocating internal combustion engines as specified in the applicable rule.

1.1 Analytes. What does this protocol determine?

This protocol measures the engine exhaust gas concentrations of carbon monoxide (CO) and oxygen (O_2).

Analyte	CAS No.	Sensitivity
Carbon monoxide (CO)	630-08-0	Minimum detectable limit should be 2 percent of the nominal range or 1 ppm, whichever is less restrictive.
Oxygen (O_2)	*7782-44-7*	

1.2 Applicability. When is this protocol acceptable?

This protocol is applicable to 40 CFR part 63, subpart ZZZZ. Because of inherent cross sensitivities of EC cells, you must not apply this protocol to other emissions sources without specific instruction to that effect.

1.3 Data Quality Objectives. How good must my collected data be?

Refer to Section 13 to verify and document acceptable analyzer performance.

1.4 Range. What is the targeted analytical range for this protocol?

The measurement system and EC cell design(s) conforming to this protocol will determine the analytical range for each gas component. The nominal ranges are defined by choosing up-scale calibration gas concentrations near the maximum anticipated flue gas concentrations for CO and O_2, or no more than twice the permitted CO level.

1.5 Sensitivity. What minimum detectable limit will this protocol yield for a particular gas component?

The minimum detectable limit depends on the nominal range and resolution of the specific EC cell used, and the signal to noise ratio of the measurement system. The minimum detectable limit should be 2 percent of the nominal range or 1 ppm, whichever is less restrictive.

2.0 Summary of Protocol

In this protocol, a gas sample is extracted from an engine exhaust system and then conveyed to a portable EC analyzer for measurement of CO and O_2 gas concentrations. This method provides measurement system performance specifications and sampling protocols to ensure reliable data. You may use additions to, or modifications of vendor supplied measurement systems (e.g., heated or unheated sample lines, thermocouples, flow meters, selective gas scrubbers, etc.) to meet the design specifications of this protocol. Do not make changes to the measurement system from the as-verified configuration (Section 3.12).

3.0 Definitions

3.1 Measurement System. The total equipment required for the measurement of CO and O_2 concentrations. The measurement system consists of the following major subsystems:

3.1.1 Data Recorder. A strip chart recorder, computer or digital recorder for logging measurement data from the analyzer output. You may record measurement data from the digital data display manually or electronically.

3.1.2 Electrochemical (EC) Cell. A device, similar to a fuel cell, used to sense the presence of a specific analyte and generate an electrical current output proportional to the analyte concentration.

3.1.3 Interference Gas Scrubber. A device used to remove or neutralize chemical compounds that may interfere with the selective operation of an EC cell.

3.1.4 Moisture Removal System. Any device used to reduce the concentration of moisture in the sample stream so as to protect the EC cells from the damaging effects of condensation and to minimize errors in measurements caused by the scrubbing of soluble gases.

3.1.5 Sample Interface. The portion of the system used for one or more of the following: sample acquisition; sample transport; sample conditioning or protection of the EC cell from any degrading effects of the engine exhaust effluent; removal of particulate matter and condensed moisture.

3.2 Nominal Range. The range of analyte concentrations over which each EC cell is operated (normally 25 percent to 150 percent of up-scale calibration gas value). Several nominal ranges can be used for any given cell so long as the calibration and repeatability checks for that range remain within specifications.

3.3 Calibration Gas. A vendor certified concentration of a specific analyte in an appropriate balance gas.

3.4 Zero Calibration Error. The analyte concentration output exhibited by the EC cell in response to zero-level calibration gas.

3.5 Up-Scale Calibration Error. The mean of the difference between the analyte concentration exhibited by the EC cell and the certified concentration of the up-scale calibration gas.

3.6 Interference Check. A procedure for quantifying analytical interference from components in the engine exhaust gas other than the targeted analytes.

3.7 Repeatability Check. A protocol for demonstrating that an EC cell operated over a given nominal analyte concentration range provides a stable and consistent response and is not significantly affected by repeated exposure to that gas.

3.8 Sample Flow Rate. The flow rate of the gas sample as it passes through the EC cell. In some situations, EC cells can experience drift with changes in flow rate. The flow rate must be monitored and documented during all phases of a sampling run.

3.9 Sampling Run. A timed three-phase event whereby an EC cell's response rises and plateaus in a sample conditioning phase, remains relatively constant during a measurement data phase, then declines during a refresh phase. The sample conditioning phase exposes the EC cell to the gas sample for a length of time sufficient to reach a constant response. The measurement data phase is the time interval during which gas sample measurements can be made that meet the acceptance criteria of this protocol. The refresh phase then purges the EC cells with CO-free air. The refresh phase replenishes requisite O_2 and moisture in the electrolyte reserve and provides a mechanism to de-gas or desorb any interference gas scrubbers or filters so as to enable a stable CO EC cell response. There are four primary types of sampling runs: pre- sampling calibrations; stack gas sampling; post-sampling calibration checks; and measurement system repeatability checks. Stack gas sampling runs can be chained together for extended evaluations, providing all other procedural specifications are met.

3.10 Sampling Day. A time not to exceed twelve hours from the time of the pre-sampling calibration to the post-sampling calibration check. During this time, stack gas sampling runs can be repeated without repeated recalibrations, providing all other sampling specifications have been met.

3.11 Pre-Sampling Calibration/Post-Sampling Calibration Check. The protocols executed at the beginning and end of each sampling day to bracket measurement readings with controlled performance checks.

3.12 Performance-Established Configuration. The EC cell and sampling system configuration that existed at the time that it initially met the performance requirements of this protocol.

4.0 INTERFERENCES.

When present in sufficient concentrations, NO and NO_2 are two gas species that have been reported to interfere with CO concentration measurements. In the likelihood of this occurrence, it is the protocol user's responsibility to employ and properly maintain an appropriate CO EC cell filter or scrubber for removal of these gases, as described in Section 6.2.12.

5.0 SAFETY. [RESERVED]

6.0 EQUIPMENT AND SUPPLIES.

6.1 What equipment do I need for the measurement system?

The system must maintain the gas sample at conditions that will prevent moisture condensation in the sample transport lines, both before and as the sample gas contacts the EC cells. The essential components of the measurement system are described below.

6.2 Measurement System Components.

6.2.1 Sample Probe. A single extraction-point probe constructed of glass, stainless steel or other non-reactive material, and of length sufficient to reach any designated sampling point. The sample probe must be designed to prevent plugging due to condensation or particulate matter.

6.2.2 Sample Line. Non-reactive tubing to transport the effluent from the sample probe to the EC cell.

6.2.3 Calibration Assembly (optional). A three-way valve assembly or equivalent to introduce calibration gases at ambient pressure at the exit end of the sample probe during calibration checks. The assembly must be designed such that only stack gas or calibration gas flows in the sample line and all gases flow through any gas path filters.

6.2.4 Particulate Filter (optional). Filters before the inlet of the EC cell to prevent accumulation of particulate material in the measurement system and extend the useful life of the components. All filters must be fabricated of materials that are non-reactive to the gas mixtures being sampled.

6.2.5 Sample Pump. A leak-free pump to provide undiluted sample gas to the system at a flow rate sufficient to minimize the response time of the measurement system. If located upstream of the EC cells, the pump must be constructed of a material that is non-reactive to the gas mixtures being sampled.

6.2.8 Sample Flow Rate Monitoring. An adjustable rotameter or equivalent device used to adjust and maintain the sample flow rate through the analyzer as prescribed.

6.2.9 Sample Gas Manifold (optional). A manifold to divert a portion of the sample gas stream to the analyzer and the remainder to a by-pass discharge vent. The sample gas manifold may also include provisions for introducing calibration gases directly to the analyzer. The manifold must be constructed of a material that is non-reactive to the gas mixtures being sampled.

6.2.10 EC cell. A device containing one or more EC cells to determine the CO and O_2 concentrations in the sample gas stream. The EC cell(s) must meet the applicable performance specifications of Section 13 of this protocol.

6.2.11 Data Recorder. A strip chart recorder, computer or digital recorder to make a record of analyzer output data. The data recorder resolution (i.e., readability) must be no greater than 1 ppm for CO; 0.1 percent for O_2; and one degree (either °C or °F) for temperature. Alternatively, you may use a digital or analog meter having the same resolution to observe and manually record the analyzer responses.

6.2.12 Interference Gas Filter or Scrubber. A device to remove interfering compounds upstream of the CO EC cell. Specific interference gas filters or scrubbers used in the performance-established configuration of the analyzer must continue to be used. Such a filter or scrubber must have a means to determine when the removal agent is exhausted. Periodically replace or replenish it in accordance with the manufacturer's recommendations.

7.0 REAGENTS AND STANDARDS. WHAT CALIBRATION GASES ARE NEEDED?

7.1 Calibration Gases. CO calibration gases for the EC cell must be CO in nitrogen or CO in a mixture of nitrogen and O_2. Use CO calibration gases with labeled concentration values certified by the manufacturer to be within ±5 percent of the label value. Dry ambient air (20.9 percent O_2) is acceptable for calibration of the O_2 cell. If needed, any lower percentage O_2 calibration gas must be a mixture of O_2 in nitrogen.

7.1.1 Up-Scale CO Calibration Gas Concentration. Choose one or more up-scale gas concentrations such that the average of the stack gas measurements for each stack gas sampling run are between 25 and 150 percent of those concentrations. Alternatively, choose an up-scale gas that does not exceed twice the concentration of the applicable outlet standard. If a measured gas value exceeds 150 percent of the up-scale CO calibration gas value at any time during the stack gas sampling run, the run must be discarded and repeated.

7.1.2 Up-Scale O_2 Calibration Gas Concentration.

Select an O_2 gas concentration such that the difference between the gas concentration and the average stack gas measurement or reading for each sample run is less than 15 percent O_2. When the average exhaust gas O_2 readings are above 6 percent, you may use dry ambient air (20.9 percent O_2) for the up-scale O_2 calibration gas.

7.1.3 Zero Gas. Use an inert gas that contains less than 0.25 percent of the up-scale CO calibration gas concentration. You may use dry air that is free from ambient CO and other combustion gas products (e.g., CO_2).

8.0 Sample Collection and Analysis

8.1 Selection of Sampling Sites.

8.1.1 Control Device Inlet. Select a sampling site sufficiently downstream of the engine so that the combustion gases should be well mixed. Use a single sampling extraction point near the center of the duct (e.g., within the 10 percent centroidal area), unless instructed otherwise.

8.1.2 Exhaust Gas Outlet. Select a sampling site located at least two stack diameters downstream of any disturbance (e.g., turbocharger exhaust, crossover junction or recirculation take-off) and at least one-half stack diameter upstream of the gas discharge to the atmosphere. Use a single sampling extraction point near the center of the duct (e.g., within the 10 percent centroidal area), unless instructed otherwise.

8.2 Stack Gas Collection and Analysis. Prior to the first stack gas sampling run, conduct that the pre-sampling calibration in accordance with Section 10.1. Use Figure 1 to record all data. Zero the analyzer with zero gas. Confirm and record that the scrubber media color is correct and not exhausted. Then position the probe at the sampling point and begin the sampling run at the same flow rate used during the up-scale calibration. Record the start time. Record all EC cell output responses and the flow rate during the “sample conditioning phase” once per minute until constant readings are obtained. Then begin the “measurement data phase” and record readings every 15 seconds for at least two minutes (or eight readings), or as otherwise required to achieve two continuous minutes of data that meet the specification given in Section 13.1. Finally, perform the “refresh phase” by introducing dry air, free from CO and other combustion gases, until several minute-to-minute readings of consistent value have been obtained. For each run use the “measurement data phase” readings to calculate the average stack gas CO and O_2 concentrations.

8.3 EC Cell Rate. Maintain the EC cell sample flow rate so that it does not vary by more than ±10 percent throughout the pre-sampling calibration, stack gas sampling and post-sampling calibration check.

Alternatively, the EC cell sample flow rate can be maintained within a tolerance range that does not affect the gas concentration readings by more than ±3 percent, as instructed by the EC cell manufacturer.

9.0 Quality Control (Reserved)

10.0 Calibration and Standardization

10.1 Pre-Sampling Calibration. Conduct the following protocol once for each nominal range to be used on each EC cell before performing a stack gas sampling run on each field sampling day. Repeat the calibration if you replace an EC cell before completing all of the sampling runs. There is no prescribed order for calibration of the EC cells; however, each cell must complete the measurement data phase during calibration. Assemble the measurement system by following the manufacturer's recommended protocols including for preparing and preconditioning the EC cell. Assure the measurement system has no leaks and verify the gas scrubbing agent is not depleted. Use Figure 1 to record all data.

10.1.1 Zero Calibration. For both the O_2 and CO cells, introduce zero gas to the measurement system (e.g., at the calibration assembly) and record the concentration reading every minute until readings are constant for at least two consecutive minutes. Include the time and sample flow rate. Repeat the steps in this section at least once to verify the zero calibration for each component gas.

10.1.2 Zero Calibration Tolerance. For each zero gas introduction, the zero level output must be less than or equal to ±3 percent of the up-scale gas value or ±1 ppm, whichever is less restrictive, for the CO channel and less than or equal to ±0.3 percent O_2 for the O_2 channel.

10.1.3 Up-Scale Calibration. Individually introduce each calibration gas to the measurement system (e.g., at the calibration assembly) and record the start time. Record all EC cell output responses and the flow rate during this “sample conditioning phase” once per minute until readings are constant for at least two minutes. Then begin the “measurement data phase” and record readings every 15 seconds for a total of two minutes, or as otherwise required. Finally, perform the “refresh phase” by introducing dry air, free from CO and other combustion gases, until readings are constant for at least two consecutive minutes. Then repeat the steps in this section at least once to verify the calibration for each component gas. Introduce all gases to flow through the entire sample handling system (i.e., at the exit end of the sampling probe or the calibration assembly).

10.1.4 Up-Scale Calibration Error. The mean of the difference of the “measurement data phase” readings from the reported standard gas value must be less than or equal to ±5 percent or ±1 ppm for CO or ±0.5 percent O_2, whichever is less restrictive, respectively. The maximum allowable deviation from the mean measured value of any single “measurement data phase” reading must be less than or equal to ±2 percent or ±1 ppm for CO or ±0.5 percent O_2, whichever is less restrictive, respectively.

10.2 Post-Sampling Calibration Check. Conduct a stack gas post-sampling calibration check after the stack gas sampling run or set of runs and within 12 hours of the initial calibration. Conduct up-scale and zero calibration checks using the protocol in Section 10.1. Make no changes to the sampling system or EC cell calibration until all post-sampling calibration checks have been recorded. If either the zero or up-scale calibration error exceeds the respective specification in Sections 10.1.2 and 10.1.4 then all measurement data collected since the previous successful calibrations are invalid and re-calibration and re-sampling are required. If the sampling system is disassembled or the EC cell calibration is adjusted, repeat the calibration check before conducting the next analyzer sampling run.

11.0 Analytical Procedure

The analytical procedure is fully discussed in Section 8.

12.0 Calculations and Data Analysis

Determine the CO and O_2 concentrations for each stack gas sampling run by calculating the mean gas concentrations of the data recorded during the “measurement data phase”.

13.0 Protocol Performance

Use the following protocols to verify consistent analyzer performance during each field sampling day.

13.1 Measurement Data Phase Performance Check. Calculate the mean of the readings from the “measurement data phase”. The maximum allowable deviation from the mean for each of the individual readings is ±2 percent, or ±1 ppm, whichever is less restrictive. Record the mean value and maximum deviation for each gas monitored. Data must conform to Section 10.1.4. The EC cell flow rate must conform to the specification in Section 8.3.

Example: A measurement data phase is invalid if the maximum deviation of any single reading comprising that mean is greater than ±2 percent *or* ±1 ppm (the default criteria). For example, if the mean = 30 ppm, single readings of below 29 ppm and above 31 ppm are disallowed).

13.2 Interference Check. Before the initial use of the EC cell and interference gas scrubber in the field, and semi-annually thereafter, challenge the interference gas scrubber with NO and NO_2 gas standards that are generally recognized as representative of diesel-fueled engine NO and NO_2 emission values. Record the responses displayed by the CO EC cell and other pertinent data on Figure 1 or a similar form.

13.2.1 Interference Response. The combined NO and NO_2 interference response should be less than or equal to ±5 percent of the up-scale CO calibration gas concentration.

13.3 Repeatability Check. Conduct the following check once for each nominal range that is to be used on the CO EC cell within 5 days prior to each field sampling program. If a field sampling program lasts longer than 5 days, repeat this check every 5 days. Immediately repeat the check if the EC cell is replaced or if the EC cell is exposed to gas concentrations greater than 150 percent of the highest up-scale gas concentration.

13.3.1 Repeatability Check Procedure. Perform a complete EC cell sampling run (all three phases) by introducing the CO calibration gas to the measurement system and record the response. Follow Section 10.1.3. Use Figure 1 to record all data. Repeat the run three times for a total of four complete runs. During the four repeatability check runs, do not adjust the system except where necessary to achieve the correct calibration gas flow rate at the analyzer.

13.3.2 Repeatability Check Calculations. Determine the highest and lowest average “measurement data phase” CO concentrations from the four repeatability check runs and record the results on Figure 1 or a similar form. The absolute value of the difference between the maximum and minimum average values recorded must not vary more than ±3 percent or ±1 ppm of the up-scale gas value, whichever is less restrictive.

14.0 Pollution Prevention (Reserved)

15.0 Waste Management (Reserved)

16.0 Alternative Procedures (Reserved)

17.0 References

(1) “Development of an Electrochemical Cell Emission Analyzer Test Protocol”, Topical Report, Phil Juneau, Emission Monitoring, Inc., July 1997.

(2) “Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Emissions from Natural Gas-Fired Engines, Boilers, and Process Heaters Using Portable Analyzers”, EMC Conditional Test Protocol 30 (CTM-30), Gas Research Institute Protocol GRI-96/0008, Revision 7, October 13, 1997.

(3) “ICAC Test Protocol for Periodic Monitoring”, EMC Conditional Test Protocol 34 (CTM-034), The Institute of Clean Air Companies, September 8, 1999.

(4) “Code of Federal Regulations”, Protection of Environment, 40 CFR, Part 60, Appendix A, Methods 1-4; 10.

TABLE 1: APPENDIX A—SAMPLING RUN DATA.

Facility_____ Engine I.D._____ Date_____											
Run Type:	(_)			(_)				(_)			(_)
(X)	Pre-Sample Calibration			Stack Gas Sample				Post-Sample Cal. Check			Repeatability Check
Run #	1	1	2	2	3	3	4	4	Time	Scrub. OK	Flow- Rate
Gas	O_2	CO	O_2	CO	O_2	CO	O_2	CO			
Sample Cond. Phase											
″											
″											
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″											
Measurement Data Phase											
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Mean											
Refresh Phase											
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[78 FR 6721, Jan. 30, 2013]

APPENDIX D: EMISSIONS INVENTORY

APPENDIX E: AIR DISPERSION MODELING REPORT

PROJECT REPORT

City of Jerome WWTP > Jerome, ID

Air Dispersion Modeling Report

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July 2016

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1. EXECUTIVE SUMMARY

This air quality modeling report documents the methodology and results of the air quality analyses prepared in support of an Idaho Department of Environmental Quality (IDEQ) Permit to Construct (PTC) application for the City of Jerome Wastewater Treatment Plant (WWTP) in Jerome, Idaho. This report seeks to fully document and report the methods and techniques used to perform the modeling as well as the results of the modeling analysis, in support of the PTC application.

All information provided in this report and the PTC application is based on preliminary facility design and bid package response. All available manufacturer and vendor information has been provided. If, upon final design and construction, information or parameters differ from the values presented in this modeling report and PTC application and/or PTC, the City of Jerome will review the applicability of a modification to the PTC including impacts to the NAAQS analyses completed as part of this initial PTC application.

The City of Jerome is proposing to upgrade the existing WWTP. Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1) biogas fired boiler, one (1) biogas flare, five (5) emergency generators and various small natural gas fired heaters. In addition, there are three (3) existing emergency generators that will be included in the modeling analyses and permit application. Auxiliary support and controls equipment and new facility buildings will also be included as part of the upgrade. The City does not currently have a PTC.

The Jerome WWTP facility will be a minor source of criteria pollutants and Hazardous Air Pollutants (HAPs)/Toxic Air Pollutants (TAPs). In addition, the emergency generators at the facility will be subject to 40 CFR Part 60, Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines and 40 CFR Part 63, Subpart ZZZZ—National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

Air dispersion modeling was conducted for those criteria pollutants which exceed the Idaho Level I modeling thresholds and TAPs which exceed the screening emissions level (EL) in Idaho Air Rules Section 585 and 586. The criteria pollutants which exceed the modeling threshold at the WWTP are PM_{10}, $PM_{2.5}$, and NO_X. In addition, several TAPs exceed the screening emission levels (ELs) in IDAPA 58.01.01.585 and 586. These TAPs a include formaldehyde, arsenic, cadmium, and nickel.

The model used for this application is AERMOD (version 15181), the USEPA–approved model for near-field new source review. AERMOD was applied as recommended in the United States Environmental Protection Agency's (EPA) Guideline on Air Quality Models and consistent with guidance in IDEQ's Dispersion Modeling Guidelines and the model protocol submitted to IDEQ on June 10, 2016, with minor exceptions (introduced for conservatism) as noted in Section 3.4. No non-regulatory or beta options within AERMOD were employed; only regulatory defaults were used. The results of the modeling show that the facility is in compliance with all applicable National Ambient Air Quality Standards (NAAQS) and TAP Acceptable Ambient Concentrations (AACs) and Acceptable Ambient Concentrations for Carcinogens (AACCs).

2. PROJECT DESCRIPTION AND BACKGROUND AS IT RELATES TO MODELING ANALYSES

The City of Jerome is proposing to upgrade the existing WWTP. Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1) biogas fired boiler, one (1) biogas flare, five (5) emergency generators and various small natural gas fired heaters. In addition, there are three (3) existing emergency generators that will be included in the modeling analyses. Auxiliary support and controls equipment and new facility buildings will also be included as part of the upgrade.

Emissions from the project include criteria pollutants and several IDAPA TAPs.

2.1. GENERAL FACILITY/PROJECT DESCRIPTION

The City of Jerome provides wastewater treatment for City residents, commercial retail, light industrial, and industrial wastewater. The current treatment facility includes headworks (fine screening, grit removal, and flow measurement) trickling filters (two bio-towers), membrane bioreactor (MBR) treatment (two aeration basins, MBR tanks, blowers and permeate pumps), chemical addition for phosphorus removal, ultraviolet disinfection, solids handling facilities (aerobic digester, pumps, belt press and back up drying beds), a lab and a control building. Treated wastewater is discharged to the J8 Canal under a discharge permit issued by the EPA. Since the existing WWTP was originally constructed, the plant has experienced a drastic increase in both flows and loading with new commercial, industrial and residential development. Due to these increases as well as stricter effluent discharge permit conditions and limitations, upgrades to the WWTP are necessary.

The proposed upgrades to the plant include construction of two new anaerobic digesters to allow for improvements in solids handling; biogas will be generated by the anaerobic digesters. The typical composition of biogas ranges from 60%-70% methane (CH_4), 20%-30% carbon dioxide (CO_2), and less than 1% sulfur gases. The accumulated biogas will be collected and conveyed via piping to one dual-fuel fired boiler and one biogas fired boiler. The boilers will use biogas as the primary fuel. If an inadequate amount of biogas is generated by the digesters, the second boiler will fire on natural gas. The boilers will be operated to maintain a specific temperature of the sludge in the digesters; as such, there may be times when one boiler is operating at partial capacity. During these times some biogas will be burned at the boilers, and some will be burned at the flare. Since the production of biogas is not consistent and varies with loadings and other factors, there will be flaring at the waste gas burner especially during the summer when there is minimal heat demand.

Five new diesel-fired emergency generators as well as three existing diesel-fired emergency generators will be used to supply emergency backup power to the entire WWTP if necessary. The engines will operate a maximum of 100 hours per year for testing and maintenance and required regulatory purposes. Generator maintenance and testing will be limited to 30 minutes per day to account for load bank and other required testing. In addition to the generators, the City of Jerome is proposing to install various small (<1 MMBtu/hr) natural gas-fired heaters throughout the facility for comfort heating in the winter months.

The facility proposes to operate 8,760 hours per year, with the exception of the emergency generators. The emergency generators will operate less than 100 hours/year for non-emergency situations; testing of the engines will only occur between the hours of 6am and 7pm.

Emissions from the facility will include natural gas and biogas combustion emissions from the boilers, flare and heaters and diesel combustion emissions from the emergency generators. A draft process flow diagram is included in **Appendix A.**

Specific emission sources at the facility are described in the subsections below.

2.1.1. Anaerobic Digesters

Anaerobic digestion involves the decomposition of organic and inorganic matter in the absence of oxygen. In the process of decomposing organic and inorganic matter, heat is generated. This heat facilitates pathogen reduction. In addition to heat, anaerobic digestion produces biogas, consisting of methane, carbon dioxide and traces of other gases, and can be combusted to generate steam, heat or electricity.

The proposed project will include installation of two anaerobic digesters. Each digester will be approximately 99,500 cubic feet (cf) in size (745,000 gallons). The biogas produced by the digesters will be collected and conveyed via piping to one dual-fuel fired boiler and one biogas fired boiler to maintain the temperature of the sludge in the digesters. If the amount of biogas produced exceeds the combined capacity of the boilers, or when there is minimal heat demand by the digesters, the biogas will be directed to the proposed open-top flare.

2.1.2. Biogas Boilers

Biogas generated by the anaerobic digesters will be collected and conveyed to the Burnham biogas boiler and Burnham dual-fuel boiler. Operation of the boilers will be dependent on the amount of biogas generated by the digesters, which can vary based on the incoming wastewater characteristics. Operation of the boilers will also be dependent on the amount of heat required to maintain the temperature of the digesters. Biogas will be primarily conveyed to the biogas boiler. If the digester biogas generation exceeds the capacity of the biogas boiler, the excess biogas will be conveyed to the dual-fuel boiler. If insufficient biogas is available to fire both boilers, and additional heating of the digesters is required, the dual-fuel fired boiler can be operated solely on natural gas.

The boilers will be located inside the Anaerobic Digester Control building, and will exhaust through stacks on top of the roof. A site layout drawing is included in **Appendix A**. The boilers are represented in the model as unrestricted vertical point sources. Emissions of criteria pollutants were calculated using a combination of manufacturer specific emission factors and AP-42 Section 1.4. HAPs/TAPs were calculated using AP-42 Section 1.4. Emission factors from the manufacturer and from AP-42 Tables 1.4-1 through 1.4.-4 are for combustion of natural gas, which has a heating value of 1020 Btu/scf. In order to develop emission factors for biogas combustion, the emission factors from the manufacturer and AP-42 were converted to biogas emission factors by multiplying the given natural gas emission factor by the ratio of the specified biogas heating value to the average natural gas heating value. The biogas from the digesters will have an average heating value of 550 Btu/scf.

Exhaust parameters including the exhaust temperature, stack diameter and flow rate for the boilers were provided by Folsom Associates for the Burnham biogas and natural gas-fired boilers. The stack height was provided by Keller Associates, and is based on height of building J5; the boilers will exhaust through the roof of the building. Exhaust calculation and boiler spec sheets are provided in **Appendix B.**

2.1.3. Flare

Biogas generated by the anaerobic digesters will be conveyed to the biogas and dual-fuel boilers. However, if the amount of biogas generated by the digesters exceeds the capacity of both of the boilers, or if one or both of the

boilers is not needed to maintain the digester sludge temperature, excess biogas will be directed to the open flare.

The flare is located near the Anaerobic Digester Control building and is shown on the site layout as J6 (**Appendix A**). The flare was modeled as a point source with the stack diameter and stack height provided by Keller Associates, based on the manufacturer specifications for the Varec 244 WL flare, with 6" diameter gas piping. The manufacturer specifications are provided in **Appendix B.** Exhaust temperature and exit velocity used the standard SCREEN3 values of 1273 Kelvin and 20 meters per second (m/s), respectively.

Emissions from the flare and natural gas flare pilot were calculated using AP-42 Section 1.4. Emission factors from AP-42 Tables 1.4-1 through 1.4.-4 are for combustion of natural gas, which has a heating value of 1020 Btu/scf. In order to develop emission factors for biogas combustion, the emission factors from AP-42 were converted to biogas emission factors by multiplying the given natural gas emission factor by the ratio of the specified biogas heating value to the average natural gas heating value. The biogas from the digesters will have an average heating value of 550 Btu/scf.

2.1.4. Emergency Generators

Five new Caterpillar diesel-fired emergency generators as well as three existing Generac diesel-fired emergency generators will be used to supply emergency backup power to the entire WWTP if necessary. The engines will operate a maximum of 100 hours per year for testing and maintenance and required regulatory purposes. Generator maintenance and testing will be limited to 30 minutes per day to account for load bank and other required testing. The emergency generators will operate less than 100 hours/year for non-emergency situations; testing of the engines will only occur between the hours of 6am and 7pm.

The three existing generators (GENA-GENC) are located near the MBR & UV building. Two of the new generators will be located near the existing Sludge Storage tank (structure K3 on Site Layout) and three of the new generators will be located near Biotower #1 (structure K2 on Site Layout). The generators are represented in the model as unrestricted vertical point sources. Emissions from the generators were calculated using manufacturer's specifications and AP-42 Section 3.4.

Exhaust parameters including stack diameter, exhaust temperature and exit velocity were obtained from several sources in order to provide the most conservative (worst-case) dispersion parameters. Per email from Kevin Schilling (received 6/21/2016), DEQ recommended the use of the method provided in the *Washington State Department of Ecology document, Suitability of Diesel-Powered Emergency Generators for Air Quality General Order of Approval: Evaluation of Control Technology, Ambient Impacts, and Potential Approval Criteria (June 2006).* Using this guidance, the engine exhaust flow is based on the horsepower (hp) rating of the engine by the following equation (Table 6 in the attached guidance document in **Appendix C**):

$$\frac{0.284\ m^3/sec}{100\ hp} \times X\ hp = Y\ m^3/sec$$

The guidance recommends using a 44.6 meter/second stack gas exit velocity and then calculating the diameter that would result in a total flow equal to the exhaust flow calculated by the equation above. The exhaust exit temperature can be estimated by interpolating between appropriate values from a table in the guidance document that lists temperatures for various engine power ratings. Using this methodology results in a flow rate of 2.16 m^3/sec for the 762 BHP engines and a diameter of 0.049 m (1.93 inches). Interpolation of exhaust temperatures from Table 7 of the guidance, using a logarithmic trend line to fit the data, results in an

approximate temperature of 885°K (1135°F). The DOE guidance is included in **Appendix C.** However, DEQ's modeling protocol approval (received July 11, 2016) states that "in general exhaust velocities over 50 m/s and temperatures over 800°F are considered suspect." In addition, the 1.93 inch diameter calculated using the DOE methodology is unrealistic, and the exhaust diameter of the existing generators was measured at 5 inches by facility personnel.

Therefore, a conservative combination of exhaust parameters were used for the emergency engines. Exhaust velocities were set to 44.6 m/s per DOE guidance, and a temperature of 800°F was used per DEQ guidance. The exhaust diameter was set to the value provided on the manufacturer specification sheets, included in **Appendix B**. The stack height of the new Caterpillar generators was estimated as the height of the engine package, as listed in the manufacturer specification. This height represents a conservative value, as the generators will be set on concrete pads, and will have a vertical stack exiting the generator enclosure. The as-built stack height is expected to be at least one to two feet higher. The stack height of the existing Generac generators was measured on-site and provided by the WWTP personnel.

2.1.5. Heaters

Various small (<1 MMBtu/hr) natural gas-fired heaters will be installed throughout the facility for comfort heating in the winter months. The heaters will be located in the Solids & Dewatering building and Anaerobic Digester Control building, and will exhaust through the sides of the building. One heater, GUH3, will exhaust through the roof of the Sludge Pump Building. The heaters that exhaust through the sides of the building were represented in the model as vertical point sources with the actual stack diameter and a 0.001 m/sec exit velocity, consistent with IDEQ modeling guidance. The GUH3 heater was represented in the model as a vertical point source with actual stack diameter and stack height based on the height of the Sludge Pump Building; as a conservative measure, the exhaust exit velocity was assumed to be 0.001 m/sec. The exhaust temperature of all the heaters were set to the discharge air temperature rise provided in the manufacturer specification sheet, included in **Appendix B.** Criteria and HAP/TAP emissions from the heaters were calculated using AP-42 Section 1.4.

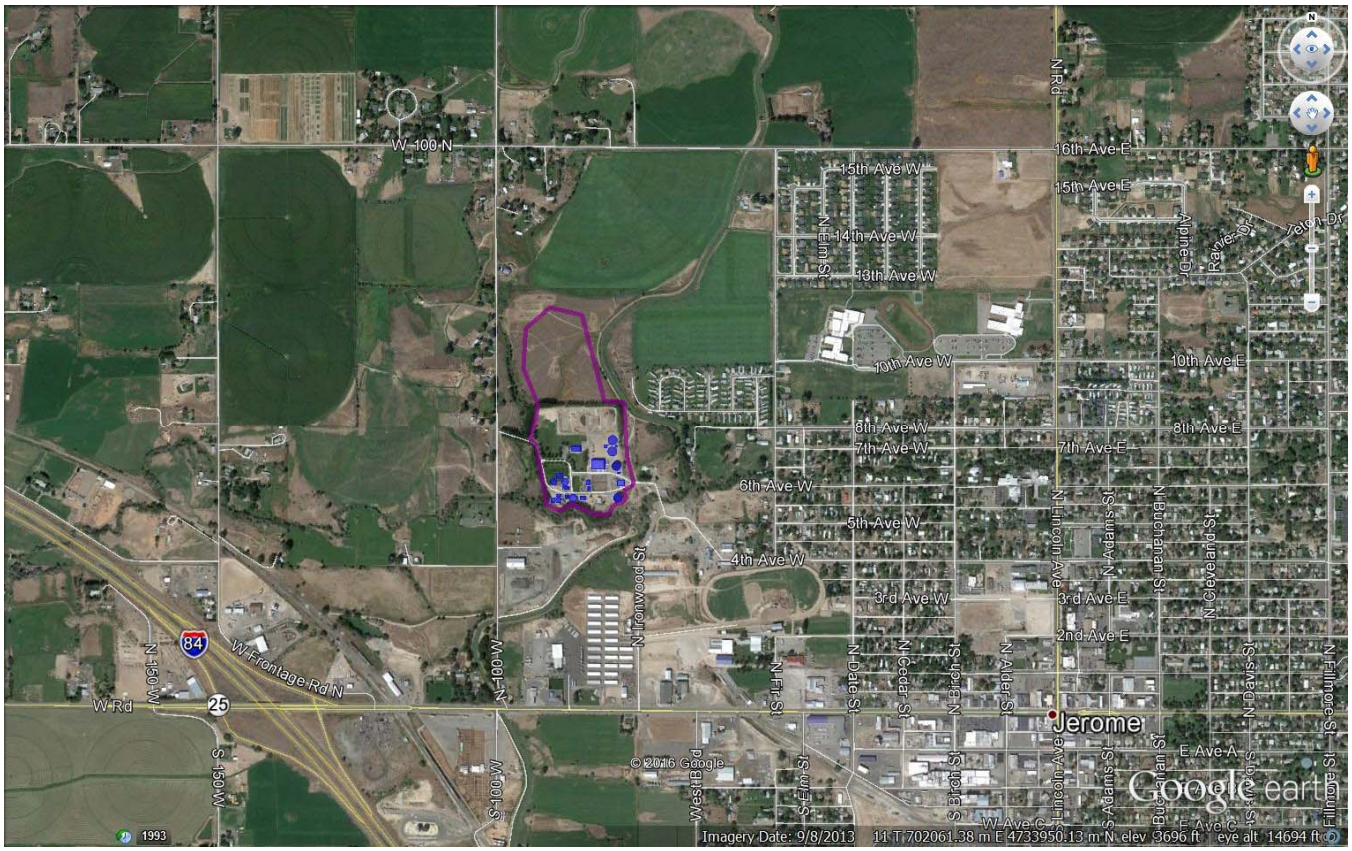
2.2. LOCATION OF PROJECT

The Jerome WWTP is located at 500 N 100 W in Jerome in Jerome County, ID. The UTM coordinates for the facility are approximately 701,811 m E, 4,733,848 m N, Zone 11 (NAD83 coordinate system). Jerome County is an attainment area for all criteria pollutants. Land use in the area includes agricultural, light industrial and residential properties. Terrain surrounding the project site is relatively flat. A map showing the location of the facility is provided as Error! Reference source not found.**.**

The proposed equipment will be constructed within the existing property boundary. Some of the existing site buildings and equipment such as the sludge storage tanks will be decommissioned and removed to accommodate the new equipment and facility buildings

X A map showing the geographical location of the facility is provided in this section or a reference is provided to another location in the application where a map is provided.

Figure 2-1. Facility Location



2.3. EXISTING PERMITS AND MODELING ANALYSES PERFORMED

Emissions sources at the existing WWTP include three emergency generators; there are no existing air quality permits, and no previous modeling analyses have been performed.

X (n/a) Any existing air quality permits are listed and described in this section, and any associated air quality modeling analyses have been described and referenced, and submitted if appropriate.

3. MODELING ANALYSES APPLICABILITY AND PROTOCOL

The model used for this application is AERMOD (version 15181), the USEPA–approved model for near-field new source review. Based on EPA guidance AERMOD is the most appropriate of the EPA-approved models given the site's physical characteristics and the facility emission sources. AERMOD was applied as recommended in EPA's Guideline on Air Quality Models and consistent with guidance in IDEQ's Dispersion Modeling Guidelines.

The criteria pollutants which exceed the modeling threshold at the WWTP are PM_{10}, $PM_{2.5}$, and NO_X. In addition, several TAPs exceed the screening emission levels (ELs) in IDAPA 58.01.01.585 and 586. These TAPs include formaldehyde, arsenic, cadmium, and nickel.

The emergency generators at the facility will be subject to 40 CFR Part 60, Subpart IIII and 40 CFR Part 63, Subpart ZZZZ. Per IDEQ policy and guidance, HAPs that are regulated by a federal NSPS or NESHAPS are not required to be included in the calculation of PTE or in the modeling analysis. The regulated HAPs under Subparts IIII and ZZZZ include PAH, acetaldehyde, arsenic, benzene, beryllium, cadmium, formaldehyde, acrolein and methanol. Therefore emissions of these pollutants from the emergency generators were not included in the PTE calculation nor in the modeling for those pollutants listed that exceeded the IDAPA modeling thresholds.

In general, the AERMOD model application used model source data consistent with the permit emission inventory. The model receptor network and model domain proposed meet all EPA and IDEQ recommendations, and ensured a complete dispersion analysis that captures maximum potential impacts. Only direct chemical emissions and transport were considered in this analysis; chemical transformation of emissions was not considered in this analysis.

3.1. APPLICABLE STANDARDS

Criteria pollutant National Ambient Air Quality Standards (NAAQS) are listed in **Table 3-1**, along with significant impact levels (SILs).

Table 3-1. Applicable Regulatory Limits

Pollutant	Averaging Period	Significant Impact Levels[a] (µg/m³)[b]	Regulatory Limit[c] (µg/m³)	Modeled Design Value Used[d]
PM_{10}[e]	24-hour	5.0	150[f]	Maximum 6th highest[g]
$PM_{2.5}$[h]	24-hour	1.2	35[i]	Mean of maximum 8th highest[j]
	Annual	0.3	12[k]	Mean of maximum 1st highest[l]
Carbon monoxide (CO)	1-hour	2,000	40,000[m]	Maximum 2nd highest[n]
	8-hour	500	10,000[m]	Maximum 2nd highest[n]
Sulfur Dioxide (SO_2)	1-hour	3 ppb[o] (7.8 µg/m³)	75 ppb[p] (196 µg/m³)	Mean of maximum 4th highest[q]
	3-hour	25	1,300[m]	Maximum 2nd highest[n]
	24-hour	5	365[m]	Maximum 2nd highest[n]

Pollutant	Averaging Period	Significant Impact Levels[a] (μg/m³)[b]	Regulatory Limit[c] (μg/m³)	Modeled Design Value Used[d]
	Annual	1.0	80[r]	Maximum 1st highest[n]
Nitrogen Dioxide (NO_2)	1-hour	4 ppb (7.5 μg/m³)	100 ppb[s] (188 μg/m³)	Mean of maximum 8th highest[t]
	Annual	1.0	100[r]	Maximum 1st highest[n]
Lead (Pb)	3-month[u]	NA	0.15[r]	Maximum 1st highest[n]
	Quarterly	NA	1.5[r]	Maximum 1st highest[n]
Ozone (O_3)	8-hour	40 TPY VOC[v]	75 ppb[w]	Not typically modeled

a. Idaho Air Rules Section 006 (definition for significant contribution) or as incorporated by reference as per Idaho Air Rules Section 107.03.b.
b. Micrograms/cubic meter.
c. Incorporated into Idaho Air Rules by reference, as per Idaho Air Rules Section 107.
d. The maximum 1st highest modeled value is always used for the significant impact analysis unless indicated otherwise. Modeled design values are calculated for each ambient air receptor.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
f. Not to be exceeded more than once per year on average over 3 years.
g. Concentration at any modeled receptor when using five years of meteorological data.
h. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
i. 3-year mean of the upper 98th percentile of the annual distribution of 24-hour concentrations.
j. 5-year mean of the 8th highest modeled 24-hour concentrations at the modeled receptor for each year of meteorological data modeled. For the SIL analysis, the 5-year mean of the 1st highest modeled 24-hour impacts at the modeled receptor for each year.
k. 3-year mean of annual concentration.
l. 5-year mean of annual averages at the modeled receptor.
m. Not to be exceeded more than once per year.
n. Concentration at any modeled receptor.
o. Interim SIL established by EPA policy memorandum.
p. 3-year mean of the upper 99th percentile of the annual distribution of maximum daily 1-hour concentrations.
q. 5-year mean of the 4th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of 1st highest modeled 1-hour impacts for each year is used.
r. Not to be exceeded in any calendar year.
s. 3-year mean of the upper 98th percentile of the annual distribution of maximum daily 1-hour concentrations.
t. 5-year mean of the 8th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of maximum modeled 1-hour impacts for each year is used.
u. 3-month rolling average.
v. An annual emissions rate of 40 ton/year of VOCs is considered significant for O_3.
w. Annual 4th highest daily maximum 8-hour concentration averaged over three years.

TAP screening emissions levels (ELs) are listed in **Table 3-2**, along with acceptable ambient concentration limits (AAC/AACC).

Table 3-2. TAP ELs and AACS/AACCS

TAP	Non-Carcinogen or Carcinogen	Screening Emissions Level (EL)[a] (lb/hr)	AAC or AACC[b] (µg/m³)
Benzene	Carcinogen	8.00E-04	1.2E-01
Formaldehyde	Carcinogen	5.10E-04	7.7E-02
Toluene	Non-Carcinogen	2.50E+01	18,750
Xylenes	Non-Carcinogen	2.90E+01	21,750
Acetaldehyde	Carcinogen	3.00E-03	4.5E-01
Acrolein	Non-Carcinogen	1.70E-02	12.5
2-Methylnaphthalene	Carcinogen	9.10E-05	1.4E-02
3-Methylchloranthrene	Carcinogen	9.10E-05	1.4E-02
7,12-Dimethylbenz(a)anthracene	Carcinogen	9.10E-05	1.4E-02
Acenaphthylene	Carcinogen	9.10E-05	1.4E-02
Benzo(a)pyrene	Carcinogen	2.00E-06	3.0E-04
Benzo(b)fluoranthene	Carcinogen	2.00E-06	3.0E-04
Benzo(k)fluoranthene	Carcinogen	2.00E-06	3.0E-04
Dibenzo(a,h)anthracene	Carcinogen	2.00E-06	3.0E-04
Dichlorobenzene	Non-Carcinogen	3.00E+01	22,500
Hexane	Non-Carcinogen	1.20E+01	9,000
Naphthalene	Non-Carcinogen	3.33E+00	2,500
Acenaphthene	Carcinogen	9.10E-05	1.4E-02
Anthracene	Carcinogen	9.10E-05	1.4E-02
Benzo(a)anthracene	Carcinogen	2.00E-06	3.0E-04
Benzo(g,h,i)perylene	Carcinogen	9.10E-05	1.4E-02
Chrysene	Carcinogen	2.00E-06	3.0E-04
Fluoranthene	Carcinogen	9.10E-05	1.4E-02
Fluorene	Carcinogen	9.10E-05	1.4E-02
Indeno(1,2,3-cd)pyrene	Carcinogen	2.00E-06	3.0E-04
Phenanthrene	Carcinogen	9.10E-05	1.4E-02
Pentane	Non-Carcinogen	1.18E+02	88,500
Pyrene	Carcinogen	9.10E-05	1.4E-02
Arsenic	Carcinogen	1.50E-06	2.3E-04
Barium	Non-Carcinogen	3.30E-02	25
Beryllium	Carcinogen	2.80E-05	4.2E-03
Cadmium	Carcinogen	3.70E-06	5.6E-04
Chromium	Carcinogen	3.30E-02	8.3E-05
Cobalt	Non-Carcinogen	3.30E-03	2.5
Copper	Non-Carcinogen	6.70E-02	50
Manganese	Non-Carcinogen	3.33E-01	250
Molybdenum	Non-Carcinogen	3.33E-01	250
Nickel	Carcinogen	2.70E-05	4.2E-03
Selenium	Non-Carcinogen	1.30E-02	10
Vanadium	Non-Carcinogen	3.00E-03	2.5

a. ELs from Idaho Air Rules Section 585 and 586 in pounds/hour.

b. Acceptable Ambient Concentration (AAC) or Acceptable Ambient Concentration for a Carcinogen (AACC) from Idaho Air Rules Section 585 and 586, in micrograms/cubic meter or milligrams/cubic meter. Note that AACs listed in Idaho Air Rules Section 585 are expressed in units of milligrams/cubic meter rather than micrograms/cubic meter.

__X__All TAPs identified in the emissions inventory for the project are listed in the TAPs EL and AAC/AACC Table in this section.

3.2. CRITERIA POLLUTANT MODELING APPLICABILITY

Air dispersion modeling was conducted for those criteria pollutants which exceeded the Idaho Level I modeling thresholds, which include NO_x, PM_{10}, and $PM_{2.5}$. The facility-wide PTE as compared to the modeling thresholds is shown in **Table 3-3** below. Specific emission unit calculations are provided in **Appendix D**.

Table 3-3. Criteria Pollutant PTE vs. Modeling Thresholds

Pollutant	Facility-Wide PTE	Idaho Level I Modeling Threshold	Modeling Required?
CO (lb/hr)	8.5	15	No
NO_x (lb/hr)	63.3	0.20	Yes
NO_x (tpy)	10.6	1.2	Yes
SO_2 (lb/hr)	0.09	0.21	No
SO_2 (tpy)	0.06	1.2	No
PM_{10} (lb/hr)	0.60	0.22	Yes
$PM_{2.5}$ (lb/hr)	0.60	0.054	Yes
$PM_{2.5}$ (tpy)	0.56	0.35	Yes
Lead (lb/month)	0.02	14	No

Table 3-4 lists criteria pollutants for which site-specific modeling analyses were performed to demonstrate compliance with NAAQS.

Table 3-4. Modeling Applicability

Criteria Pollutant	Modeled (yes/no)	Basis for Exclusion from Modeling
$PM_{2.5}$ 24-hour	Yes	__BRC Exempt[a] __Emissions Below Level l Thresholds[b] __Emissions Below Level II Thresholds[c]
$PM_{2.5}$ annual	Yes	__BRC Exempt __Emissions Below Level l Thresholds __Emissions Below Level II Thresholds
PM_{10} 24-hour	Yes	__BRC Exempt __Emissions Below Level l Thresholds __Emissions Below Level II Thresholds

Criteria Pollutant	Modeled (yes/no)	Basis for Exclusion from Modeling
NO_2 1-hour	Yes	___BRC Exempt ___Emissions Below Level l Thresholds ___Emissions Below Level II Thresholds
NO_2 annual	Yes	___BRC Exempt ___Emissions Below Level l Thresholds ___Emissions Below Level II Thresholds
SO_2 1-hour, 3-hour	No	___BRC Exempt _X_Emissions Below Level l Thresholds ___Emissions Below Level II Thresholds
SO_2 annual	No	___BRC Exempt _X_Emissions Below Level l Thresholds ___Emissions Below Level II Thresholds
CO 1-hour, 8-hour	No	___BRC Exempt _X_Emissions Below Level l Thresholds ___Emissions Below Level II Thresholds

a. If the project would have qualified for a Category I BRC permitting exemption for the criteria pollutant in question, as per Idaho Air Rules Section 221.01, except for the emissions quantities of another criteria pollutant, then a NAAQS compliance analysis is not required under Section 203.02 or 403.02 for that criteria pollutant.

b. Level I Modeling Thresholds from Table 2 in Section 3 of the DEQ Modeling Guideline. NAAQS compliance is assured through DEQ's non-site-specific modeling analyses.

c. Level II Modeling Thresholds from Table 2 in Section 3 of the DEQ Modeling Guideline. NAAQS compliance is assured through DEQ's non-site-specific modeling analyses. Level II Modeling Thresholds can only be used with prior DEQ approval.

__**X**__Explanations/documentation why modeling was or was not performed for each criteria pollutant are provided in this section.

__**X**__Emissions calculations that clearly show how the modeling applicability determination was performed are provided in this section. Detailed emissions calculations are provided in **Appendix D.**

3.3. TAP MODELING APPLICABILITY

The increase in Toxic Air Pollutant (TAP) emission rates from the facility was calculated and compared to the screening levels. Air dispersion modeling was conducted for those TAPs which exceed the screening emissions level (EL) in Idaho Air Rules Section 585 and 586. These TAPs include formaldehyde, arsenic, cadmium, and nickel.

As discussed above, the emergency generators at the facility will be subject to 40 CFR Part 60, Subpart IIII and 40 CFR Part 63, Subpart ZZZZ. Per IDEQ policy and guidance, HAPs that are regulated by a federal NSPS or NESHAPS are not required to be included in the calculation of PTE or in the modeling analysis. The regulated HAPs under Subparts IIII and ZZZZ include PAH, acetaldehyde, arsenic, benzene, beryllium, cadmium, formaldehyde, acrolein and methanol. Therefore emissions of these pollutants from the emergency generators were not included in the PTE calculation nor in the modeling for those pollutants listed that exceeded the IDAPA modeling thresholds.

A comparison of the facility-wide TAPs emissions to the EL is shown in **Table 3-5**. Detailed emissions calculations are provided in **Appendix D**.

Table 3-5. TAPs PTE vs. Modeling Thresholds

Pollutant	HAP?	Non-Carc. TAP?	Carc. TAP?	Potential Emissions		IDAPA EL	Exceeds EL?
				lb/hr	tpy	lb/hr	
Benzene	Yes	No	Yes	3.89E-05	1.70E-04	8.00E-04	No
Formaldehyde	Yes	No	Yes	1.39E-03	6.09E-03	5.10E-04	Yes
Toluene	Yes	Yes	No	4.42E-03	4.94E-04	2.50E+01	No
Xylenes	Yes	Yes	No	2.99E-03	1.50E-04	2.90E+01	No
2-Methylnaphthalene	Yes	No	Yes	4.45E-07	1.95E-06	9.10E-05	No
3-Methylchloranthrene	Yes	No	Yes	3.33E-08	1.46E-07	9.10E-05	No
7,12-Dimethylbenz(a)anthracene	Yes	No	Yes	2.96E-07	1.30E-06	9.10E-05	No
Acenaphthylene	Yes	No	Yes	3.33E-08	1.46E-07	9.10E-05	No
Benzo(a)pyrene	Yes	No	Yes	2.22E-08	9.74E-08	2.00E-06	No
Benzo(b)fluoranthene	Yes	No	Yes	3.33E-08	1.46E-07	2.00E-06	No
Benzo(k)fluoranthene	Yes	No	Yes	3.33E-08	1.46E-07	2.00E-06	No
Dibenzo(a,h)anthracene	Yes	No	Yes	2.22E-08	9.74E-08	2.00E-06	No
Dichlorobenzene	Yes	Yes	No	2.22E-05	9.74E-05	3.00E+01	No
Hexane	Yes	Yes	No	3.33E-02	1.46E-01	1.20E+01	No
Naphthalene	Yes	Yes	No	1.13E-05	4.95E-05	3.33E+00	No
Acenaphthene	Yes	No	Yes	3.33E-08	1.46E-07	9.10E-05	No
Anthracene	Yes	No	Yes	4.45E-08	1.95E-07	9.10E-05	No
Benzo(a)anthracene	Yes	No	Yes	3.33E-08	1.46E-07	2.00E-06	No
Benzo(g,h,i)perylene	Yes	No	Yes	2.22E-08	9.74E-08	9.10E-05	No
Chrysene	Yes	No	Yes	3.33E-08	1.46E-07	2.00E-06	No
Fluoranthene	Yes	No	Yes	5.56E-08	2.43E-07	9.10E-05	No
Fluorene	Yes	No	Yes	5.19E-08	2.27E-07	9.10E-05	No
Indeno(1,2,3-cd)pyrene	Yes	No	Yes	3.33E-08	1.46E-07	2.00E-06	No
Phenanthrene	Yes	No	Yes	3.15E-07	1.38E-06	9.10E-05	No
Pentane	No	Yes	No	4.82E-02	2.11E-01	1.18E+02	No
Pyrene	Yes	No	Yes	9.26E-08	4.06E-07	9.10E-05	No
Arsenic	Yes	No	Yes	3.71E-06	1.62E-05	1.50E-06	Yes
Barium	No	Yes	No	8.15E-05	3.57E-04	3.30E-02	No
Beryllium	Yes	No	Yes	2.22E-07	9.74E-07	2.80E-05	No
Cadmium	Yes	No	Yes	2.04E-05	8.93E-05	3.70E-06	Yes

Pollutant	HAP?	Non-Carc. TAP?	Carc. TAP?	Potential Emissions		IDAPA EL	Exceeds EL?
				lb/hr	tpy	lb/hr	
Chromium	Yes	No	Yes	2.59E-05	1.14E-04	3.30E-02	No
Cobalt	Yes	Yes	No	1.56E-06	6.82E-06	3.30E-03	No
Copper	No	Yes	No	1.57E-05	6.90E-05	6.70E-02	No
Manganese	Yes	Yes	No	7.04E-06	3.08E-05	3.33E-01	No
Molybdenum	No	Yes	No	2.04E-05	8.93E-05	3.33E-01	No
Nickel	Yes	Yes	No	3.89E-05	1.70E-04	2.70E-05	Yes
Selenium	Yes	No	Yes	4.45E-07	1.95E-06	1.30E-02	No
Vanadium	No	No	Yes	4.26E-05	1.87E-04	3.00E-03	No

__X__ Explanation/documentation on why modeling was or was not performed for emissions of each TAP identified in the emissions inventory of the application are provided in this section.

3.4. MODELING PROTOCOL

A modeling protocol was submitted to DEQ prior to the application, on June 9, 2016 by Trinity Consultants; approval of the protocol was received on July 11, 2016 from Mr. Kevin Schilling, DEQ. A copy of the model protocol and approval is included in **Appendix E**. Project-specific modeling and other required impact analyses were generally conducted using data and methods described in the protocol and in the Idaho Air Quality Modeling Guideline; however, slight modifications were made to the modeling methodology including:

- Change in the heating value of biogas (changed from 700 Btu/scf to 550 Btu/scf)
- One of the space heaters will exhaust through the building roof.
- Updated PTE.

In addition, the protocol approval included several comments; CRE's response to selected comments is included below.

> ***Comment 1:*** *Release parameters of internal combustion engines used in the models are commonly incorrect, with estimates of flow rate and temperature substantially overstated. Vendor supplied parameters are often representative of conditions at the exhaust manifold rather than those at the point of release to the atmosphere, where the exhaust has cooled and condensed considerable after passing through a muffler system. In general, exhaust velocities over 50 meters/second and temperatures over 800oF are considered suspect. If good data from the manufacturer are not available, DEQ can provide some general methods to estimated flow rates and temperature. Documentation*
>
> > All information provided in this report and the PTC application is based on preliminary facility design and bid package response. All available manufacturer and vendor information has been provided. To provide the most conservative exhaust parameters for the emergency generator engines, a combination of exhaust parameter sources was used, as described in Section 2.1.4.

__**X**__If a protocol was submitted to DEQ prior to performing the modeling analyses, the protocol and DEQ's conditional protocol approval notice is included in **Appendix E** of this Modeling Report.

__**X**__Concerns identified by DEQ in the protocol approval notice have been addressed in the analyses performed and in this Modeling Report.

Descriptions of specific emission sources are provided in Section 2.1. Manufacturer information provided in **Appendix B**.

4.1. CRITERIA POLLUTANTS

Criteria pollutant emission rates used in the modeling analysis are consistent with the emission rates listed in the permit application, however, some minor differences exist.

4.1.1. Modeled Emission Rates for Significant Impact Level Analysis

A Significant Impact Level (SIL) analyses was not conducted; a full Cumulative Impact Analyses was performed for the initial modeling.

4.1.2. Modeled Emission Rates for the Cumulative Impact Analyses

The lb/hr emission rates for all averaging periods were calculated assuming continuous operation at the maximum hourly rate, with the exception of the emergency generators. The emergency generators will operate less than 100 hours/year for non-emergency situations; testing of the engines will only occur between the hours of 6am and 7pm, therefore the HROFDAY factor was used for the existing and new generator sources in the model.

The WWTP is located in an agricultural, light industrial and residential area with no significant emission sources in proximity to the site. As such, no co-contributing sources were included in the cumulative impact analyses.

Table 4-1 lists criteria pollutant emission rates used in the cumulative NAAQS impact analysis.

Table 4-1. Modeled Emission Rates for Cumulative NAAQS Impact Analyses

Source ID	Source Description	Pollutant	Averaging Period	Emissions[a] (lb/hr)
NGBOIL	Natural Gas Fired Boiler	$PM_{2.5}$	24-hour	0.01
			Annual	0.01
		PM_{10}	24-hour	0.01
		NOx	1-hr	0.19
			Annual	0.19
BIOBOIL	Digester Gas (Biogas) Fired Boiler	$PM_{2.5}$	24-hour	0.01
			Annual	0.01
		PM_{10}	24-hour	0.01
		NOx	1-hr	0.15
			Annual	0.15
FLARE	Biogas Flare (Waste Gas Burner)	$PM_{2.5}$	24-hour	0.10
			Annual	0.10
		PM_{10}	24-hour	0.10
		NOx	1-hr	1.30
			Annual	1.30

Source ID	Source Description	Pollutant	Averaging Period	Emissions[a] (lb/hr)
GENA-GENC (each)	Existing Emergency Generators	$PM_{2.5}$	24-hour	0.088
			Annual	0.0018
		PM_{10}	24-hour	0.088
		NOx	1-hour	(not included in model)
			Annual	0.13
GEN1-GEN5 (each)	New Emergency Generators	$PM_{2.5}$	24-hour	0.05
			Annual	0.001
		PM_{10}	24-hour	0.05
		NOx	1-hour	(not included in model)
			Annual	0.18
1GUH1 – 6GUH1 (each)	60 scf/hr Natural Gas Fired Heaters	$PM_{2.5}$	24-hour	0.0005
			Annual	0.0005
		PM_{10}	24-hour	0.0005
		NOx	1-hr	0.006
			Annual	0.006
1GUH2-2GUH2 (each)	125 scf/hr Natural Gas Fired Heaters	$PM_{2.5}$	24-hour	0.001
			Annual	0.001
		PM_{10}	24-hour	0.001
		NOx	1-hr	0.012
			Annual	0.012
GUH3	45 scf/hr Natural Gas Fired Heater	$PM_{2.5}$	24-hour	0.0003
			Annual	0.0003
		PM_{10}	24-hour	0.0003
		NOx	1-hr	0.004
			Annual	0.004
GUH4	100 scf/hr Natural Gas Fired Heater	$PM_{2.5}$	24-hour	0.0008
			Annual	0.0008
		PM_{10}	24-hour	0.0008
		NOx	1-hr	0.009
			Annual	0.009

[a.] Pounds/hour emissions rate modeled is the potential/allowable emissions for the averaging period specified for the pollutant.

__X__Emissions rates in Table 4-1 are identical to those in the model input files for the cumulative NAAQS impact analyses.

__X__Calculation of modeled emissions are thoroughly documented in this section (unless already described in Section 4.1.1), and any unique handling of emissions in the model have been described.

4.1.3. NO_2/NO_x Ratio for NOx Chemistry Modeling

NO_x chemistry was not considered in the compliance demonstration for 1-hour NO_2.

4.1.4. Special Methods for Modeling Critical Pollutant Emissions

Routine generator testing will only occur between the hours of 6am and 7pm. The HROFDY factor was applied to these sources (GENA-C, GEN1-5) in the model. In addition, per IDEQ modeling guidance, emissions of NO_x from intermittent testing of engines powering emergency generators and fire suppression water pumps can typically be excluded from the modeling applicability determination for 1-hour NO_2 NAAQS compliance demonstrations. Therefore emissions from the emergency generators were not included in the 1-hr NO_x model runs.

4.2. TOXIC AIR POLLUTANTS

The sources of TAPs at the WWTP include the boilers, flare, heaters and generators. The model results were compared to the applicable Acceptable Ambient Concentration (AAC) for non-carcinogens or Acceptable Ambient Concentration for Carcinogens (AACC) for carcinogens to determine compliance.

Table 4-2 lists TAP emissions rates that were included in the modeling analyses. Modeling was performed for each TAP having total project emissions exceeding the TAP specific Screening EL, with the exception of NSPS and NESHAPS regulated HAPs from the generators, as discussed in Section 3.3.

Table 4-2. Modeled Emissions Rates for TAP Analyses

Source ID	Source Description	TAP	Averaging Period	Emissions[a] (lb/hr)
NGBOIL	Natural Gas Fired Boiler	Arsenic	Annual	3.82E-07
		Cadmium	Annual	2.10E-06
		Formaldehyde	Annual	1.43E-04
		Nickel	Annual	4.01E-06
BIOBOIL	Digester Gas (Biogas) Fired Boiler	Arsenic	Annual	5.74E-07
		Cadmium	Annual	3.15E-06
		Formaldehyde	Annual	2.15E-04
		Nickel	Annual	6.02E-06
FLARE	Biogas Flare (Waste Gas Burner)	Arsenic	Annual	2.60E-06
		Cadmium	Annual	1.43E-05
		Formaldehyde	Annual	9.74E-04
		Nickel	Annual	2.73E-05
1GUH1 – 6GUH1 (each)	60 scf/hr Natural Gas Fired Heaters	Arsenic	Annual	1.20E-08
		Cadmium	Annual	6.60E-08
		Formaldehyde	Annual	4.50E-06
		Nickel	Annual	1.26E-07
1GUH2-2GUH2 (each)	125 scf/hr Natural Gas Fired Heaters	Arsenic	Annual	2.50E-08
		Cadmium	Annual	1.38E-07
		Formaldehyde	Annual	9.38E-06
		Nickel	Annual	2.63E-07
GUH3	45 scf/hr Natural Gas Fired Heater	Arsenic	Annual	9.00E-09
		Cadmium	Annual	4.95E-08
		Formaldehyde	Annual	3.38E-06
		Nickel	Annual	9.45E-08
GUH4	100 scf/hr Natural Gas Fired Heater	Arsenic	Annual	2.00E-08
		Cadmium	Annual	1.10E-07

		Formaldehyde	Annual	7.50E-06
		Nickel	Annual	2.10E-07

a. Pounds/hour emissions rate modeled is the project-specific increase in potential/allowable emissions increase for the averaging period specified for the TAP.

__X__ TAP emissions rates have been listed for each TAP that has project cumulative emissions exceeding the applicable EL.

__X__ Emissions rates in Table 4-2 are identical to those in the model input file for TAP analyses.

4.3. EMISSIONS RELEASE PARAMETERS

The emissions sources were represented in the model as point sources. Sources were 'placed' into the model using the BREEZE AERMOD graphical user interface (GUI). A Google Earth image was imported into the model to place existing sources and buildings; a site drawing was used to measure distances from existing features to new sources and buildings and point sources and buildings were added at the corresponding locations.

Emissions from the boilers, flare, heaters and generators are represented in the model as point sources. The point source parameters are shown in **Table 4-3** below.

Table 4-3. Point Source Parameters

Source ID/ Pollutant ID	Description	UTM[a]		Elev. (m)	Stack Height (m)	Stack Temp (K)[c]	Stack Velocity (m/s)[d]	Stack Diameter (m)	Orient. Of Release[e]
		East - X (m)[b]	North - Y (m)						
GENA	Emergency Generator A	701861.5	4733839.9	1121.98	2.64	699.8	44.6	0.127	Vertical
GENB	Emergency Generator B	701864.6	4733840	1122.02	2.64	699.8	44.6	0.127	Vertical
GENC	Emergency Generator C	701867.8	4733840	1122.05	2.64	699.8	44.6	0.127	Vertical
NGBOIL	Natural Gas Boiler	701720.7	4733790.3	1119.9	5.03	505.37	8.178	0.254	Vertical
BIOBOIL	Biogas Boiler	701731	4733790.3	1119.97	5.03	505.37	12.26	0.254	Vertical
FLARE		701749	4733802.6	1120.24	5.03	1273	20.0	0.5588	Vertical
GEN1	Emergency Generator #1	701746	4733729.1	1119.67	2.08	699.8	44.6	0.2032	Vertical
GEN2	Emergency Generator #2	701750.1	4733729.1	1119.75	2.08	699.8	44.6	0.2032	Vertical
GEN3	Emergency Generator #3	701913.5	4733833	1122.54	2.08	699.8	44.6	0.2032	Vertical
GEN4	Emergency Generator #4	701914.7	4733826.8	1122.51	2.08	699.8	44.6	0.2032	Vertical

Source ID/ Pollutant ID	Description	UTM[a]		Elev. (m)	Stack Height (m)	Stack Temp (K)[c]	Stack Velocity (m/s)[d]	Stack Diameter (m)	Orient. Of Release[e]
		East - X (m)[b]	North - Y (m)						
GEN5	Emergency Generator #5	701915.9	4733822.3	1122.5	2.08	699.8	44.6	0.2032	Vertical
1GUH1	#1 GUH1	701704.2	4733730.5	1118.41	3.35	280.37	0.001	0.1016	Vertical
2GUH1	#2 GUH1	701718.1	4733733	1119.03	3.35	280.37	0.001	0.1016	Vertical
3GUH1	#3 GUH1	701732.1	4733730.3	1119.42	3.35	280.37	0.001	0.1016	Vertical
4GUH1	#4 GUH1	701704.2	4733722	1118.19	3.35	280.37	0.001	0.1016	Vertical
5GUH1	#5 GUH1	701718	4733719.1	1118.65	3.35	280.37	0.001	0.1016	Vertical
6GUH1	#6 GUH 1	701732.1	4733721.8	1119.23	3.35	280.37	0.001	0.1016	Vertical
1GUH2	#1 GUH2	701706.5	4733719.8	1118.32	3.3528	280.3722	0.001	0.1016	Vertical
2GUH2	#2 GUH2	701730.1	4733719.6	1119.33	3.3528	280.3722	0.001	0.1016	Vertical
GUH3	ABI #3 GUH3	701738.5	4733759.1	1120.02	6.7818	285.9278	0.001	0.1016	Vertical
GUH4	GUH4	701735	4733800.6	1119.59	4.062984	288.7056	0.001	0.1016	Vertical

a. Universal Transverse Mercator.
b. Meters.
c. Kelvin.
d. Meters per second.
e. Vertical uninterrupted, rain-capped, or horizontal release.

Exhaust parameters were determined as described in Section 2.1. A summary is provided below. Documentation from the equipment vendors is included in **Appendix B.**

4.3.1. Boilers

Exhaust parameters including the exhaust temperature, stack diameter and flow rate for the boilers were provided by Folsom Associates for the Burnham biogas and natural gas-fired boilers, and are based on combustion calculations. The stack height was provided by Keller Associates, and is based on height of building J5; the boilers will exhaust through the roof of the building.

4.3.2. Flare

The flare was modeled as a point source with the stack diameter and stack height provided by Keller Associates, based on the manufacturer specifications for the Varec 244 WL flare, with 6" diameter gas piping. Exhaust temperature and exit velocity used the standard SCREEN3 values of 1273 Kelvin and 20 meters per second (m/s), respectively.

4.3.3. Emergency Generators

The generators are represented in the model as unrestricted vertical point sources. Exhaust parameters including stack diameter, exhaust temperature and exit velocity were obtained from several sources in order to provide the most conservative (worst-case) dispersion parameters. Per email from Kevin Schilling (received 6/21/2016), DEQ recommended the use of the method provided in the *Washington State Department of Ecology document, Suitability of Diesel-Powered Emergency Generators for Air Quality General Order of Approval: Evaluation of Control Technology, Ambient Impacts, and Potential Approval Criteria (June 2006).* Using this guidance, the engine exhaust flow is based on the horsepower (hp) rating of the engine by the following equation (Table 6 in the attached guidance document in **Appendix C**):

$$\frac{0.284\ m^3/sec}{100\ hp} \times X\ hp = Y\ m^3/sec$$

The guidance recommends using a 44.6 meter/second stack gas exit velocity and then calculating the diameter that would result in a total flow equal to the exhaust flow calculated by the equation above. The exhaust exit temperature can be estimated by interpolating between appropriate values from a table in the guidance document that lists temperatures for various engine power ratings. Using this methodology results in a flow rate of 2.16 m^3/sec for the 762 BHP engines and a diameter of 0.049 m (1.93 inches). Interpolation of exhaust temperatures from Table 7 of the guidance, using a logarithmic trend line to fit the data, results in an approximate temperature of 885°K (1135°F). However, DEQ's modeling protocol approval (received July 11, 2016) states that "in general exhaust velocities over 50 m/s and temperatures over 800°F are considered suspect." In addition, the 1.93 inch diameter calculated using the DOE methodology is unrealistic, and the exhaust diameter of the existing generators was measured at 5 inches by facility personnel.

Therefore, a conservative combination of exhaust parameters were used for the emergency engines. Exhaust velocities were set to 44.6 m/s per DOE guidance, and a temperature of 800°F was used per DEQ guidance. The exhaust diameter was set to the value provided on the manufacturer specification sheets, included in **Appendix B**. The stack height of the new Caterpillar generators was estimated as the height of the engine package, as listed in the manufacturer specification. This height represents a conservative value, as the generators will be set on concrete pads, and will have a vertical stack exiting the generator enclosure. The as-built stack height is expected to be at least one to two feet higher. The stack height of the existing Generac generators was measured on-site and provided by the WWTP personnel.

The emergency generators will operate less than 100 hours/year for non-emergency situations; testing of the engines will only occur between the hours of 6am and 7pm therefore the HROFDAY factor was used for the existing and new generator sources in the model.

4.3.4. Heaters

The heaters will be located in the Solids & Dewatering building and Anaerobic Digester Control building, and will exhaust through the sides of the building. One heater, GUH3, will exhaust through the roof of the Sludge Pump Building. The heaters that exhaust through the sides of the building were represented in the model as vertical point sources with the actual stack diameter and a 0.001 m/sec exit velocity, consistent with IDEQ modeling guidance. The GUH3 heater was represented in the model as a vertical point source with actual stack diameter and stack height based on the height of the Sludge Pump Building; as a conservative measure, the exhaust exit velocity was assumed to be 0.001 m/sec. The exhaust temperature of all the heaters was set to the discharge air temperature rise provided in the manufacturer specification sheet.

_X_ Thorough justification/documentation of release parameters for all modeled sources is provided in this section.

_X_ The specific methods used to determine/calculate given release parameters is described in this section.

_X_ The release orientation of all point source stacks (horizontal, rain-capped, or uninterrupted vertical release) has been verified and is documented in this section.

5. MODELING METHODOLOGY

The section of the report will describe and justify the specific methods and data used in the air impact analyses.

Table 5-1 summarizes the key modeling parameters used in the impact analyses.

Table 5-1. Modeling Parameters

Parameter	Description/Values	Documentation/Addition Description
General Facility Location	500 N 100 W, Jerome, in Jerome County, ID.	Facility is an existing WWTP located at 500 N 100 W in Jerome, Idaho, approximately 0.9 miles northwest of the Jerome city center in Jerome County, ID. Jerome County is in attainment for all pollutants.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 15181
Meteorological Data	Jerome County Airport surface/ASOS data NWS Boise Station upper air data	The meteorological model input files for this project were developed by IDEQ. See Section 5.2 of this report for additional details of the meteorological data.
Terrain	Considered	3-dimensional receptor coordinates were obtained from USGS National Elevation Dataset (NED) files and were used to establish elevation of ground level receptors. AERMAP was used to determine each receptor elevation and hill height scale.
Building Downwash	Considered	Plume downwash was considered for the structures associated with the facility. BPIP-PRIME was used to evaluate building dimensions for consideration of downwash effects in AERMOD.
NOx Chemistry	None	Regulatory Default
Receptor Grid	**NAAQS/TAPs Analyses (No SIL Analyses performed)**	
	Grid 1	25-meter spacing along the ambient air boundary
	Grid 2	25-meter spacing in a 400 meter (easting) by 400 meter (northing) grid centered on the facility
	Grid 3	50-meter spacing in a 800 meter (easting) by 800 meter (northing) grid centered on the facility
	Grid 4	150-meter spacing in a 2300 meter (easting) by 2300meter (northing) grid centered on the facility
	Grid 5	500-meter spacing in a 5000 meter (easting) by 5000 meter (northing) grid centered on the facility

5.1. MODEL SELECTION

The model used for this application is AERMOD (version 15181), the USEPA–approved model for near-field new source review. AERMOD was applied as recommended in EPA's Guideline on Air Quality Models and consistent with guidance in IDEQ's Dispersion Modeling Guidelines and the model protocol submitted to IDEQ on June 9, 2016 with exceptions as noted in Section 3.4. Non-regulatory or beta options were not employed within AERMOD; regulatory defaults were used.

The Prime building downwash algorithm was applied for the facility. Terrain data was processed consistent with the model protocol and EPA guidance for AERMAP (version 11103). Meteorological data recommended for this analysis was provided by IDEQ.

__X__The current versions of all models and associated programs were used in analyses, or alternate versions were specifically approved by DEQ.

__N/A__Any non-default model options used were approved by DEQ in advance.

5.2. METEOROLOGICAL DATA

Preprocessed AERMOD ready meteorological files were provided upon request from Thomas Swain of IDEQ. The data was processed by IDEQ using the National Weather Service (NWS) surface Hourly Met Data and 1-minute ASOS winds from the Jerome County Airport and NWS Boise Station upper air data for the years 2008 through 2012. The data presented by IDEQ is model-ready, and was used without alteration or processing.

A memorandum describing the meteorological data in further detail is provided in **Appendix F.**

__X__Meteorological data files are provided with the application.

__N/A__If meteorological data used for modeling were not provided by DEQ, then a detailed discussion of the data is provided along with documentation of the processing steps.

5.3. EFFECTS OF TERRAIN

All source, building and receptor elevations were obtained from USGS NED data using the AERMAP preprocessing system in BREEZE. One-third arc second seamless NED data were downloaded from the Multi-Resolution Land Characteristics Consortium website. The datum of the terrain data is UTM NAD83, which is consistent with the datum used to specify locations of buildings, emissions points, and the ambient air boundary. All stack heights are referenced to ground surface elevations.

__X__The datum of terrain data, building corner locations, emissions sources, and the ambient air boundary are specified and are consistent such that the modeled plot plan accurately represents the facility and surroundings.

5.4. FACILITY LAYOUT

Sources were 'placed' into the model using the BREEZE AERMOD graphical user interface (GUI). A Google Earth image was imported into the model to place existing sources and buildings; a site drawing was used to measure distances from existing features to new sources and buildings and point sources and buildings were added at the corresponding locations. The accuracy of the existing source and building placement in the model layout was confirmed by exporting the model property boundary and model sources to Google Earth, as shown in **Figure 5-1.** A facility plot plan is included in **Appendix A.**

Figure 5-1. Google Earth Model Overlay

__X__The facility layout plot plan is provided in this section that clearly and accurately depicts buildings, emissions points, and the ambient air boundary.

__X__This section of the Modeling Report has thoroughly described how locations of emissions sources, building corners, and the ambient air boundary were determined, specifying the datum used.

5.5. EFFECTS OF BUILDING DOWNWASH

The Prime building downwash algorithm was applied for the facility to account for downwash effects from on-site structures. Buildings were 'placed' into the model using the BREEZE AERMOD graphical user interface (GUI).

A Google Earth image was imported into the model to place existing sources and buildings; a site drawing was used to measure distances from existing features to new sources and buildings and point sources and buildings were added at the corresponding locations. Keller Associates personnel provided building height data to Trinity Consultants via email. The proposed facility is located in a predominately agricultural area. As such, there are no offsite buildings within close enough proximity to affect downwash.

5.6. AMBIENT AIR BOUNDARY

The WWTP property covers approximately 30 acres. Consistent with IDEQ guidance the ambient air boundary used in this analysis will be the property boundary, which also serves as the public access boundary. The property boundary is fenced and the WWTP controls access to the property through posting of signage and by training facility personnel to patrol and prevent public access.

__**N/A**__ If any of the following apply, the effect on areas excluded from ambient air is thoroughly described in this section: a river/stream bisecting the facility; the facility is on leased property or is leasing property to another entity; the facility is not completely fenced; there are right-of-way areas on the facility; the nature of business is such that the general public have access to part or all of the facility.

_**X**__ This section thoroughly describes how the facility can legally preclude public access (and practically preclude access) to areas excluded from ambient air in the modeling analyses.

5.7. RECEPTOR NETWORK

Receptor density will be set to a spacing of 25 meters along the ambient air boundary, 25 meters for the first 400 meters from the center of the property, then receptors will be set a density of one per 50 meters out to 800 meters away from the property center, 150 meters out to 2,300 meters from the property center, and 500 meters out to 5 kilometers from the center of the property. The receptor network ensures that the analysis meets or exceeds EPA receptor network requirements and captures the maximum impact from the facility. Therefore, no supplemental receptor network or expansion of the model domain is required or included.

_**X**__ This section of the Modeling Report provides justification that receptor spacing used in the air impact analyses was adequate to reasonably resolve the maximum modeled concentrations to the point that NAAQS or TAP compliance is assured.

5.8. BACKGROUND CONCENTRATIONS

Background concentrations for criteria pollutants were obtained from the Northwest International Air Quality Environmental Science and Technology Consortium (NW AIRQUEST) and are shown in **Table 5-2** below. Background values for TAPs are zero.

Table 5-2. Background Concentration Data

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)	Source
PM_{10}	24-hour	52	NW AIRQUEST, 2009-2011. The 'no extremes' value was used.
$PM_{2.5}$	24-hour	24	NW AIRQUEST, 2009-2011

Pollutant	Averaging Period	Background Concentration (µg/m³)	Source
	Annual	8	NW AIRQUEST, 2009-2011
NO_2	1-hour	24.5	NW AIRQUEST, 2009-2011
	Annual	4.14	NW AIRQUEST, 2009-2011
SO_2	1-hour	3.67	NW AIRQUEST, 2009-2011
	Annual	1.05	NW AIRQUEST, 2009-2011
CO	1-hour	1638	NW AIRQUEST, 2009-2011
	Annual	740	NW AIRQUEST, 2009-2011

__**X**__Background concentrations have been thoroughly documented and justified for all criteria pollutants where a cumulative NAAQS impact analysis was performed.

5.9. NO_X CHEMISTRY

NO_x chemistry was not considered in the compliance demonstration for 1-hour NO_2

__**N/A**__If OLM or PVMRM was used to address NO_x chemistry, reasons for selecting one algorithm over the other are provided in this section.

This section of the report discusses the model output results. The results of the modeling show that the facility is in compliance with all applicable NAAQS and TAP AACs and AACCs.

6.1. CRITERIA POLLUTANT IMPACT RESULTS

Modeling analyses were conducted for the criteria pollutants which exceed the modeling threshold at the Jerome WWTP facility, which include PM_{10}, $PM_{2.5}$, and NO_X. Model input and output files are included on CD in **Appendix G.**

6.1.1. Significant Impact Level Analyses

A Significant Impact Level (SIL) analyses was not conducted; a full Cumulative Impact Analyses was performed for the initial modeling.

6.1.2. Cumulative NAAQs Impact Analyses

A Significant Impact Level (SIL) analyses was not conducted; therefore a Cumulative Impact Analyses was performed for all receptors. The results of the Cumulative Impact Analyses are provided in **Table 6-1.**

Table 6-1. Results for Cumulative NAAQS Impact Analyses

Pollutant	Averaging Period	Modeled Design Concentration (µg/m³)[a]	Background Concentration (µg/m³)	Total Impact (µg/m³)	NAAQS (µg/m³)
$PM_{2.5}$[b]	24-hour	5.40[g]	24	29.4[g]	35
	Annual	0.65[h]	8	8.65[h]	12
PM_{10}[c]	24-hour	6.22[i]	52	58.2[i]	150
NO_2[d]	1-hour	110.2[g]	24.5	134.7[g]	188
	Annual	10.3	4.14	14.5	100

a. Micrograms/cubic meter
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
d. Nitrogen dioxide.
g. Maximum of 5-year means (or a lesser averaging period if less than 5 years of meteorological data were used in the analyses) of 8th highest modeled concentrations for each year modeled.
h. Maximum of 5-year means (or a lesser averaging period if less than 5 years of meteorological data were used in the analyses) of maximum modeled concentrations for each year modeled.
i. Maximum of 6th highest modeled concentrations for a 5-year period (or the maximum of the 2nd highest modeled concentrations if only 1 year of meteorological data are modeled).

__X__Model input and output files for the cumulative NAAQS impact analyses are provided with the application.

N/A If there were modeled NAAQS violations, all violations were analyzed and clearly show that the project did not significantly contribute to those modeled violations. If there were multiple violations at a given receptor, all cumulative impacts (including background) for the averaging period analyzed were ranked along with the project contribution, and the project contributions were below the applicable SIL. A table was included to show all ranked impacts above the NAAQS along with the project contribution

6.2. TAP IMPACT ANALYSES

Table 6-2 provides the results of the TAP impact analyses. The modeled impacts for all TAPs are below their respective AAC or AACC.

Table 6-2. Results for TAP Impact Analyses

TAP	Averaging Period	Maximum Modeled Impact (µg/m³)[a]	AAC or AACC (µg/m³)
Arsenic	Annual	2.0E-05	2.3E-04
Cadmium	Annual	1.2E-04	5.6E-04
Formaldehyde	Annual	7.9E-03	7.7E-02
Nickel	Annual	2.2E-04	4.2E-03

a. Micrograms/cubic meter.

7. QUALITY ASSURANCE/CONTROL

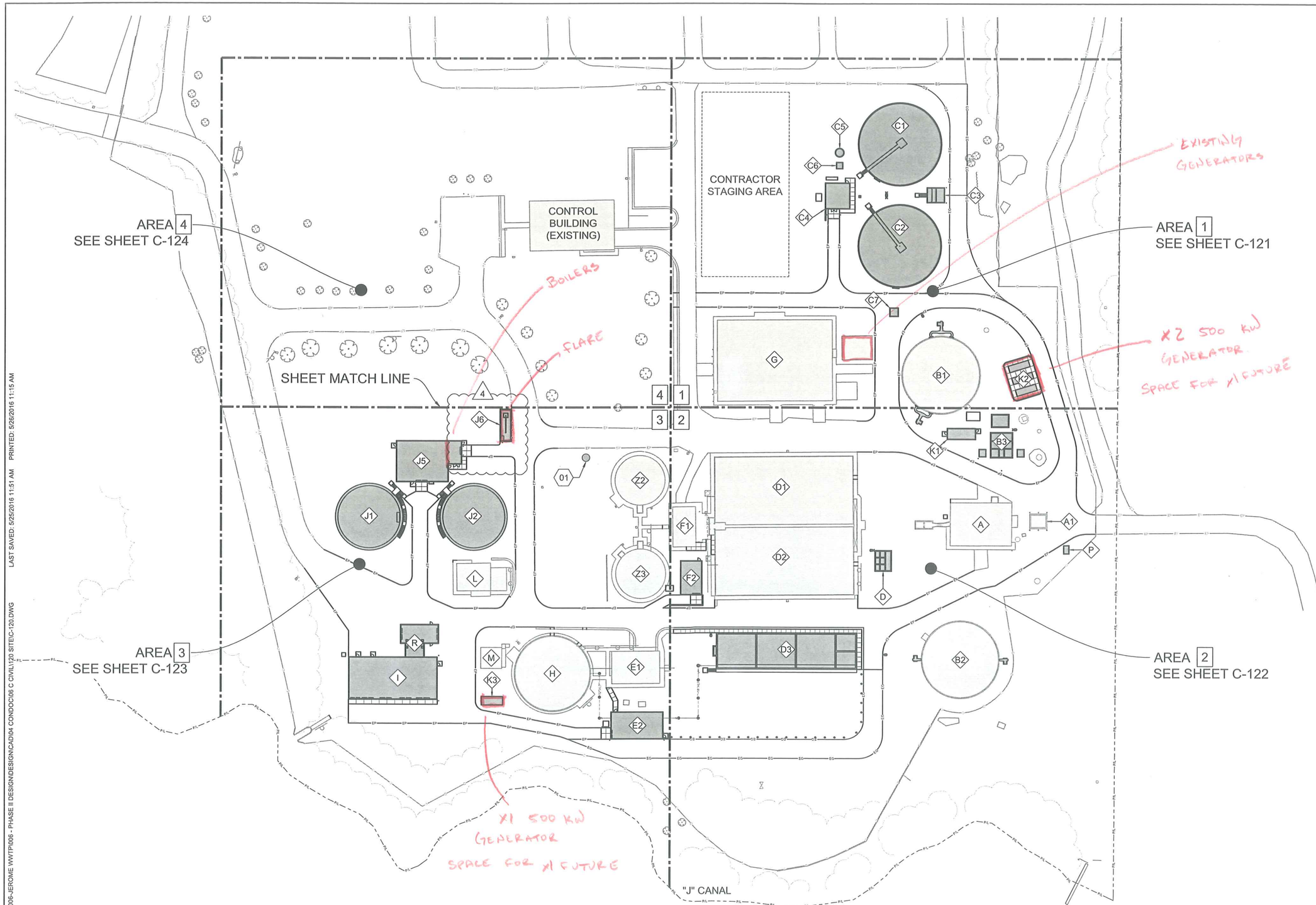
This analysis meets IDEQ expectations for quality assurance / quality control (QAQC).

Trinity Consultants provided services to develop this modeling analysis. Trinity's air quality and dispersion modeling expertise are unmatched in the professional environmental world. Trinity is ISO 9001:2008 certified at its corporate office in Dallas, Texas. Trinity's Quality Management System, based on the ISO standard, is implemented throughout its consulting operations company-wide. Trinity's system requires certified peer-reviewed validation of dispersion modeling analyses prepared by Trinity. Furthermore, Trinity has been developing and publishing air dispersion modeling software for 30 years.

Trinity dispersion modeling staff with 5 or more years of modeling experience were involved in designing the analysis and providing ongoing critical commentary on its preparation. After completing this modeling analysis, Trinity conducted a thorough internal peer review of its content.

Supplementing Trinity's expertise, Trinity has worked alongside modeling staff at IDEQ since July 2014 to ensure that the final analysis meets IDEQ's specifications and desires.

APPENDIX A: PROCESS FLOW DIAGRAMS AND PLOT PLAN



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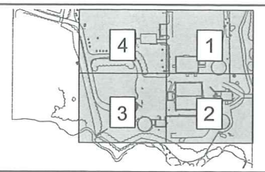
STRUCTURE DESIGNATORS

A	HEADWORKS BUILDING (E)
A1	HEADWORKS COLLECTION BOX (E)
B1	BIO-TOWER #1 (E)
B2	BIO-TOWER #2 (E)
B3	BIO-TOWER RECYCLE & INTERMEDIATE CLARIFIER PUMP STATION (N) INTERMEDIATE CLARIFIER PUMP STATION VALVE VAULT (N) BIO-TOWER #1 PUMP STATION VALVE VAULT (N) BIO-TOWER #2 PUMP STATION VALVE VAULT (N)
C1	INTERMEDIATE CLARIFIER #1 (N)
C2	INTERMEDIATE CLARIFIER #2 (N)
C3	INTERMEDIATE CLARIFIER SPLITTER BOX (N)
C4	INTERMEDIATE CLARIFIER SLUDGE PUMP BUILDING #2 (N)
C5	INTERMEDIATE CLARIFIER SCUM PIT (N)
C6	INTERMEDIATE CLARIFIER SCUM PIT VALVE VAULT (N)
C7	INTERMEDIATE CLARIFIER COLLECTION BOX (N)
D	AERATION BASIN SPLITTER BOX (N)
D1	AERATION BASIN #1 (E)
D2	AERATION BASIN #2 (E)
D3	AERATION BASIN #3 (N)
E1	BLOWER BUILDING #1 (E)
E2	BLOWER BUILDING #2 (N)
F1	AERATION BASIN PUMP STATION #1 (E)
F2	AERATION BASIN PUMP STATION #2 (N)
G	MBR & UV BUILDING (E)
H	SLUDGE STORAGE (E)
I	SOLIDS & DEWATERING BUILDING (N)
J1	ANAEROBIC DIGESTER #1 (N)
J2	ANAEROBIC DIGESTER #2 (N)
J5	ANAEROBIC DIGESTER CONTROL BUILDING (N)
J6	BIO-GAS WASTE BURNER (N)
K1	ELECTRICAL BUILDING (N)
K2	GENERATOR PADS (N)
K3	GENERATOR PADS (N)
L	SLUDGE PUMP BUILDING #1 (E)
M	CENTRIFUGE BUILDING (E)
P	BACKFLOW PREVENTER VAULT (N)
R	SOLIDS LOADING BUILDING (N - ADDITIVE BID ITEM #3)
Z2	SLUDGE STORAGE #1 (E) (TO BE DECOMMISSIONED)
Z3	SLUDGE STORAGE #2 (E) (TO BE DECOMMISSIONED)

SHEET KEYNOTES

01	PTZ CAMERA (PAN-TILT-ZOOM), RE: SPECIFICATIONS

KEY PLAN



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0	QA REVISIONS	NGC	04-13-16

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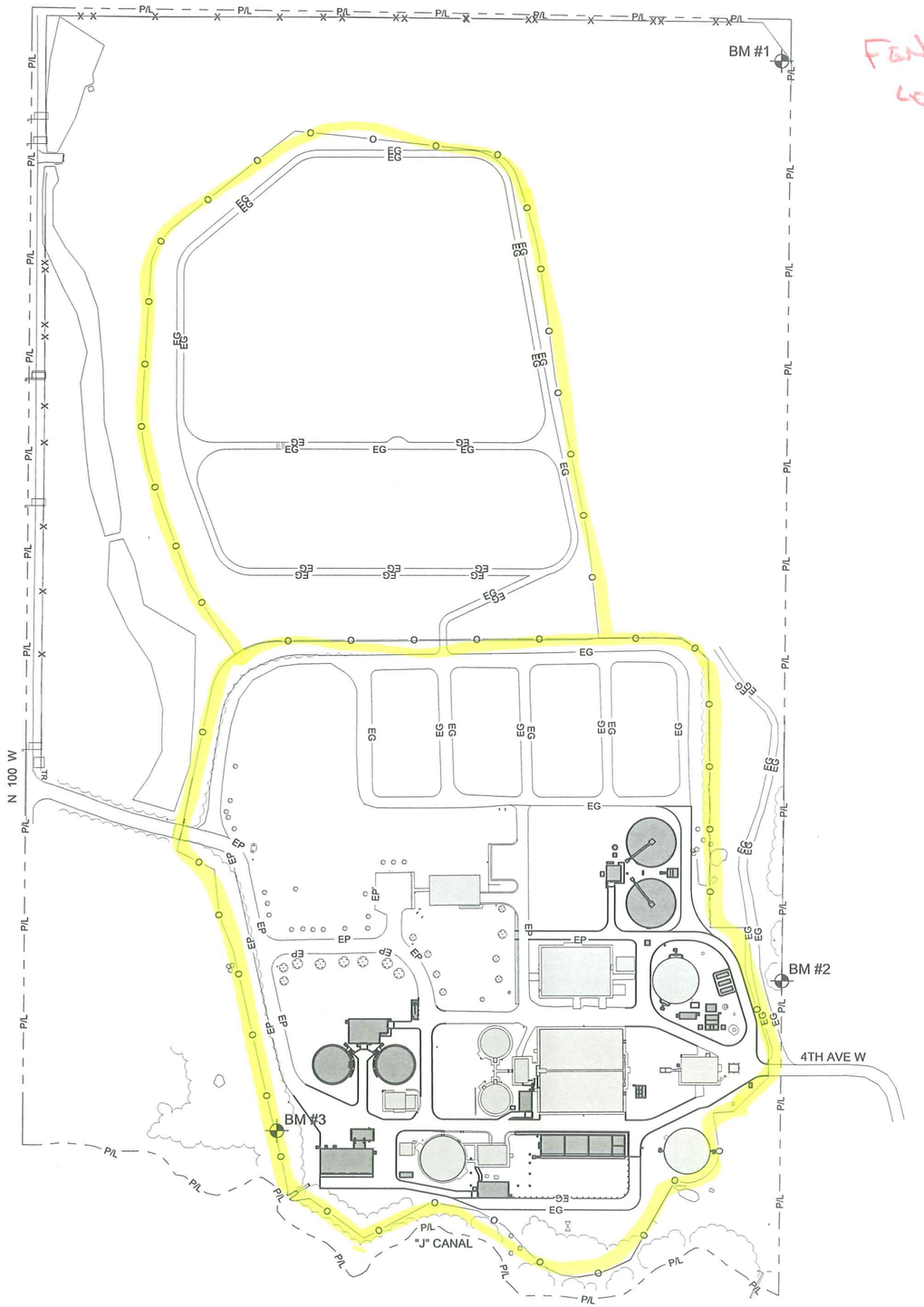
JEROME, IDAHO

PHASE II WWTP IMPROVEMENTS

SITE PLAN

PROJECT NO. 212006-006

SHEET NO. C-120



NTS

LEGEND

EXISTING STRUCTURES

PROPOSED STRUCTURES

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E = 1497457.51
EL = 3691.80

BM #2 - REBAR
N = 388170.88
E = 1497464.25
EL = 3683.86

BM #3 - BRASS CAP
N = 387906.00
E = 1496587.42
EL = 3666.41

SURVEY NOTES

1. HORIZONTAL DATUM IS BASED ON IDAHO STATE PLANE COORDINATES ZONE TO GROUND COORDINATES USING A COMBINED ADJUSTMENT FACTOR OF 1.000204411.

2. VERTICAL DATUM IS BASED ON AN CHISELED SQUARE BENCHMARK LOCATED ON THE SOUTHEAST CORNER OF THE EXISTING AERATION BASINS. THE ELEVATION OF SAID BENCHMARK WAS DERIVED FROM THE ORIGINAL CONSTRUCTION DRAWINGS AND HAS BEEN ASSIGNED AN ELEVATION OF 3679.50 FEET. (PROJECT DATUM = NAVD88(12A)-2.88 FEET).

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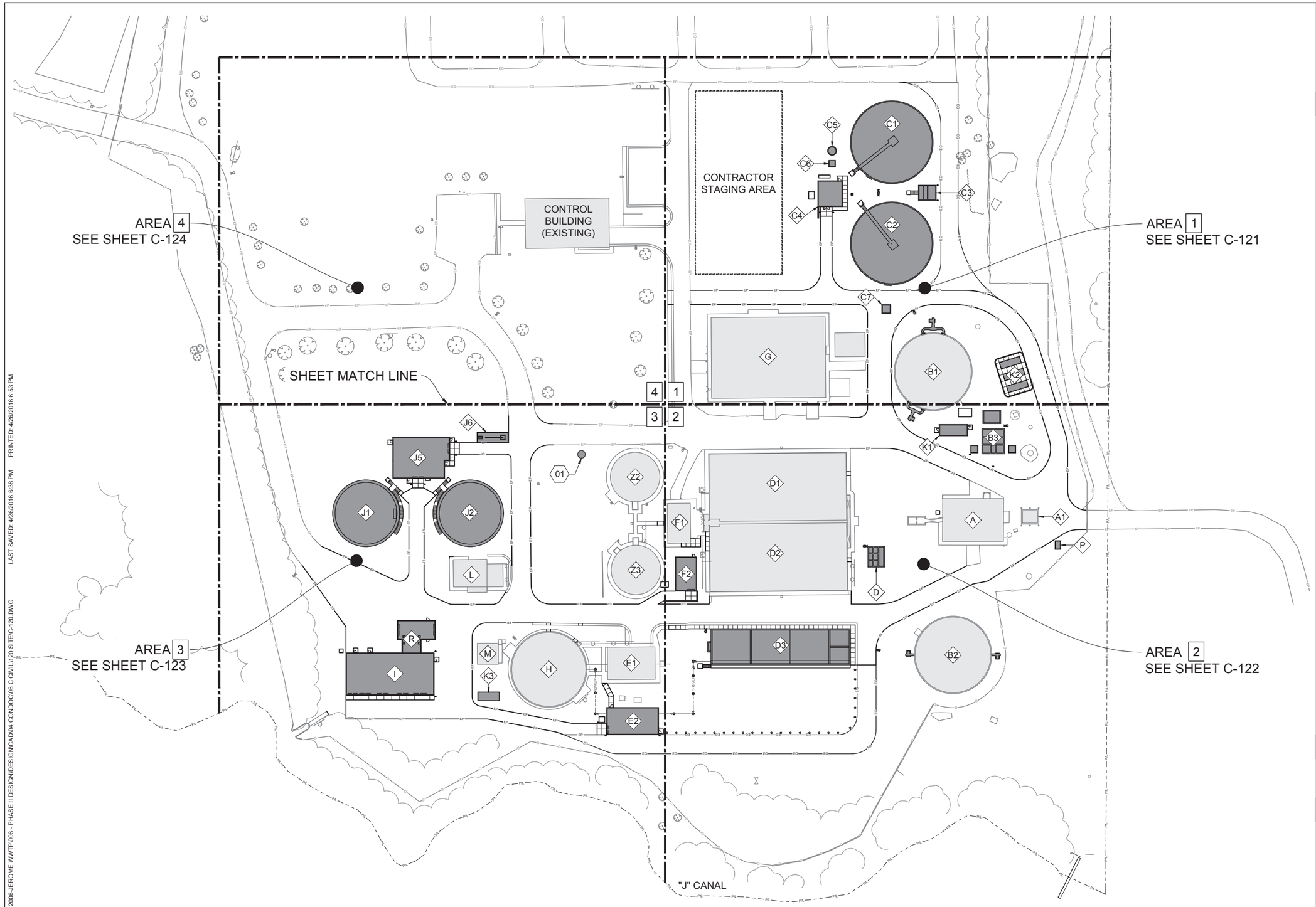
PHASE II WWTP IMPROVEMENTS

OVERALL SITE PLAN

PROJECT NO. 212006-006

SHEET NO. C-010



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J5	ANAEROBIC DIGESTER CONTROL BUILDING (N)
J6	BIO-GAS WASTE BURNER (N)
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SHEET KEYNOTES

01 PTZ CAMERA (PAN-TILT-ZOOM), RE: SPECIFICATIONS

KEY PLAN

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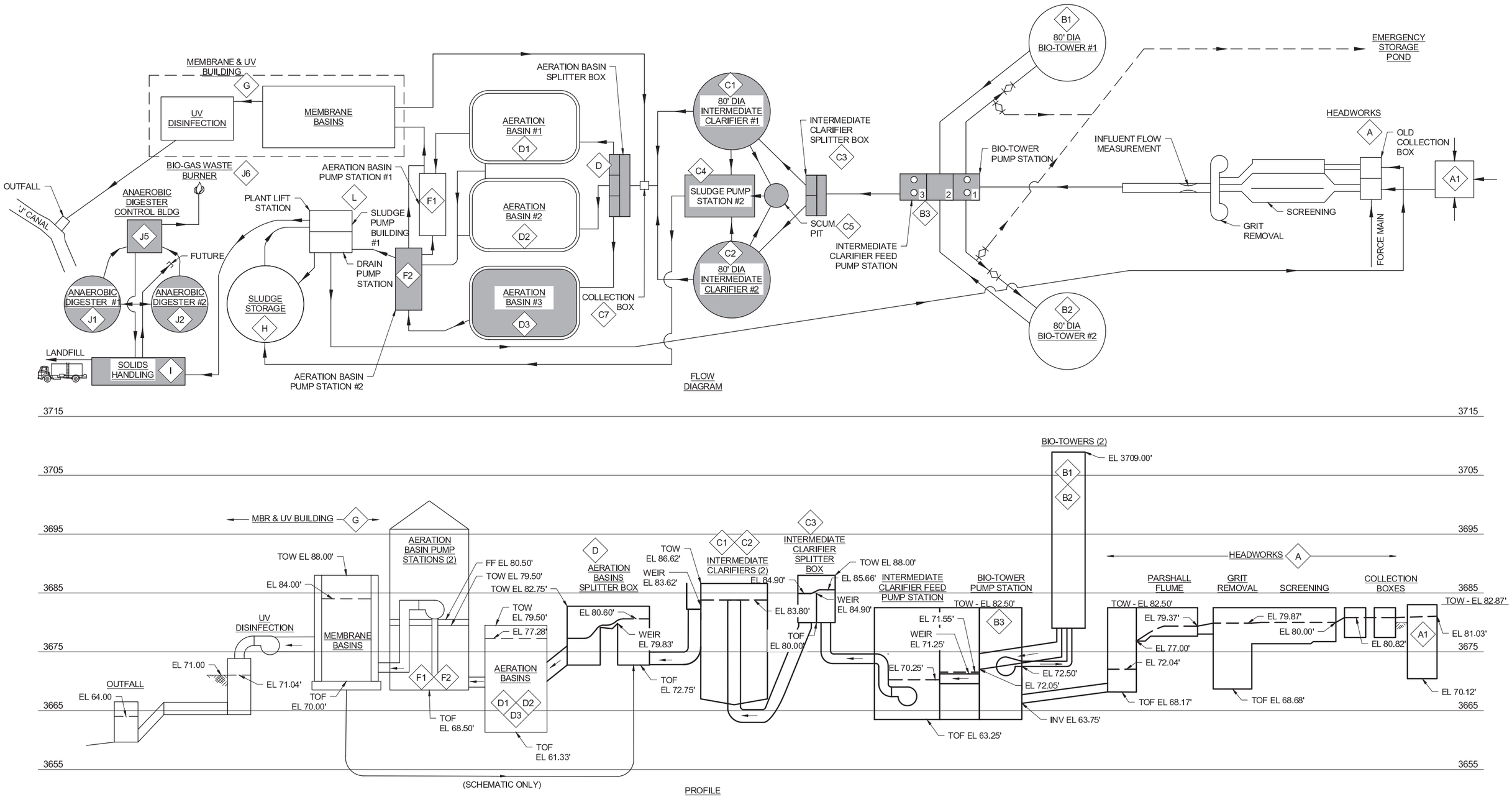
PHASE II WWTP IMPROVEMENTS

SITE PLAN

PROJECT NO. 212006-006

SHEET NO. C-120



A1 HYDRAULIC PROFILE THROUGH MAJOR TREATMENT UNITS AT PEAK FLOW - 9.41 MGD INFLUENT FLOW

N.T.S.

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PHASE II WWTP IMPROVEMENTS

HYDRAULIC PROFILE

PROJECT NO. 212006-006

SHEET NO. G-010

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APPENDIX B: MANUFACTURERS SPECIFICATIONS

VAREC BIOGAS 244W Series
WASTE GAS BURNER IGNITION SYSTEM

The Varec Biogas 244W Series Waste Gas Burner is a highly reliable flare and ignition system ideal for use in burning excess biogas.

Introduction

The Varec Biogas 244W Series Waste Gas Burner is a highly reliable flare and ignition system. The pilot has proven reliability even in extreme climate conditions. The 244W Series is ideal for use in burning excess biogas.

Application

Excess biogas must be disposed of safely. The gas is flared to avoid an odor nuisance or an explosion hazard. Biogas is generated through the anaerobic digestion of organic solids. It is produced in municipal or industrial anaerobic digesters, lagoons, and municipal landfills. Biogas is typically a highly-moist mixture of gases. It consists of approximately 55 to 70% methane, 25 to 35% carbon dioxide and trace amounts of nitrogen, hydrogen sulfide, and water vapor. The biogas often has a fluctuating flow and BTU value. The 244W Series is designed to operate reliably at low and high flow rates, and is not affected by changes in the biogas BTU value.

Operation

The Varec Biogas 244WS Series Burner is a state-of-the-art, candle-stick flare. The burner utilizes a patented pilot ignition system. Pilot gas and air are mixed and ignited at ground level, remote from the burner stack. This controlled method results in a stable pilot flame with an ideal gas-to-air ratio. The pilot burns a true stoichiometric, non-smoking flame. It is not affected by changes in the biogas flow rate or BTU content.

The electronics package controls automatic pilot ignition and monitoring. During the ignition cycle, pilot gas is directed to the flame retention nozzle. Pilot gas is also directed to the venturi where air is inspirated. The air/ gas mixture is ignited at the venturi outlet. The ignition generates a flame front which travels through the continuous flame line and exits the continuous flame nozzle at the burner tip. Gas flowing in the flame retention nozzle is ignited by this flame front.

A thermocouple is installed in the continuous flame nozzle. When it reaches its temperature setting, the pilot gas flowing in the secondary flame retention line is shut-off. Pilot is flowing only on the continuous flame line and only when there is demand to combust biogas at the burner. In case the pilot is lost, automatic pilot reignition occurs in AUTO mode. If the burner goes through the number of reignition attempts within the set time and the thermocouple fails to reach its temperature setting, a system alarm comes on requiring a manual re-set.

Varec Biogas reserves the right to change product design and specifications without notice.
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Design Features

The 244W Series design includes features that provide reliable and efficient operation. The flare can withstand wind loading of 150 mph (242 km/h) and wind speeds of 110 mph (180 km/h). Baffles, downdraft preventers, vortex vanes, and secondary stacks are not required. The inclined continuous pilot nozzle provides a long-profile flame which penetrates the waste gas as it passes through. This feature ensures the biogas is ignited at near zero flows.

Installation is simplified. The burner allows high turndown ratios; therefore there is no need to manifold several burners together. Pre-cast concrete supports are not necessary. The burner includes an integral ANSI 150 RF flange. The contractor just has to provide a matching flange and pipe supports. These features keep installation costs to a minimum.

The venturi-driven pilot burns at higher temperature when fueled by propane, natural gas or biogas (see 244WG or 244WL systems). This improves H_2S conversion, which reduces odor to a minimum. The heavy-wall continuous pilot nozzle and flame retention nozzle are both mounted at the burner tip. The nozzles are designed to withstand the elevated pilot temperature and H_2S environment. A heavily protected thermocouple permits pilot flame monitoring. The thermocouple provides an extremely reliable pilot signal.

Contacts are provided as standard for remote pilot indication and system alarm. HAND and AUTO ignition mode is selectable.

The Varec Biogas 244WS is designed to operate satisfactorily in very cold climates.

The large venturi design allows the ignition components to be mounted up to 100 feet (30 m) away from the burner. The control package may also be mounted at this distance without suffering any performance loss.

The venturi includes a backflash preventer for safety. An anti-clog orifice is supplied which eliminates the need for pilot filters. The Varec Biogas Model 244WS is designed with operator safety in mind. All hi-tension leads and sparking devices are located a safe distance from the flame. Typical adjustments and maintenance are performed at ground level, away from the heat of combustion. Ignition components are also located remote from the burner, which provides optimum serviceability.

BLOWER PACKAGE

A blower package is available when the pilot gas supply is less than 10 psig (70 kPa) and as low as 8” W.C. (2 kPa) pressure.

The burner stack and control panel design is the same as the standard 244WS with a venturi.

This option can also handle the same burner flow capacities. Local or “Remote-Start” features are still available. You retain the advantage of having the theory of operation using flamefront technology.

A blower panel replaces the venturi and valve + regulator panel and utilizes a blower to pre-mix air and pilot gas. The blower comes with an air/gas mixing chamber to achieve proper airgas mixture and is ignited at the chamber exit. It also includes the pilot gas solenoid valves, regulators and gauges required to control pilot gas.

See the Sample Specification Product Data Sheet for more information.

244WG Series Low Pressure Pilot Ignition System

The Varec Biogas 244WG option is specifically designed to burn biogas efficiently with the use of low pressure biogas for pilot fuel (4” < pilot gas pressure < 14” WC) without the requirement of blower-assisted fuel or air.

The burner comes with two inspirating venturis to help pre-mix air and pilot gas and ensure pilot reliability and efficient combustion of biogas even with the low volume biogas pilot fuel. The control panel and pilot gas control components are mounted on stainless steel plate. It is installed a maximum of 10 feet horizontal distance from the waste gas burner. The pilot gas piping from the venturis to the waste gas burner connection must be a straight pipe – no pipe bends allowed. This will ensure that the stoichiometric gas can travel to the burner tip.

The 244WG also utilizes flamefront technology like the 244WS option and follows the same operation scheme.

244WL Series Low Pressure Pilot Ignition System

The 244WL ignition system utilizes the same flame from technology as the industry standard for our Model 244W Waste Gas Burners. The pilot gas control components panel can be mounted up to 70 ft. (seventy feet) from the burner stack. It can utilize biogas, natural gas or propane at pressures as low as 4" WC.

The 244WL ignition system no longer requires a straight pilot gas piping run from the pilot gas control components panel to the burner stack.

45 degrees elbows are allowed providing for greater flexibility during design and installation.

The "L" ignition system comes equipped with a blower to pre-mix air with the pilot gas to achieve the proper air-gas mixture required for combustion. This pre-mixing of the pilot gas and air insures that the pilot stays lit under virtually all flow and weather conditions.

The sparkplug is located at the exit of the 2" mixing chamber. A flame front travels on the 2" pilot gas line and as it exits the burner stack, the 1/2" retention line is there to capture the flame front. The angled design of the pilot gas piping has been field tested to achieve the proper air-gas mixture needed for optimum combustion of the waste gas. All serviceable items are located remotely from the burner stack which protects all electrical components from the heat of combustion. More importantly, Operators are protected from radiant heat effects from the waste gas burner when it is in operation.

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Optional Features

"REMOTE-START"

If biogas will be flared intermittently, an option to conserve pilot fuel is available through our "Remote-Start" pilot ignition option. It includes a pilot-gas supply solenoid valve, which opens when pilot ignition is required and remains open while the gas is flaring. The solenoid may be specified to: (a) fail open which will continue to deliver pilot fuel during a power failure and keep the burner operational in an emergency condition, or (b) fail close, which is used when a blower is available to deliver the biogas to the burner ("L" ignition system).

The "call for ignition" signal may be provided by a pressure switch, flow-switch, or through a contact change-over.

FLASHBACK PROTECTION

It is recommended that suitable flame flashback protection be installed in fuel gas lines supplying any of the 244W burner systems. Please refer to 5200 Series Product Data Sheet for information.

CONTROL

The standard control panel is provided with a programmable logic controller (PLC). The PLC can be provided with HMI touch screen controls. Relay logic panels available upon request.

HEATER & THERMOSTAT

For ambient temperatures below -200F (-290C), a heater and thermostat is recommended.

REMOTE SPARK GENERATOR

The hi-tension lead wire supplied with the unit is a maximum 10 feet (3 m) in length. In cases where the control panel that houses the transformer cannot be located within 10 feet of the spark plug location, a remote generator can be specified.

The transformer is supplied in either a NEMA 4, 4X or 4 & 7 enclosure and located within 10 feet of the spark plug. This allows an operator to have the control panel installed further away from the burner for improved burner monitoring.

Specifications

SIZES

2", 3", 4", 6", 8", 10" and 12"

CONNECTIONS

Burner Stack
ANSI 150 RF Flange

CONTROL PANEL

Power Supply Input:
115/ 120 VAC, 60 Hz, Standard
220/ 240 VAC, 50 Hz, Option
220/ 240 VAC, 60 Hz, Option

Load:
Maximum 10 AMPS at 120 VAC or
5 AMPS at 220 VAC (50-/ 60 Hz)

Ambient Temperature Rating:
-20°F to +131°F (-29°C to +55°C), Standard

REMOTE ALARM CONTACTS

SPDT (NC, NO and Common) Contacts
Contact Rating:
2 AMPS at 115 or 240 VAC (50/ 60 Hz)
Funtion:
Pilot Out and System Alarm

Materials

BURNER
Stainless Steel Shroud and Upper 24" of Stack; Remainder Mild Steel, Standard.

All 304SS or 316SS (Optional)

PILOT NOZZLES

316 SS

THERMOCOUPLE

316 SS

CONTROL ENCLOSURE[1]

NEMA 4, Steel Construction, Standard

NEMA 4X, 316 SS Construction, Optional

NEMA 7, Aluminum Construction with O'ring or Steel, Optional

NOTES:
1. UL Certified

HIGH PRESSURE PILOT GAS SUPPLY

Natural Gas or Propane
Min. Supply Pressure: 10 PSIG (70 kPa)
Max. Supply Pressure: 100 PSIG (700 kPa)

Recommended Pipe Length from Venturi to Continuous Flame Nozzle:
Minimum Distance: 15 feet (5m)
Maximum Distance: 100 feet (30m)

LOW PRESSURE PILOT GAS SUPPLY

When available pilot gas pressure is less than 10
PSIG (70 kPa) and greater than 4" WC.

BLOWER PACKAGE

Natural Gas or Propane
Minimum Supply Pressure: 6" - 8" WC
Explosion Proof Motor and Switch, Standard

Recommended Pipe Length from blower package to continuous flame nozzle:
Maximum distance: 33 feet (10m)

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Specifications

244WG Biogas Pilot Ignition System

Dry Biogas Pilot of 500 BTU/ ft^3 Minimum

Biogas or Natural Gas Supply Pressure

Supply Pressure:
4" WC min. to 14" WC max.
(100mm WC - 360mm WC)

Recommended Pipe Length from Venturis to waste gas burner (244WG):
Maximum distance: 10 feet (3m)

Only one 90° bend allowed on pilot gas piping, Maximum.

244WL Biogas Pilot Ignition System

Dry Biogas Pilot of 500 BTU/ ft^3 Minimum

Biogas or Natural Gas Supply Pressure

Supply Pressure:
4" WC min. to 20" WC max.
(100mm WC - 500mm WC)

Pipe Gas Piping Connections

1. Pilot Fuel Supply - 1" NPT
2. Valve & Regulator Panel Connections.
   a. Continous Line - 2" NPT
   b. Flame Retention Line - 1/2" NPT

Recommended Pipe Length from Venturi Continuouse Flame Nozzle:

Maximum Distance: 70 Feet (21m)

45° Bend Allowed on Pilot Gas Piping

NOTE:
Varec Biogas does not supply the pilot gas piping between the valve & regulator panel to the combustion stack.

GAS TO BE FLARED

Biogas
Composed primarily of Methane (50 - 55%) and CO_2 (40 - 45%)

Minimum Inlet Pressure
4" WC (1 kPa)

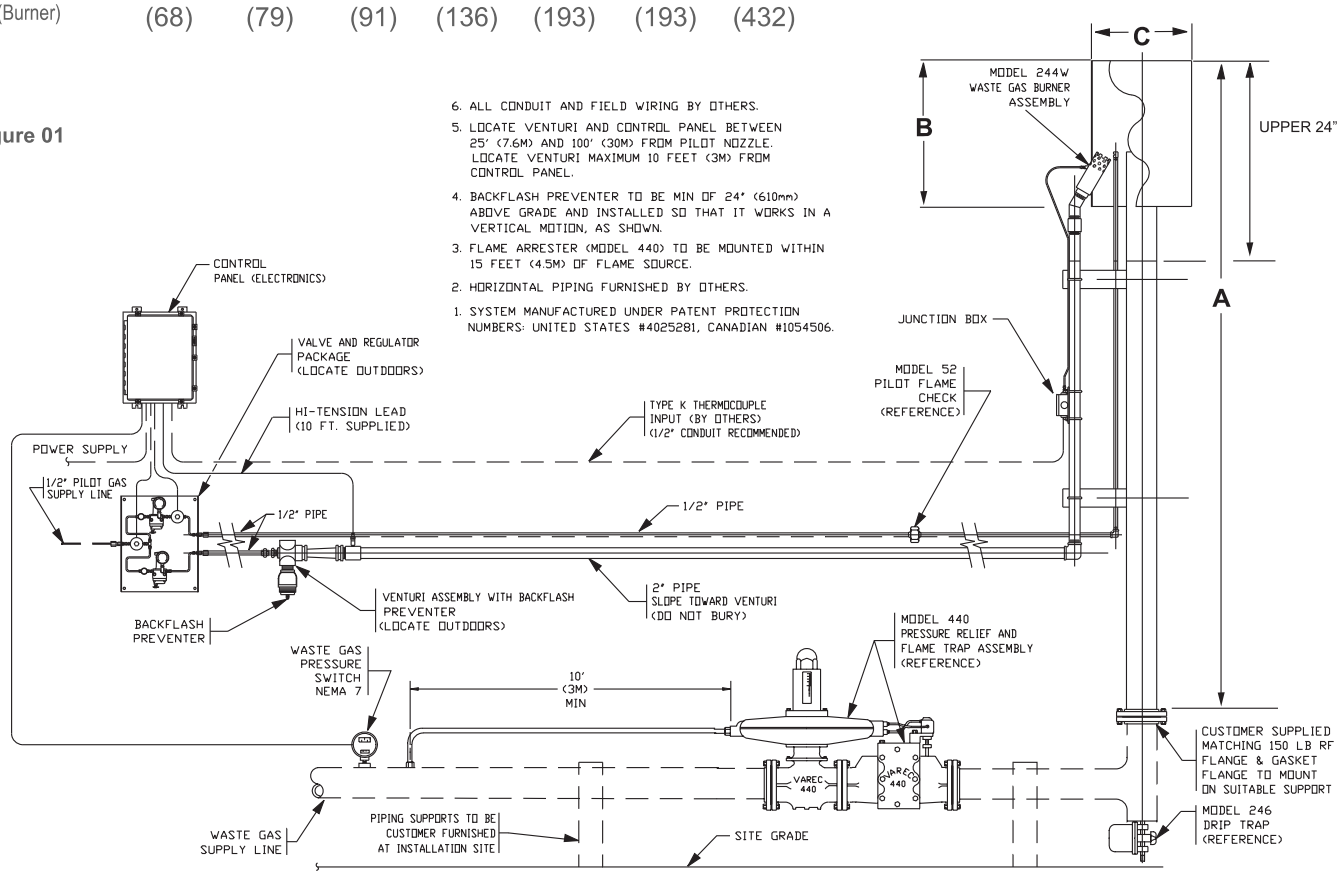
OPTIONAL FEATURES
Auto-Start Signal (Specify With)
Dry Contact, Standard

Explosion Proof Pressure Switch
Operating Range: 4" - 20" (100mm - 500mm) WC
Deadband: Approximately 0.5" (13mm) WC

Dimensions and Weights, inches [mm] and lbs. (kg)

Size Code	2	3	4	6	8	0	1
Nominal Pipe Size	2 [50]	3 [80]	4 [100]	6 [150]	8 [200]	10 [250]	12 [300]
A	88 [2235]	92 [2337]	92 [2337]	128 [3251]	144 [3658]	176 [4470]	188 [4775]
B	20 [508]	24 [610]	24 [610]	32 [813]	48 [1219]	48 [1219]	60 [1524]
C	17 [431]	18 [457]	19 [482]	22 [559]	24 [610]	24 [610]	36 [914]
Weight (Burner)	150 (68)	175 (79)	200 (91)	300 (136)	425 (193)	425 (193)	950 (432)

Figure 01



NOTE: 1 - The appropriate height of the flare must be calculate to ensure occupational safety. Consult factory for assistance.
2 - Stack dimensions are the same for all the options available with the 244W (244WS or 244WG).

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Specifications

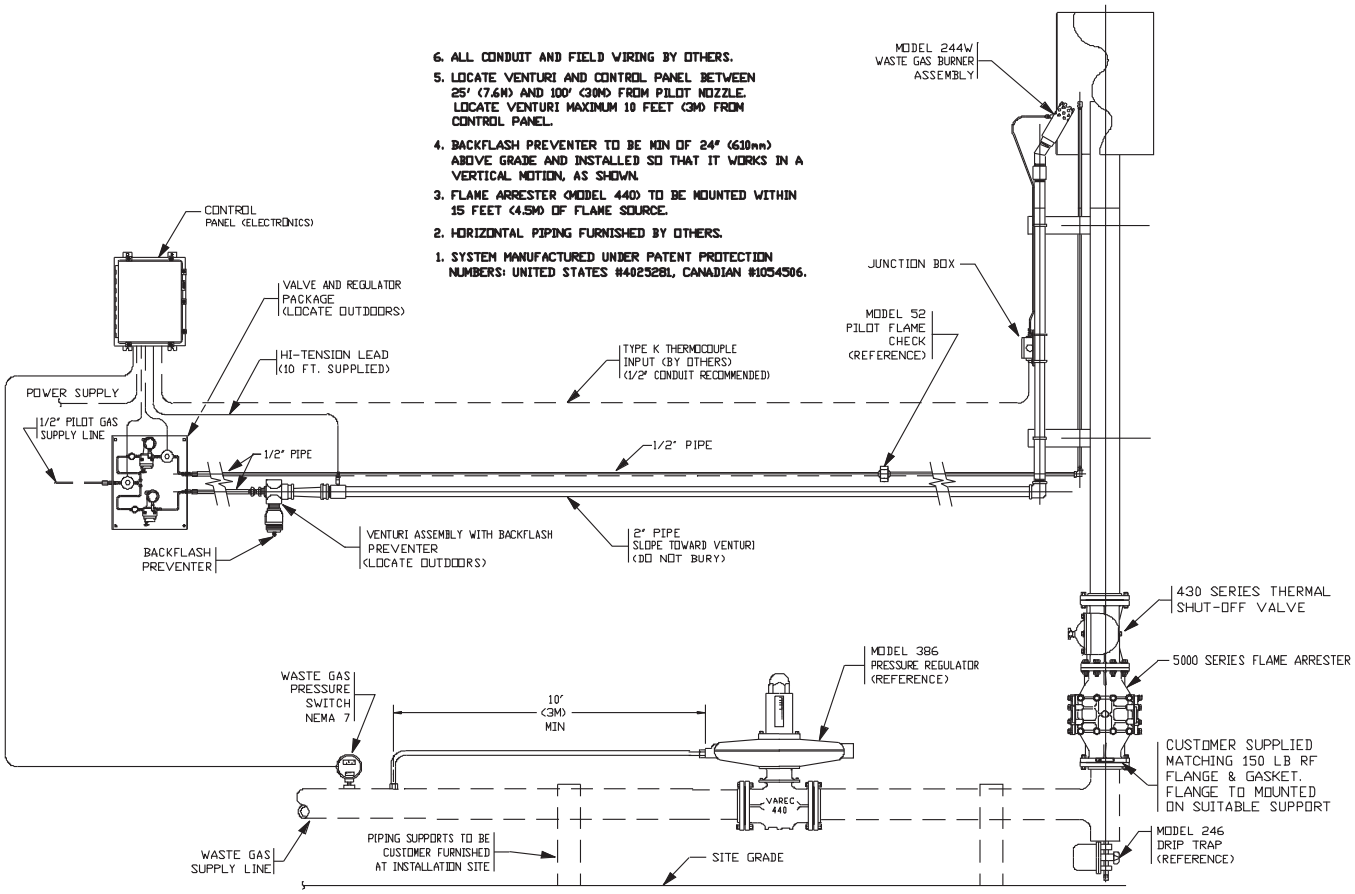
Burning Capcity, FT³ / HR [M³ / HR] - Maximum Flows

Flow stated for biogas with specific gravity 0.8 with 4” WC inlet pressure at flange connection and 0.5” WC pressure drop at 60°F (15°C) between the inlet flange and burner tip. Consult factory for flare sizing base on meeting 40 CFR Part 60.18 and Water Environment Federation, Manual of Practoce (MOP) No. 8

Size Code	2	3	4	6	8	0	1
	2”	3”	4”	6”	8”	10”	12”
FT³ / HR	3850	11600	22250	51300	88150	150000	250000
M³ / HR	109	328	630	1453	2496	4245	7075
MOP 8 Recommended Maximum Flow Rates*							
FT³ / HR	1100	2500	4275	9520	16350	25580	361701
M³ / HR	31	71	121	270	463	724	024

*The Water Environment Federation Manual of Practice Number 8 (MOP 8), copyright © 1998 recommends a velocity of no more than 12 feet per second. The maximum flow rates given are based upon Schedule 10 pipe leading up to the burner. Different schedule pipe will have different maximum recommended flow rates.

Figure 02: 244WS - Venturi with Varec Biogas 386 Series Regulator and 450 Series Flame Trap Assembly.



NOTE: The 450 Flame Trap Assembly is not designed to support burner weight. Alternate support may be required and is recommended.

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Specifications

See Fig 01 for Dimensions

Figure 03: 244WG - Venturi with Varec Biogas 440 Series Flame Trap Assembly

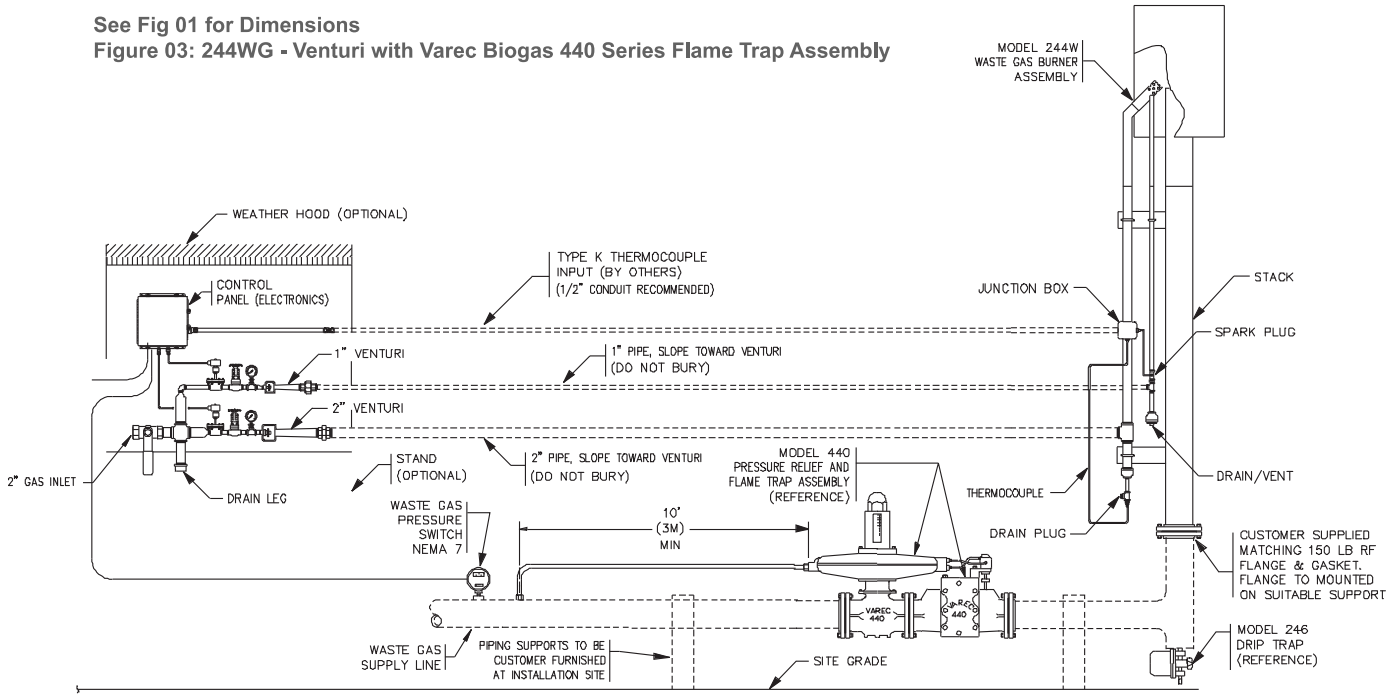
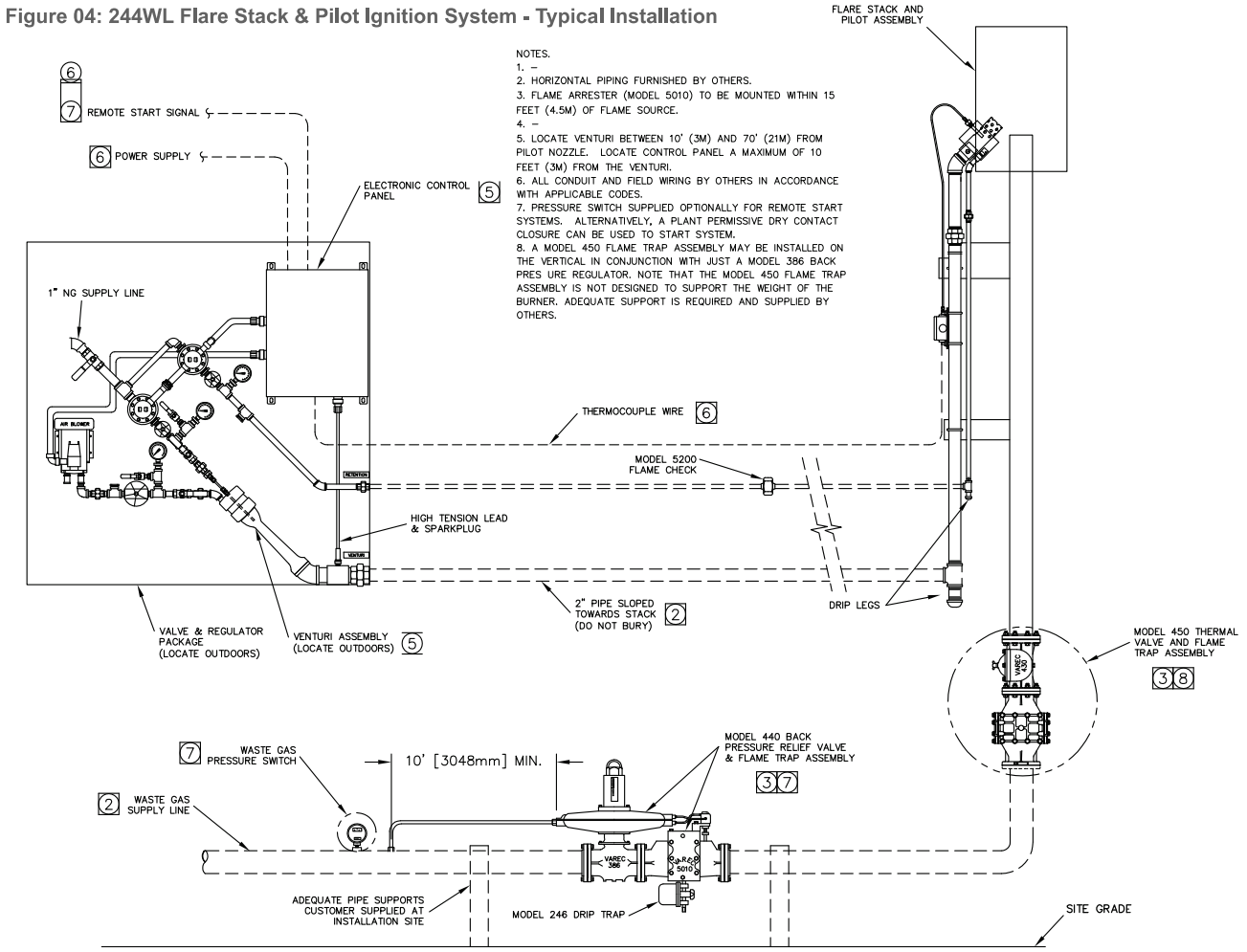


Figure 04: 244WL Flare Stack & Pilot Ignition System - Typical Installation



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Ordering Information

Model	Description
244W	Waste Gas Burner & Ingnition System

Code	Pilot Ignition System
S	Standard
G	Low Pressure Pilot Ignition System (Pilot Gas is 15" WC > X > 4" WC)
L	Low Pressure Pilot Ignition System (Pilot Gas is 20" WC > X > 4" WC)

Code	Size
2	2"
3	3"
4	4"
6	6"
8	8"
0	10"
1	12"

Code	Power Requirements (Must Select One)
1	115/ 120 VAC, 60 Hz (Standard)
2	220/ 240 VAC, 60 Hz
3	220/ 240 VAC, 50 Hz

Code	Electronic Enclosure Rating (Must Select One)
4	NEMA 4, Weather-Proof (Standard)
7	NEMA 7, Explosion-Proof (Optional)
9	NEMA 4X, Stainless Steel (Optional)

Code	Auto-Start Option (Must Select One)
0	None - Manual Start
1	Dry Contact - NEMA 7 Pressure Switch Included
2	Dry Contact - Pressure Switch Not Required

Code	Pilot Solenoid (Used Only with Auto-Start Option) (Must Select One)
0	No Auto Start Option Required
1	Pilot Solenoid Shall Fail Open (Not Avail. w/ Blower)
2	Pilot Solenoid Shall Fail Closed

Code	Blower Package Option (Only w/ 244WS) Indicate When Specified:
0	Standard Venturi-Driven System (Pilot Gas 10PSIG or Greater) or "G" & "L" Pilot Ignition System
1	Blower-Driven System [1]

Code	Options (May Select More Than One)
0	None required (Standard)
1	Heater and Thermostat Mounted within Electronic Enclosure Panel
2	Remote Spark Generator NEMA 4
3	Remote Spark Generator NEMA 7
4	Low Pressure Natural Gas for Pilot Gas (244WG & 244WL)
5	Propane/ LPG for Pilot Gas (244WS or 244WL Option)
7	244WG or 244WL Mounting Stand & Weatherhood (316L Weatherhood and Mounting Plate and 304L Stands) [2]
9	Auxiliary Weatherhood and Mounting Stand (316L Weatherhood and Mounting Plate and 304L Stands) [3]
R	Relay for use with Model 386/ 440 [4]
A	Anchor Bolt Calculations
B	Standard Support Burner Base for Flare Stack [5]
C	CSA Approval (Min. Stack Height, FF Flange, CSA Inspection)
W	Left Exit Panel (Right Exit - Standard)
P	Step Down Pilot Gas Pressure Regulator Max 10 PSIG Regulated to 12" WC [6]

Code	Burner Stack, Shroud and Pilot Gas Piping Material [7]
*	Leave blank when specifying standard of upper 24 inches of stack
S4	All 304 SS
S6	All 316 SS

244W	S	6	1	4	1	1	0	0	(Example)

Example: Standard Unit 6" Flange Connection; Electronic Panel to Accept 120 VAC, 60 Hz Input Power; Housed in NEMA 4 Enclosure. Includes Auto-Start Option with Pressure Switch/ Dry Contact Input and Fail Open Pilot Solenoid Valve

NOTE:
1 - Comes standard with Explosion Proof Motor and Switch.
2 - Available option with the 244WG and 244WL.
3 - Option can be used for 244WS/ WG/ WL Systems.
4 - Include when specifying a 3-Way Solenoid Valve with the Model 386/ 440.

NOTE:
5 - Standard design for support base. Add SPC if a special support base is required.
6 - Always include with an "L" ignition system.
7 - Add S4 or S6 at the end of the PN to signify choice of either all 304 SS or all 316 SS burner stack, shroud and pilot gas piping

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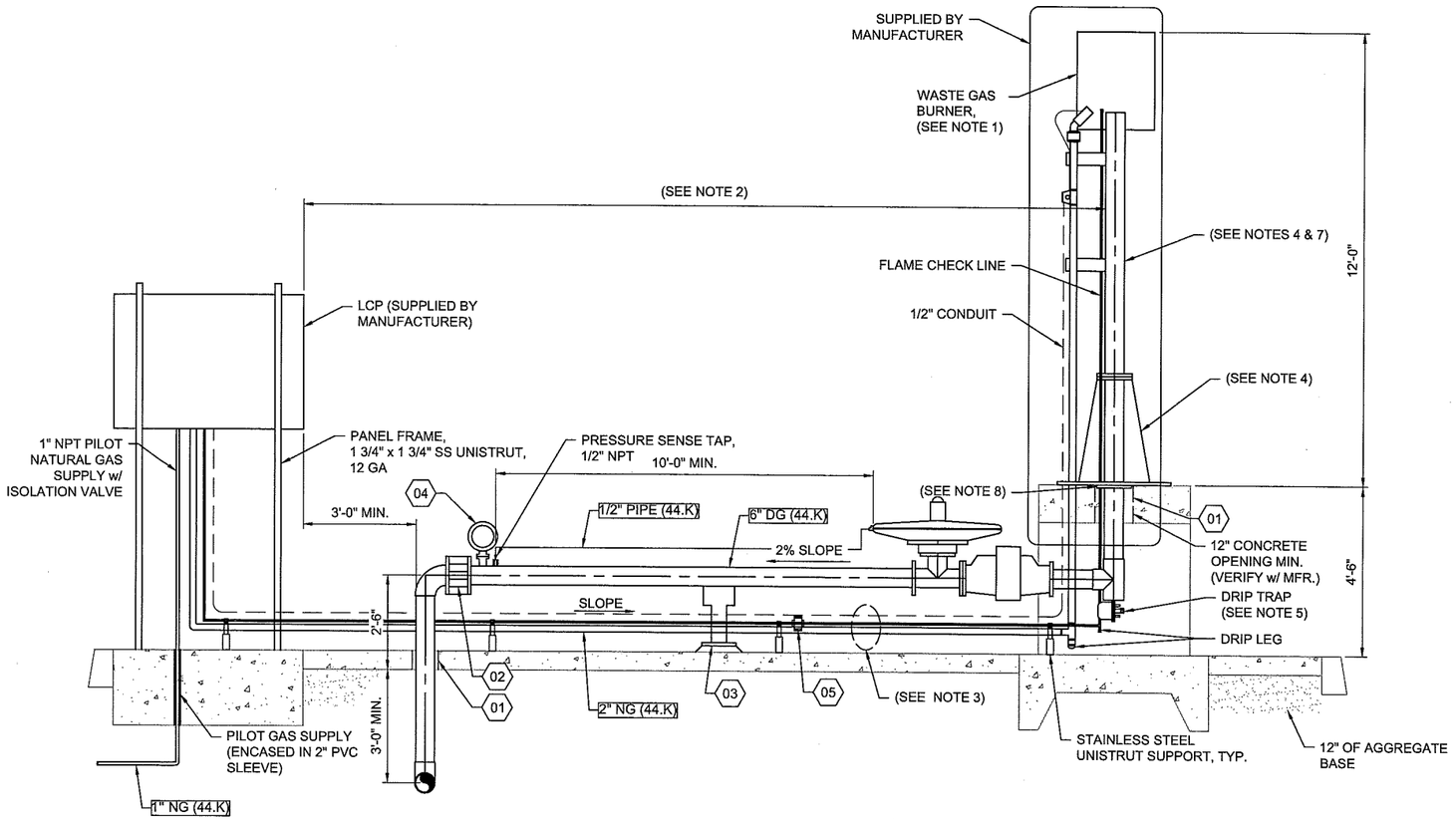
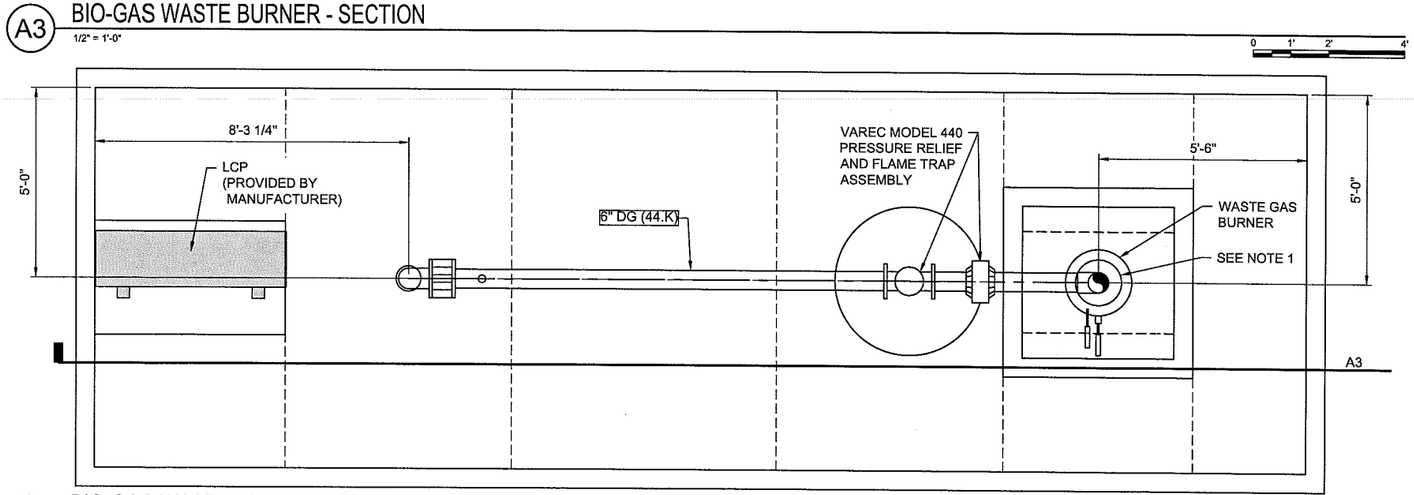


A3 BIO-GAS WASTE BURNER - SECTION

1/2" = 1'-0"



A1 BIO-GAS WASTE BURNER - PLAN

1/2" = 1'-0"

GENERAL SHEET NOTES

1. ARRANGE AND INSTALL BURNER AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. LCP SHALL BE A MINIMUM OF 15' FROM BURNER.
3. INSULATE ALL EXPOSED DIGESTER GAS PIPING FROM THE LCP TO THE WASTE GAS BURNER. COORDINATE WITH MANUFACTURER FOR PLACEMENT LOCATION OF PIPING/CONDUIT TO GAS BURNER.
4. MANUFACTURER TO PROVIDE SUPPORT BASE AND ANCHOR BOLT CALCULATIONS FOR BURNER SUPPORT UPWARD FROM BASE SLAB ELEVATION.
5. INSTALL SHARPE SERIES 5457 SPRING BALL VALVE ON DRIP TRAP FOR DRAINING.
6. NOT USED.
7. ALL VERTICAL 6" DIGESTER GAS PIPING AND ASSOCIATED FLANGES ABOVE CONCRETE SLAB IS SUPPLIED BY THE MANUFACTURER.
8. CONNECT 6" DIGESTER GAS PIPE TO BOTTOM OF SUPPORT BASE WITH STAINLESS STEEL FLANGE. SUPPORT BASE IS PROVIDED WITH FLANGE CONNECTIONS.

SHEET KEYNOTES

01 PIPE PENETRATION, RE: STANDARD DETAIL M-227

02 SLEEVE TYPE COUPLING, INSTALL OUTSIDE OF WASTE GAS FLARE FACILITY FOOTPRINT

03 PIPE SUPPORT, RE: STANDARD DETAIL M-048

04 PRESSURE SWITCH

05 PILOT FLAME CHECK

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PHASE II WWTP IMPROVEMENTS

BIO-GAS WASTE BURNER - MECHANICAL PLAN & SECTIONS

PROJECT NO. 212006-006

SHEET NO. M-101-J6

REZNOR®
Model UDBS

Separated Combustion, High Static Blower Type Unit Heaters for Commercial/Industrial Use

CSA 2.6b

ANSI Z83.8b

DESCRIPTION

Reznor® V3 Series Model UDBS gas-fired separated combustion unit heaters are available in 14 sizes ranging from 30,000 to 400,000 BTUH gas input. Model UDBS heaters are designed for 82-83% thermal efficiency and are approved for commercial/industrial installations in the United States and Canada by the Canadian Standards Association (CSA).

Reznor V3 Series unit heaters have a refreshing new appearance with a glossy white cabinet finish and less visible hardware. Each size cabinet is easily suspended from four suspension points. The low voltage terminal strip on the outside of the cabinet makes connecting control wiring easy with no panels to remove. The addition of a "G" terminal to the low voltage strip, along with the new design of the circuit board, allows for blower only operation (without adding relays). All units have a factory installed gas line nipple to the exterior of the cabinet for easy gas service connection.

The preeminent new internal feature is the TCORE² heat exchanger and single burner combustion system. Other standard features include a single-stage gas valve, multi-try direct spark ignition with timed lockout, pressure switch to verify vent flow, resiliently isolated venter motor, venter wheel with improved housing, a high temperature limit control, interlock door switch, and a built-in disconnect switch. Sizes 30-125 are equipped with a centrifugal blower and direct drive motor with multispeed taps. Sizes 30 and 45 are capable of handling up to .5" w.c. of external static pressure; Sizes 60-125 will handle up to .75" w.c. of external static pressure. Sizes 150-400 are equipped with a centrifugal blower with an adjustable belt drive and motor. All units are designed for use with optional 30° and 60° downturn nozzles with horizontal and vertical louvers. Operation is controlled through an integrated circuit board. The circuit board monitors heater operation and has LED diagnostic indicator lights to identify abnormalities in control functions.

The 1ST ever separated combustion system in the commercial/industrial heating industry **was introduced on a Reznor heater** in the 1960s, and that proven technology is continued in this new separated combustion product. Model UDBS separated combustion units require installation of a specially designed combustion air/vent system including the unique concentric adapter box that allows for only one building penetration for both the vent and combustion air.

The V3 Series unit heaters are designed to provide all the features you expect in a Reznor heater plus improved efficiency, easier installation, and a new look ***~ both inside and out.*** Look for the unique white unit with no visible front and bottom hardware, deep red louvers, black side handle, and angled corner to know you have a genuine Reznor heater.

STANDARD FEATURES

- Certified for commercial/industrial heating applications
- 82-83% Thermal efficient ***~ TOP in its class!***
- 45-75°F Rise range - Sizes 30-350 50-80°F Rise range - Size 400
- TCORE² titanium stabilized aluminized steel heat exchanger
- Patented [A] single burner combustion system including a one-piece burner assembly
- 115/1/60 Supply voltage
- 115 Volt open dripproof blower motor with internal overload protection - Sizes 30-125
- 115 Volt open dripproof blower motor with internal overloads and definite purpose motor contactor - Sizes 150-400
- Direct drive blower with multispeed taps - Sizes 30-125
- Adjustable belt drive blower - Sizes 150-400
- Transformer for 24-volt controls
- Integrated circuit board with diagnostic indicator lights
- Blower relay (included on the circuit board)
- Multi-try direct spark ignition with timed lockout
- Single-stage natural gas valve (field adjustable for operation to 9,000 ft. elevation ®)
- Vibration/noise isolated venter motors
- Sealed compartment houses all electrical components
- 4-pt Suspension
- Built-in disconnect switch - Sizes 30-125, 20A@115V rating; Sizes 150-400 30A@115V rating
- External terminal strip for 24-volt wiring
- Sealed junction box for supply wiring
- External gas connection
- Fully gasketed door panel with safety door switch
- Improved cabinet design with less visible hardware

[A] U.S. Patent No. 6,889,686

OPTIONAL FEATURES - FACTORY INSTALLED

- Equipped for propane gas
- Single-stage, propane gas valve (field adjustable for operation to 9,000 ft. elevation [B])
- Two-stage natural gas or propane gas valve - Sizes 60-400
- 409 or 316 Stainless steel heat exchanger
- 208, 230, 480, and 575 Three phase voltage - Sizes 150-400 (step down transformer shipped separate for field installation for 480 and 575 units)
- Adjustable belt drive and motor for up to .5" w.c. external static pressure - Sizes 150-400
- Totally enclosed blower motor - Sizes 150-250
- Belt and blower guards

OPTIONAL FEATURES - FIELD INSTALLED

- Horizontal or Vertical Combustion Air/Vent Kit including concentric adapter [C]
- Thermostat
- Thermostat guard with locking cover
- Vertical louvers
- Downturn nozzle (30° or 60° deflection, with and without vertical louvers)
- Gas conversion kits
- Manual shutoff valves
- High altitude kits (above 6,000 ft. to 9,000 ft.)
- Primary/secondary controls for zoning up to six units
- Duct flange
- Polytube adapters
- Blower and belt guards
- Hanger kits for 1" pipe
- Stepdown transformer (for 208/115, 230/115 or 460/115 supply voltage) - Sizes 30-125

[B] Pressure switch change required for installations above 6,000 ft.
[C] Selection of either a horizontal or vertical combustion air/vent kit is required.

For installations where dirt, dust, and other air borne contamination is present in the indoor environment, it is [illegible] use separated [illegible] units (Model UDBS). These models use air from outside the space [illegible] This will help re[illegible] of contaminates on the burner which would affect the combustion process. Refer to the installation manuals for recommended frequency of maintenance and cleaning.

TECHNICAL DATA

Model UDBS

GUH 1 GUH 2

Size		30	45	60	75	100	125	150	175	200	225	250	300	350	400
Input Heating Capacity	BTUH	30,000	45,000	60,000	75,000	105,000	120,000	150,000	175,000	200,000	225,000	250,000	300,000	350,000	400,000
	kw/h	8.8	13.2	17.6	22.0	30.8	35.2	43.9	51.2	58.6	65.9	73.2	87.8	102.5	117.1
Thermal Efficiency (%)		82	82	82	82	83	83	83	83	83	83	83	83	83	82
Output Heating Capacity [D]	BTUH	24,600	36,900	49,200	61,500	87,150	99,600	124,500	145,250	166,000	186,750	207,500	249,000	290,500	328,000
	kw/h	7.2	10.8	14.4	18.0	25.6	29.2	36.4	42.5	48.6	54.7	60.8	72.9	85.1	96.0
Gas Connection (in.) [E]	Natural	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4
	Propane	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4
Vent Connection [F] (in. diameter)		4	4	4	4	4	4	5	5	5	5	5	6	6	6
Combustion Air Inlet [F] (in. diameter)		4	4	4	4	4	4	6	6	6	6	6	6	6	6
Control Amps (24 volt)		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
FLA (with standard HP 115V motor)		3.7	3.7	7.1	7.1	13.0	13.0	5.9	6.3	10.5	12.7	12.7	17.7	27.3	27.3
Maximum OCP (115V) [G]		15	15	15	15	30	30	15	15	25	30	30	40	60	60
Normal Power Consumption (watts @ full load, medium speed)		215	215	447	447	537	537	230	415	485	675	675	1260	1635	1635
Minimum Discharge Air Temperature Rise	°F	45	45	45	45	45	45	45	45	45	45	45	45	45	50
Maximum Discharge Air Temperature Rise	°F	75	75	75	75	75	75	75	75	75	75	75	75	75	80
Maximum Air Volume	CFM	506	759	1012	1265	1793	2049	2562	2989	3416	3843	4270	5123	5977	6185
	M^3/min	14.3	21.5	28.7	35.8	50.8	58.0	72.5	84.6	96.7	108.8	120.9	145.1	169.2	175.1
Minimum Air Volume	CFM	304	456	607	759	1076	1230	1537	1793	2049	2306	2562	3074	3586	4100
	M^3/min	8.6	12.9	17.2	21.5	30.5	34.8	43.5	50.8	58.0	65.3	72.5	87.0	101.5	116.1
Discharge Air Opening Area	Ft^2	0.96	0.96	1.25	1.25	2.01	2.01	2.56	2.56	2.56	3.51	3.51	4.79	4.79	4.79
	M^2	0.09	0.09	0.12	0.12	0.19	0.19	0.24	0.24	0.24	0.33	0.33	0.45	0.45	0.45
Maximum Output Velocity	FPM	527	791	810	1012	892	1020	1001	1168	1334	1095	1217	1070	1248	1291
	M^3/min	159	239	239	299	267	305	305	356	407	334	371	326	380	393
Minimum Output Velocity	FPM	316	475	486	607	535	612	600	700	800	657	730	642	749	856
	M^3/min	96	143	143	179	160	183	183	213	244	200	223	196	228	261
Standard Blower Motor HP		1/6	1/6	1/3	1/3	3/4	3/4	1/4	1/2	1/2	3/4	3/4	1-1/2	2	2
Blower Size	inches	9 X 6	9 X 6	9 X 6	9 X 6	10 X 10	10 X 10	12 x 12	12 x 12	12 x 12	15 x 11	15 x 11	15 x 15	15 x 15	15 x 15
Approximate Net Weight	lbs	72	77	89	94	131	136	255	275	275	320	335	375	410	425
	kg	33	35	40	43	59	62	116	125	125	145	152	170	186	193
Approximate Ship Weight	lbs	90	95	110	115	176	181	315	335	335	400	415	475	510	525
	kg	41	43	50	52	80	82	143	152	152	181	188	215	231	238

[D] CSA rating for altitudes to 2000 ft.
[E] Size shown is for gas connection to a single stage gas valve, not supply line size.
[F] Smaller and/or larger vent and combustion air pipe diameters may be allowed; refer to the Venting Installation Manual for Separated Combustion Units, Form I-UD-V-SC. If vent diameter is different from vent connection, reducer/enlargers will be field-required.
[G] MOP = 2.25 x largest motor FLA + remaining load. Answer is rounded down to the next size of commercially available circuit breaker or fuse.

REZNOR®

Model UDAS

Separated Combustion, Low Static Commercial/Industrial Unit Heaters

Sizes 30-125 carry an additional approval for use in residential garage/workshops under CSA International Requirement 10.96 - U.S. and CR96-0005 - Canada

CSA 2.6b

ANSI Z83.8b

DESCRIPTION

Reznor® V3 Series Model UDAS gas-fired separated combustion unit heaters are available in 14 sizes ranging from 30,000 to 400,000 BTUH gas input. All sizes are approved for commercial/industrial installations. Sizes 30-125 carry an additional approval for use in attached residential garage/workshop application. Model UDAS heaters are designed for 82-83% thermal efficiency and are approved for installation in the United States and Canada by the Canadian Standards Association (CSA).

Reznor® V3 Series unit heaters have a refreshing new appearance with a glossy white cabinet finish and less visible hardware. Each size cabinet is easily suspended from either 2 or 4 suspension points. Or, an optional hanger kit for Sizes 30-125 allows for ceiling mounting. The low voltage terminal strip on the outside of the cabinet makes connecting control wiring easy with no panels to remove. The addition of a “G” terminal to the low voltage strip, along with the new design of the circuit board, allows for fan only operation (without adding relays). All units have a factory installed gas line nipple to the exterior of the cabinet for easy gas service connection.

The preeminent new internal feature is the TCORE² ® heat exchanger and single burner combustion system. Other standard features include a single-stage gas valve, multi-try direct spark ignition with timed lockout, pressure switch to verify vent flow, resiliently isolated venter motor, venter wheel with improved housing, resiliently isolated axial fan and motor assembly, a high temperature limit control, interlock door switch, and a built-in disconnect switch. Sizes 30-125 also include a flame rollout safety switch. Operation is controlled through an integrated circuit board. The circuit board monitors heater operation and has LED diagnostic indicator lights to identify abnormalities in control functions.

The 1ST ever separated combustion system in the commercial/industrial heating industry **was introduced on a Reznor heater** in the 1960s, and that proven technology is continued in this new separated combustion product. Model UDAS separated combustion units require installation of a specially designed combustion air/vent system including the unique concentric adapter box that allows for only one building penetration for both the vent and combustion air.

The new V3 Series unit heaters are designed to provide all the features you expect in a Reznor heater plus improved efficiency, easier installation, and a new look ***~ both inside and out.*** Look for the unique white unit with no visible front and bottom hardware, deep red louvers, black side handle, and angled corner to know you have a genuine Reznor heater.

STANDARD FEATURES

- Sizes 30-400 certified for commercial/industrial heating application
- Sizes 30-125 carry an additional approval for use in residential garage/workshop heating applications
- 82-83% Thermal efficient ***~ TOP in its class!***
- 50-60°F Rise range
- TCORE² titanium stabilized aluminized steel heat exchanger
- Patented [A] single burner combustion system including a one-piece burner assembly
- 115/1/60 Supply voltage
- 115 Volt open fan motor with internal overload protection
- Transformer for 24-volt controls
- Integrated circuit board with diagnostic indicator lights
- Multi-try direct ignition with timed lockout
- Fan relay (included on the circuit board)
- Single-stage natural gas valve (field adjustable for operation to 9,000 ft. elevation ⊘)
- Vibration/noise isolated fan and venter motors
- Sealed control compartment houses all electrical components
- 2-pt ***and*** 4-pt Suspension ***~ standard on all sizes***
- Built-in disconnect switch (20A @ 115V Rating)
- External terminal strip for 24-volt wiring
- Sealed junction box for supply wiring
- External gas connection
- Fully gasketed door panel with safety door switch
- Full fan guard ***~ engineered for safety***
- Improved cabinet design with less visible hardware

[A] U.S. Patent No. 6,889,686.

OPTIONAL FEATURES - FACTORY INSTALLED

- Single-stage, propane gas valve (field adjustable for operation to 9,000 ft. elevation [B])
- Two-stage natural gas or propane gas valve - Sizes 60-400
- 409 or 316 Stainless steel heat exchangers
- Totally enclosed fan motor (Sizes 30-250, 115V only)

ACCESSORIES - FIELD INSTALLED

- Horizontal or Vertical Combustion Air/Vent Kit including concentric adapter [C]
- Thermostat
- Thermostat guard with locking cover
- Vertical louvers
- Downturn nozzle kits
- Gas conversion kits (natural and propane)
- Primary/secondary controls for zoning up to six units
- Ceiling suspension kit - Sizes 30-125
- Hanger kits for 1" pipe
- Stepdown transformer (for 208/115, 230/115 or 460/115 supply voltage)
- Manual shutoff valves

[B] Pressure switch change required for installations above 6,000 ft.
[C] Selection of either a horizontal or vertical combustion air/vent kit is required.

TECHNICAL DATA

Model UDAS

GUH 3 GUH 4

Size		30	45	60	75	100	125	150	175	200	225	250	300	350	400
Input Heating Capacity	BTUH	30,000	45,000	60,000	75,000	105,000	120,000	150,000	175,000	200,000	225,000	250,000	300,000	350,000	400,000
	(kw/h)	(8.8)	(13.2)	(17.6)	(22.0)	(30.8)	(35.2)	(44.0)	(51.3)	(58.6)	(65.9)	(73.3)	(87.9)	(102.6)	(117.2)
Thermal Efficiency (%)		82	83	83	83	83	83	83	83	83	83	83	83	83	83
Output Heating Capacity [D]	BTUH	24,600	37,350	49,800	62,250	87,150	99,600	124,500	145,250	166,000	186,750	207,500	249,000	290,500	332,000
	(kw/h)	(7.2)	(10.9)	(14.6)	(18.2)	(25.5)	(29.2)	(36.5)	(42.6)	(48.7)	(54.7)	(60.8)	(73.0)	(85.1)	(97.3)
Gas Connection (inches) [E]	Natural	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4
	Propane	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4
Vent Connection [F] (inches diameter)		4	4	4	4	4	4	5	5	5	5	5	6	6	6
Combustion Air Inlet [F] (inches diameter)		4	4	4	4	4	4	6	6	6	6	6	6	6	6
Control Amps (24 volt)		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Full Load Amps (115 volt)		1.9	2.4	2.4	3.3	3.9	5.1	3.8	3.8	4.6	7.5	7.5	11.0	11.0	11.0
Maximum Over Current Protection (115V) [G]		15	15	15	15	15	15	15	15	15	15	15	20	20	20
Normal Power Consumption (watts)		109	155	155	217	276	354	392	392	491	747	747	1086	1086	1086
Discharge Air Temperature Rise (°F)		50	55	60	60	60	60	60	60	60	60	60	60	60	60
Air Volume	CFM	456	629	769	961	1345	1537	1921	2242	2562	2882	3202	3843	4483	5123
	(M^3/min)	(12.9)	(17.8)	(21.8)	(27.2)	(38.1)	(43.5)	(54.4)	(63.5)	(72.5)	(81.6)	(90.7)	(108.8)	(126.9)	(145.1)
Discharge Air Opening Area	ft^2	0.96	0.96	1.25	1.25	2.01	2.01	2.56	2.56	2.56	3.51	3.51	4.79	4.79	4.79
	(M^2)	(0.09)	(0.09)	(0.12)	(0.12)	(0.19)	(0.19)	(0.24)	(0.24)	(0.24)	(0.33)	(0.33)	(0.45)	(0.45)	(0.45)
Output Velocity	FPM	475	656	616	770	668	763	752	877	1003	820	911	802	936	1069
	(M/min)	(145)	(200)	(188)	(235)	(204)	(233)	(229)	(267)	(306)	(250)	(278)	(244)	(285)	(326)
Fan Motor HP [H]	Open	0.02	0.03	0.03	0.06	1/30	1/20	1/6	1/6	1/6	1/4	1/4	1/2	1/2	1/2
	Enclosed	0.06	0.06	0.06	0.06	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2
Fan Motor	RPM	1550	1550	1550	1550	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
Fan Diameter	inches	10	10	12	12	16	16	18	18	18	20	20	24	24	24
Sound Level	dba @ 15 ft	40	40	40	49	54	55	51	52	53	56	56	59	61	62
Approximate Net Weight	lbs	55	60	68	73	97	102	173	188	188	204	216	270	295	307
	(kg)	(25)	(27)	(31)	(33)	(44)	(46)	(78)	(85)	(85)	(93)	(98)	(122)	(134)	(139)
Approximate Ship Weight	lbs	63	68	76	81	120	125	206	221	221	247	259	323	348	360
	(kg)	(29)	(31)	(34)	(37)	(54)	(57)	(93)	(100)	(100)	(112)	(117)	(147)	(158)	(163)

[D] CSA rating for altitudes to 2000 ft.
[E] Size shown is for gas connection to a single stage gas valve, not supply line size.
[F] Smaller and/or larger vent and combustion air pipe diameters may be allowed; refer to the Venting Installation Manual for Separated Combustion Units, Form I-V-SC. If vent diameter is different from vent connection, reducer/enlargers will be field-required.
[G] MOP = 2.25 x largest motor FLA + remaining load. Answer is rounded down to the next size of commercially available circuit breaker or fuse.
[H] All other information in this table is based on a heater equipped with a standard 115 volt open fan motor.

For installations where dirt, dust, and other air borne contamination is present in the indoor environment, it is recommended to use separated combustion units (Model UDAS). These models use air from outside the space for combustion. This will help reduce the build up of contaminates on the burner which would affect the combustion process. Refer to the installation manuals for recommended frequency of maintenance and cleaning.

STATEMENT OF EXHAUST EMISSIONS
2016 PERKINS DIESEL FUELED GENERATOR

The measured emissions values provided here are proprietary to Generac and it's authorized dealers. This information may only be disseminated upon request, to regulatory governmental bodies for emissions permitting purposes or to specifying organizations as submittal data when expressly required by project specifications, and shall remain confidential and not open to public viewing. This information is not intended for compilation or sales purposes and may not be used as such, nor may it be reproduced without the expressed written permission of Generac Power Systems, Inc. The data provided shall not be meant to include information made public by Generac.

Generator Model:	**SD500**	EPA Certificate Number:	**GCPXL15.2NZS-003**
kW_e Rating:	**500**	CARB Certificate Number:	**Not Applicable**
Engine Family:	**GCPXL15.2NZS**	SCAQMD CEP Number:	**545376**
Engine Model:	**2506C-E15TAG3**	Emission Standard Category:	**Tier 2**
Rated Engine Power (BHP)*:	**762**	Certification Type:	**Stationary Emergency CI**
Fuel Consumption (gal/hr)*:	**31.2**		**(40 CFR Part 60 Subpart IIII)**
Aspiration:	**Turbo/Aftercooled**		
Rated RPM:	**1800**		

*Engine Power and Fuel Consumption are declared by the Engine Manufacturer of Record and the U.S. EPA.

Emissions based on engine power of specific Engine Model.
(These values are actual composite weighted exhaust emissions results over the EPA 5-mode test cycle.)

CO	NOx + NMHC	PM	
1.43	**5.02**	**0.07**	Grams/kW-hr
1.06	**3.73**	**0.05**	Grams/bhp-hr

- The stated values are actual exhaust emission test measurements obtained from an engine representative of the type described above.
- Values based on 5mode testing are official data of record as submitted to regulatory agencies for certification purposes. Testing was conducted in accordance with prevailing EPA protocol, which is typically accepted by SCAQMD and other regional authorities.
- No emissions values provided above are to be construed as guarantees of emission levels for any given Generac generator unit.
- Generac Power Systems, Inc. reserves the right to revise this information without prior notice.
- Consult state and local regulatory agencies for specific permitting requirements.
- The emission performance data supplied by the equipment manufacturer is only one element required toward completion of the permitting and installation process. State and local regulations may vary on a case-by-case basis and local agencies must be consulted by the permit application/equipment owner prior to equipment purchase or installation. The data supplied herein by Generac Power Systems cannot be construed as a guarantee of installability of the generating set.

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DIESEL GENERATOR SET

Image shown may not reflect actual package.

PRIME
500 ekW 625 kVA
60 Hz 1800 rpm 480 Volts

Caterpillar is leading the power generation marketplace with Power Solutions engineered to deliver unmatched flexibility, expandability, reliability, and cost-effectiveness.

FEATURES

FUEL/EMISSIONS STRATEGY

- EPA Certified for Stationary Emergency Application (EPA Tier 2 emissions levels)

DESIGN CRITERIA

- The generator set accepts 100% rated load in one step per NFPA 110 and meets ISO 8528-5 transient response

UL 2200 / CSA – Optional

- UL 2200 Listed packages
- CSA Certified

Certain restrictions may apply.

Consult with your Cat® Dealer.

FULL RANGE OF ATTACHMENTS

- Wide range of bolt-on system expansion attachments, factory designed and tested
- Flexible packaging options for easy and cost effective installation

SINGLE-SOURCE SUPPLIER

- Fully prototype tested with certified torsional vibration analysis available

WORLDWIDE PRODUCT SUPPORT

- Cat dealers provide extensive post sale support including maintenance and repair agreements
- Cat dealers have over 1,800 dealer branch stores operating in 200 countries
- The Cat S•O•S℠ program cost effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by-products

CAT C18 ATAAC DIESEL ENGINE

- Utilizes ACERT™ Technology
- Reliable, rugged, durable design
- Field-proven in thousands of applications worldwide
- Four-stroke-cycle diesel engine combines consistent performance and excellent fuel economy with minimum weight
- Electronic controlled governor

CAT GENERATOR

- Matched to the performance and output characteristics of Cat engines
- UL 1446 Recognized Class H insulation
- CSA Certified

CAT EMCP 4 CONTROL PANELS

- Simple user friendly interface and navigation
- Scalable system to meet a wide range of customer needs
- Integrated Control System and Communications Gateway
- Integrated Voltage Regulation

SEISMIC CERTIFICATION

- Seismic Certification available
- Anchoring details are site specific, and are dependent on many factors such as generator set size, weight, and concrete strength.

  IBC Certification requires that the anchoring system used is reviewed and approved by a Professional Engineer
- Seismic Certification per Applicable Building Codes: IBC 2000, IBC 2003, IBC 2006, IBC 2009, IBC 2012, CBC 2007, CBC 2010

FACTORY INSTALLED STANDARD & OPTIONAL EQUIPMENT

System	Standard	Optional
Air Inlet	• Disposable air filter	[ ] Canister type, dual element [ ] Heavy duty air cleaner
Cooling	• Package mounted radiator	
Exhaust	• Exhaust flange outlet	[ ] Industrial [ ] Residential / Critcal
Fuel	• Primary fuel filter with integral water separator • Secondary fuel filters • Fuel priming pump	
Generator	• Matched to the performance and output characteristics of Cat engines • IP23 Protection	[ ] Permanent magnet excitation (PMG) [ ] Anti-condensation space heater [ ] Internal excitation (IE) [ ] Coastal insulation protection
Power Termination	• Power terminal strips	[ ] Circuit breakers – 100% rated assembly, UL Listed [ ] SUSE (Suitable for use as service equipment)
Control Panels	• EMCP 4.2	[ ] EMCP 4.3 [ ] EMCP 4.4 [ ] Local and remote annunciator modules [ ] Remote monitoring software
Mounting	• Rubber vibration isolators	
Starting/Charging	• 24 volt starting motor & charging alternator • Batteries	[ ] Battery chargers [ ] Oversize batteries [ ] Jacket water heater
General	• Paint - Caterpillar Yellow except rails and radiators gloss black • Narrow skid base	The following options are based on regional and product configuration: [ ] Seismic Certification per Applicable Building Codes: IBC 2000, IBC 2003, IBC 2006, IBC 2009, IBC 2012, CBC 2007, CBC 2010 [ ] UL 2200 Listed package [ ] CSA Certified [ ] Wide skid base [ ] Sound attenuated enclosure [ ] Weather protective enclosure [ ] Integral dual wall UL Listed 8 hr fuel tank [ ] Sub-base dual wall UL Listed 24 hr fuel tank [ ] Sub-base dual wall UL Listed 48 hr fuel tank

SPECIFICATIONS

STANDARD CAT GENERATOR	
Frame size	LC6114G
Excitation	Self Excitation
Pitch	0.6667
Number of poles	4
Number of bearings	Single bearing
Number of leads	12
Insulation	UL 1446 Recognized Class H with tropicalization and antiabrasion
IP Rating	IP23
Alignment	Pilot shaft
Overspeed capability (%)	125
Wave form deviation (%)	2
Voltage regulator	Three phase sensing
Voltage regulation	+/- 0.25% (steady state)
– Consult your Cat dealer for other available voltages	
CAT DIESEL ENGINE	
C18 ATAAC, I-6, 4-Stroke Water-cooled Diesel	
Bore	145.00 mm (5.71 in)
Stroke	183.00 mm (7.2 in)
Displacement	18.13 L (1106.36 in^3)
Compression ratio	14.5:1
Aspiration	Air-to-air aftercooled
Fuel system	MEUI
Governor type	Caterpillar ADEM control system

CAT EMCP 4 SERIES CONTROLS

EMCP 4 controls including:
- Run / Auto / Stop Control
- Speed and Voltage Adjust
- Engine Cycle Crank
- 24-volt DC operation
- Environmental sealed front face
- Text alarm/event descriptions

Digital indication for:
- RPM
- DC volts
- Operating hours
- Oil pressure (psi, kPa or bar)
- Coolant temperature
- Volts (L-L & L-N), frequency (Hz)
- Amps (per phase & average)
- ekW, kVA, kVAR, kW-hr, %kW, PF (4.2 only)

Warning/shutdown with common LED indication of:
- Low oil pressure
- High coolant temperature
- Overspeed
- Emergency stop
- Failure to start (overcrank)
- Low coolant temperature
- Low coolant level

Programmable protective relaying functions:
- Generator phase sequence
- Over/Under voltage (27/59)
- Over/Under Frequency (81 o/u)
- Reverse Power (kW) (32) (4.2 only)
- Reverse reactive power (kVAr) (32RV)
- Overcurrent (50/51)

Communications:
- Four digital inputs (4.1)
- Six digital inputs (4.2 only)
- Four relay outputs (Form A)
- Two relay outputs (Form C)
- Two digital outputs
- Customer data link (Modbus RTU) (4.2 only)
- Accessory module data link (4.2 only)
- Serial annunciator module data link (4.2 only)
- Emergency stop pushbutton

Compatible with the following:
- Digital I/O module
- Local Annunciator
- Remote CAN annunciator
- Remote serial annunciator

TECHNICAL DATA

Open Generator Set - - 1800 rpm/60 Hz/480 Volts	DM8521	
EPA Certified for Stationary Emergency Application (EPA Tier 2 emissions levels)		
Generator Set Package Performance		
Genset power rating @ 0.8 pf	625 kVA	
Genset power rating with fan	500 ekW	
Fuel Consumption		
100% load with fan	138.8 L/hr	36.7 gal/hr
75% load with fan	112.3 L/hr	29.7 gal/hr
50% load with fan	81.8 L/hr	21.6 gal/hr
Cooling System[1]		
Air flow restriction (system)	0.12 kPa	0.48 in. water
Air flow (max @ rated speed for radiator arrangement)	568 m³/min	20059 cfm
Engine Coolant capacity with radiator/exp. tank	54.9L	14.5 gal
Engine coolant capacity	20.8 L	5.5 gal
Radiator coolant capacity	34.1 L	9.0 gal
Inlet Air		
Combustion air inlet flow rate	44.8 m³/min	1582.1 cfm
Exhaust System		
Exhaust stack gas temperature	501.5°C	934.7°F
Exhaust gas flow rate	121.5 m³/min	4290.7 cfm
Exhaust flange size (internal diameter)	203 mm	8 in
Exhaust system backpressure (maximum allowable)	10.0 kPa	40.2 in. water
Heat Rejection		
Heat rejection to coolant (total)	166 kW	9440 Btu/min
Heat rejection to exhaust (total)	549 kW	31222 Btu/min
Heat rejection to aftercooler	129 kW	7336 Btu/min
Heat rejection to atmosphere from engine	69.0 kW	3924 Btu/min
Heat rejection to atmosphere from generator	28.5 kW	1620.8 Btu/min
Alternator[2]		
Motor starting capability @ 30% voltage dip	1445 skVA	
Frame	LC6114G	
Temperature rise	105°C	189°F
Lubrication System		
Sump refill with filter	64.0 L	16.9 gal
Emissions (Nominal)[3]		
NOx g/hp-hr	5.08 g/hp-hr	
CO g/hp-hr	0.22 g/hp-hr	
HC g/hp-hr	0.01 g/hp-hr	
PM g/hp-hr	0.03 g/hp-hr	

[1] For ambient and altitude capabilities consult your Cat dealer. Air flow restriction (system) is added to existing restriction from factory.

[2] Generator temperature rise is based on a 40° C (104° F) ambient per NEMA MG1-32. Some packages may have oversized generators with a different temperature rise and motor starting characteristics.

[3] Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77°F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 btu/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

RATING DEFINITIONS AND CONDITIONS

Applicable Codes and Standards:
AS1359, CSA C22.2 No100-04, UL142,UL489, UL869, UL2200, NFPA37, NFPA70, NFPA99, NFPA110, IBC, IEC60034-1, ISO3046, ISO8528, NEMA MG1-22,NEMA MG1-33, 72/23/EEC, 98/37/EC, 2004/108/EC.

Prime – Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand is 100% of prime rated ekW with 10% overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year.

Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions.

Fuel Rates are based on fuel oil of 35° API (16°C or 60°F) gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29°C (85°F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.).

Additional Ratings may be available for specific customer requirements. Consult your Cat representative for details.

DIMENSIONS

Package Dimensions		
Length	3361 mm	132.3 in
Width	1580 mm	62.2 in
Height	2078 mm	81.8 in

NOTE: For reference only – do not use for installation design. Please contact your local dealer for exact weight and dimensions.

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Materials and specifications are subject to change without notice. The International System of Units (SI) is used in this publication.

CAT, CATERPILLAR, their respective logos, "Caterpillar Yellow," the "Power Edge" trade dress, as well as corporate and product identity used herein, are trademarks of Caterpillar and may not be used without permission.

Performance No.: DM8521

Feature Code: C18DE6D

Gen. Arr. Number: 4183869

Source: U.S. Sourced

LEHE0480-00 (12/13)

SD500 | 15.2L | 500 kW

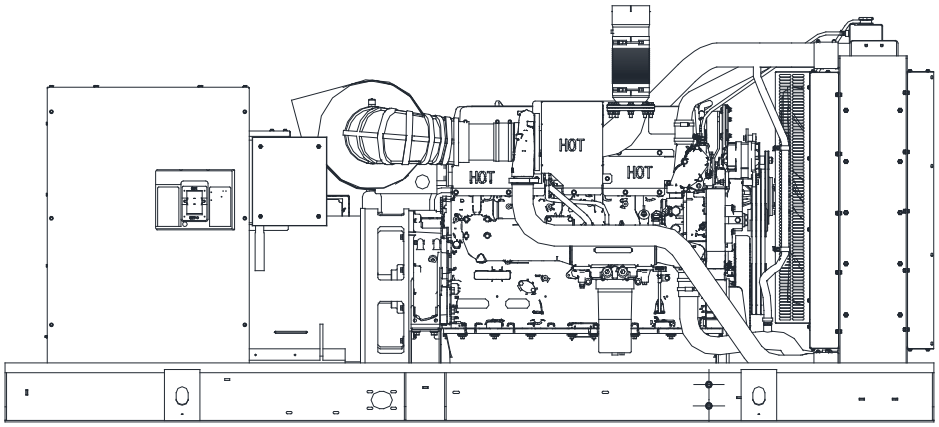
INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

STANDBY POWER RATING

500 kW, 625 kVA, 60 Hz



*Built in the USA using domestic and foreign parts

*EPA Certified Prime ratings are not available in the US or its Territories

**Certain options or customization may not hold certification valid

Image used for illustration purposes only

CODES AND STANDARDS

Generac products are designed to the following standards:

UL2200, UL508, UL142, UL498

NFPA70, 99, 110, 37

NEC700, 701, 702, 708

ISO9001, 8528, 3046, 7637, Pluses #2b, 4

NEMA ICS10, MG1, 250, ICS6, AB1

ANSI C62.41

POWERING AHEAD

For over 50 years, Generac has led the industry with innovative design and superior manufacturing.

Generac ensures superior quality by designing and manufacturing most of its generator components, including alternators, enclosures and base tanks, control systems and communications software.

Generac's gensets utilize a wide variety of options, configurations and arrangements, allowing us to met the Standby power needs of practically every application.

Generac searched globally to ensure the most reliable engines power our generator. We choose only engines that Have already been proven in heavy-duty industrial application under adverse conditions.

Generac is committed to ensuring out customer's service support continues after their generator purchase.

SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

STANDARD FEATURES

ENGINE SYSTEM

General

- Oil Drain Extension
- Air Cleaner
- Fan Guard
- Stainless Steel flexible exhaust connection
- Critical Exhaust Silencer (enclosed only)
- Factory Filled Oil
- Radiator Duct Adapter (open set only)

Fuel System

- Fuel lockoff solenoid
- Primary fuel filter

Cooling System

- Closed Coolant Recovery System
- UV/Ozone resistant hoses
- Factory-Installed Radiator
- Radiator Drain Extension
- 50/50 Ethylene glycol antifreeze
- 120 VAC Coolant Heater

Engine Electrical System

- Battery charging alternator
- Battery cables
- Battery tray
- Solenoid activated starter motor
- Rubber-booted engine electrical connections

ALTERNATOR SYSTEM

- UL2200 GENprotect™
- 12 leads (3-phase, non 600 V)
- Class H insulation material
- Vented rotor
- 2/3 pitch
- Skewed stator
- Auxiliary voltage regulator power winding
- Amortisseur winding
- Brushless Excitation
- Sealed Bearings
- Automated manufacturing (winding, insertion, lacing, varnishing)
- Rotor dynamically spin balanced
- Full load capacity alternator
- Protective thermal switch

GENERATOR SET

- Internal Genset Vibration Isolation
- Separation of circuits - high/low voltage
- Separation of circuits - multiple breakers
- Silencer Heat Shield
- Wrapped Exhaust Piping
- Silencer housed in discharge hood (enclosed only)
- Standard Factory Testing
- 2 Year Limited Warranty (Standby rated Units)
- 1 Year Limited Warranty (Prime rated Units)

ENCLOSURE (IF SELECTED)

- Rust-proof fasteners with nylon washers to protect finish
- High performance sound-absorbing material
- Gasketed doors
- Stamped air-intake louvers
- Air discharge hoods for radiator-upward pointing
- Stainless steel lift off door hinges
- Stainless steel lockable handles
- Rhino Coat™ - Textured polyester powder coat

TANKS (IF SELECTED)

- UL 142
- Double wall
- Vents
- Sloped top
- Sloped bottom
- Factory pressure tested (2 psi)
- Rupture basin alarm
- Fuel level
- Check valve in supply and return lines
- Rhino Coat™- Textured polyester powder coat
- Stainless hardware

CONTROL SYSTEM

Control Panel

- Digital H Control Panel - Dual 4x20 Display
- Programmable Crank Limiter
- 7-Day Programmable Exerciser
- Special Applications Programmable PLC
- RS-232/485
- All-Phase Sensing DVR
- Full System Status
- Utility Monitoring
- Low Fuel Pressure Indication
- 2-Wire Start Compatible
- Power Output (kW)
- Power Factor
- kW Hours, Total & Last Run
- Real/Reactive/Apparent Power
- All Phase AC Voltage
- All Phase Currents
- Oil Pressure
- Coolant Temperature
- Coolant Level
- Engine Speed
- Battery Voltage
- Frequency
- Date/Time Fault History (Event Log)
- Isochronous Governor Control
- Waterproof/sealed Connectors
- Audible Alarms and Shutdowns
- Not in Auto (Flashing Light)
- Auto/Off/Manual Switch
- E-Stop (Red Mushroom-Type)
- NFPA110 Level I and II (Programmable)
- Customizable Alarms, Warnings, and Events
- Modbus protocol
- Predictive Maintenance algorithm
- Sealed Boards
- Password parameter adjustment protection
- Single point ground
- 15 channel data logging
- 0.2 msec high speed data logging
- Alarm information automatically comes up on the display

Alarms

- Oil Pressure (Pre-programmable Low Pressure Shutdown)
- Coolant Temperature (Pre-programmed High Temp Shutdown)
- Coolant Level (Pre-programmed Low Level Shutdown)
- Engine Speed (Pre-programmed Over speed Shutdown)
- Battery Voltage Warning
- Alarms & warnings time and date stamped
- Alarms & warnings for transient and steady state conditions
- Snap shots of key operation parameters during alarms & warnings
- Alarms and warnings spelled out (no alarm codes)

SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

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CONFIGURABLE OPTIONS

ENGINE SYSTEM

General

- O 50º C Ambient Cooling System
- O Heavy Duty Air Cleaner
- O Critical & Hospital Grade Silencers
- O CCV (Closed Crankcase Ventilation)

Fuel Electrical System

- O 10A & 20A UL battery charger
- O Battery Warmer

ALTERNATOR SYSTEM

- O Alternator Upsizing
- O Antl-Condensation Heather

CIRCUIT BREAKER OPTIONS

- O Main Line Circuit Breaker
- O 2nd Main Line Circuit Breaker
- O Shunt Trip and Auxiliary Contact
- O Electronic Trip Breaker

GENERATOR SET

- O Intelimonitor Communications Software (English Only)
- O 8 Load Position Load Center
- O AC Electrical Lighting Package (ELP)
- O 5 Year Warranty
- O 5 Year Extended Warranty
- O Spring Isolators (Standard/Seismic)

ENCLOSURE

- O Weather Protected Enclosure
- O Level 1 Sound Attenuation
- O Level 2 Sound Attenuation
- O Steel Enclosure
- O Aluminum Enclosure
- O 150/180 MPH Wind Rating
- O Louvers with Gravity Dampers
- O Enclosure Heaters

TANKS (Size on last page)

- O Electrical Fuel Level
- O Mechanical Fuel Level
- O 12 Hour Run Time
- O 24 Hour Run Time
- O Fuel Line Kits
- O Fuel Water Separator

CONTROL SYSTEM

- O NFPA 110 Complaint
- O Remote Relay Board (8 or 16)
- O Oil Temperature Sender with Indication Alarm
- O Remote E-Stop (Break Glass-Type, Surface Mount)
- O Remote E-Stop (Red Mushroom- Type, Surface Mount)
- O Remote E-Stop (Red Mushroom-Type, Flush Mount)
- O Remote Communication - Bridge
- O Remote Communication - Ethernet
- O 10A Run Relay, 12 outputs
- O Ground Fault Indication and Protection Functions

ENGINEERED OPTIONS

ENGINE SYSTEM

- O Fluid containment Pan
- O Oil Heater
- O Stainless Steel Hardware

ALTERNATOR SYSTEM

- O 3rd Breaker Systems
- O Unit Mounted Load Banks
- O Medium Voltage Alternators

CONTROL SYSTEM

- O Spare inputs (x4) / outputs (x4)
- O Battery Disconnect Switch

GENERATOR SET

- O Special Testing
- O 12 VDC Enclosure Lighting Kit
- O 24 VDC/120 VAC Enclosure Lighting Kit

ENCLOSURE

- O Motorized Dampers
- O Intrusion Alert Door Switch

TANKS

- O Overfill Protection Valve
- O UL2085 Tank
- O ULC S-601 Tank
- O Stainless Steel Tank
- O Special Fuel Tanks (MIDEQ and FL DEP/DERM, etc.)
- O Vent Extensions
- O Transfer Pumps and Controllers
- O Fuel Tank Heaters

RATING DEFINITIONS

Standby - Applicable for a varying emergency load for the duration of a utility power outage with no overload capability.

Prime - Applicable for supplying power to a varying load in lieu of utility for an unlimited amount of running time. A 10% overload capacity is available for 1 out of every 12 hours. The Prime Power option is only available on International applications. Power ratings in accordance with ISO 8528-1, Second Edition

SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

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APPLICATION AND ENGINEERING DATA

ENGINE SPECIFICATIONS

General

Make	Perkins
EPA Emissions Compliance	Stationary Emergency
EPA Emissions Reference	See Emissions Data Sheet
Cylinder #	6
Type	In-Line
Displacement - L (cu In)	15.2
Bore - mm (in)	137 (5.39)
Stroke - mm (in)	171 (6.73)
Compression Ratio	16.0:1
Intake Air Method	Turbocharged/Intercooled
Cylinder Head Type	4 - Valve
Piston Type	Aluminum
Crankshaft Type	I-Beam Section

Engine Governing

Governor	Electronic Isochronous
Frequency Regulation (Steady State)	+/- 0.25%

Lubrication System

Oil Pump Type	Gear
Oil Filter Type	Full-Flow Cartridge
Crankcase Capacity - L (qts)	45 (47.55)

Cooling System

Cooling System Type	Closed Recovery
Water Pump	Centrifugal Type, Belt Driven
Fan Type	Pusher
Fan Speed (rpm)	1658
Fan Diameter mm (in)	927 (36.5)
JW Coolant Heater Standard Wattage	
After Coolant Heater Standard Wattage	1500
Coolant Heater Standard Voltage	240VAC

Fuel System

Fuel Type	Ultra Low Sulfur Diesel #2
Fuel Specifications	ASTM
Fuel Filtering (microns)	Primary 10 - Secondary 2
Fuel Injection	Electronic
Fuel Pump Type	Engine Driven Gear
Injector Type	MEUI
Engine Type	Pre-Combustion
Fuel Supply Line mm (in)	12.7 (½"NPT)
Fuel Return Line mm (in)	12.7 (½"NPT)

Engine Electrical System

System Voltage	24 VDC
Battery Charging Alternator	70 Amps at 24V
Battery Size	1155 CCA
Battery Group	8D
Battery Voltage	(2) - 12 VDC
Ground Polarity	Negative

ALTERNATOR SPECIFICATIONS

Standard Model	WEG
Poles	4
Field Type	Revolving
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	<3%
Telephone Interference Factor (TIF)	<50

Standard Excitation	Permanent Magnet
Bearings	Single Sealed Cartridge
Coupling	Direct, Flexible Disc
Load Capacity - Standby	100%
Prototype Short Circuit Test	Yes
Voltage Regulator Type	Digital
Regulation Accuracy (Steady State)	±0.5%

SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

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OPERATING DATA

POWER RATINGS

		Standby
Three-Phase 120/208 VAC @0.8pf	500 kW	Amps: 1735
Three-Phase 120/240 VAC @0.8pf	500 kW	Amps: 1504
Three-Phase 277/480 VAC @0.8pf	500 kW	Amps: 752
Three-Phase 346/600 VAC @0.8pf	500 kW	Amps: 601

STARTING CAPABILITIES (sKVA)

sKVA vs. Voltage Dip

		480 VAC								208/240 VAC					
Alternator	kW	10%	15%	20%	25%	30%	35%	Alternator	kW	10%	15%	20%	25%	30%	35%
Standard	500	475	686	914	1143	1371	1600	Standard	500	429	643	857	1071	1286	1500
Upsize 1	642	471	707	943	1179	1414	1650	Upsize 1	689	543	814	1086	1357	1629	1900
Upsize 2	832	757	1136	1514	1893	2271	2650	Upsize 2	723	571	857	1143	1429	1714	2000

FUEL CONSUMPTION RATES*

Fuel Pump Lift - ft (m)
12 (3.7)

Total Fuel Pump Flow (Combustion + Return) gal/hr (l/hr)
121 (457)

	Diesel - gal/hr (l/hr)
Percent Load	Standby
25%	10.5 (39.7)
50%	19.5 (73.8)
75%	23.7 (89.7)
100%	31.2 (118.1)

* Fuel supply installation must accommodate fuel consumption rates at 100% load.

COOLING

		Standby
Coolant Flow per Minute	gal/min (l/min)	114.1 (432)
Coolant System Capacity	gal (L)	13 (49)
Heat Rejection to Coolant	BTU/hr	1,198,080
Inlet Air	cfm (m^3/hr)	30,582 (866)
Max. Operating Radiator Air Temp	F° (C°)	122 (50)
Max. Ambient Temperature (before derate)	F° (C°)	104 (40)
Maximum Radiator Backpressure	in H_2O	0.5

COMBUSTION AIR REQUIREMENTS

		Standby
Flow at Rated Power	cfm (m^3/min)	1483 (42)

ENGINE

		Standby
Rated Engine Speed	rpm	1800
Horsepower at Rated kW**	hp	762
Piston Speed	ft/min (m/min)	2020
BMEP	psi	366

** Refer to "Emissions Data Sheet" for maximum bHP for EPA and SCAQMD permitting purposes.

EXHAUST

		Standby
Exhaust Flow (Rated Output)	cfm (m^3/min)	3955 (112)
Max. Backpressure (Post Silencer)	inHg (Kpa)	2.01 (6.8)
Exhaust Temp (Rated Output)	°F (°C)	1022 (550)
Exhaust Outlet Size (Open Set)	mm (in)	127 (5)

Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions. Please consult a Generac Power Systems Industrial Dealer for additional details. All performance ratings in accordance with ISO3046, BS5514, ISO8528 and DIN6271 standards.

SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

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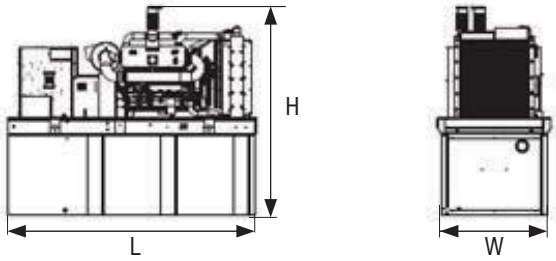
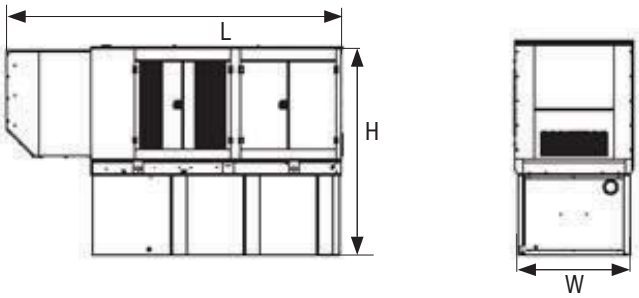
DIMENSIONS AND WEIGHTS*



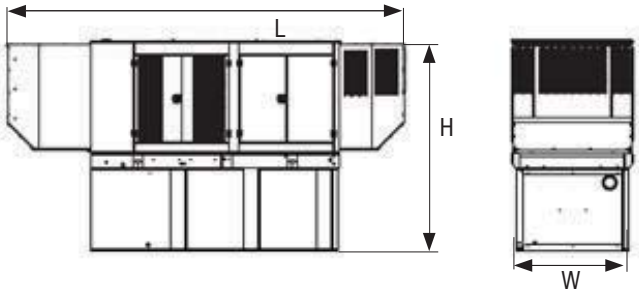
OPEN SET

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) - Tank & Open Set
NO TANK	-	154.4 (3923) x 71 (1803) x 67 (1702)	10580 (4799)
10	334	158.5 (4026) x 71 (1803) x 81 (2057)	12255 (5559)
32	1001	158.5 (4026) x 71 (1803) x 103 (2616)	13180 (6978)
32	1001	228 (5791) x 71 (1803) x 92 (2337)	13730 (6228)
64	2002	290 (7366) x 71 (1803) x 103 (2616)	15430 (6999)



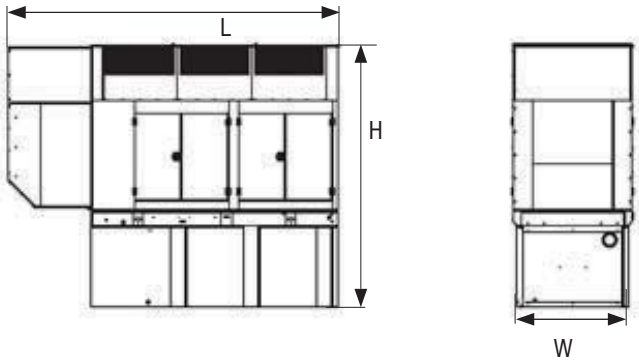
STANDARD ENCLOSURE

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) – Enclosure Only	
			Steel	Aluminum
NO TANK	-	207.4 (5268) x 71 (1803) x 80 (2032)	1999 (907)	869 (394)
10	334	207.4 (5268) x 71 (1803) x 94 (2388)		
32	1001	207.4 (5268) x 71 (1803) x 116 (2946)		
32	1001	228 (5791) x 71 (1803) x 105 (2667)		
64	2002	290 (7366) x 71 (1803) x 116 (2946)		



LEVEL 1 ACOUSTIC ENCLOSURE

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) - Enclosure Only	
			Steel	Aluminum
NO TANK	-	247.5 (6285) x 71 (1803) x 80 (2032)	2782 (1262)	1291 (586)
10	334	247.5 (6285) x 71 (1803) x 94 (2388)		
32	1001	247.5 (6285) x 71 (1803) x 116 (2946)		
32	1001	247.5 (6285) x 71 (1803) x 105 (2667)		
64	2002	290 (7366) x 71 (1803)x 116 (2946)		



LEVEL 2 ACOUSTIC ENCLOSURE

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) - Enclosure Only	
			Steel	Aluminum
NO TANK	-	207.4 (5268) x 71 (1803) x 114 (2899)	3330 (1510)	1522 (692)
10	334	207.4 (5268) x 71 (1803)) x 128 (3251)		
32	1001	207.4 (5268) x 71 (1803) x 150 (3810)		
32	1001	228 (5791) x 71 (1803) x 139 (3531)		
64	2002	290 (7366) x 71 (1803) x 150 (3810)		

* All measurements are approximate and for estimation purposes only. Sound dBA can be found on the sound data sheet. Enclosure Only weight is added to Tank & Open Set weight to determine total weight.

SPEC SHEET

Specification characteristics may change without notice. Dimensions and weights are for preliminary purposes only. Please consult a Generac Power Systems Industrial Dealer for detailed installation drawings.

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Part No 0197160SBY
Rev. D 09/21/15

Estimated Emissions -JB and JBX Burners

The following emissions apply to all JB and JBX burners firing the fuels shown.

Estimated Emission Levels Firing Natural Gas			
Pollutant		**Model JB**	**Model JBX**
NOx (B)	ppm lb/mmbtu	80 0.096	25 0.03
CO (A)	ppm lb/mmbtu	50 0.037	50 0.037
SOx (C)	ppm lb/mmbtu	1 0.001	1 0.001
HC / VOC	ppm lb/mmbtu	20 0.008	20 0.008
PM	ppm lb/mmbtu	na 0.0048	na 0.0048

~~Estimated Emission Levels Firing #2 Oil~~ (D)			
Pollutant		**Model JB**	**Model JBX**
NOx (B)	ppm lb/mmbtu	135 0.176	120 0.157
CO (A)	ppm lb/mmbtu	50 0.04	50 0.04
SOx (C)	ppm lb/mmbtu	278 0.52	278 0.52
HC / VOC	ppm lb/mmbtu	25 0.013	25 0.013
PM	ppm lb/mmbtu	na 0.014	na 0.014

Assumption sued for above (Contact Webster if different assumptions required)

A. CO varies with firing rate. Lower levels available, contact sales.
B. The ppm levels are corrected to 3% Oxygen (15% excess air) and dry volume basis.
C. Maximum sulfur in natural gas is 0.0006% wt.
D. ASTM #2 fuel, 0.02% Nitrogen, 0.5% Sulfur and 0.01% Ash (% by weight).
E. All levels are above backround (ambient) conditions.
F. Emission levels are based on a properly maintained and tuned burner.

SELKIRK®
COMMERCIAL & INDUSTRIAL
5030 Coporate Exchange Blvd.
Grand Rapids, MI 49512
Phone: 800.848.2149
Fax: 800.972.1421

DIGESTER GAS

THE FOLLOWING CALCULATIONS ARE THEORETICAL AND ARE FOR REFERENCE ONLY TO ASSIST OUR CLIENTS. SELKIRK ASSUMES NO RESPONSIBILITY FOR FIELD CLAIMS AGAINST THIS DATA. CALCULATIONS SHOULD BE VERIFIED BY A LICENSED HVAC PROFESSIONAL ENGINEER.

SELKIRK Run Date: 6/24/2016 4:17:55 PM EST

~~~~~~~~~~~~~~ BOILER / APPLIANCE FLUE GAS CALCULATION ~~~~~~~~~~~~~~~~~~~~~~

PROJECT:	JEROME W.W.T.P.	PREPARED FOR:	Mike Branan
PREPARED BY:	W. Norman Foster		FOLSOM ASSOCIATES

Fuel Type:	1 - Natural Gas or Equivalent.	
MBTU Input (1000 / BTU):	2925	Per Hour
Ambient Temperature:	70	Degrees F.
Flue Gas Temp. Rise Above Ambient:	380	Degrees F.
%CO2 in Combustion Products:	8.5	%
Altitude Above Sea Level:	3800	Feet
Effective Height of System:	23	Feet
Length of System (inc. height):	28	Feet
Outlet Diameter:	10	Inches

Veritcal Manifold Tees:	1	Horizontal Manifold Tee:	0
45 Degree Lateral Tee:	0	90 Degree Wye Tee:	0
15 Degree Elbow:	0	30 Degree Elbows:	0
45 Degree Elbow :	0	90 Degree Turns (2-45's) :	1
Drain Sections:	0	Duct Drains:	0
		Other System Resistance:	0
Tapered Increasers in Sys. :	NO	Stepped Increasers in Sys.:	NO
Tapered Reducers in Sys:	NO	Stepped Reducer in Sys. :	NO
Allowable Pressure:	0	Pressure Changes :	0
Barometric Damper:	0		

Stack Cap Termination

Computer Sized at:	14.132	Inches
Selkirk Product Size Selected :	12	Inches
Barometric Pressure @ Altitude :	26.12	Inches Hg
Density of Flue Gasses :	0.039	lbs. / Foot^3
Theoretical Draft:	0.121	Inches H2O
Flue Gas %CO@ Used for Calcs:	8.5	%
Combustion Products Mass :	1.04	lbs. / MBTU
Flue Gas Mass Flow:	50.62	lbs. / min.
Flue Gas Volume Flow(CFM):	1317.2	Feet^3 / min.
Flue Gas Velocity (@ Size):	27.95	Feet / Sec.
Total System Velocity Heads :	2.644	K
Total System Pressure Losses:	0.239	Inches H2O
Max. Pres. at System Entrance :	0.118	Inches H2O

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NATURAL GAS.

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Grand Rapids, MI 49512
Phone: 800.848.2149
Fax: 800.972.1421

THE FOLLOWING CALCULATIONS ARE THEORETICAL AND ARE FOR REFERENCE ONLY TO ASSIST OUR CLIENTS. SELKIRK ASSUMES NO RESPONSIBILITY FOR FIELD CLAIMS AGAINST THIS DATA. CALCULATIONS SHOULD BE VERIFIED BY A LICENSED HVAC PROFESSIONAL ENGINEER.

SELKIRK Run Date: 6/24/2016 4:16:43 PM EST

~~~~~~~~~~~~~~ BOILER / APPLIANCE FLUE GAS CALCULATION ~~~~~~~~~~~~~~~~~~~~~

PROJECT: JEROME W.W.T.P. PREPARED FOR: Mike Branan
PREPARED BY: W. Norman Foster FOLSOM ASSOCIATES

Fuel Type:	1 - Natural Gas or Equivalent.	
MBTU Input (1000 / BTU):	1950	Per Hour
Ambient Temperature:	70	Degrees F.
Flue Gas Temp. Rise Above Ambient:	380	Degrees F.
%CO2 in Combustion Products:	8.5	%
Altitude Above Sea Level:	3800	Feet
Effective Height of System:	23	Feet
Length of System (inc. height):	28	Feet
Outlet Diameter:	10	Inches

Veritcal Manifold Tees:	1	Horizontal Manifold Tee:	0
45 Degree Lateral Tee:	0	90 Degree Wye Tee:	0
15 Degree Elbow:	0	30 Degree Elbows:	0
45 Degree Elbow :	0	90 Degree Turns (2-45's) :	1
Drain Sections:	0	Duct Drains:	0
		Other System Resistance:	0
Tapered Increasers in Sys. :	NO	Stepped Increasers in Sys.:	NO
Tapered Reducers in Sys:	NO	Stepped Reducer in Sys. :	NO
Allowable Pressure:	0	Pressure Changes :	0
Barometric Damper:	0		

Stack Cap Termination

Computer Sized at:	11.756	Inches
Selkirk Product Size Selected :	12	Inches
Barometric Pressure @ Altitude :	26.12	Inches Hg
Density of Flue Gasses :	0.039	lbs. / Foot^3
Theoretical Draft:	0.121	Inches H2O
Flue Gas %CO@ Used for Calcs:	8.5	%
Combustion Products Mass :	1.04	lbs. / MBTU
Flue Gas Mass Flow:	33.74	lbs. / min.
Flue Gas Volume Flow(CFM):	878.1	Feet^3 / min.
Flue Gas Velocity (@ Size):	18.63	Feet / Sec.
Total System Velocity Heads :	2.693	K
Total System Pressure Losses:	0.108	Inches H2O
Max. Pres. at System Entrance :	-0.013	Inches H2O

Powered By US Draft Co., LLC Technology
~~~~~~~~~~~~~~

APPENDIX C: ENGINE EXHAUST PARAMETER GUIDANCE

From: Kevin.Schilling@deq.idaho.gov
To: Shannon Manoulian; Craig.Woodruff@deq.idaho.gov
Cc: jwilson@Kellerassociates.com; jking@Kellerassociates.com; Craig.Woodruff@deq.idaho.gov
Subject: RE: Jerome WWTP Permit Application
Date: Tuesday, June 21, 2016 6:24:45 AM
Attachments: goemergencygenerator.pdf

Shannon,

A potential option is to use a method provided in the Washington State Department of Ecology document, *Suitability of Diesel-Powered Emergency Generators for Air Quality General Order of Approval: Evaluation of Control Technology, Ambient Impacts, and Potential Approval Criteria*, published in June 2006. The engine exhaust flow is based on the horsepower (hp) rating of the engine (610 hp) by the following equation from the guidance (Table 6 in the attached guidance document):

$$\frac{0.284\ m^3/sec}{100\ hp} \times X\ hp = Y\ m^3/sec$$

The guidance recommends using a 44.6 meter/second stack gas exit velocity and then calculating the diameter that would result in a total flow equal to the exhaust flow calculated by the equation above. The exhaust exit temperature can be estimated by interpolating between appropriate values from a table in the guidance document that lists temperatures for various engine power ratings.

I hope this guidance is useful for you.

Best Regards,

Kevin Schilling

Stationary Source Air Modeling Coordinator
Idaho Department of Environmental Quality
208 373-0112

From: Shannon Manoulian [SManoulian@trinityconsultants.com]
Sent: Friday, June 17, 2016 2:42 PM
To: Craig Woodruff
Cc: Kevin Schilling; Jeremy Wilson; Jason King
Subject: Jerome WWTP Permit Application

Hi Craig,

We are continuing to work with Keller Associates on obtaining manufacturer's specifications for the Jerome WWTP permit application. However, based on the process of bid award and subsequent contractor submittals, some of the information – specifically certain exhaust parameters such as exit velocity and temperature – is not available at this time.

Can you tell me exactly what type of exhaust parameter documentation is required, and what our options might be for submitting estimated worst case exhaust parameters? Does DEQ have default conservative exhaust parameters, or parameter calculation methods for equipment such as

generator engines, boilers, etc.? Would DEQ accept exhaust parameters from similar equipment (same manufacturer, same use, similar sized) that is permitted at other facilities, with some sort of 'safety factor' incorporated?

Thank you in advance for your help!

Best Regards,
Shannon

Shannon K. Manoulian, P.E. | Senior Consultant
Trinity Consultants | On Demand Environmental | SafeBridge Consultants
P: 208.472.8837 | M: 734.624.4555 | E: smanoulian@trinityconsultants.com | LinkedIn : www.linkedin.com/in/smanoulian
702 W. Idaho St Suite 1100 | Boise, Idaho 83702

Upcoming Events:
July 12, 2016 – Waste Compliance Auditing for Industrial Facilities (SEATTLE)
July 13, 2016 – Water Compliance Auditing for Industrial Facilities (SEATTLE)
July 14, 2016 – Air Compliance Auditing for Industrial Facilities (SEATTLE)
August 25, 2016 – Intro to Exhaust Management, Abatement, and Air Emissions in the Semiconductor Industry (PORTLAND)

Visit us online:

SUITABILITY OF DIESEL-POWERED EMERGENCY GENERATORS FOR AIR QUALITY GENERAL ORDER OF APPROVAL: EVALUATION OF CONTROL TECHNOLOGY, AMBIENT IMPACTS, AND POTENTIAL APPROVAL CRITERIA

June 23, 2006

Prepared by Washington State Department of Ecology
Air Quality Program
General Order Engineering Team

Information Contacts:
Bernard Brady 360 407 6803

EXECUTIVE SUMMARY

Ecology's Air Quality Program revised its Notice of construction rules (contained in Chapter 173-400 Washington Administrative Code) in early 2005 to allow for the Establishment of General Orders of Approval

Ecology determined that establishment of a General Order of Approval is appropriate for diesel-powered emergency generators meeting the criteria in Table 1.

Table 1: Diesel-powered Emergency Generator Applicability Criteria for General Order of Approval

Criterion	Limitation
Fuel	Low-sulfur content, off-road quality fuel: Not greater than 500 parts sulfur per million by weight (ppmw).
Generator set size	Not greater than 530 brake horsepower (BHP) engine
Diesel engine qualifications	Certified by manufacturer to meet the Tier II standards of 40 CFR Part 60 Subpart IIII (as proposed July, 2005)
Location Minimum distances to property line and publicly-accessible buildings vary with engine size.	If the exhaust stack extends at least ten feet above the roof line, there are no location restrictions. Engines under 100 BHP may use a shorter stack with location restrictions shown in Table 13.
Hours of operation	Not more than 30 hours in any calendar year for required testing, and not more than 500 hours total operation in any calendar year.

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1. INTRODUCTION

PURPOSE

The purpose of the analysis described in this document is to determine emission unit criteria and approval conditions within which a General Order of Approval is appropriate for diesel-powered emergency generators. In addition, a list of minimum requirements or applicability criteria will be developed to identify diesel-powered emergency generators that would qualify for coverage under the General Order of Approval.

This General Order of Approval will be required of any diesel-driven emergency generator up to the specified maximum unless the applicant chooses to use the standard notice of construction approval process. Any applicant proposing any size emergency generator set may opt to use the standard notice of construction approval process to acquire appropriate permitting.

BACKGROUND

Since 1972, Ecology has required a preconstruction review and permitting program for new sources that will emit pollutants to the air in the State of Washington. This review and permitting process is referred to as "New Source Review" by the state or the relevant local air quality control agency. Based on that review, the relevant agency issues an approval-to-construct and operates the new source. This "Notice of Construction Approval" contains pollutant emission limitations and operating requirements for the new source.

The typical process to obtain a site-specific, individual Notice of Construction air quality permit is described in "How to Apply for a Notice of Construction Air Quality Permit." HTTP://WWW.ECY.WA.GOV/BIBLIO/ECY070121.HTML

Effective, February 10, 2005, Ecology revised its regulations to include the General Order of Approval as an alternative to the individual Notice of Construction permit. General Orders of Approval are intended to be a method for owners of commonly permitted, small emission sources to know, prior to committing to purchase and submitting an application to Ecology, what is necessary to comply with Washington's new source review requirement. A significant goal of issuing General Orders of Approval is to simplify the permitting process by reducing the regulatory and administrative burden on the applicant and Ecology. Use of General Orders should reduce the permit processing cost to both the applicant and Ecology.

2. EVALUATION BASES

GENERAL CRITERIA

The Ecology Air Quality Program established the following criteria for the General Order of Approval determination. The criteria are intended to facilitate completing the development of each categorical general order with a reasonable amount of time and effort. The criteria are:

1. Best Available Control Technology (BACT) and Toxic Air Pollutant-BACT is the same as for a site specific approval issued during the time the engineering evaluation is developed.

2. The emissions will not delay the attainment date for any area not in attainment nor will the emissions cause or contribute to the exceedance of any ambient air quality standard.
3. An emission unit size or type can not receive a General Order of Approval if the ambient air quality analysis indicates that a Tier 2 review would be required at any potential location
4. The General Order will assure a covered unit will comply with all applicable new source performance standards, national emissions standards for hazardous air pollutants, national emission standards for hazardous air pollutants for source categories, and emission standards adopted under the Washington State Clean Air Act.
5. The individual emission unit cannot cause a facility to become subject to the Air Operating Permit program or be subject to Prevention of Significant Deterioration (PSD) permitting. However, the facility may be an existing Title V or PSD source.
6. Information content of and analyses described in the technical analysis will be similar to that required in a permit application for this type of emission unit.

Assumptions 1, 2, 4, and 5, reflect the requirements of WAC 173-400-110, 112, 113, and 560 and are requirements for all new source review actions in Washington. Assumption 5 reflects specific requirements for General Orders of Approval found in WAC 173-400-560. Assumption 6 reflects the actuality that this analysis needs to evaluate a number of control options and generic emissions modeling prospectively rather than a permit application review's retrospective analysis.

Assumption 3 reflects the criteria of the Tier 2 toxic air pollutant review process (WAC 173-460-090). A Tier 2 review is a site specific analysis of the impacts of toxic air pollutants from a known, existing facility on the surrounding community. A General Order of Approval is developed without a specific site in mind. A General Order of Approval is unable to incorporate the site specific considerations of the Tier 2 process. In order to reflect this limitation, Ecology is including criteria related to the distance from the described units to property lines and buildings, hills, or other structures that affect ambient air quality concentrations.

EMERGENCY GENERATORS

Definition

An emergency stationary internal combustion engine (ICE) is defined[1] as any stationary internal combustion engine whose operation is limited to emergency situations and required testing. Examples of when emergency ICEs are used:

- produce power for critical networks or equipment when electric power from the local utility is interrupted,
- pump water in the case of fire or flood, etc.,
- federal or state declared disasters and emergencies, and
- simulations of emergencies by Federal, State, or local governments.

Emergency stationary ICE are allowed to be operated for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by the manufacturer, the vendor, or the insurance company associated with the engine. Under the proposed federal New Source

[1] Federal Register: July 11, 2005 (Volume 70, Number 131)], Proposed Rules, Page 39869-39904

Performance Standard, 40 CFR Part 60, Subpart IIII, required testing of such units is limited to 30 hours per year, and owners and operators are required to keep records of this information. In routine permitting, Ecology generally limits operation of an emergency generator to not more than 500 hours in any calendar year.

Emissions

Diesel-fired compression-ignition ICE will emit a variety of air pollutants. The primary criteria pollutants[2] are nitrogen oxides (NO_X), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter (PM and PM_{10}[3]), and volatile organic compounds[4] (VOCs, also called nonmethane hydrocarbons, NMHC). Diesel-fired engines also emit various toxic air pollutants (TAPs). In addition to nitric oxide, the primary TAPs emitted by diesel engines are listed in Table 10.

At the time of writing of this document, the EPA is finalizing the new source performance standard (NSPS) for diesel-fired compression-ignition ICEs. When finalized, the new rule (40 CFR Part 60 Subpart IIII) will specify the maximum allowable emissions of CO, NO_X plus NMHC, and PM (which includes PM_{10}) for diesel-fired compression-ignition ICEs. Over several years, the rule progressively reduces allowable emissions of these air pollutants from new engines in stages called "Tiers." The standards are engine-based pollution emission controls. Depending on engine size, the emission standards are applied as

- Tier I: Engines built between 1996 and 2005.
- Tier II: Engines built between 2003 and 2006.
- Tier III: Engines built between 2006 and 2008.

Tier II requirements for all engine sizes and Tier III requirements for engines greater than or equal to 175 BHP up to less than 750 BHP take effect not later than this year. In addition, Subpart IIII will require use of non-road specification fuel, that is, fuel containing not more than 500 parts per million sulfur by weight (0.05 weight percent sulfur content)[5]. Because the Tier II and some Tier III NSPS will go into effect this year, Ecology considers this to be the "base case" for establishing emission factors of the primary criteria pollutants.

The criteria pollutant emission factors are shown in Table 4. TAP emission factors are shown in Table 10. Nitric oxide was assumed to be 100 molar percent of the nitrogen oxides at the stack. For engines over 500 BHP, formaldehyde emissions are established at the reciprocating internal combustion engine standard 40 CFR Part 63 Subpart ZZZZ (350 parts per billion, dry basis). The remaining TAPs emission factors are taken from EPA's AP-42[6].

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[2] Several other so-called criteria pollutants are listed under the National Ambient Air Quality Standards. However, none of these are known to be emitted by diesel-powered engines in measurable quantities for the engine sizes subject to consideration for this general order.

[3] Particulate matter less than 10 microns in aerodynamic diameter.

[4] Volatile organic compounds are the surrogate family of air pollutants used to determine an emission unit's impact on ambient ozone concentrations.

[5] 40 CFR 80.510(a)(1)

[6] EPA AP-42, "Stationary Internal Combustion Sources," Chapter 3.3 (Gasoline and Diesel Industrial Engines), Table 3.3-2 for engines up to 600 BHP, Chapter 3.4 (Large Stationary Diesel and All Stationary Dual-fuel Engines) Tables 3.4-3 and 3.4-4 for engines over 600 BHP (October, 1996)

Basis for Requiring Permit

Under WAC 173-400-110(5), Washington exempts emissions sources from new source review under WAC 173-400-110 if potential NAAQS pollutant emission increases are below those shown in Table 2.

Table 2: Exemption Levels, New Source Review (WAC 173-400-110)

Pollutant	Level (tons per year)
Sulfur Oxides (sulfur dioxide and sulfur trioxide)	2.0
Carbon Monoxide (CO)	5.0
Nitrogen Oxides(NO_X)	2.0
Volatile Organic Compounds (VOCs, NMHCs)	2.0
Total Suspended Particulates	1.25
PM_{10}	0.75
Lead	0.005

If the NAAQS pollutants were the only ones emitted by diesel-powered engines, emergency generator sets operating less than 500 hours per year would be exempted[7] from Washington's new source review process unless they exceeded 875 BHP (See Table 4). However, as noted previously, diesel-fired ICEs also emit TAPs listed in Chapter 173-460 WAC. Proposed sources of TAPs listed in Chapter 173-460 WAC are required to undergo new source review. There are no diminis levels for these TAPs. Consequently, a Notice of Construction approval is required for installation of diesel-powered generators.

4. Best Available Control Technology

State law and rule[8] defines BACT as "an emission limitation based on the maximum degree of reduction for each air pollutant subject to regulation under the Washington Clean Air Act emitted from or which results from any new or modified stationary source, which the permitting authority, on a case-by-case basis, taking into account energy, environmental and economic impacts and other costs, determines is achievable for such source or modification through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each pollutant."

Ecology has chosen to implement the "top-down" process to determine what BACT is for notice of construction reviews. In the 'top-down" analysis process, the applicant lists and ranks all potential pollutant control options from highest level of control (lowest emission rate) to the lowest (highest emission rate). Next those emission control options that are technically infeasible are removed from the list of available controls. The highest level of control remaining

[7] Because the exemption is based a limitation on annual hours of operation, diesel-driven emergency generator sets above about 875 BHP would have to request and receive a voluntary regulatory order to limit emissions issued under WAC 173-400-091.

[8] RCW 70.94.030(7) and WAC 173-400-030(12)

is considered technically feasible to implement on the emission unit. When that level of control is either proposed by an applicant, it is accepted as BACT with no further analysis involved. An applicant may choose to demonstrate that the highest level of emissions control is not financially feasible (not cost effective) to implement or has adverse environmental or energy impacts. In this case the applicant evaluates the economic, environmental and energy impacts of the next most stringent level of control until a level of control is demonstrated to be economically feasible.

In the case of this General Order of Approval Technical analysis document, there is no identified applicant. Thus, Ecology is responsible for providing this BACT technology analysis comparing the economic feasibility of several of the available emission control options available as add-on emission control technologies as part of our process to determine what BACT should be.

BACT for NO_X, CO, VOCs, and $PM/PM_{10}/PM_{2.5}$

EPA expects the final 40 CFR 60 Subpart IIII NSPS to go into effect in 2006. Ecology considers this to be the "base case" for the Best Available Control Technology (BACT) analysis for NO_X, CO, VOCs, and PM/PM_{10}. The South Coast Air Quality Management District came to the same conclusion after their extensive analysis performed in 2002[9].

Beyond the "base case" emission limits of the proposed NSPS, there are several existing and anticipated emission control systems for diesel-fired CI-ICEs. Several of these are promising, and even expected to be mechanisms by which engine manufacturers can comply with Tier IV emission control requirements under the NSPS. However, all of them fail the test for selection as BACT because they are either not sufficiently demonstrated in practice, not commercially available, or are unjustifiably costly for an emergency generator.

- Not yet commercially available or adequately demonstrated in practice: EPA reasonably concludes that control technologies that are specifically designed for stationary ICEs will not be commercialized until related emissions levels are required under regulation. EPA also realizes that it will take several years advance notice to manufacturers to allow time to design and implement engine modifications to accommodate advanced emission controls. EPA anticipates that several of the following emission control technologies will become commercially available as a result of implementation of Tier IV requirements under Subpart IIII[10]. Because most of these are multi-pollutant reduction systems, the following discussion will not itemize them by targeted pollutant. The potential pollutant reduction levels described are based on pre-Tier I emissions.
    - Catalyzed Diesel Particulate Filter: Requires fuel with less than 30 ppm sulfur content and an electronic fuel control system. Traps and catalytically burns emission particulate at an operating temperature above 482 ^{o}F. Ninety percent reduction of PM, CO, and NMHC.
    - Lubrizol Purifilter: Requires fuel with less than 15 ppm sulfur content (ultra-low sulfur). Traps and catalytically burns emission particulate at an operating

[9] Preliminary Draft Staff Report for Proposed Amended Best Available Control Technology (BACT) Guidelines, Part D- Non-Major Polluting Facilities, Regarding Emergency Compression Ignition (Diesel) Engines, South Coast Air Quality Management District, Los Angeles, California (July, 2002)

[10] Documents associated with development and comment collection for 40 CFR Part 60 Subpart IIII, Docket ID No. OAR-2005-0029.

temperature above 536 ^{o}F. Requires periodic shutdown and cleaning of filter. Ninety percent reduction of CO, and NMHC. Eighty-five percent reduction of PM. Five to 10 percent increase in NO_X emissions.

- <u>NO_X adsorber</u>: Precious metal catalyst on a ceramic matrix converts NO_X to nitrates. The nitrates are adsorbed on the ceramic, and periodically reduced to nitrogen by a momentary switch to a fuel-rich environment. Ninety percent reduction of NO_X, NMHC, and CO. Ten to 30 percent reduction of PM.
- <u>EM_X</u>^{TM} (formerly $SCONO_X$^{TM}): Potassium carbonate and noble metal catalyst are coated on a ceramic matrix. NO_X reacts with the potassium carbonate in situ to form potassium nitrate. CO and NHMC are catalytically oxidized by the noble metal catalyst. When all the potassium carbonate is converted, exhaust gas flow is switched to an active module while the potassium nitrate in the "spent" module is converted back to potassium carbonate by contact with hydrogen. The nitrate is reduced and released to atmosphere as nitrogen. Operates between 300 and 700 ^{o}F. Relatively mechanized system compared to other control technologies. NO_X, CO, and NMHC reduction expected to be up to 95%. In various cost comparisons, has been much more expensive than competing technologies. Advertised as commercially available for diesel-fired ICEs, but no units yet in commercial operation.
- <u>Ozone injection</u>: Ozone oxidizes NO_X to water soluble nitrous pentoxide which is removed via a scrubber. Must operate below 350 ^{o}F. Eighty to 85 percent NO_X reduction.
- Systems that might be adaptable from mobile engine emission control technology:
  - <u>Donaldson diesel particulate muffler systems</u>: Requires ultra-low sulfur fuel. Up to 34% PM reduction. Up to 50% CO and NMHC reduction.
  - <u>Cleaire Flash and Catch</u>: Recalibrated fuel injection with a diesel particulate filter. Eighty-five percent reduction of PM. Ninety percent reduction of CO and NMHC. Twenty percent reduction of NO_X.
  - <u>Fuel Borne and Diesel Oxidation Catalyst</u>: Requires ultra-low sulfur fuel. Fifty percent reduction of PM (compared to using low-sulfur fuel). Sixty percent reduction of CO and NMHC. Seven percent reduction of NO_X.
  - <u>Platinum Plus Purifier</u>: Requires ultra-low sulfur fuel, fuel reformulation, and platimum-based catalytic muffler. Fifty percent reduction of PM, CO and NMHC. Twenty-five percent reduction of NO_X.
  - <u>Catalyzed Converter/Muffler</u>: Oxidation catalyst muffler. Twenty percent reduction of PM and CO. Forty percent reduction of NMHC.

  Application of these systems would require various design modifications to the stationary engine that are not currently commercial available.

- <u>Ecology concludes that the following are unjustifiably costly for an emergency generator set</u>:
  - <u>Noble metal coated, honeycomb ceramic oxidation catalyst/filter</u>: Ultra-low sulfur fuel recommended. Eighty-five percent reduction of PM. Ninety-five percent reduction of CO. Ninety percent reduction of NMHC. Ten to 20 percent increase in NO_X. Overall BACT cost $25,000 per ton pollutant reduction to $8,000/ton for engine sizes ranging from 100 BHP to 2000 BHP diesel-driven emergency generator sets, respectively.

- Selective Catalytic Reduction (SCR): Low-sulfur fuel required. Urea or ammonia injected into exhaust prior to contact with non-noble metal catalyst (ususlly vanadium-based). NO_X is reduced to nitrogen. Must use stoichiometrically excess ammonia (i.e., excess ammonia is expelled in exhaust). Four percent fuel penalty. Fifty to 90 percent NO_X reduction. Overall BACT cost $47,000 per ton pollutant reduction to $16,000/ton for engine sizes ranging from 100 BHP to 2000 BHP diesel-driven emergency generator sets, respectively.
- Combustion catalyst: Ultra-low sulfur fuel required. CO and NMHC oxidized over noble metal catalyst on a ceramic matrix. Ninety percent CO and NMHC reduction. Overall BACT cost $25,000 per ton pollutant reduction to $7,500/ton for engine sizes ranging from 100 BHP to 2000 BHP diesel-driven emergency generator sets, respectively.

Ecology concludes that BACT for diesel-driven emergency generators for NO_X, CO, VOCs, and $PM/PM_{10}/PM_{2.5}$ emissions is compliance with the NSPS standards in 40 CFR Part 60 Subpart IIII (as proposed July, 2005).

Table 3: BACT for Diesel-Driven Emergency Generators for NO_X, CO, Vocs, and $PM/PM_{10}/PM_{2.5}$ Emissions

Engine Power		Tier	Engine model year effective	Carbon monoxide grams per BHP per hr	Non-methane hydro-carbons plus nitrogen oxides grams per BHP per hr	Particulate matter grams per BHP per hr
Brake horsepower (BHP)	Kilowatts					
Less than 11	Less than 8	Tier 2	2005 and after	6.0	5.6	0.6
25 to less than 25	8 to less than 19	Tier 2	2005 and after	4.9	5.6	0.6
25 to less than 50	19 to less than 37	Tier 2	2004 and after	4.1	5.6	0.45
50 to less than 100	37 to less than 75	Tier 2	2004 through 2007	3.7	5.6	0.3
		Tier 3	2008 and after	3.7	3.5	0.3
100 to less than 175	75 to less than 130	Tier 2	2003 through 2006	3.7	4.9	0.22
		Tier 3	2007 and after	3.7	3.0	0.22
175 to less than 300	130 to less than 225	Tier 2	2003 through 2005	2.6	4.9	0.15
		Tier 3	2006 and	2.6	3.0	0.15

			after			
300 to less than 600	225 to less than 450	Tier 3	2006 and after	2.6	3.0	0.15

BACT for Sulfur Oxides (SO_2, SO_3 and H_2SO_4 mist)

Sulfur in diesel fuel oxidizes during combustion to sulfur dioxide (SO_2) and sulfur trioxide (SO_3). In the presence of water vapor, these will hydrolyze to sulfuric acid mist (H_2SO_4). Beginning in 2006, ultra-low sulfur diesel will be widely available in the United States. Whereas low-sulfur diesel has a maximum sulfur content of 500 ppmw, ultra-low sulfur diesel is limited to 15 ppmw. The anticipated price premium for the reduction in sulfur content is five to ten cents per gallon[11]. This translates to an annualized cost of $15,000 to $30,000 per ton sulfur reduced. Ecology believes this is unjustifiably costly. Ecology knows of no other technically feasibly and economically justifiable sulfur oxide reduction methods for diesel-powered IC engines. **Ecology concludes that use of diesel fuel with not greater than a 500 ppmw sulfur content is BACT for diesel-powered emergency generators.** If finalized in its present form, this limit will be imposed on all new diesel-powered ICEs by 40 CFR Part 60 Subpart IIII through September 30, 2010. Beginning on October 1, 2010, 40 CFR Part 60 Subpart IIII will require that all new diesel-powered ICEs use ultra-low sulfur fuel.

Based on Subpart IIII standards, using low sulfur fuel, and 500 hour per year limit, the potential-to-emit of the air pollutants subject to regulation under the NAAQS is shown in Table 4 for diesel-driven generator sets from 11 BHP to 6,900 BHP capacity.

[11] Ibid., 40 CFR Part 60 Subpart IIII, Docket ID No. OAR-2005-0029

Table 4: NAAQS Pollutant Emissions from Diesel Engines

Emissions of Pollutants Subject to National Ambient Air Quality Standards from Emergency, Diesel-powered Generators: Tier II Compliant, 500 hour per year maximum operation									
Generator set Capacity: **Electrical output capacity and diesel engine power capacity**	**Sulfur Dioxide** **(low sulfur fuel)** **tons per year @ top of range**	**Carbon Monoxide**		**Nitrogen Oxides (NO_X) plus Non-methane Hydrocarbons (NMHC)**		**NO_X** **(tons per year)**	**NMHC** **(tons per year)**	**Particulate Matter**	
		Year 2006 40 CFR 60 Sub-part IIII (grams per BHP-hr)	**tons per year @ top of range**	**Year 2006 40 CFR 60 Sub-part IIII (grams per BHP-hr)**	**tons per year @ top of range**	**Estimated based on assumed 6.9:1 NO_X to NMHC ratio (Tier I)**		**Year 2006 40 CFR 60 Sub-part IIII (grams per BHP-hr)**	**tons per year @ top of range**
<8 kw <11 BHP	.0014	6.0	.036	5.6	.034	.03	.004	0.6	.0036
8 to <19 kw 11 to <25 BHP	.0031	4.9	.067	5.6	.077	.067	.01	0.6	.008
19 to <37 kw 25 to <50 BHP	.0057	4.1	.112	5.6	.154	.135	.019	0.45	.012
37 to <75 kw 50 to <100	.0094	3.7	.203	5.6	.308	.27	.038	0.3	.017
112.5 kw 150 BHP	.0138	3.7	.305	4.9	.404	.354	.06	0.22	.018
130 kw 175 BHP	.01645	2.6	.250	3.0	.289	.253	.036	0.15	.014
150 kw 200 BHP	.018	2.6	.286	3.0	.330	.288	.042	0.15	.017
225 kw 300 BHP	.026	2.6	.43	3.0	.495	.432	.063	0.15	.025
375 kw 500 BHP	.044	2.6	.716	3.0	.825	.720	.105	0.15	.041
559 kw	.067	2.6	1.085	3.0	1.236	1.078	.158	0.15	.062

Emissions of Pollutants Subject to National Ambient Air Quality Standards from Emergency, Diesel-powered Generators: Tier II Compliant, 500 hour per year maximum operation									
Generator set Capacity: **Electrical output capacity and diesel engine power capacity**	**Sulfur Dioxide** **(low sulfur fuel)** **tons per year @ top of range**	**Carbon Monoxide**		**Nitrogen Oxides (NO_X) plus Non-methane Hydrocarbons (NMHC)**		**NO_X** **(tons per year)**	**NMHC** **(tons per year)**	**Particulate Matter**	
		Year 2006 40 CFR 60 Sub-part IIII (grams per BHP-hr)	**tons per year @ top of range**	**Year 2006 40 CFR 60 Sub-part IIII (grams per BHP-hr)**	**tons per year @ top of range**	**Estimated based on assumed 6.9:1 NO_X to NMHC ratio (Tier I)**		**Year 2006 40 CFR 60 Sub-part IIII (grams per BHP-hr)**	**tons per year @ top of range**
749 BHP									
656 kw 875 BHP	.077	2.6	1.25	4.8	2.31	2.0	0.31	0.15	.072
750 kw 1000 BHP	.088	2.6	1.432	4.8	2.64	2.31	.33	0.15	.083
1.5 MW 2000 BHP	.176	2.6	2.86	4.8	5.29	4.62	.67	0.15	.165
5.2 MW 6,900 BHP	0.61	2.6	9.98	4.8	18.25	16.0	2.25	0.15	.637

BACT for Toxic Air Pollutants

Nitric oxide is a component of NO_X. Control technologies that reduce NO_X reduce nitric oxide proportionately. No emission control technologies specifically reduce nitric oxide beyond those designed for NO_X control.

There are no add-on technologies technically feasible or demonstrated or commercially available for reduction of organic TAPs emissions from diesel-powered generators. Technologies that will be required under 40 CFR Subpart IIII, Tier IV that are intended to reduce particulate emissions are likely to collaterally reduce some of the TAPs. However, there is no documentation to quantify this expectation. Currently available add-on technology for CO emissions reduction might reduce some of the organic TAPs, especially the ones having relatively lower molecular weights, such as formaldehyde and acetaldehyde. However, even if all the organic TAPs could

be 100% reduced (15 pounds per year, see Table 10), the effectiveness cost would be about $2.9 million per ton. Ecology considers this to be economically unjustifiable.

40 CFR Part 63 Subpart ZZZZ is already in effect. Subpart ZZZZ requires stationary internal combustion engines larger than 500 BHPO to emit formaldehyde at not greater than 350 parts per billion (dry basis). Ecology concludes that BACT for non-nitric oxide TAPs (T-BACT) is no control except for formaldehyde emissions from engines over 500 BHP. For engines over 500 BHP, T-BACT for formaldehyde is compliance with 40 CFR Part 63 Subpart ZZZZ. T-BACT for nitric oxide is compliance with NO_X emission standards in 40 CFR 60 Subpart IIII, as-proposed in 2005 (Table 3).

5. Ambient Impact analysis

All notice of construction applications are required to be evaluated for their ambient air quality impacts. "Ambient air" means the surrounding outside air, the air outside of buildings.

The federal government has established National Ambient Air Quality Standards for six common air pollutants. Ecology has adopted these standards with minor changes and also has one additional ambient air quality standard that applies in Washington. All new and modified sources of air pollution in Washington are required to demonstrate that the project will not cause or contribute to an exceedance of one or more of these ambient air quality standards.

Dispersion Model

Ecology used an air quality plume dispersion model to determine whether the ambient impacts from a proposed project will be acceptable. The dispersion model predicts the ambient air concentrations of the various air pollutants caused by the project. Ecology compared the results of the model with the ambient standards to see if the project will cause or contribute to an exceedance of the standard.

There are a number of dispersion models available for use. All of them use mathematical formulas and meteorological information to predict where the exhaust emissions will travel and the ambient concentrations at specific locations. Models generally come in 2 forms, screening models and complex models. In most cases, the models use the same formulae. The differences occur in the level of detail of the emission source(s) and meteorological information required by the model. Screening models use a set of default meteorological characteristics and reports which characteristics give the highest pollutant concentration, and the resulting concentration. More complex models require actual weather conditions for the site or the region around the site. Due to their simpler meteorological input characteristics, screening models are typically conservative, in other words, screening models will usually over-predict the ambient concentrations compared to what would be actually measured (and compared to what would be predicted by a more complex model).

Ecology chose the SCREEN3 model for predicting ambient concentrations. This is a common screening model that has been recognized by EPA as suitable for this purpose and has been in common use for the past 15 + years. There are other models that Ecology could choose, but this one is both the simplest to use and the one most often used by small facilities and Ecology in determining ambient air quality impacts from a given facility.

The National Ambient Air Quality Standards (NAAQS) and Washington State Ambient Air Quality Standards (AAQS) for Class II Areas are shown in Table 5.

Table 5: National Ambient Air Quality Standards

Pollutant	Averaging Time	National		Washington State AAQS
		Primary	Secondary	
Particulate	Annual	50 μg/m^3	50 μg/m^3	50 μg/m^3
	24-hr	150 μg/m^3	150 μg/m^3	150 μg/m^3
Sulfur Dioxide	Annual	0.03 ppm	----	0.02 ppm
	24-hr	0.14 ppm	----	0.10 ppm
	3-hr	----	0.50 ppm	----
	1-hr	----	----	0.40 ppm[12]
Carbon Monoxide	8-hr	9 ppm	9 ppm	9 ppm
	1-hr	35 ppm	35 ppm	35 ppm
Nitrogen Dioxide	Annual	0.05 ppm	0.05 ppm	0.05 ppm

The general SCREEN3 input variables are shown in Table 6 and Table 7.

Table 6: SCREEN3 Input Variables for Emergency Generator General Order Analysis

Variable	**Model Input**
Source type	Point
Emission rate	40 CFR part 60, Subpart IIII compliant: See Table 7.
Stack Height	25 BHP: 7.5, 8, 8.5, and 10 meters 50 BHP: 7.5, 8.5, and 10 meters 100 BHP: 8.5, and 10 meters > 100 BHP: 10 meters
Stack diameter	Sufficient to have the stack velocity at 44.6 meters per second for all engine sizes based on volumetric flow of 0.284 cubic meters per second per 100 BHP.
Stack velocity	44.6 meters per second
Stack temperature	See Table 7
Ambient temperature	293 ^{o}K
Receptor height	All pollutants: 1.7 meters (nose height) TAPs: 5 meter (single story), and 20 meter (2 to 3 story)
Urban/rural option	Rural
Building downwash	6.5 meter high, 8.5 meter × 11 meter horizontal
Terrain	Neither complex nor simple terrain considered
Meteorology	Full (All stabilities and wind speeds)

[12] 0.25 ppm not to be exceeded more than two times in any 7 consecutive days

Table 7: Engine Size-Dependent SCREEN3 Input Variables for Emergency Generator General Order Analysis

BHP	Subpart IIII g-NO_X per BHP-hr	Emission rate g-NO_X /sec	Stack height (m)	Stack diam. (m)	T_{stk} (^oK)[13]
25	4.9	0.0340	7.5	0.045	528
25	4.9	0.0340	8	0.045	526
25	4.9	0.0340	8.5	0.045	524
25	4.9	0.0340	10	0.045	519
50	4.9	0.0681	7.5	0.064	568
50	4.9	0.0681	8.5	0.064	563
50	4.9	0.0681	10	0.064	556
100	4.3	0.1277	8.5	0.090	674
100	4.3	0.1277	10	0.090	670
150	4.3	0.1916	10	0.110	702
200	2.6	0.1444	10	0.127	734
300	2.6	0.217	10	0.156	799
500	2.6	0.361	10	0.201	897
6900	4.20	8.05	10	0.285	1100

Dispersion Modeling Results

NAAQS Pollutants

Under the Tier II standards proposed in Subpart IIII and using low sulfur fuel, PM_{10} is the first pollutant emission from diesel-driven generators to encroach on a NAAQS-related ambient impact limit as one considers progressively larger machines. It would take a diesel-fired, compression ignition (CI) emergency generator having as large as a 6,900 BHP engine, to emit enough PM_{10} to exhaust the 24-hour average allowable increment. This would be an unusually large emergency generator. Up to and including this size generator set, no pollutant will contribute to an exceedance of the NAAQS even when coupled with background concentrations. In other words, criteria pollutant emissions will not be the limiting factor in establishing qualifying terms for a general order for emergency generators, at least up to about 6,900 BHP. This agrees with the conclusion reached on emergency generator placement at the State Penitentiary in Walla Walla, Washington[14].

[13] Based on data from Caterpillar Detroit engines.
[14] Order No. 05AQ-E154, First Amendment; August 25, 2005

Table 8: Modeled Air Quality Impact 6,900 BHP Diesel-fired CI engine[15]

Pollutant		Air Quality Impact µg/m^3	Significance Level* µg/m^3	Allowable Increment Consumption µg/m^3	Estimated Background Level** µg/m^3	A/Q Impact plus Background µg/m^3	NAAQS µg/m^3
SO_2	3-hr avg.	19.5	25	512	11.25	31	1300
	24-hr avg.	8.7	5	91	5	13.7	365
	ann. avg.	0.1	1	20	1	1.1	80
PM_{10}	24-hr avg.	8	5	8	60	68	150
	ann. avg.	0.094	1	4	12	12.1	50
NO_X	ann. avg.	3.5	1	25	78	81.5	100

***** The EPA does not require a full air quality impact analysis for a particular pollutant when the emissions of that pollutant from a proposed source or modification would not increase ambient concentrations by more than the significant levels shown in this column.
** Background levels are estimated from Washington air quality monitorin data.

Toxic Air Pollutants

Diesel-fired emergency generators emit a variety of TAPs as products of partial combustion. In order to qualify for this general permit, emergency generators must be located such that their emissions do not cause an ambient TAP concentration increase in excess of any acceptable source impact level (ASIL)[16]. WAC 173-460-080 provides that this may be demonstrated in either of two ways:

- Ambient impact analysis (dispersion modeling).
- Small quantity emission rates (SQER): Instead of using dispersion modeling, a source may use the SQER tables (reproduced in Table 9, below) for TAPs with ASILs equal to or greater than 0.001 µg/m^3.[17] In other words, a proposed emission source is not required to demonstrate that air quality impacts are below the ASIL for any TAP for which mass emissions per unit time are below the corresponding thresholds in the SQER tables.

[15] Stack height ten feet above the roof; adequate stack diameter to avoid excessive back pressure on the engine; rural conditions; building downwash included, 1.7 meter detector height; 500 hour per year operation limit, Tier II compliant, low-sulfur content (<500 ppm) fuel.
[16] A TAP concentration increase below the ASIL should not cause a significant increase in air pollution impact. A TAP above the ASIL triggers a second tier risk analysis. By definition, a second tier risk analysis case-by-case, not "general."
[17] WAC 173-460-080(2)(e)

Table 9: Small Quantity Emission Rate Tables

Small Quantity Emission Rates Class A Toxic Air Pollutants (Tables 1, 2, and 3, WAC 173-460-150)		
ASIL (µg/m^3)	**TAP emissions Pounds per year (10 meter stack and downwash)**	
0.001 to 0.0099	0.5	
0.01 to 0.06	10	
0.07 to 0.12	20	
0.13 to 0.99	50	
1.0 to 10	500	
Small Quantity Emission Rates Class B Toxic Air Pollutants (WAC 173-460-160)		
ASIL (µg/m^3)	**TAP emissions (10 meter stack and downwash)**	
	Pounds per year	**Pounds per hour**
< 1	175	0.02
1 to 9.9	175	0.02
10 to 29.9	1750	0.2
30 to 59.9	5250	0.6
60 to 99.9	10,500	1.2
100 to 129.9	17,500	2.0
130 to 250	22,750	2.6
> 250	43,748	5.0

If the source is expected to emit a TAP at rates for which the SQER variance does not apply, dispersion modeling must show that the ASIL is not exceeded at ground level or at any vertical location where ambient air may be breathed by humans for several hours each day[18]. This is an important consideration because emergency generators are often placed very near publicly accessible buildings that might have open windows or air intake vents exposed to the diesel engine's emissions.

All the TAPs expected to be emitted from diesel-powered emergency generators (Table 10) qualify for application of the SQER tables except "polycyclic aromatic hydrocarbons (PAH)." PAHs have an ASIL that is too low to qualify for consideration under the SQER dispersion modeling exemption. All the other TAPs expected to be emitted from diesel-powered emergency generators are exempted from dispersion modeling by the SQER consideration up to 530 BHP engine size (Table 10). Above 530 BHP, nitric oxide emissions exceed the 2.0 pounds per hour SQER threshold.

[18] Strictly speaking, the ASIL cannot be exceeded at any location where ambient air is likely to be breathed by members of the general public. Protection of employees and indoor air generally is under the jurisdiction of the Department of Labor and Industries and the Department of Health, respectively, in the state of Washington.

Table 10: TAPS, Diesel-powered emergency generator

TAP	Class	ASIL (µg/m^3)	Emission Factor (Pounds per million British thermal units)†	Engine BHP⊥	Pounds per hour	SQER limit	Pounds per year, 500 hour per year operating limit	SQER limit
						Pounds per hour		Pounds per year
Acetaldehyde	A	0.45	7.67E-04	600	.0035	N/A	1.8	50
			2.52E-05	2000	0.0004		0.2	
Acrolein	B	0.02	9.25E-05	600	0.0004	0.02	0.2	175
			7.88E-06	2000	0.0012		0.6	
Benzene	A	0.12	9.33E-04	600	0.004	0.02	2.1	175
			7.76E-04	2000	0.0118		5.9	
Butadiene	A	0.0036	<3.9E-05	2000	<.0006	N/A	<0.3	0.5
Formaldehyde	A	0.077	1.18E-03	500	0.0045	N/A	2.25	20
Formaldehyde	A	0.077	6.07E-04	2000	0.0092	N/A	4.6	20
Naphthalene	B	170	8.48E-05	600	0.0004	2.6	0.19	22,750
			1.6E-04	2000	0.0024		1.21	
Nitric oxide	B	100	0.926	100-	0.65	2.0	325	17,500
			0.810	175-	1.075		538	
			0.496	531	2.00		1000	
			0.496	750-	2.82		1,410	
			0.792	2000	12.0		6,000	
Toluene	B	400	4.09E-04	600	0.0019	5.0	0.9	43,748
			2.81E-04	2000	0.0043		0.7	
Xylene	B	1,500	2.85E-04	600	0.0013	2.0	2.2	43,748
			1.93E-04	2000	0.0029		1.5	
Total poly-cyclic aromatic hydrocarbons (PAH)▲	A	4.8E-04	3.4E-06	600	1.5E-05	N/A	0.008	N/A
			4.5E-06	2000	6.8E-05		0.033	
Benzo-pyrene	A	4.8E-04	<1.9 E-07	600	<8.4 E-07	N/A	<0.0004	N/A
			<2.6E-07	2000	<3.8 E-06		<0.0014	
Benz-anthracene	A	Not estab-lished (N/E)	1.68E-06	600	8.3E-06	N/E	0.0026	N/E
			6.22E-07	2000	9.2E-06		0.003	
Benzofluoro-anthenes	A	N/E	<2.5 E-07	600	<1.11 E-06	N/E	<0.0004	N/E
			1.33E-06	2000	2.0E-05		0.0069	

TAP	Class	ASIL (µg/m^3)	Emission Factor (Pounds per million British thermal units)┼	Engine BHP⊥	Pounds per hour	SQER limit	Pounds per year, 500 hour per year operating limit	SQER limit
						Pounds per hour		Pounds per year
Chrysene	A	N/E	<3.5 E-07	600	<5.2 E-06	N/E	<0.002	N/E
			1.53E-06	2000	2.3E-05		0.0087	
Dibenz-anthracene	A	N/E	<5.8E-07	600	<2.5 E-06	N/E	<0.0009	N/E
			<3.5E-07	2000	<5.1 E-06		<0.0018	
Indeno-pyrene	A	N/E	<3.8E-07	600	<1.7 E-06	N/E	<0.0006	N/E
			<4.1E-07	2000	<6.0 E-06		<0.0021	

⊥ 7,585 British thermal units per BHP-hr

┼ Emission factors for organic TAPs are from EPA's AP-42, Tables 3.3-2, 3.4-3, and 3.4-4 (October, 1996) except for formaldehyde from engines 500 BHP or greater. Stationary combustion engines over 500 BHP must follow the formaldehyde emission limit in 40 CFR 63 Subpart ZZZZ. The emission factor for nitric oxide is based on Tier II NO_X emission limits in 40 CFR 60 Subpart IIII assuming the NO_X to be 100 molar % nitric oxide at the stack exit.

▲ Subject to quantification under WAC 173-460-050(4)(c)

Because of the SQER exemption, air quality impact dispersion modeling for TAP impacts relative to preconstruction review and permitting can be limited to

- Engines greater than 530 BHP for nitric oxide air quality impacts.
- PAH air quality impacts.
- All TAPs for cases using less than 10 meter exhaust stack height.

Emergency Generator Size Limit

The analysis could continue beyond this 530 BHP, SQER exemption point to larger engine sizes. The analysis would attempt to determine appropriate distancing of the diesel engine from publicly-accessible locations. However, several considerations suggest this may not be necessary or advisable:

- As noted in the "Background" section, the purpose of a general permit is applicability to "commonly permitted, small emission sources."
    - The most common emergency generators are likely to be below 530 BHP. This is about enough power to generate electricity for over twenty homes or a typical commercial building having over 150,000 square feet.
    - In other words, 530 BHP should be sufficiently large to cover the field of "small" emergency generators.

- General permits are intended "to simplify the permitting process by reducing the regulatory and administrative burden on the applicant and Ecology."
    - An analysis extended to emergency generators driven by diesel engines larger than 530 BHP will result in a matrix of requirements and recommendations that may be difficult or impossible to enforce:
        - Requirements for distancing the generator from publicly-accessible locations will vary with
            - Height variations of off-site buildings (emission receptor heights).
            - Building downwash variations from nearby buildings, on-site or off-site.
            - Exhaust stack diameters that differ between engine manufacturers.
            - Uncertainties about stack exhaust temperature variations between engine sizes and designs.

Because of these considerations, Ecology will limit this general order to diesel-powered emergency generators that are 530 BHP or smaller.

Because PAHs are not exempted under the SQER consideration, dispersion modeling to determine the PAH air quality impact is mandatory. However, dispersion modeling of any sort for the other TAPs could be eliminated from consideration by simply mandating a 10 meter stack for all emergency generator sizes. Ecology believes that for the smallest emergency generators, this may be impractical, and against the interests of potential general permit applicants. Notwithstanding the above discussion of the complexity of analysis outside the qualifiers of the SQER tables, Ecology determined additional requirements that will allow emergency generators up to 100 BHP to install small stacks.

Polycyclic Aromatic Hydrocarbons

Ecology ran SCREEN3 dispersion analyses for a variety of configurations to determine the air quality impact of PAH emissions from emergency generators. As noted earlier in Section 5, the base case parameters are shown in Table 6 and Table 7. In reality, any given engine may have a stack diameter, exhaust temperature, and downwash building height that differ from the base case. However, it appears that the only one of these variables that may cause modeled impacts to vary significantly form the base case is the downwash building height (at least up to 530 BHP).

Stack diameter and exhaust temperature are not likely to vary greatly from the base case. Engines must be designed with a sufficiently large exhaust port diameter to prevent significant back pressure. At the same time, an unnecessarily large exhaust port only adds cost to the engine's manufacture. Ecology found that exhaust port diameter was comparable from one manufacturer to another for the same engine sizes. Exhaust temperature will depend primarily on fuel consumption. Similar size engines use similar amounts of fuel, and will have similar exhaust temperatures. Ecology varied stack diameter ± 25% and stack temperature ± 50 ^{o}K and found less than a 25% change in modeled impact. The results of a variety of analyses over a range of downwash and receptor combinations are shown in Table 11. They show that modeled impacts do not exceed about 30% of the ASIL. So, the likely variations in stack diameter and temperature should not be sufficient to elevate impacts above the ASIL if superimposed on these results.

Table 11: Air Quality Impact for PAHs from a 530 BHP Diesel Engine

Environment	Receptor height	Downwash building height; except where indicated, stack is on and 10 feet above the downwash building.	Maximum PAH impact $\mu g/m^3$, ann. avg.
Urban	10 stories (46 meters)	10 stories (46 meters)	2E-05
	8 stories (36 m.)	10 stories	5.3E-07
	6 stories (27 m.)	10 stories	1.7E-07
	10 stories	8 stories (36 m.)	4.6E-05
	10 stories	6 stories (27 m.)	8.9E-05
	10 stories	4 stories (20 m.)	5.4 E-05
	6 stories (27 m.)	6 stories (27 m.)	2E-05
	4 stories (20 m.)	6 stories	8.5E-07
	6 stories (27 m.)	4 stories (20 m.)	5.6E-05
	6 stories (27 m.)	3 stories (15 m.)	4.8E-05
	6 stories (27 m.)	2 stories (10 m.)	1.3E-04
	6 stories (27 m.)	1 story (5 m.)	1.4E-04
	5 stories (23.5 m)	10 stories (46 m.)	<1E-06
	4 stories (20 m.)	4 stories	1.7E-05
	4 stories	2 stories	1.2E-04
	4 stories	**1 story**	**0.0026 max; 1.3E-04 @ 10 meters**
		4 stories; stack is on and 10 feet above the 1 story generator building	**6.6E-05**
	3 story (14 m.)	**1 story**	**0.0034 max; 1.45E-04 @ 27 meters**
		3 stories; stack is on and 10 feet above the 1 story generator building	**4.6E-05**
	2 stories (10 m.)	2 stories (10 m.)	2.6E-05
	2 stories	1 story	4.7E-05
	1 story (5 m.)	2 stories	6.9E-06
	1 story	1 story	8.2E-06
Rural	3 story (14 m.)	3 story (14 m.)	5.3E-05
	3 story	**2 stories (10 m.)**	**0.0015 max. 1.2E-04 @ 31 meters**
		3 stories; stack is on and 10 feet above the 2 story generator building	**9.1E-05**

Environment	Receptor height	Downwash building height; except where indicated, stack is on and 10 feet above the downwash building.	Maximum PAH impact µg/m^3, ann. avg.
	3 story	1 story (5 m.)	7.8E-05
	2 stories (10 m.)	3 story	2.4E-05
	2 story	2 stories (10 m.)	6.2E-05
	2 story	1 story (5 m.)	6.2E-05
	1 story (5 m.)	1 story (5 m.)	9.2E-06

Several of the entries (hi-lighted) in Table 11 deserve explanation. Whether a building near the emission source is to be considered as a downwash source is determined in SCREEN3 by the "area of influence (AOI)" rule. A nearby building will have a downwash effect if the emission source is within that building's AOI. The AOI is 5 times the lesser of height or the maximum width of the building. To illustrate, consider the example in the table where the receptor is 4 stories high and the generator building is one story high. SCREEN 3 predicts an ASIL exceedance at a 4 story receptor height. However, the impact is below the ASIL if the 4 story receptor is 10 meters horizontally away from the generator. Assuming the foot print of the receptor building is similar to the base-case generator building (11 meters), the AOI of the receptor building is 55 meters. Because the AOI of the receptor is greater than the "<ASIL" distance, the receptor building downwash will reduce the PAH impact. SCREEN3 does not have the capability of considering multiple downwash sources. However, the calculations procedures in SCREEN3 suggest that the tallest building with a relevant AOI will dominate the downwash effect[19]. Where this is meaningful, the results are shown in the hi-lighted entries in the table. The results in the table also show that whenever the downwash building is greater than or equal in height to the receptor, the impact at all levels is below the ASIL. Ecology concludes that PAH impacts will not exceed the ASIL in any configuration of receptor building and generator building heights.

Stack Heights for Smaller Engines

For engines smaller than 100 BHP, it will often be impractical to mandate stack heights ten feet above the building. Using SCREEN3 modeling, Ecology determined NO air quality impacts for various stack heights for smaller engines. The base case model input variables are shown in Table 12. NO extinction by reaction with ambient ozone following the discussion outlined in the Appendix was considered in these calculations. The results are shown in Table 13.

Table 12: Input Variables for Small Engine Stack Height Analysis

BHP	Subpart IIII g-NO_X per BHP-hr	Emission rate g-NO/sec	Stack height (m)	Stack diam. (m)	T_{stk} (^oK)[20]
25	4.9	0.0222	7.5	0.045	528
25	4.9	0.0222	8	0.045	526

[19] SCREEN3 Model User's Guide, EPA-454/B-95-004, Section 3.6 "Downwash Effect," page 48, Equation (9)
[20] Based on data from Caterpillar Detroit engines.

BHP	Subpart IIII g-NO_X per BHP-hr	Emission rate g-NO/sec	Stack height (m)	Stack diam. (m)	T_{stk} (^oK)[20]
25	4.9	0.0222	8.5	0.045	524
25	4.9	0.0222	10	0.045	519
50	4.9	0.0443	7.5	0.064	568
50	4.9	0.0443	8.5	0.064	563
50	4.9	0.0443	10	0.064	556
100	4.3	0.0778	8.5	0.090	674
100	4.3	0.0778	10	0.090	670

Table 13: Emergency Generator Placement, Small Engines with Stack Height Less Than 10 Feet Above Roofline

Engine BHP	Exhaust stack height above housing or adjacent building roofline	Minimum from property line (feet)	Minimum distance from nearest single story building (feet)	Minimum distance from nearest building two stories or greater in height (feet)
Rural Environment				
≤ 25	3 feet	Zero	109	109
	4.5 feet	Zero	94	94
	6 feet	Zero	69	69
	10 feet	Zero	Zero	Zero
> 25 to 50	3 feet	Zero	148	352
	6 feet	Zero	110	401
	10 feet	Zero	Zero	Zero
> 50 to 100	6 feet	Zero	132	395
	10 feet	Zero	Zero	Zero
Urban Environment				
≤ 25	3 feet	Zero	Zero	Zero
	4.5 feet	Zero	Zero	Zero
	6 feet	Zero	Zero	Zero
	10 feet	Zero	Zero	Zero
> 25 to 50	3 feet	Zero	79	79
	6 feet	Zero	Zero	Zero
	10 feet	Zero	Zero	Zero
> 50 to 100	6 feet	Zero	Zero	188
	10 feet	Zero	Zero	Zero

As can be seen in Table 13, when one cannot invoke the SQER exemption, one must consider the location of the generator relative to publicly-accessible locations.

The modeling procedure used to estimate the allowable relative generator and public-access locations (SCREEN3) gives different results depending upon whether the area is "urban" or "rural." These are somewhat qualitative distinctions. EPA guidance recommends assessing the urban vs. rural character of a location on either the basis of land-use or population density[21]. The land-use approach is the more complicated and more accurate. It involves an assessment of the degree and combination of industrial (heavy and light), commercial, and compact residential land-use. The population density approach requires knowledge of the average number of persons living within about 2 miles of the generator. If 24,000 persons or more live within 2 miles of the proposed generator, the location is urban. Otherwise, it is rural. Because the Ecology regional offices for which this general order is intended are not heavily industrial, and simplicity is at a premium, Ecology believes that the population density approach will adequately determine the urban-rural characterization.

Figure 1 shows the results of dispersion modeling for PAH air quality impacts from small diesel -powered engines at distances from the emergency generator where the nitric oxide impact is 100 $\mu g/m^3$ or less. In other words, as long as a small emergency generator is located far enough from a publicly-accessible location so that the nitric oxide air quality impact is below the ASIL, the PAH air quality impact will also be substantially below the ASIL.

Figure 1

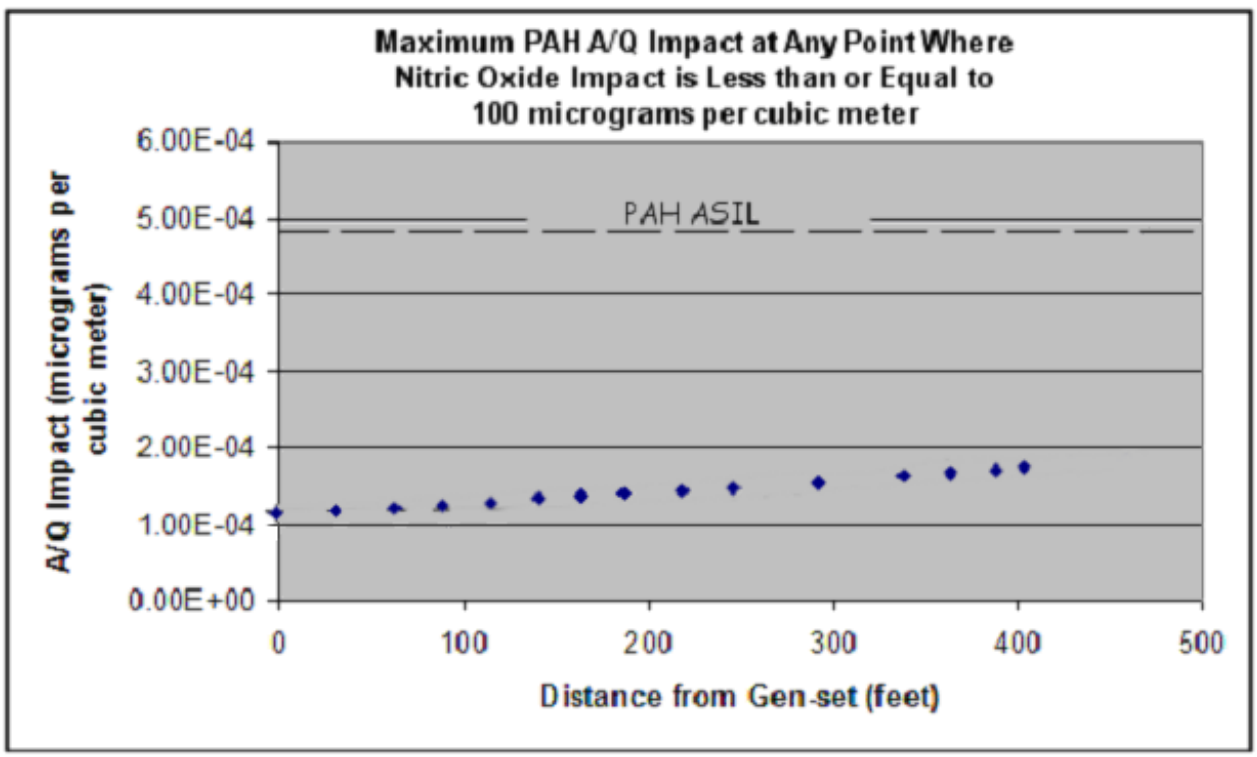


Figure 1 and Table 13 show that the highest non-nitric oxide impact for the small engines having less than a "standard" stack height will occur at 401 feet from the generator (50 BHP engine,

[21] 40 CFR Part 50, Appendix W, Section 8.2.3.

stack 6 feet above roofline, receptor at two story or higher building). At that point, the air quality impacts of the other diesel engine TAPS (PAH already having been considered in Figure 1) are shown in Table 14. None exceeds its ASIL.

Table 14: Non-PAH TAP Maximum Impacts for Non-Standard Stack Heights for Small Diesel-Powered Engines

TAP	ASIL ($\mu g/m^3$)	Maximum Impact ($\mu g/m^3$)	Ratio of Impact to ASIL
Acetaldehyde	0.45	0.025	5.6%
Acrolein	0.02	0.0155	77.5%
Benzene	0.12	0.031	25.8%
Butadiene	0.0036	0.0013	36.1%
Formaldehyde	0.077	0.039	60.6%
Naphthalene	170	0.0143	<1%
Toluene	400	0.0682	<1%
Xylene	1,500	0.0471	<1%

Because none of the TAPs exceed its ASIL at any point where the NO air quality impact is less than or equal to 100 $\mu g/m^3$, NO is the determining TAP relative to the generator placement. The generator placement requirements relative to publicly accessible locations are as shown in Table 13. The most dramatic restrictions are for rural locations. However, in practice there are likely to be many applications for generator installation in rural locations, such as farms and food storage locations that are sufficiently distant from publicly-accessible buildings. In urban locations, generators having a diesel engine smaller than 25 BHP may be installed with as little as a three foot stack above the roof. Applicants intending to install larger engines will have to comply with the indicated stack heights relative to the neighboring buildings or process their notice of construction applications through the non-general procedure.

6. REGULATORY REQUIREMENTS

There are a number of regulations that apply to the installation and operation of the emergency generators proposed for coverage under this General Order of Approval. The following is a listing of those requirements. Some of these requirements result in notification, monitoring, and reporting requirements. There are also requirements related to periodic payment of fees and reporting of emissions. Ecology recommends that these requirements be included in the text of the General Order of Approval so the applicant understands what is expected once coverage is granted.

Washington State Law

Title 70 RCW, Chapter 70.94, "Washington Clean Air Act"

- 70.94.152 (3) requires that any order that is adopted under this chapter shall be in accord with this chapter, or the applicable ordinances, resolutions, rules, and regulations adopted under this chapter.
- 70.94.152 (7) requires that any features, machines, or devices that are the subject of an order shall be maintained and operated in good working order.

- 70.94.152 (10) requires that any notice of construction approval issued under (3) above shall include a determination that the source will achieve best available control technology (BACT).

Washington State Regulations

- WAC 173-400-99 through 104, these sections deal with the source registration program. Section 100 defines which facilities are subject to the registration program and payment of periodic registration fees.
- WAC 173-400-105, Subsection (1) relates to submittal of annual emission inventory information. Subsection (2) relates to the ability of Ecology to request emissions testing. Subsection (3) relates to site access by agency personnel at reasonable times to ascertain compliance or investigate complaints.
- Under WAC 173-400-110, Subsection (5) (d) Exemption threshold table for criteria pollutants (See Table 2).
- Chapter 173-460 WAC "New Sources of Toxic Air Pollutants" does not allow facilities discharging toxics listed under WAC 173-460-150 and WAC 173-460-160 to be exempt from new source review.
  WAC 173-460-080(2)(e): Small Quantity Emission Rate (SQER) Tables: This rule allows an applicant for a proposed TAP emissions source to avoid a second tier risk analysis without first doing a modeling dispersion analysis if all TAPs emission rates are less than those shown under WAC 173-460-080(2)(e).

Federal Regulations

- 40 CFR 63.6645(d), Initial notification requirements for Reciprocating Internal Combustion Engines: Diesel-driven emergency generator sets greater than or equal to 500 BHP that are installed in or would cause the stationary source to become a major source of hazardous air pollutants must provide initial notification of installation to the permitting agency.
- 40 CFR Part 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines: Finalization of this federal rule appears to be imminent. Emissions standards, notification, monitoring, reporting and recording requirements in this general order will be consistent with this federal rule.

7. Conclusions

Generator set placement and size

As long as the diesel engine is equipped with a stack that extends ten feet above the roofline[22], emergency generators up to 530 BHP may be installed without consideration of location. If the notice of construction approval applicant wants to install a shorter stack for a smaller engine, he/she will have to comply with the location requirements in Table 13.

[22] Taken as functionally equivalent to a 10 meter stack for the SQER exemption.

Other Approval Conditions

- Opacity from the exhaust stack shall not exceed 10% when averaged over 6-minutes. This shall be measured using Method 9 and a correspondingly certified opacity reader when required by Ecology. Ecology expects this will occur as a result of complaints, visibility observations, or compliance questions.
- The permittee is to follow all recommended operation and equipment maintenance provisions supplied by the manufacturer of the generator set.
- Periodic emissions inventory information and other information may be requested by the Ecology. Information requested by Ecology shall be submitted within 30 days of receiving the request unless otherwise specified in the request. Ecology will supply the necessary forms to use for periodic emission inventory.
- The applicant will pay the required annual/periodic registration or air operating permit fees within 30 days of receipt of the invoice from Ecology.
- Access to the source for the purpose of determining compliance with the terms of this General Order of Approval by Ecology staff shall be permitted during normal business hours. Failure to allow such access is grounds for an enforcement action under the Washington State Clean Air Act.
- The generator set shall be installed and operated shall be the same as described in the application.
- The provisions of this General Order of Approval are severable and, if any provision of this authorization, or application of any provisions of this authorization to any circumstance, is held invalid, the application of such provision to their circumstances, and the remainder of this authorization, shall not be affected thereby.
- The applicant is required to comply with applicable rules and regulations pertaining to air quality, and conditions of operation imposed upon issuance of this order. Any violation of applicable state and/or federal air quality rules and regulations or of the terms of this approval shall be subject to the sanctions provided in Chapter 70.94 RCW. Authorization under this Order may be modified, suspended, or revoked in whole or part for cause including, but not limited to, the following:
    - Violation of any terms or conditions of this authorization;
    - Obtaining this authorization by misrepresentation or failure to disclose fully all relevant facts.

8. ABBREVIATIONS AND ACRONYMS

AAQS	Ambient Air Quality Standards
ASIL	acceptable source impact level
BACT	Best Available Control Technology
BHP	brake horsepower
BHP-hr	brake horsepower-hour
CFR	Code of Federal Regulations
CI	compression ignition
CO	carbon monoxide
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ºF	degrees Fahrenheit

ft	feet
g	grams
HHV	higher heat value
hr/yr	hours per year
ICE	internal combustion engine
^{o}K	degrees Kelvin
kw	kilowatt
lb/MMBtu	pounds per million British thermal units
m	meter(s)
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NMHC	non-methane hydrocarbon(s)
NO	nitric oxide
NOC	Notice of Construction
NO_X	oxides of nitrogen
NSPS	New Source Performance Standard
O_3	ozone
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter of 10 micrometers or less
PSD	Prevention of Significant Deterioration
psig	pounds per square inch gage (above ambient pressure)
SCR	Selective Catalytic Reduction
SO_2	sulfur dioxide
SO_X	sulfur oxides (SO_2, SO_3, and H_2SO_4)
SQER	small quantity emission rate
TAP(s)	toxic air pollutants as defined in Chapter 173-460 WAC
VOC	volatile organic compound
WAC	Washington Administrative Code
%	percent
ppb	parts per billion
ppmdv	parts per million, dry volume
ppmw	parts per million by weight
sec	second
µg (pollutant)/m^3	micrograms (pollutant) per cubic meter

APPENDIX: EMERGENCY GENERATORS LARGER THAN 530 BHP

The following analysis determines how far the engine must be from publicly-accessible locations for nitric oxide concentrations caused by the engine to decline below the ASIL.

NO is a member of the family of nitrogen oxides (NO_X) formed during combustion processes. Up to 530 BHP, all TAPs from a Subpart IIII compliant diesel-powered emergency generator are exempted from dispersion modeling except PAHs. The analysis described in the body of this technical document demonstrated that PAH air quality impact from the Subpart IIII compliant emergency generator will not exceed the ASIL anywhere for any reasonably expected receptor

height at least up to 530 BHP. Above 530 BHP, however, NO air quality impacts can exceed the ASIL at reasonably expected receptor heights.

In the presence of sufficient oxygen and high temperature, NO will convert rapidly to nitrogen dioxide (NO_2). However, diesel exhaust is at high temperatures for only a fraction of a second. For all practical purposes, all the nitrogen oxides leaving the exhaust stack are in the form of NO. Since the exhaust cools very rapidly on exposure to ambient air, the NO is effectively "frozen." The NO will react with ambient oxygen (O_2) relatively slowly. If there is no ozone (O_3) in the ambient air, it will take a day or two for half the NO from the diesel exhaust to convert to NO_2. However, ambient air always has some ozone.

Ozone and NO react very rapidly at ambient temperatures. Although the ambient ozone concentration varies with location, time of day, and time of year, ozone monitors in Washington indicate that 40 parts per billion (ppb) is a typical background level. In the presence of 40 ppb ozone at ambient temperatures, it takes about 40 seconds to convert half the NO from the diesel exhaust to NO_2[23]. In addition to the effect of this NO-ozone reaction, the NO concentration in the exhaust plume decreases by dispersion into the ambient atmosphere. In the range of wind speeds used in the SCREEN3 model, NO is diluted to below the ASIL in 2 to 30 seconds for engines up to 2000 BHP. Because the NO-ozone reaction time and the dispersion time are of similar magnitude, both must be considered in estimating the NO air quality impact.

Using the recommended "full meteorology" option, SCREEN3 calculates the air quality impacts concurrent with a variety of wind speeds. The worst case result is reported for each distance from the stack, and the wind speed used may differ point-to-point. The wind speeds in analysis most frequently fell in the 7.5 to 11 mile per hour range. While SCREEN3 reports the magnitude and location of the pollutant air quality impact, it does not report the time it took the pollutant to get from the stack to that location. For the sake of simplicity in extending this analysis to include the extinction of NO by ambient ozone, Ecology assumed the exhaust plume drifts from the stack at 10 miles per hour[24]. Figure 2 shows the extinction of NO by conversion to NO_2 due to reaction with ambient ozone.

---

[23] Ratio of the concentration of NO at times 1 and 2)

$$= \exp[-9.64\times 10^{9} \times (\text{ambient ozone concentration}) \times (\text{time 2 - time 1})]$$

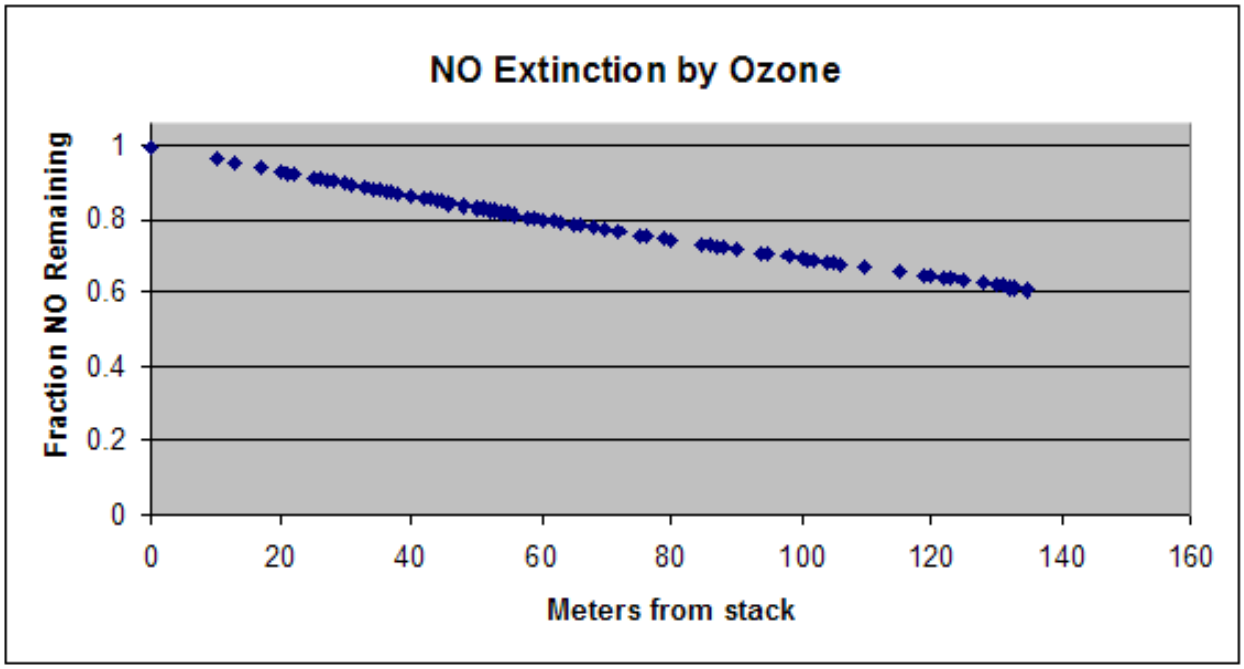
Time in seconds, ozone concentration in gram-moles per cubic centimeter

(40 ppb ozone = 1.7×10^{-12} gram-moles per cubic centimeter)

"Kinetics of the Reaction Between NO and O_2," Descriptive Chemistry of Nitrogen in an Environmental Context, Bruner, et al., Department of Chemistry and Biology, University of California at San Diego (1997)

[24] The slower the assumed wind speed, the greater effect the NO extinction rate will have in mitigating the air quality impact. However, SCREEN3 is generally-recognized as conservative relative to reality. Ecology believes that choosing a higher wind speed for the sake of analysis serves no realistic purpose.

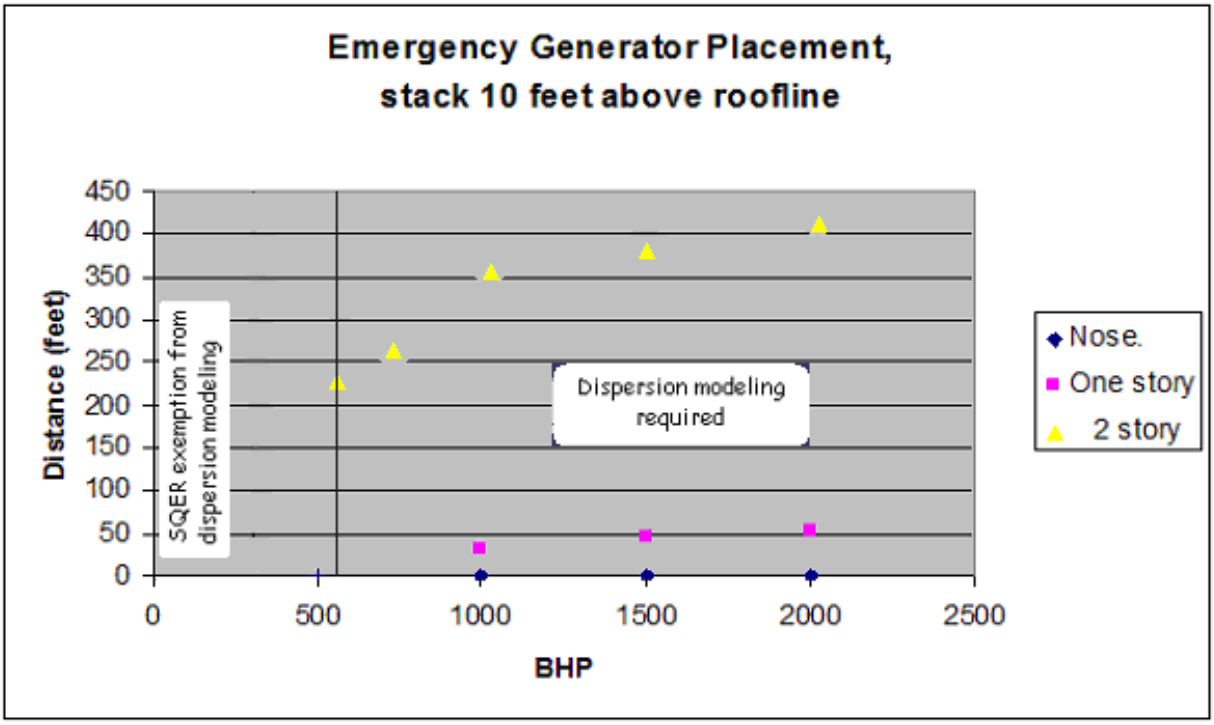
Figure 2



Using SCREEN3 and the NO extinction rate from Figure 2, Ecology estimated NO concentrations at nose height, one story, two story, and higher levels. The general SCREEN3 input variables are shown in Table 6 and Table 7.

The results are shown in Figure 3, and for stack height variations for small engines in Table 13. For the sake of visualization, the term "single story" has been substituted for a 5 meter receptor height, and "two stories or greater" has been substituted for a receptor height of 20 meters.

Figure 3


Emergency Generator Placement,
stack 10 feet above roofline
Distance (feet)
450
400
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
BHP
SQER exemption from dispersion modeling
Dispersion modeling required
Nose.
One story
2 story

APPENDIX D: EMISSIONS CALCULATIONS

APPENDIX E: MODEL PROTOCOL

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 NORTH HILTON, BOISE, ID 83706 · (208) 373-0502

C. L. "BUTCH" OTTER, GOVERNOR
JOHN TIPPETS, DIRECTOR

July 11, 2016

Shannon K. Manoulian
Trinity Consultants
Boise, Idaho

RE: Modeling Protocol for the City of Jerome Proposed Modifications to the Jerome Waste Water Treatment Plant in Jerome, Idaho

Shannon:

DEQ received your dispersion modeling protocol submitted to me via email on June 9, 2016. The modeling protocol was submitted on behalf of the City of Jerome. The modeling protocol proposes methods and data for use in the ambient impact analyses of a Permit to Construct application for modifications to the Jerome Waste Water Treatment Plant (WWTP) in Jerome, Idaho.

The modeling protocol has been reviewed and DEQ has the following comments:

- **Comment 1: Receptor Grid.** The protocol discusses the receptor grid proposed for the air impact analyses. The proposed grid appears reasonable and DEQ anticipates it will be adequate to resolve maximum modeled concentrations. However, it is the applicant's responsibility to use a grid that resolves the maximum modeled impacts to a degree where the results unquestionably demonstrate compliance with the applicable NAAQS or TAP increment. Indications of inadequate receptor spacing would be modeled impacts very near the standard where surrounding receptors show a substantially reduced impact (high concentration gradient).

  Considering the nature of sources and the current release heights, extending receptors out to 5,000 meters is adequately conservative.

- **Comment 2: Background Concentrations.** Background concentrations as determined from the NW AIRQUEST site are correct.

- **Comment 3: Space Heater Emissions.** Compliance with the 1-hour NO_2 standard is frequently problematic for permit applicants, and maximum design capacity emissions from natural gas-fired space heating units can substantially contribute to modeled impacts where sources are close to the ambient air boundary. Since these units typically

operate only to provide space comfort heating, PTE is usually substantially less than 8,760 hours/year. DEQ will allow applicants to adjust PTE modeled rates according to typical heating needs, usually using heating degree days data to scale the usage. DEQ should be consulted if adjustments will be proposed for space heaters.

- **Comment 4: Engine Testing Hours.** The protocol indicates that the testing of emergency generators will only occur between the hours of 6 am and 7 pm. If the submitted modeling analyses restrict emissions to this time only, the issued permit will include a permit restriction accordingly.

- **Comment 5: Release Parameters of Modeled Sources.** The protocol states that documentation of how modeled emissions release parameters were determined will be included with the final modeling report submitted in the PTC application. Inadequate justification/documentation of release parameters is a common deficiency of submitted air impact analyses. This is largely because applicants frequently use equipment design specifications or vendor supplied design data, and then merely state that parameters were "design data." This is not adequate because DEQ has no readily available method to verify that such values have been accurately calculated for the unit in question. The application should state the method used to generate "design data," providing calculations where possible.

  Release parameters of internal combustion engines used in the models are commonly incorrect, with estimates of flow rate and temperature substantially overstated. Vendor supplied parameters are often representative of conditions at the exhaust manifold rather than those at the point of release to the atmosphere, where the exhaust has cooled and condensed considerably after passing through a muffler system. In general, exhaust velocities over 50 meters/second and temperatures over 800° F are considered suspect. If good data from the manufacturer are not available, DEQ can provide some general methods to estimate flow rates and temperatures.

- **Comment 6: Capped and Horizontal Releases.** Use of a 0.001 meter/second exit velocity is acceptable for capped and horizontal releases. However, DEQ will also allow use of the AERMOD BETA option for capped and horizontal releases.

- **Comment 7: Horizontal Coordinates and Base Elevations of Buildings and Emissions Sources.** DEQ often receives modeling files where building locations and/or emissions point locations are in error, as frequently revealed through comparison with aerial photographs. Often these errors occur through the use of multiple data sources that have differing datums.

  DEQ also frequently observes submitted modeling analyses where different base elevation heights are used for an emissions point and the building containing the point. This typically occurs because a different source of elevation data was used for the buildings than for the emissions points. This can also occur when using NED files for large footprint buildings in rapidly changing terrain. When determining base elevations for receptors, buildings, and emissions points, the modeler should assure that: 1) the datum of the sources are consistent; 2) all building height and stack heights are verifiably linked to the base elevation used; 3) extra effort/care should be taken to assure that

horizontal coordinates and elevations are sufficiently accurate when facilities are located in areas of rapidly changing terrain.

DEQ's modeling staff considers the submitted dispersion modeling protocol, with consideration/resolution of the additional items noted above, to be approved. It should be noted, however, that the approval of this modeling protocol is not meant to imply approval of a completed dispersion modeling analysis. Please refer to the *State of Idaho Air Quality Modeling Guideline*, which is available on the Internet at http://www.deq.state.id.us/air/permits_forms/permitting/modeling_guideline.pdf, for further guidance. The protocol is considered to be approved for analyses performed within four months of the protocol approval date. If the permit application will be submitted after that date, DEQ should be consulted to determine whether any changes must be made.

DEQ has developed an Air Impact Modeling Analyses Report Template Form and requests that it be used to submit model results and detailed descriptions of the analyses and inputs to DEQ as part of the permit application process. DEQ modeling staff also request submission of electronic copies of all modeling input and output files (including BPIP and AERMAP input and output files) with the analysis report. If DEQ provided model-ready meteorological data files, then resubmission of these to DEQ with the application is not required. Also, please include with the application materials a copy of the protocol and this protocol approval notices. If you have any further questions or comments, please contact me at (208) 373-0112.

Sincerely,

Kevin Schilling

Kevin Schilling
Stationary Source Air Modeling Coordinator
Idaho Department of Environmental Quality
208 373-0112
kevin.schilling@deq.idaho.gov

PROJECT REPORT
City of Jerome WWTP

Air Dispersion Modeling Protocol

Prepared By:

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June 2016

Project 161301.0055

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1. EXECUTIVE SUMMARY

This air quality modeling protocol documents the proposed methodology to prepare an air quality analyses in support of an Idaho Department of Environmental Quality (IDEQ) Permit to Construct (PTC) application for the City of Jerome Wastewater Treatment Plant (WWTP) in Jerome, Idaho. This report seeks to fully document and report the methods and techniques proposed to perform the modeling in support of the PTC application in order to gain concurrence from IDEQ staff.

2. PROJECT OVERVIEW

The City of Jerome is proposing to upgrade the existing WWTP. Upgrades to the plant will include the installation of two (2) new anaerobic digesters, one (1) natural gas/biogas fired boiler, one (1) biogas fired boiler, one (1) biogas flare, five (5) emergency generators and various small natural gas fired heaters. Auxiliary support and controls equipment and new facility buildings will also be included as part of the upgrade.

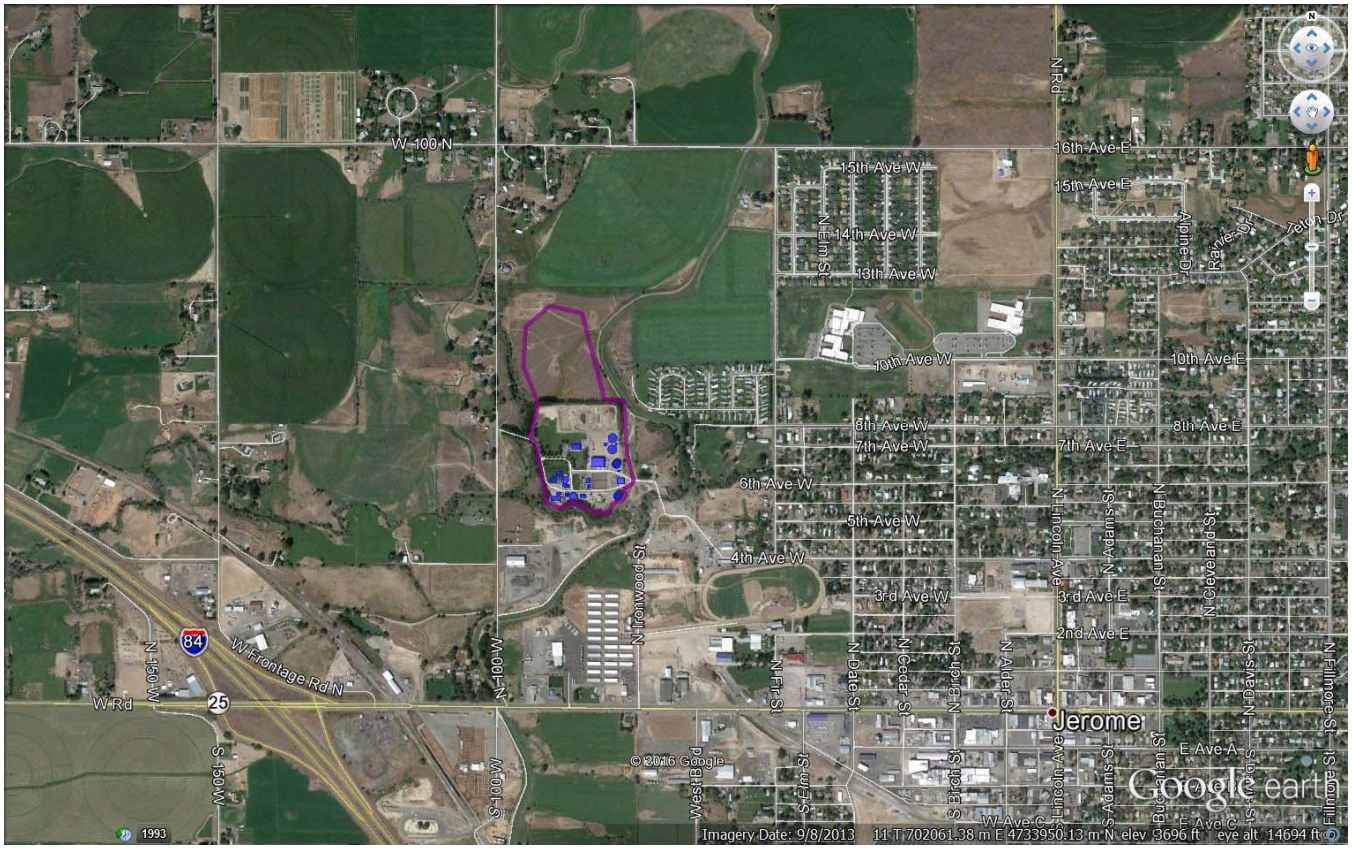
Emissions from the project include criteria pollutants and several IDAPA TAPs.

2.1. LOCATION OF PROJECT

The Jerome WWTP is located at 500 N 100 W in Jerome in Jerome County, ID. The UTM coordinates for the facility are approximately 701,811 m E, 4,733,848 m N, Zone 11 (NAD83 coordinate system). Jerome County is an attainment area for all criteria pollutants. Land use in the area includes agricultural, light industrial and residential properties. Terrain surrounding the project site is relatively flat. A map showing the location of the proposed facility is provided as Figure 2-1.

The proposed equipment will be constructed within the existing property boundary. Some of the existing site buildings and equipment such as the sludge storage tanks will be decommissioned and removed to accommodate the new equipment and facility buildings.

Figure 2-1. Facility Location



2.2. GENERAL FACILITY / PROJECT DESCRIPTION

The City of Jerome provides wastewater treatment for City residents, commercial retail, some light industrial, and industrial wastewater. The current treatment facility includes headworks (fine screening, grit removal, and flow measurement) trickling filters (two bio-towers), membrane bioreactor (MBR) treatment (tow aeration basins, MBR tanks, blowers and permeate pumps), chemical addition for phosphorus removal, ultraviolet disinfection, solids handling facilities (aerobic digester, pumps, belt press and back up drying beds), a lab and a control building. Treated wastewater is discharged to the J8 Canal under a discharge permit issued by the Environmental Protection Agency. Since the existing WWTP was originally constructed, the plant has experienced a drastic increase in both flows and loading with new commercial, industrial and residential development. Due to these increases as well as stricter effluent discharge permit conditions and limitations, upgrades to the WWTP are necessary.

The proposed upgrades to the plant include construction of two new anaerobic digesters to allow for improvements in solids handling; biogas will be generated by the anaerobic digesters. The typical composition of biogas ranges from 60%-70% methane (CH_4), 20%-30% carbon dioxide (CO_2), and less than 1% sulfur gases. The accumulated biogas will be collected and conveyed via piping to one dual-fuel fired boiler and one biogas fired boiler. The boilers will use biogas as the primary fuel. If an inadequate amount of biogas is generated by the digesters, the second boiler will fire on natural gas. The boilers will be operated to maintain a specific temperature of the sludge in the digesters; as such, there may be times when one boiler is operating at partial

capacity. During these times some biogas will be burned at the boilers, and some will be burned at the flare. Since the production of biogas is not consistent and varies with loadings and other factors, there will be flaring at the waste gas burner especially during the summer when there is minimal heat demand.

Five new diesel-fired emergency generators as well as three existing diesel-fired emergency generators will be used to supply emergency backup power to the entire WWTP if necessary. The engines will operate a maximum of 100 hours per year for testing and maintenance and required regulatory purposes. Generator maintenance and testing will be limited to 30 minutes per day to account for load bank and other required testing. In addition to the generators, the City of Jerome is proposing to install various small (<1 MMBtu/hr) natural gas-fired heaters throughout the facility for comfort heating in the winter months.

The facility proposes to operate 8,760 hours per year, with the exception of the emergency generators. The emergency generators will operate less than 100 hours/year for non-emergency situations; testing of the engines will only occur between the hours of 6am and 7pm.

2.3. EMISSION SOURCES

2.3.1. Anaerobic Digesters

Anaerobic digestion involves the decomposition of organic and inorganic matter in the absence of oxygen. In the process of decomposing organic and inorganic matter, heat is generated. This heat facilitates pathogen reduction. In addition to heat, anaerobic digestion produces biogas, consisting of methane, carbon dioxide and traces of other gases, and can be combusted to generate steam, heat or electricity.

The proposed project includes installation of two anaerobic digesters. Each digester will be approximately 99,500 cubic feet (cf) in size (745,000 gallons). The biogas produced by the digesters will be collected and conveyed via piping to one dual-fuel fired boiler and one biogas fired boiler to maintain the temperature of the sludge in the digesters. If the amount of biogas produced exceeds the combined capacity of the boilers, or when there is minimal heat demand by the digesters, the biogas will be directed to the proposed open-top flare. Therefore, the boilers and flare will function as control devices for the anaerobic digesters.

2.3.2. Biogas Boilers

Biogas generated by the anaerobic digesters will be collected and conveyed to the biogas boiler and dual-fuel boiler. Operation of the boilers will be dependent on the amount of biogas generated by the digesters, which can vary based on the incoming wastewater characteristics. Biogas will be primarily conveyed to the biogas boiler. If the digester biogas generation exceeds the capacity of the biogas boiler, the excess biogas will be conveyed to the dual-fuel boiler. If insufficient biogas is available to fire both boilers, the dual-fuel fired boiler will operate on natural gas.

The boilers will be located inside the Anaerobic Digester Control building, and will exhaust through stacks on top of the roof. A site layout drawing is included in **Appendix A**. The boilers will be represented in the model as unrestricted vertical point sources. Emissions of criteria pollutants and HAPs/TAPs were calculated using AP-42 Section 1.4. The emission factors in Tables 1.4-1 through 1.4-4 were converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to the average natural gas heating value of 1020 Btu/scf. The biogas from the digesters will have an average heating value of 700 Btu/scf.

2.3.3. Flare

Biogas generated by the anaerobic digesters will be conveyed to the biogas and dual-fuel boilers. However, if the amount of biogas generated by the digesters exceeds the capacity of both of the boilers, or if one or both of the boilers is not needed to maintain the digester sludge temperature, excess biogas will be directed to the open flare.

The flare is located near the Anaerobic Digester Control building and is shown on the site layout as J6 (Appendix A). The flare will be modeled as a point source with the equivalent diameter exhaust parameter that was calculated according to EPA SCREEN3 model guidance methods for equivalent diameter and an effective release height. This method is appropriate for modeling of open flares as point sources. Exhaust temperature and exit velocity will use the standard SCREEN3 values of 1273 Kelvin and 20 meters per second (m/s), respectively.

Emissions from the flare and natural gas flare pilot were calculated using AP-42 Section 1.4. The emission factors in Tables 1.4-1 through 1.4-4 were converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to the average natural gas heating value of 1020 Btu/scf. The biogas from the digesters will have an average heating value of 700 Btu/scf.

2.3.4. Emergency Generators

Five new diesel-fired emergency generators as well as three existing diesel-fired emergency generators will be used to supply emergency backup power to the entire WWTP if necessary. The engines will operate a maximum of 100 hours per year for testing and maintenance and required regulatory purposes. Generator maintenance and testing will be limited to 30 minutes per day to account for load bank and other required testing.

The three existing generators are located near the MBR & UV building. Two of the new generators will be located near the existing Sludge Storage tank (structure K3 on Site Layout) and three of the new generators will be located near Biotower #1 (structure K2 on Site Layout). The generators will be represented in the model as unrestricted vertical point sources. Emissions from the generators were calculated using manufacturer's specifications and AP-42 Section 3.4.

2.3.5. Heaters

Various small (<1 MMBtu/hr) natural gas-fired heaters will be installed throughout the facility for comfort heating in the winter months. The heaters will be located in the Solids & Dewatering building, Solids Loading building, and Sludge Pump building, and will exhaust through the sides of the building. The heaters will be represented in the model as vertical point sources with the actual stack diameter and a 0.001 m/sec exit velocity, consistent with IDEQ modeling guidance. Criteria and HAP/TAP emissions from the heaters were calculated using AP-42 Section 1.4.

2.4. POTENTIAL TO EMIT

The facility-wide potential to emit is shown in Table 2-1 and Table 2-2 below. Hourly emission rates are based on the maximum material throughputs and equipment capacities. Annual emission rates are based on 8,760 operating hours per year, with the exception of the emergency generators. Individual emission source calculations will be provided electronically with the PTC application.

Table 2-1. Facility-wide Potential to Emit (lb/hr)

Emission Sources	CO	NO_X	PM	PM_{10}	$PM_{2.5}$	SO_2	VOC	Lead
Biogas Boiler	0.14	0.16	0.01	0.01	0.01	0.001	0.01	8.21E-06
Dual-Fuel Boiler	0.14	0.16	0.01	0.01	0.01	0.001	0.01	8.21E-06
Flare – Biogas Combustion	0.87	1.04	0.08	0.08	0.08	0.006	0.06	5.18E-06
Flare - Pilot	0.004	0.01	4.0E-05	4.0E-05	4.0E-05	3.0E-05	2.75E-04	2.50E-08
Emergency Generators	14.3	50.4	0.70	0.70	0.70	0.07	4.30	n/a
Heaters	0.04	0.08	0.01	0.01	0.01	0.001	0.005	4.48E-07
TOTAL	15.5	51.8	0.8	0.8	0.8	0.08	4.4	2.21E-05

Table 2-2. Facility-wide Potential to Emit (tpy)

Emission Sources	CO	NO_X	PM	PM_{10}	$PM_{2.5}$	SO_2	VOC	Lead
Biogas Boiler	0.60	0.72	0.05	0.05	0.05	0.004	0.04	3.59E-05
Dual-Fuel Boiler	0.60	0.72	0.05	0.05	0.05	0.004	0.04	3.59E-05
Flare – Biogas Combustion	3.81	4.54	0.35	0.35	0.35	0.027	0.25	2.27E-05
Flare - Pilot	0.02	0.02	0.002	0.002	0.002	1.31E-04	0.001	1.10E-07
Emergency Generators	0.72	2.52	0.04	0.04	0.04	0.004	0.21	n/a
Heaters	0.16	0.37	0.03	0.03	0.03	0.002	0.02	1.96E-06
TOTAL	5.91	8.89	0.52	0.52	0.52	0.04	0.57	9.67E-05

2.5. APPLICABLE REGULATIONS AND REQUIREMENTS

The Jerome WWTP will be a minor source of criteria pollutants and HAPs. In addition, the emergency generators will be subject to 40 CFR Part 60, Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines and 40 CFR Part 63, Subpart ZZZZ—National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

Air dispersion modeling will be conducted for those criteria pollutants which exceed the Idaho Level I modeling thresholds and TAPs which exceed the screening emissions level (EL) in Idaho Air Rules Section 585 and 586. The pollutants modeled are detailed in Section 3.0 below.

2.6. EXISTING PERMITS AND MODELING ANALYSES PERFORMED

Emissions sources at the existing WWTP include three emergency generators; there are no existing air quality permits, and no previous modeling analyses have been performed.

3. MODELING DESCRIPTION

The model proposed for this application is AERMOD (version 15181), the USEPA–approved model for near-field new source review. Based on EPA guidance AERMOD is the most appropriate of the EPA-approved models given the site's physical characteristics and the facility emission sources. AERMOD will be applied as recommended in EPA's Guideline on Air Quality Models and consistent with guidance in IDEQ's Dispersion Modeling Guidelines.

The Prime building downwash algorithm will be applied for the facility. Terrain data will be processed consistent with this protocol and EPA guidance for AERMAP. Meteorological data recommended for this analysis has been provided by IDEQ. IDEQ requires modeling of criteria pollutants if emissions from the proposed source exceed the modeling thresholds set forth the IDEQ Dispersion Modeling Guidelines.

The criteria pollutants which exceed the modeling threshold at the WWTP are PM_{10}, $PM_{2.5}$, NO_X, and CO. In addition, several TAPs exceed the screening emission levels (ELs) in IDAPA 58.01.01.585 and 586. These TAPs include formaldehyde, arsenic, cadmium, and nickel.

The emergency generators at the facility will be subject to 40 CFR Part 60, Subpart IIII and 40 CFR Part 63, Subpart ZZZZ. Per IDEQ policy and guidance, HAPs that are regulated by a federal NSPS or NESHAPS are not required to be included in the calculation of PTE or in the modeling analysis. The regulated HAPs under Subparts IIII and ZZZZ include PAH, acetaldehyde, arsenic, benzene, beryllium, cadmium, formaldehyde, acrolein and methanol. Therefore emissions of these pollutants from the emergency generators were not included in the PTE calculation nor in the modeling for those listed that exceeded the IDAPA modeling thresholds.

In general, the AERMOD model application will use model source data consistent with the permit emission inventory. The model receptor network and model domain proposed will meet all EPA and IDEQ recommendations, and ensure a complete dispersion analysis that will capture maximum potential impacts. Only direct chemical emissions and transport will be considered in this analysis; chemical transformation of emissions will not be considered in this analysis.

3.1. RECEPTOR NETWORK

The WWTP is located just outside of the city of Jerome, is bordered by agricultural, light industrial/commercial and residential properties. The WWTP property covers approximately 35 acres. Consistent with IDEQ guidance the ambient air boundary used in this analysis will be the property boundary, which also serves as the public access boundary. The property boundary will be fenced and WWTP personnel will control access to the property through posting of signage and by training facility personnel to patrol and prevent public access.

Receptor density will be set to a spacing of 25 meters along the ambient air boundary, 25 meters for the first 400 meters from the approximate center of the property, then receptors will be set a density of one per 50 meters out to 800 meters away from the property center, 150 meters out to 2,300 meters from the property center, and 500 meters out to 5,000 meters from the center of the property. The receptor network proposed ensures that the analysis meets or exceeds EPA receptor network requirements and captures the maximum impact from the facility. Therefore, no supplemental receptor network or expansion of the model domain will be required or included.

3.2. ELEVATION DATA

All source, building and receptor elevations will be from USGS NED data using the AERMAP preprocessing system in BREEZE. All stack heights will be referenced to ground surface elevations.

3.3. METEOROLOGICAL DATA

Preprocessed AERMOD ready meteorological files were provided upon request from Thomas Swain of IDEQ. The data was processed by IDEQ using the ASOS airport site data set from the Jerome County Airport for the years 2008 through 2012. The data presented by IDEQ is model-ready, and will be used without alteration or processing.

A memorandum from IDEQ describing the meteorological data in further detail is provided in **Appendix B.**

3.4. LAND USE CLASSIFICATION

AERMOD includes rural and urban algorithm options. These options affect the wind speed profile, dispersion rates, and mixing-height formula used in calculating ground-level pollutant concentrations. A protocol was developed by USEPA to classify an area as either rural or urban for dispersion modeling purposes. The classification is based on average heat flux, land use, or population density within a three-km radius from the plant site. Of these techniques, the USEPA has specified that land use is the most definitive criterion (USEPA, 1987). The urban/rural classification scheme based on land use is as follows:

> *The land use within the total area, A_0, circumscribed by a 3-km circle about the source, is classified using the meteorological land use typing scheme proposed by Auer (1978). The classification scheme requires that more than 50% of the area, A_0, be from the following land use types in order to be considered urban for dispersion modeling purposes: heavy industrial (I1); light-moderate industrial (I2); commercial (C1); single-family compact residential (R2); and multi-family compact residential (R3). Otherwise, the use of rural dispersion coefficients is appropriate.*

The WWTP is located just outside of the city of Jerome and is predominately bordered by agricultural land use with some light industrial and residential properties. Site and map reconnaissance showed that the area A_0 within a 3-km circle of the source is below the 50% urban land use criteria necessary for use of urban dispersion coefficients. Rural dispersion coefficients will therefore be used in the air quality dispersion modeling.

3.5. SPECIAL METHODS FOR MODELING CRITICAL POLLUTANT EMISSIONS

The facility proposes to operate 8,760 hours per year, with the exception of the emergency generators. The engines will operate a maximum of 100 hours per year for testing and maintenance and required regulatory purposes. Generator maintenance and testing will be limited to 30 minutes per day to account for load bank and other required testing and will only occur between the hours of 6am and 7pm. The use of any non-regulatory or beta options within AERMOD is not being proposed; regulatory defaults will be used.

The heaters will be represented in the model as vertical point sources with the actual stack diameter and a 0.001 m/sec exit velocity, consistent with IDEQ modeling guidance.

DEQ has determined that NO_x emissions from the intermittent operational testing of engines powering emergency generators or fire-suppression water pumps may be excluded from the project-specific significant impact level (SIL) analysis and the cumulative NAAQS analysis for 1-hour NO_2, providing the annual hours of

operation from testing and maintenance are less than or equal to 100 hours per engine. This determination is applicable to minor source air permitting projects and is not limited to any specific number of engines present at a facility. As such, the three existing and five proposed new emergency generators will not be included in the 1-hr NO_2 modeling analysis.

The flare will be modeled as a point source with the equivalent diameter exhaust parameter that was calculated according to EPA SCREEN3 model guidance methods for equivalent diameter and an effective release height. This method is appropriate for modeling of open flares as point sources. Exhaust temperature and exit velocity will use the standard SCREEN3 values of 1273 Kelvin and 20 meters per second (m/s), respectively.

3.6. BACKGROUND CONCENTRATIONS

Background concentrations for criteria pollutants were obtained from the Northwest International Air Quality Environmental Science and Technology Consortium (NW AIRQUEST) and are shown in Table 3-1 below. Background values for TAPs are zero.

Table 3-1. Background Concentration Data

Pollutant	Averaging Period	Background Concentration (µg/m³)	Source
PM_{10}	24-hour	52	NW AIRQUEST, 2009-2011. The 'no extremes' value was used.
$PM_{2.5}$	24-hour	24	NW AIRQUEST, 2009-2011
	Annual	8	NW AIRQUEST, 2009-2011
NO_2	1-hour	24	NW AIRQUEST, 2009-2011
	Annual	4.1	NW AIRQUEST, 2009-2011
CO	1-hour	1636	NW AIRQUEST, 2009-2011
	Annual	739	NW AIRQUEST, 2009-2011

The emissions sources described in Section 2 will be represented in the model as point sources. Sources were 'placed' into the model using the BREEZE AERMOD GUI. A geo-referenced CAD drawing (UTM meters, NAD83 datum) and Google Earth image were imported into the model, and point sources and buildings were added at the corresponding locations. The accuracy of the CAD drawing and model layout was confirmed by exporting the model property boundary and model sources to Google Earth.

4.1. POINT SOURCES

Emissions from boilers, generators, flare and heaters are represented in the model as point sources.
The project is currently in the active bid process. Approximate exhaust parameters were provided by the equipment manufacturers, however, information provided in this protocol is based on preliminary facility design and bid specifications. Final selected equipment specifications and documentation of how exhaust parameters were determined will be included with the final modeling report and PTC application.

4.2. MODEL LAYOUT

The proposed model layout showing the locations of sources, emissions points, buildings and the property boundary are shown in Figure 4-1 and Figure 4-2 below.

Figure 4-1. Model Layout

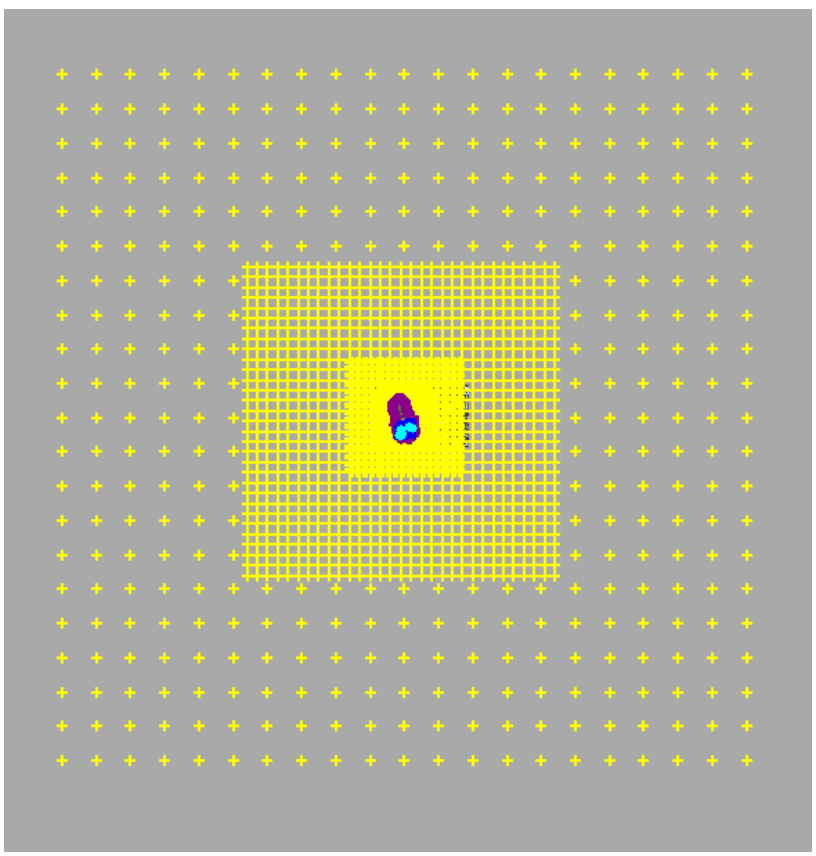


Figure 4-2. Model Layout Detail

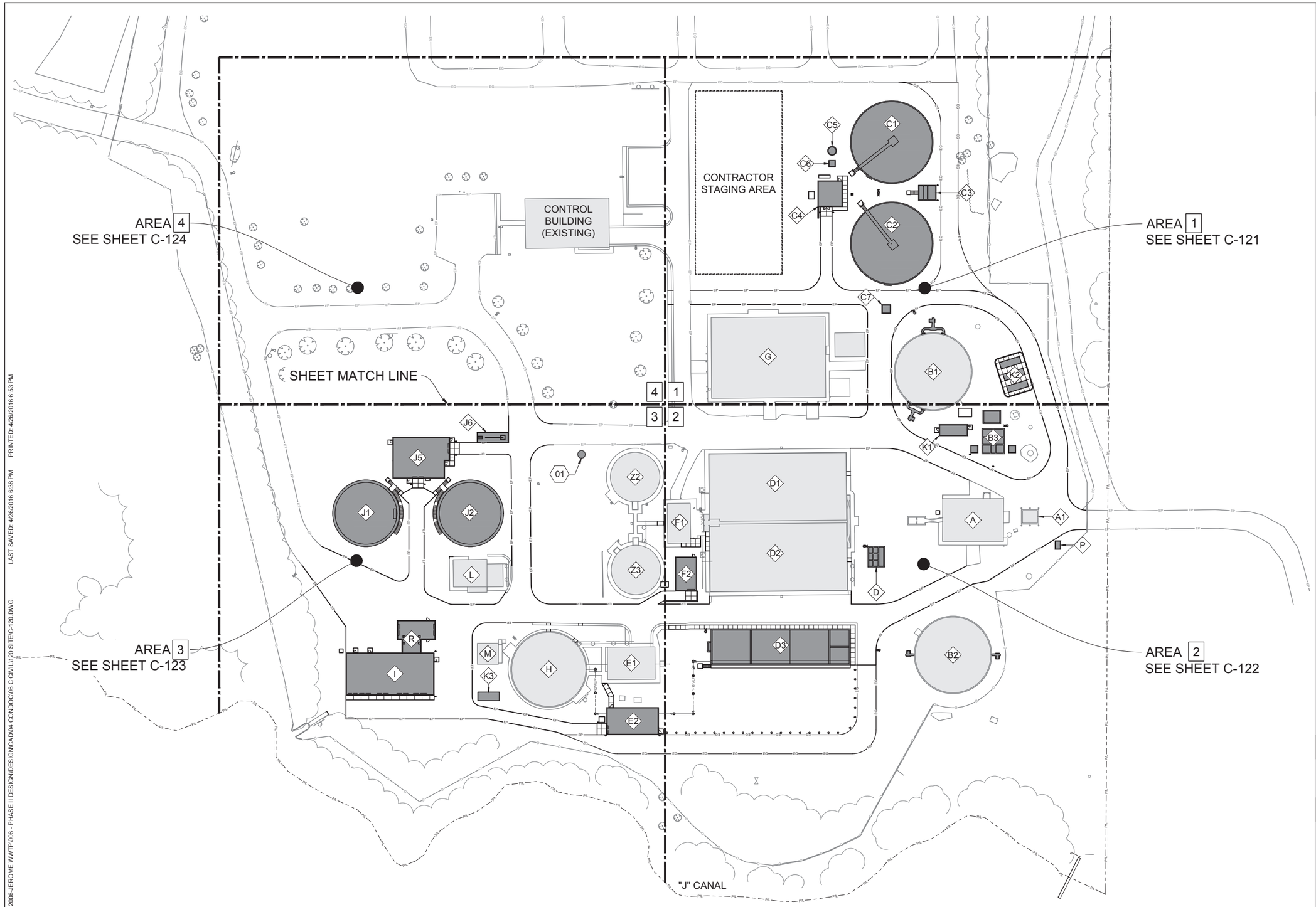
5. APPLICABLE STANDARDS

The air quality impact limits applicable to this analysis are both the National Ambient Air Quality Standards and the Idaho ambient impact limits for Toxic Air Pollutants. Model results will be added to the background concentrations and the sum compared to the applicable limits.

6. MODEL RESULTS

Model results will be presented using the IDEQ Air Impact Modeling Analyses Report Template Form; the IDEQ Modeling Information Workbook, Forms MI1-MI4, have not been updated to reflect the current NAAQs and therefore will not be used. Model files will be provided to DEQ on CD.

APPENDIX A: SITE LAYOUT



0 50 100

STRUCTURE DESIGNATORS

A	HEADWORKS BUILDING (E)
A1	HEADWORKS COLLECTION BOX (E)
B1	BIO-TOWER #1 (E)
B2	BIO-TOWER #2 (E)
B3	BIO-TOWER RECYCLE & INTERMEDIATE CLARIFIER PUMP STATION (N) INTERMEDIATE CLARIFIER PUMP STATION VALVE VAULT (N) BIO-TOWER #1 PUMP STATION VALVE VAULT (N) BIO-TOWER #2 PUMP STATION VALVE VAULT (N)
C1	INTERMEDIATE CLARIFIER #1 (N)
C2	INTERMEDIATE CLARIFIER #2 (N)
C3	INTERMEDIATE CLARIFIER SPLITTER BOX (N)
C4	INTERMEDIATE CLARIFIER SLUDGE PUMP BUILDING #2 (N)
C5	INTERMEDIATE CLARIFIER SCUM PIT (N)
C6	INTERMEDIATE CLARIFIER SCUM PIT VALVE VAULT (N)
C7	INTERMEDIATE CLARIFIER COLLECTION BOX (N)
D	AERATION BASIN SPLITTER BOX (N)
D1	AERATION BASIN #1 (E)
D2	AERATION BASIN #2 (E)
D3	AERATION BASIN #3 (N)
E1	BLOWER BUILDING #1 (E)
E2	BLOWER BUILDING #2 (N)
F1	AERATION BASIN PUMP STATION #1 (E)
F2	AERATION BASIN PUMP STATION #2 (N)
G	MBR & UV BUILDING (E)
H	SLUDGE STORAGE (E)
I	SOLIDS & DEWATERING BUILDING (N)
J1	ANAEROBIC DIGESTER #1 (N)
J2	ANAEROBIC DIGESTER #2 (N)
J5	ANAEROBIC DIGESTER CONTROL BUILDING (N)
J6	BIO-GAS WASTE BURNER (N)
K1	ELECTRICAL BUILDING (N)
K2	GENERATOR PADS (N)
K3	GENERATOR PADS (N)
L	SLUDGE PUMP BUILDING #1 (E)
M	CENTRIFUGE BUILDING (E)
P	BACKFLOW PREVENTER VAULT (N)
R	SOLIDS LOADING BUILDING (N - ADDITIVE BID ITEM #3)
Z2	SLUDGE STORAGE #1 (E) (TO BE DECOMMISSIONED)
Z3	SLUDGE STORAGE #2 (E) (TO BE DECOMMISSIONED)

SHEET KEYNOTES

01 PTZ CAMERA (PAN-TILT-ZOOM), RE: SPECIFICATIONS

KEY PLAN

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Date: 2016.04.27 16:46:36 -06'00'

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THE SEAL OF THE CITY OF JEROME IDAHO

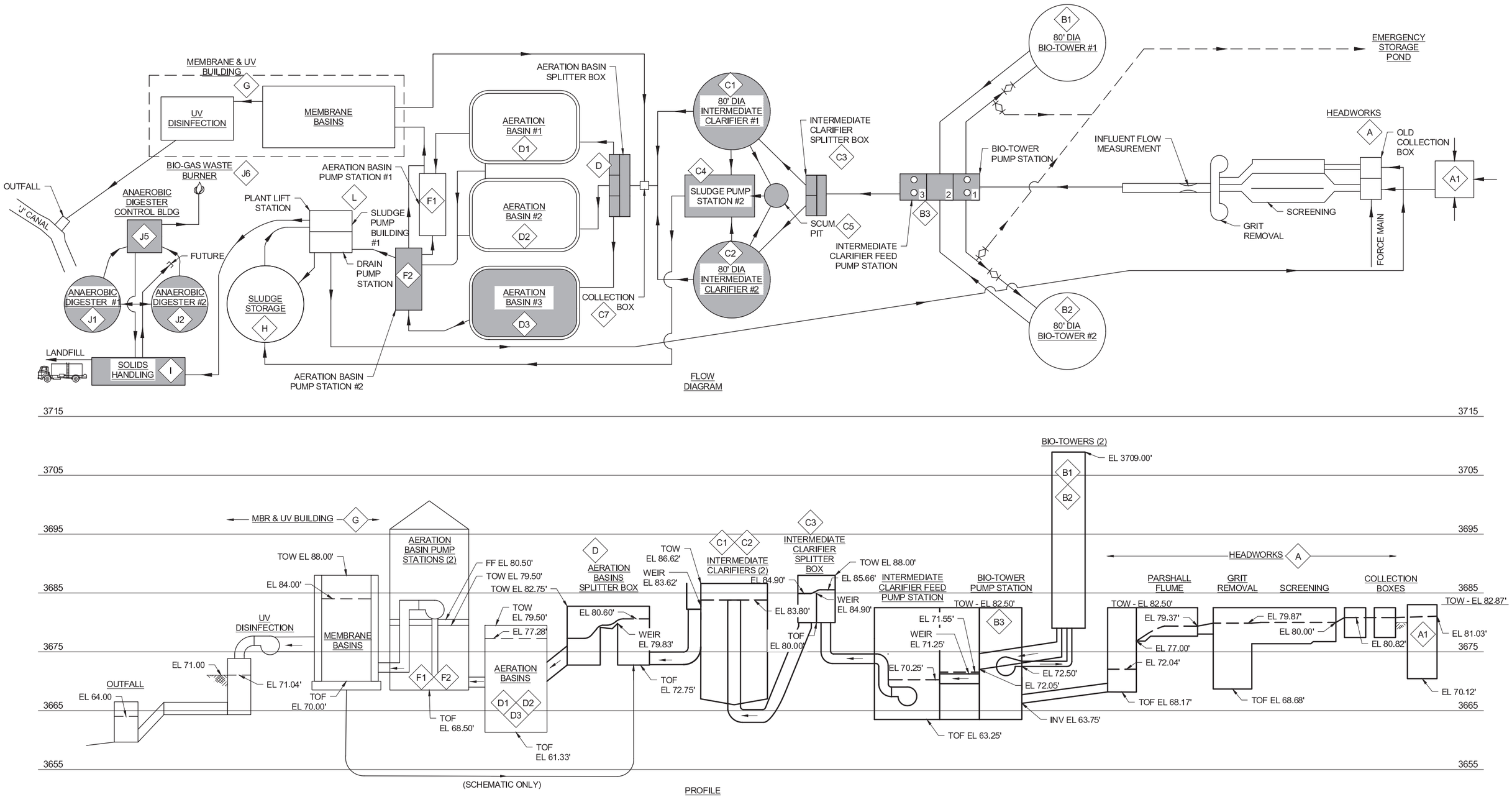
CITY OF
JEROME, IDAHO

PHASE II WWTP IMPROVEMENTS

SITE PLAN

PROJECT NO. 212006-006

SHEET NO. C-120



A1 HYDRAULIC PROFILE THROUGH MAJOR TREATMENT UNITS AT PEAK FLOW - 9.41 MGD INFLUENT FLOW

N.T.S.

NO.	REVISIONS	BY	DATE
0	QA REVISIONS	GRH	04-11-16

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CITY OF JEROME, IDAHO

PHASE II WWTP IMPROVEMENTS

HYDRAULIC PROFILE

PROJECT NO. 212006-006

SHEET NO. G-010

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APPENDIX B: METEOROLOGICAL DATA

STATE OF IDAHO
DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
1410 NORTH HILTON, BOISE, ID 83706 · (208) 373-0502
TIFFANY FLOYD, ADMINISTRATOR
BRUCE LOUKS, MANAGER, MONITORING, MODELING, & EMISSION INVENTORY

To: Kevin Schilling, NSR Modeling Coordinator, MMEI, Air Quality Division

From: Cheryl Robinson, P.E., NSR Modeling Analyst, MMEI, Air Quality Division

Date: November 4, 2013

Subject: Met Data Processing for NSR Modeling: JEROME COUNTY AIRPORT, 2008-2012t

SUMMARY:

National Weather Service (NWS) surface Hourly Met Data (ISHD, 04110, GMT-7) and 1-minute ASOS winds (KJER, LST) were collected at the Jerome County Airport for the years 2008 through 2012. The locations of surface and upper air stations were determined using Google Earth and Bing Maps. The ASOS has been upgraded to an Ice Free Wind (IFW) sensor. NWS winds were not randomized, NWS data were supplemented by ASOS winds, ASOS winds were adjusted upward by 0.5 m/s to account for truncation, and the ASOS wind threshold was set to the EPA-recommended value of 0.5 m/sec. Upper air soundings collected at the Boise NWS station (24131, BOI, GMT-7) were obtained in FSL format for the same period.

The average Palmer Z Index for the representative state climate division was used to determine relative moisture conditions for each year of the met data set based on a 30-year average covering the period from 1983 through 2012. Snow accumulation during winter months for each year was determined by reviewing NCDC daily snow depth data. Surface roughness, albedo, and Bowen ratio values were adjusted as needed to reflect the number of days of snow cover during winter months. Monthly surface roughness values were determined for each of 12 sectors within a 1-kilometer radius of the surface met station using land use data drawn from a 1992 NLCD file, at an airport, for average and wet conditions, without snow cover during the winter months of December, January, and February. Monthly values for the albedo and Bowen ratio were also based on the 1992 NLCD file for a 10-kilometer domain centered on the surface met station. No adjustments were made to the surface friction, u*.

Data were processed by DEQ with AERSURFACE v. 13016, AERMINUTE v. 11325, and AERMET v. 12345 using Oris Solutions' BEEST graphical user interface. The SFC and PFL files were flagged with a "t" to indicate that the wind threshold was set to 0.5 m/s.

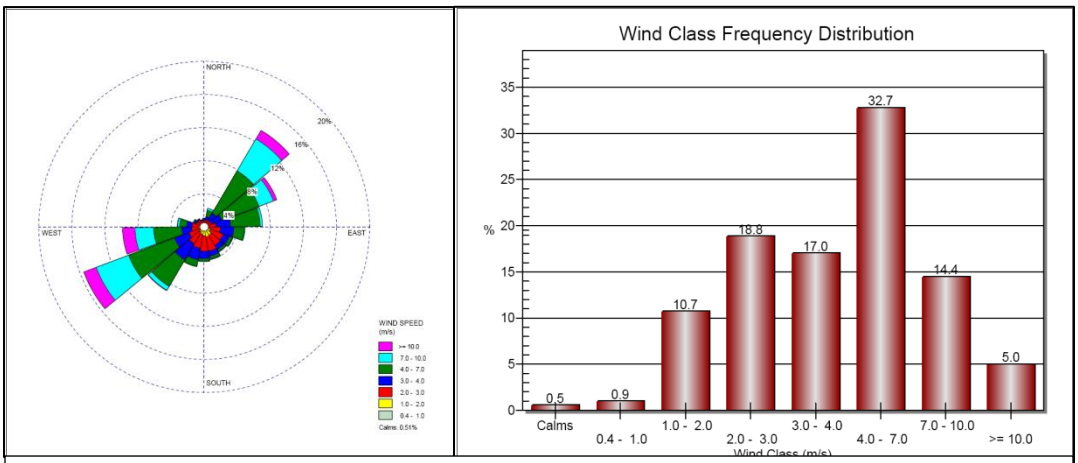

Figure S-1. WIND ROSE and WIND CLASS FREQUENCY PROFILE, KJER (WRPLOT View)

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1. ACRONYMS

AERMET	AERMOD Meteorological pre-Processor
AERMINUTE	ASOS winds pre-processor for AERMET
AERMOD	**A**merican Meteorological Society/**E**nvironmental Protection Agency **R**egulatory **Mod**el
AERSURFACE	Surface characteristics pre-processor for AERMET
ASOS	Automated Surface Observing System
DEQ	Idaho Department of Environmental Quality
EPA	Environmental Protection Agency
ESRL	Earth Systems Research Laboratory
FAA	Federal Aviation Administration
FSL	Forecast Systems Laboratory
ft	feet
GMT	Greenwich Mean Time
IFW	Ice Free Wind
ISHD	Integrated Surface Hourly Data
km	kilometer
LST	local standard time
m	meter
NAD83	North American Datum, 1983
NED	National Elevation Dataset
NESDIS	National Environmental Satellite, Data, and Information Service
NLCD	National Land Cover Database
NCDC	National Climatic Data Center
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
MRLC	Multi-Resolution Land Characteristics Consortium (the current source for obtaining NED files)
PFL	Wind profile meteorology files, output from AERMET
SCRAM	Support Center for Regulatory Atmospheric Modeling
SFC	Surface meteorology files, output from AERMET
UTC	Coordinated Universal Time
WGS84	World Geodetic System, 1984

2. MET DATA PROCESSING FOR NWS AND ASOS SURFACE STATIONS AT AIRPORTS

On December 10, 2012, EPA issued versions 12345 of the regulatory dispersion modeling program AERMOD and the regulatory meteorological data processor AERMET. AERMOD v. 12335 will accept met data processed using AERMET v. 12345 or v. 11059 (released February 28, 2011), but will not accept met data processed using AERMET v. 06341 (issued December 7, 2006) or earlier.

An update to AERMINUTE, the non-regulatory pre-processor for one-minute ASOS winds, was released on November 21, 2011. In addition, on January 16, 2013, EPA released a new version of AERSURFACE which incorporated adjustments to the spatial averaging of land cover parameters to be consistent with published guidance. Although not part of the regulatory AERMOD system, AERSURFACE is commonly used to streamline processing and produce reproducible values for three important surface characteristics: the albedo, Bowen ratio, and surface roughness length. On March 8, 2013, EPA issued a clarification memo regarding the use of ASOS wind data, including a recommendation that the wind speed threshold be set to 0.5 m/sec. These changes triggered the need to update "default" AERMOD-ready met data sets provided by DEQ to applicants for non-PSD air quality permit dispersion modeling.

Obtain Recent Meteorological Data

Integrated Surface Hourly Data (ISHD) were downloaded as zipped *.gz files from the NCDC's Integrated Surface Database (ISD) ftp site for the years 2008-2013. These data are reported in Coordinated Universal Time Code (UTC), which is the same as Greenwich Mean Time (GMT). Data for January 1 of the following year (or a duplicate of the data for December 31st, if January 1 data were missing) were copied and pasted at the end of each year's data to ensure hourly data were available for the last few hours on December 31st when data were converted from GMT to local time. The adjusted data files were saved using the same naming convention as the downloaded files: 123456-54321-YEARp1, where the first number is the met station USAF ID code, followed by the station WBAN ID number, the four-digit year, and "p1" indicating plus one day.

EPA recommends using one-minute ASOS winds when available, which provide minute-by-minute 2-minute-averaged wind speed and direction, in addition to the hourly ISHD data collected at NWS stations. ASOS data for each month of the years 2008 through 2012 were downloaded as plain text files from the NCDC's ftp site. These data are reported in local standard time. No changes were made to the file names, which follow the naming convention 64050CALLYEAR01.dat, where 64050 denotes ASOS wind data, followed by the station call sign, the four-digit year, and a two-digit code from 01 to 12 denoting the month the data was collected.

Upper air soundings in FSL (ACSII text) format were downloaded from the NOAA/Earth Systems Research Laboratory (ESRL) Radiosonde Database ftp site. These data are reported in Coordinated Universal Time Code (UTC), which is the same as Greenwich Mean Time (GMT). The data request submitted for each year was for January 1, hour 0 of each year through January 1, hour 23 of the following year, to ensure hourly data were available for the data is available for the last few hours on December 31st when data were converted from GMT to local time. Soundings were requested for all times and all levels with wind units in tenths of meters per second. ASCII data from the resulting *.tmp file were selected (CNTL+A), copied (CNTL+C), pasted (CNTL+V) into a blank Notepad text file and saved as a plain text file using the naming convention: FAA_FSL_54321_YEARp1.txt, where FAA is the three-letter call sign for the airport, FSL denotes the data format, followed by the station WBAN ID number, the four-digit year, and "p1" indicating plus one day. No actions were taken to fill missing upper air soundings.

Obtain ASOS Station Information

The AERMET source code was downloaded from the EPA SCRAM website. ASOS station commissioning dates are contained in the subroutine called "mod_AsosCommDates.for," which can be opened using a text editor such as Notepad or WordPad.

Note: If the ASOS Commission Date for the Surface Station is in the ASOS commission list (see AERMET source code, mod_AsosCommDates.for) and the "ASOS Station" box is ticked when setting up the run in AERMET View, AERMET will return the following warning message in the Stage 1 Report: ASOS flag on ISHD DATA keyword should NOT be used! Station included in ASOS commission list.

The pdf file of Ice Free Wind installation dates was downloaded from the NOAA website. These are ASOS stations that have been upgraded with a sonic anemometer. The most current listing of IFW installation dates as of October 2013 was issued on October 27, 2009.

The Excel file containing a February 11, 2009 list of ASOS anemometer heights was downloaded from the NOAA website. Anemometer heights for ASOS stations in Idaho and in nearby states are either 33.0 feet (10.05 m) or 26.0 ft (7.92 m).

Determine or Confirm Meteorological Station Coordinates and Elevations

The actual location of surface met towers is very important in determining appropriate surface parameters used in the AERMOD model. This is especially true when determining the surface roughness length, which affects the reduction in wind speed and the level of turbulence and vertical mixing in the wind layers as the air flows over the ground surface. The surface roughness length is calculated based on land use within a one-kilometer radius of the surface met station location.

The location coordinates provided by the FAA or NWS for ASOS stations in Idaho and nearby states typically refer to a point near the center of the runways. On August 6, 2013, DEQ contacted Mr. Christopher Stark, NOAA's ASOS manager, to ask whether better location data were available. Mr. Stark replied that ASOS locations are recorded only to the nearest minute (lat/long), and provided a link to a page on the NOAA website: http://www.nws.noaa.gov/tg/siteloc.shtml (Note: the correct url is http://www.nws.noaa.gov/tg/siteloc.php). Unfortunately, DEQ had already reviewed the locations provided on that web site, which had prompted the attempt to obtain more accurate coordinates. Similarly, location coordinates and base elevations provided by NWS sources were found to vary depending on the source of the information.

DEQ reviewed online sources of aerial photography, including Google Earth and Bing Maps (aerial and bird's eye views), to determine or confirm the published coordinates and base elevations for NWS and ASOS surface meteorological stations and for NWS upper air stations (datum WGS84/NAD83). Where there appeared to be a substantial difference in the published elevation and the elevation shown in Google Earth, the elevation was verified against the value contained in the National Elevation Database (NED) for the "confirmed" coordinates. Where possible, lat/long coordinates were determined to four decimal places.

Based on this review, it appeared that NWS and ASOS instrument towers were collocated at airport locations in Idaho and neighboring states. Coordinates of the upper air stations were based on the observed location of the rawinsonde balloon inflation shelter/ radiotheodolite dome at each site. All of the upper air sounding stations in Idaho and nearby states are located at NWS offices.

Determine Pairings of Surface and Upper Air Data

DEQ used three criteria to determine which upper air soundings should be paired with the surface station data being processed:

1) Geographic proximity to the surface station site,
2) Influence of elevated terrain and mountain ranges, and
3) Ground-level elevation similar to the elevation at the surface data collection site. A profile interpolation scheme is used in AERMET if the surface station elevation is lower than the elevation at the upper air station. Selecting an upper air station located at a similar elevation as the surface site helps reduce the use of this profile interpolation scheme. In addition, AERMET disregards soundings at levels higher than 5,000 meters above mean sea level. If the surface station is

considerably higher than the upper air sounding location, the upper air profile used in AERMET will be truncated, which may result in underpredicting ambient air concentrations.

Thiessen polygons were used to determine the upper air station located closest to the surface data collection site. The polygons, defined by the perpendicular bisectors of the lines between the locations of the upper air data collection sites, are shown in Figure 2-1. As shown in the figure, upper air sounding sites in or near Idaho include Spokane, Boise, Great Falls, Salt Lake City, Elko, and Riverton.

The Snake River Plain (SRP) stretches across southern Idaho, with Boise and Jerome located in the western SRP. The prevailing westerly winds typically follow the plain, strongly suggesting that upper air soundings collected in Boise are best representative of conditions in Jerome. Surface data collected at the Jerome County Airport (KJER) were therefore paired with upper air soundings collected at the Boise NWS station.

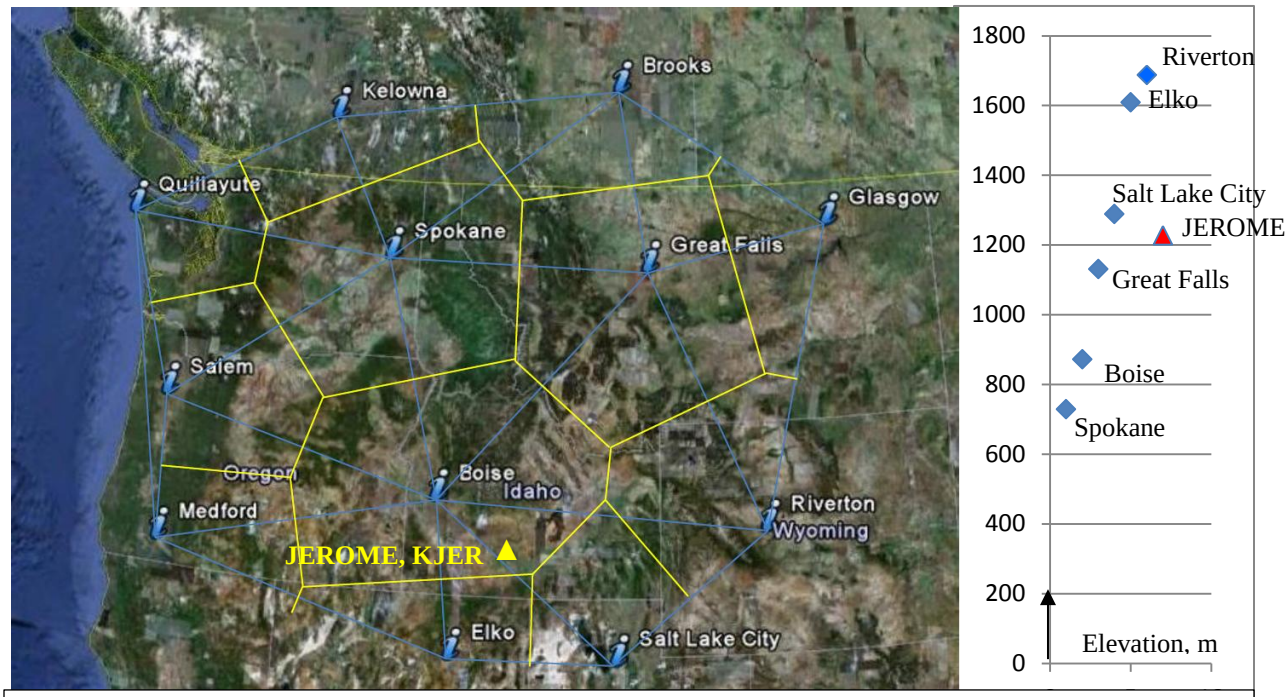


Figure 2-1. SURFACE STATION GEOGRAPHIC PROXIMITY (THIESSEN POLYGONS) AND ELEVATION COMPARISON TO UPPER AIR SOUNDINGS STATIONS

Site characteristics for these six upper air soundings locations are shown in Table 2-1.

Table 2-1. UPPER AIR SOUNDINGS STATIONS

Location	State	FAA/ ICS	WMO ID	WBAN ID	FSL Header		Local Time
					Elevation AMSL	Lat/Lon (degrees)	
Spokane, Washington 2601 N. Rambo Rd.	WA	OTX	72797	04106	728 m (2388 ft)	47.68 / -117.63	Pacific (GMT-8)
Boise, Idaho 3833 Development Ave #3807	ID	BOI	72681	24131	871 m (2858 ft)	43.57 / -116.22	Mountain (GMT-7)
Great Falls, Montana 5324 Tri-Hill Frontage Rd	MT	TFX	72776	04102	1130 m (3707 ft)	47.45 / -111.38	Mountain (GMT-7)
Salt Lake City, Utah 2242 West North Temple	UT	SLC	72572	24127	1288 m (4226 ft)	40.77 / -111.97	Mountain (GMT-7)
Elko, Nevada 3720 Paradise Drive	NV	LKN	72582	04105	1608 m (5276 ft)	40.87 / -115.73	Pacific (GMT-8)
Riverton, Wyoming 12744 West U.S. Hwy 26	WY	RIW	72672	24061	1688 m (5538 ft)	43.06 / -108.47	Mountain (GMT-7)

Obtain and Review Land Use, Moisture Conditions, and Snow Cover Data

At this time, AERSURFACE is compatible only with NLCD land use data collected in or around the year 1992 and reported for 21 land use categories. State-wide NLCD 1992 data for Idaho, Montana, Nevada, Oregon, Wyoming, and Washington were downloaded as zipped bin and tiff files from the Multi-Resolution Land Characteristics Consortium (MRLC) website. In order to review the acceptability of using the 1992 dataset, however, 2006 NLCD was also downloaded for a few locations (until October 1, 2013, when the federal government websites were shut down). After October 1, 2013, DEQ reviewed alternative sources of online aerial photography, including Google Earth, which offered relatively current images as well as historical images in the areas surrounding the airport surface site locations.

Surface characteristics calculated in AERMET depend on whether conditions have been dry, average, or wet compared to normal conditions for the area. The Palmer Drought Severity Index (PDSI) is based on a relatively simple water balance model that considers both precipitation and temperature as well as the influence of these on evapotranspiration, soil moisture, and runoff.[1] The Palmer Z-index (anomaly value) is a measure of the conditions during a particular month from the average moisture conditions for that month and location. As a starting point for the "default" met data sets, DEQ downloaded the Palmer Z-index values and anomaly values (averaged over each year, January through December) from the NCDC website for the years 1895 through 2012. Data were obtained for all nine climate divisions in Idaho, Montana division 1 (Western), Nevada divisions 1 (North West) and 2 (North East), Oregon divisions 8 (Northeast) and 9 (Southeast), Utah divisions 3 (North Central) and 5 (Northern Mountains), and Washington divisions 9 (North Eastern) and 10 (Palouse/Blue Mountains). The upper and lower 30th percentiles were calculated based on the annual average Z-index values and anomaly values reported for the 30-year period from 1983 through 2012. Years with average anomaly values in the lower 30th percentile were considered "dry," years with anomaly values in the upper 30th percentile were considered "wet," and conditions for all other years were considered "average."

Daily snow depth records, if available, for the surface met station or a nearby location considered by DEQ to be representative, were downloaded from the NCDC (or during the federal government shutdown beginning October 1, 2013, from the U.S. Historical Climatology Network operated by UT-Battelle for Oak Ridge National Laboratory) website for the years 2008 through 2012.

Run AERMINUTE

AERMINUTE was run to pre-process the one-minute ASOS wind data for each year. The ISHD file for the same year was included to allow the program to conduct quality assurance checks on the data. The AERMINUTE log for each year was reviewed to assess the validity of the ASOS wind data.

Run AERSURFACE

AERSURFACE inputs included the state-wide 1992 NLCD file and lat/long coordinates (corrected to reflect the actual location) for the surface station. The station is at an airport, the number of sectors was set to 12, the surface characteristic frequency was set to monthly using the default seasonal settings, and the radius for the surface roughness calculation was set to the default value of 1.0 km. Unless supported by additional information included in Section 9 of this report, the location was presumed not to be in an arid region. AERSURFACE was run for each moisture condition (dry, average, or wet) determined to apply to the surface station location in any of the years 2008 through 2012 for two cases: no snow and for continuous snow during the winter months of December, January, and February. The AERSURFACE log for each run was reviewed to ensure the correct input parameters had been used and to check for any warning or error messages.

Note: For surface met stations located near a state border, an appropriately sized domain was selected using the 1992 NLCD seamless data. When using seamless data rather than a tif file encompassing an

[1] William M. Alley, The Palmer Drought Severity Index: Limitations and Assumptions, *Journal of Climate and Applied Meteorology* 23 (1984): 1100, accessed at http://www.engr.colostate.edu/~jsalas/classes/ce624/Handouts/Palmer%20Index-alley%201984.pdf

entire state, AERSURFACE appears to require that the location be entered in UTM coordinates rather than in lat/long. In these cases, the EPA DOS version of AERSURFACE was used rather than the AERSURFACE version incorporated into Lakes Environmental's AERMOD View or Oris Solutions' BEEST suite.

Adjust AERSURFACE Output Values to Reflect Actual Snow Cover (as needed)

The resulting AERSURFACE output values for surface roughness, albedo, and Bowen ratio for each year were adjusted as needed to reflect the relative number of days with and without snow cover during winter months. For example, presume that AERSURFACE outputs a January 2008 albedo of 0.15 for no snow conditions, and a value of 0.33 presuming continuous snow cover. Following a convention developed by EPA Region 5 and states within Region 5,[2] the value for the January 2008 albedo value would be manually adjusted in the input text file to:

$$\frac{(2)(0.15) + (29)(0.33)}{31} = 0.32$$

After making adjustments to the albedo, Bowen ratio, and surface roughness length for January, February, and December, the AERSURFACE output file for each year of the met data set using a descriptive naming convention: AERSURFACE_YEAR_XXX_Snow.out, where YEAR is the four-digit year and XXX denotes whether the moisture conditions for that year were considered to be Dry, average (Avg), or Wet.

Because of the challenges associated with maintaining the appropriate spacing in the AERSURFACE output text file, the AERSURFACE output text file was imported into AERMET (when using Lakes Environmental's AERMET View) or imported into Excel and then copied and pasted directly into the primary site characteristics table (tab SC1, when using Oris Solutions' BEEST AERMET).

Run AERMET

AERMET was run for each year using the information and settings shown in Section 4 of this report. The message and report files were reviewed for each of the three processing stages in AERMET.

Edit SFC and PFL Files

If necessary, edit the SFC and PFL files for each year to remove January 1 hours for the following year. The surface and profile files for each year were also combined into concatenated 5-year SFC and PFL file.

Produce Wind Rose and Wind Frequency Plot

The wind rose and wind frequency plots for this five-year met data set were produced using Lakes Environmental WRPLOT.

Run AERMOD for Data Completeness Check

AERMOD was run using each year of the met data sets as well as concatenated five-year SFC and PFL files for a simple case involving a single stack, flat terrain, and no downwash. The maximum impacts and percentage of missing hours shown in the output files were summarized in a table in Section 10 of this met data processing report.

[2] EPA Region 5 and States, *Regional Meteorological Data Processing Protocol*, Draft, May 6, 2011, accessed October 9, 2013 at http://www.pca.state.mn.us/index.php/view-document.html?gid=17386

3. DATA SOURCES

NOAA Met Station Lookup, http://www.nws.noaa.gov/tg/siteloc.php
Note: Do not use the lat/long or elevation data from this site.

NWS/ISHD Surface Data: National Climatic Data Center (NCDC), NOAA Satellite and Information Service
http://www.ncdc.noaa.gov/oa/climate/isd/index.php

ASOS Wind Data: NCDC, NOAA Satellite and Information Service
ftp://ftp.ncdc.noaa.gov/pub/data/asos-onemin/

FSL Upper Air Soundings: NOAA/Earth Systems Research Laboratory (ESRL) Radiosonde Database
http://esrl.noaa.gov/raobs/

ASOS Station Information:

AERMET Source Code, EPA Support Center for Regulatory Atmospheric Modeling (SCRAM)
http://www.epa.gov/ttn/scram/metobsdata_procaccprogs.htm#aermet

NWS, ASOS Anemometer Heights, Excel file, 2/11/09
http://www.nws.noaa.gov/ops2/Surface/asosimplementation.htm

NWS, Ice Free Wind Installation Dates for NWS and FAA Owned ASOS Sites, October 27, 2009
http://www.nws.noaa.gov/ops2/Surface/documents/IFW_stat.pdf

Surface Weather Observation Stations, ASOS/AWOS (interactive map)
http://www.faa.gov/air_traffic/weather/asos/?state=ID

Land Use Data: Multi-Resolution Land Characteristics Consortium (MRLC)
http://www.mrlc.gov/

National Land Cover 1992 Database, zipped *.gz file for the entire state of Idaho
http://landcover.usgs.gov/show_data.php?code=ID&state=Idaho

Source Cite: Vogelmann, J.E., S.M. Howard, L. Yang, C. R. Larson, B. K. Wylie, and J. N. Van Driel, 2001, Completion of the 1990's National Land Cover Data Set for the conterminous United States, Photogrammetric Engineering and Remote Sensing 67:650-662.

U.S. Palmer Drought Indices: NCDC
http://www.ncdc.noaa.gov

Snow Depth Historical Data, National Operational Hydrologic Remote Sensing Center. 2004. *Snow Data Assimilation System (SNODAS) data products at NSIDC*. Boulder, CO: National Snow and Ice Data Center. Digital media. http://www.nohrsc.noaa.gov/

Note: Data were unavailable from the NCDC site due to the federal government shutdown beginning October 1, 2013. Data were obtained from the U.S. Historical Climatology Network operated by UT-Battelle for the Department of Energy, Oak Ridge National Laboratory. Data for all days from January 2008 through December 2012 were accessed on October 9, 2013 at http://cdiac.ornl.gov/cgi-bin/broker?_PROGRAM=prog.climsite_daily.sas&_SERVICE=default&id=457938

4. AERMET SETTINGS

SURFACE DATA (NWS)	JEROME COUNTY AIRPORT JEROME, IDAHO					**Time Zone** Mountain, GMT-7	
Data Collection	**Data Format**	**Time Format**	**Call**	**WBAN**	**USAF**	**Height 1 (T, RH)**	**Height 2 (Winds)**
NWS	ISHD	UTC/GMT	KJER	04110	726816	2.0 m	10.0 m
Coordinates/Elevation	**Latitude/ Northing (m)**	**Longitude/ Easting (m)**	**Elevation (m)**	**(ft)**			
ISHD Header	42.727	-114.450	1234	4049			
Google Earth, WGS84	**42.7274**	**-114.4547**	**1228**	4029			
NED, NAD83							

SURFACE DATA ASOS Winds	JEROME COUNTY AIRPORT JEROME, IDAHO					**Time Zone** Mountain, GMT-7	
Data Collection	**Data Format**	**Time Format**	**Call**	**WBAN**	**ASOS Commission Date**	**IFW Sensor Install Date**	**Height 2 (Winds)**
FAA	Metric	LST	KJER	04110	19970201	5/4/2006	7.92 m (26.00 ft)
Coordinates/Elevation	**Latitude/ Northing (m)**	**Longitude/ Easting (m)**	**Elevation (m)**	**(ft)**			
ASOS Comm. Date File	42.72	-114.45					
FAA ASOS Map	42.727	-114.457					
Google Earth, WGS84	**42.7274**	**-114.4547**	**1228**	4029			

UPPER AIR DATA:	NWS, BOISE STATION 3833 Development Ave #3807, Boise, Idaho					**Time Zone** Mountain, GMT-7	
Data Collection	**Data Format**	**Time Format**	**Call**	**WBAN**	**USAF**		
NWS	FSL	UTC/GMT	BOI	24131	72681		
Coordinates/Elevation	**Latitude/ Northing (m)**	**Longitude/ Easting (m)**	**Elevation (m)**	**(ft)**			
FSL Header	43.57	-116.22	871	2858			
Google Earth, WGS84	**43.568**	**-116.211**	**871**	2858			
NED, NAD83							

Surface data quality assurance audit parameters: Dry bulb temperature, wind direction, and wind speed.

Upper air data quality assurance audit parameters: Pressure, height, and temperature.

Randomize NWS winds? No

The use of hourly-averaged wind directions from AERMINUTE eliminates the need to randomize the wind directions associated with standard NWS observations, which are reported to the nearest 10 degrees.

Ref: Fox, Tyler, EPA Air Quality Modeling Group, Use of ASOS meteorological data in AERMOD dispersion modeling, March 8, 2013, http://www.epa.gov/scram001/guidance/clarification/20130308_Met_Data_Clarification.pdf

Adjust ASOS winds for truncation? Yes

Wind speed threshold for 1-minute ASOS winds: 0.5 m/s, per March 8, 2013 Fox memo.

5. METEOROLOGICAL STATION LOCATIONS

Figure 5-1. SURFACE AND UPPER AIR MET STATIONS

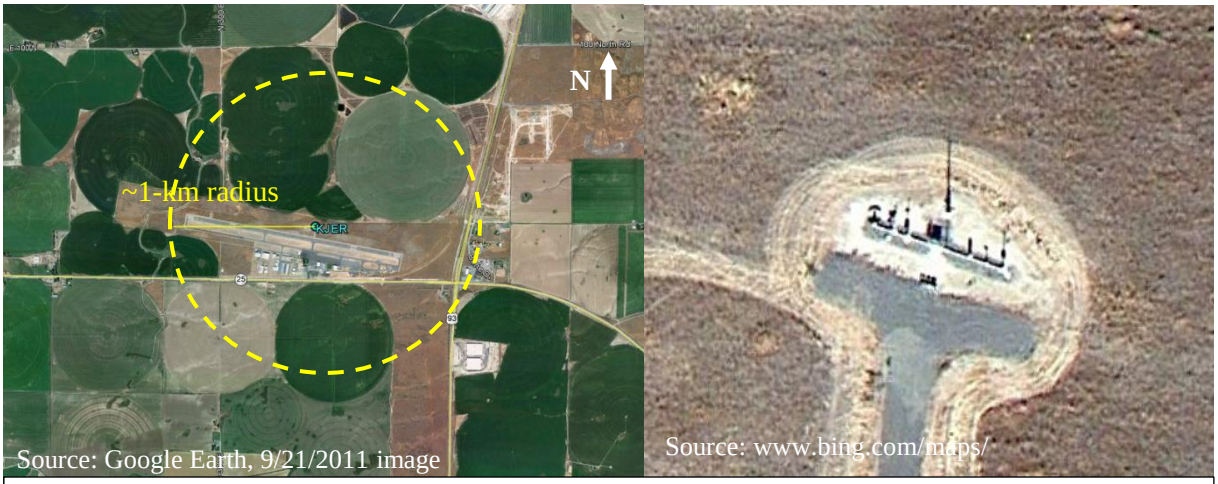


Figure 5-2. SURFACE DATA LOCATION: JEROME COUNTY AIRPORT, NWS AND ASOS

Figure 5-3. UPPER AIR SOUNDINGS LOCATION – BOISE NATIONAL WEATHER SERVICE STATION

6. LAND COVER

At this time, AERSURFACE accepts only 1992 NLCD data as input for determining three surface characteristics: the surface roughness length z_0, albedo, and Bowen ratio. Of the three, changes in the surface roughness length typically have the greatest effect on modeled concentrations.[3] The surface roughness length is calculated as the inverse-distance weighted geometric mean of gridded roughness values within 1 km of the wind measurement site, based on a maximum of 12 user-defined wind sectors.

A comparison of a July 15, 1992 image and a September 21, 2011 image in Google Earth shows that land use within a 1- km radius of the surface station has not changed substantially since 1992.

Based on the 2008-2012 wind rose, changes to land use in the 0°-30°, 90°-210° and 270°-360° sectors will have little or no effect on modeled concentrations, because winds rarely come from these directions. No adjustments have been made to the 1992 NLCD data set in this case because 1) the observed changes to land use appear to be minor, 2) of the uncertainties associated with using NLCD data to determine surface roughness lengths, and 3) DEQ's goals include streamlining data processing and ensuring that calculated surface characteristics are reproducible as well as representative.

In AERMET, selecting the "airport" option assigns more weight to runways and roads than buildings for the Commercial/Industrial/Transportation land cover category. The "non-airport" option assigns more weight to buildings for this category. *Use the "airport" option for the Jerome met data set.*

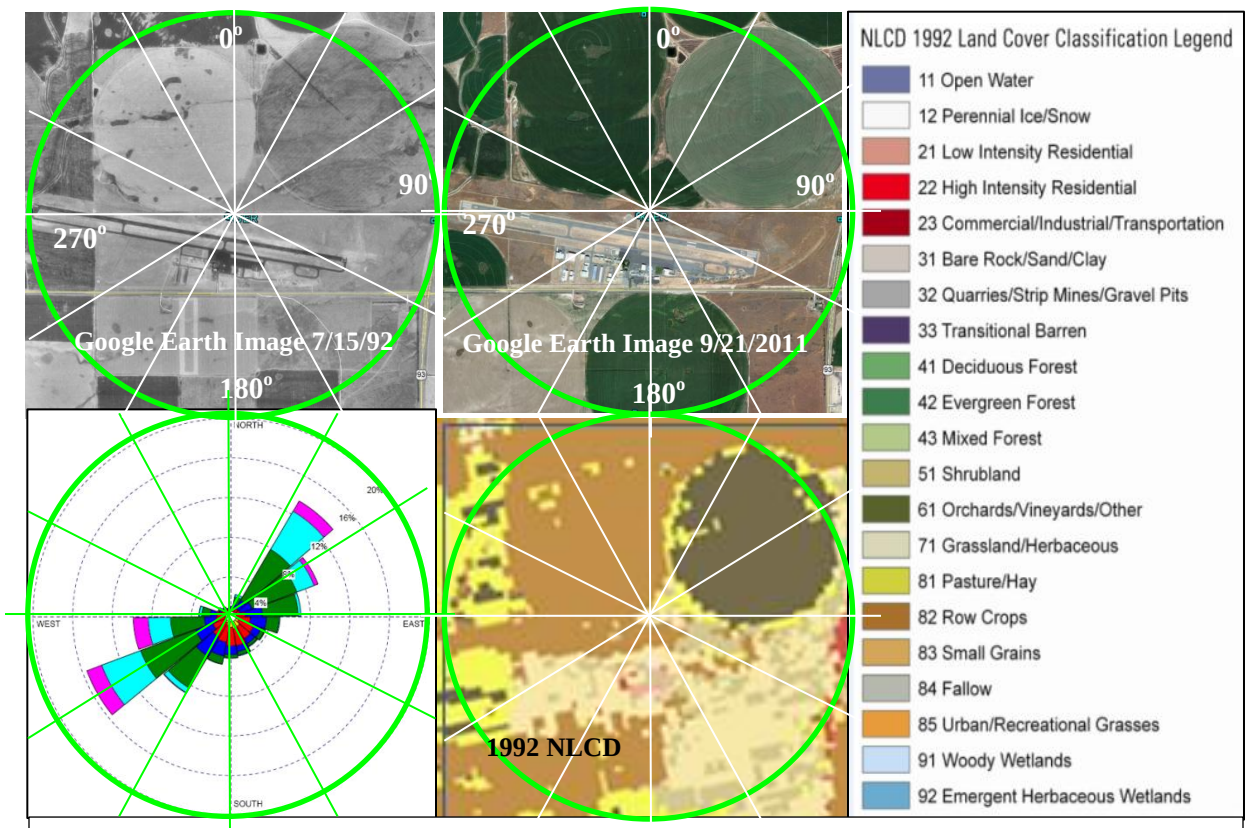


Figure 6-1. COMPARISON OF LAND USEWITHIN 1 KM OF SURFACE SITE (1992 AND 2011 IMAGES)

[3] Carper, E. and E. Ottersburg. *Sensitivity Analysis Study Considering the Selection of Appropriate Land-Use Parameters in AERMOD Modeling Analysis.* Presented at the 2004 A&WMA Annual Conference, June 2004, accessed October 9, 2013 at www.trinityconsultants.com/WorkArea/DownloadAsset.aspx?id=1627

The Bowen ratio is the ratio of sensible heat to latent heat flux from the ground to the atmosphere, which determines how much solar heating goes to evaporation of surface moisture. The Bowen ratio is based on a simple unweighted geometric mean for a 10 km square domain centered on the surface station site. The albedo is a measure of the reflectivity of a surface, and is calculated based on a simple unweighted arithmetic mean for a 10 km by 10 km domain centered on the surface station site.

As shown in Figure 6-2, land use in the vicinity of the Jerome County Airport has not changed substantially during the past two decades. Values of the Bowen ratio and albedo calculated using 1992 NLCD data should still be representative for processing meteorological data collected during the period from 2008 through 2012.

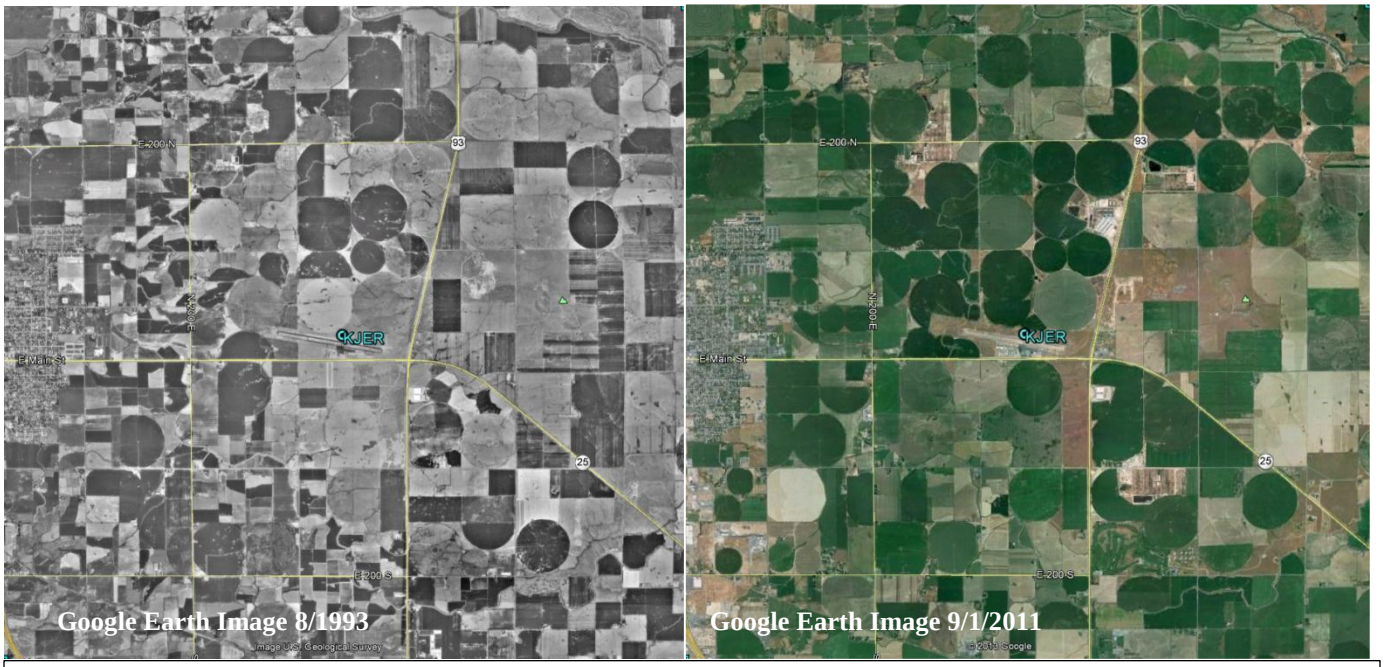


Figure 6-2. COMPARISON OF LAND USEIN A 10-KM DOMAIN CENTERED ON SURFACE SITE (1993 & 2011 IMAGES)

7. CLIMATE/SURFACE MOISTURE CONDITIONS

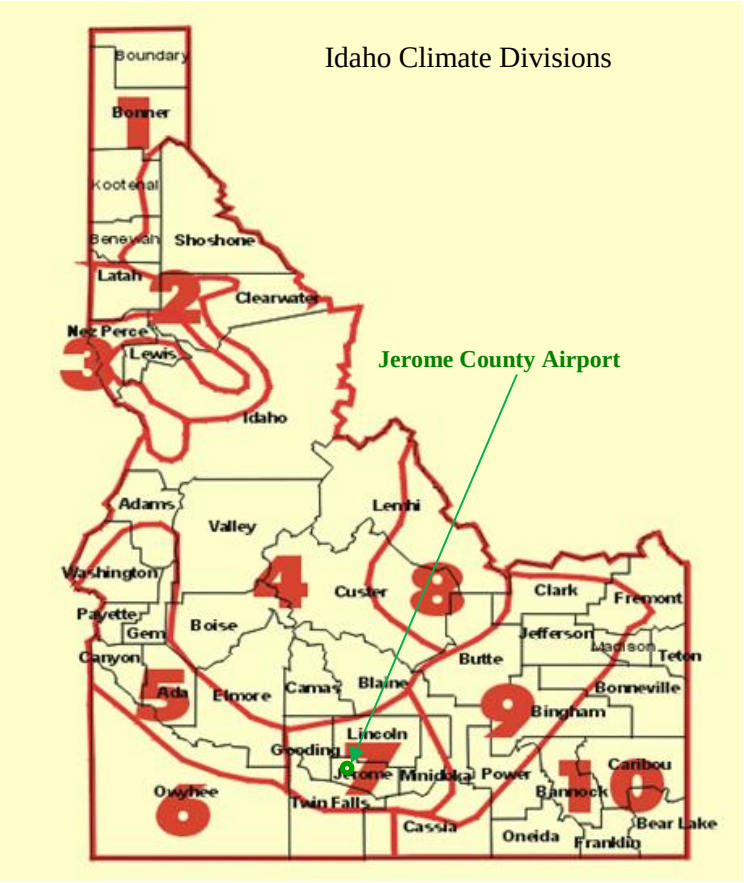
The Jerome County Airport is located near the center of Idaho Climate Division 7 (Central Plains). This division can be described as a cold semi-arid steppe climate. [4] The Jerome area is predominantly irrigated farmland, however, which has an effect on the typical temperatures and humidity ranges.

Table 7-1. Idaho, Climate Division 7

Date	Palmer Z-Index Jan-Dec		AERMET Moisture Conditions
	Value	Anomaly	
198312	2.42	2.38	WET
198412	1.65	1.61	WET
198512	-0.19	-0.23	AVERAGE
198612	0.57	0.53	AVERAGE
198712	-1.53	-1.57	DRY
198812	-0.86	-0.9	DRY
1989			AVERAGE
199012	-1.22	-1.26	DRY
199112	-1.11	-1.15	DRY
199212	-2.28	-2.32	DRY
199312	1.01	0.97	WET
199412	-1.29	-1.33	DRY
199512	1.9	1.86	WET
199612	1.45	1.41	WET
199712	0.82	0.78	AVERAGE
199812	1.42	1.38	WET
199912	0.51	0.47	AVERAGE
200012	-0.73	-0.77	AVERAGE
200112	-1.37	-1.41	DRY
200212	-0.86	-0.9	DRY
200312	-1.01	-1.05	DRY
200412	-0.13	-0.17	AVERAGE
200512	1.47	1.43	WET
200612	1.49	1.45	WET
200712	-1.01	-1.05	DRY
200812	-0.39	-0.43	AVERAGE
200912	0.53	0.49	AVERAGE
201012	0.85	0.81	AVERAGE
201112	1.22	1.18	WET
201212	0.03	-0.01	AVERAGE

The annual average Palmer Z Index anomaly for the representative state climate division was used to determine relative moisture conditions for each year of the met data set based on the 30-year period from 1983 through 2012. Years with annual anomaly values in the lower 30th percentile were considered "Dry" and years with values in the upper 30th percentile were considered "Wet."

30-YEARS	1983-2012 Anomaly
Top 30th percentile, above	**0.906**
Lower 30th percentile, below	**-0.900**



[4] http://weatherspark.com/averages/30637/Jerome-Idaho-United-States

8. SNOW COVER

Snow accumulation during winter months for each year was determined by reviewing NCDC daily snow depth data collected near Jerome (Jerome, Station ID 104670). AERSURFACE was run for average and wet surface moisture conditions and for no snow cover during the winter months of December, January, and February.

The resulting AERSURFACE output values for surface roughness, albedo, and Bowen ratio were NOT adjusted to reflect the relative number of days with and without snow cover during winter months. For example, presume that AERSURFACE outputs a January 2008 albedo of 0.15 for no snow conditions, and a value of 0.33 presuming continuous snow cover. Following a convention developed by EPA Region 5 and states within Region 5,[5] the value for the January 2008 albedo value is manually adjusted in the input text file to:

$$\frac{(2)(0.15) + (29)(0.33)}{31} = 0.32$$

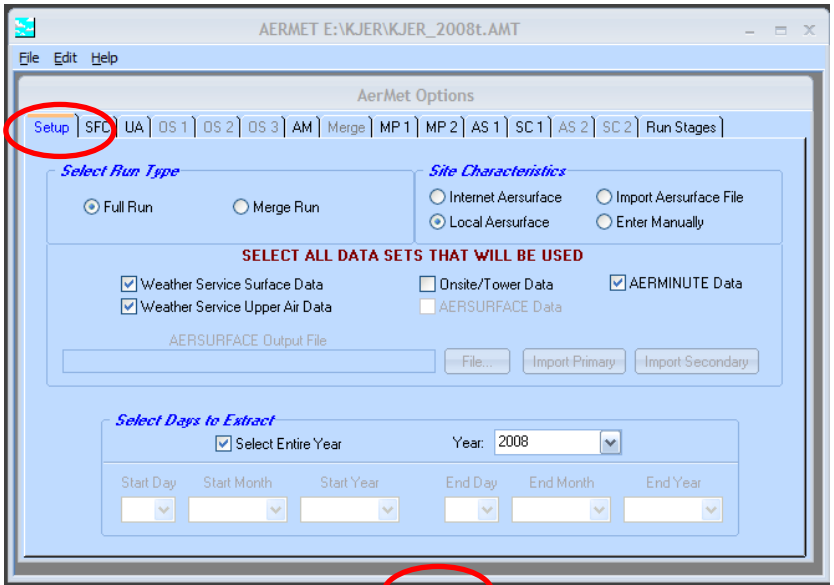
Table 8-1. DAILY SNOW DEPTHS (INCHES) AT JEROME WINTER MONTHS 2008-2012

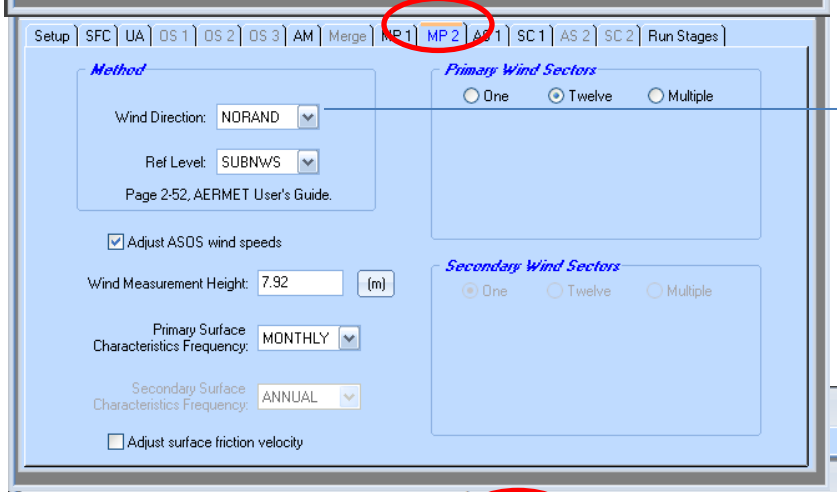
Day: MO_YR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Days	DAYS w/o Snow Cover
JAN2008																																**31**	31
FEB2008																																**29**	29
DEC2008																																**31**	31
JAN2009																																**31**	31
FEB2009																																**28**	28
DEC2009																																**31**	31
JAN2010																																**31**	31
FEB2010																																**28**	28
DEC2010	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	0	0	0	0	0	0	0	**31**	31
JAN2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**31**	31
FEB2011	0	0	0	0	0	0	0	0	0	0	--	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				**28**	28
DEC2011	0	0	--	0	0	0	0	0	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	**31**	31
JAN2012	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	0	0	0	0	**31**	31
FEB2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				**29**	29
DEC2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	0	0	0	0	0	0	0	0	**31**	31

[5] EPA Region 5 and States, *Regional Meteorological Data Processing Protocol*, Draft, May 6, 2011, accessed October 9, 2013 at http://www.pca.state.mn.us/index.php/view-document.html?gid=17386

9. SCREEN SHOTS OF DATA PROCESSING STEPS

SCREEN SHOTS – Oris Solutions' BEEST AERMET – SETUP, MP2, AND AERSURFACE TABS

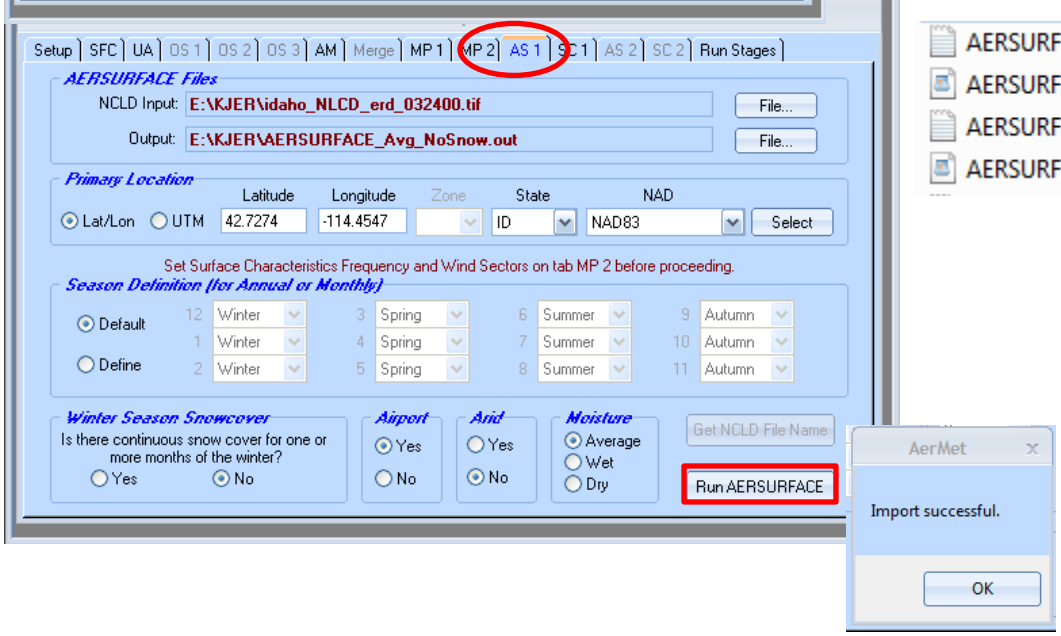


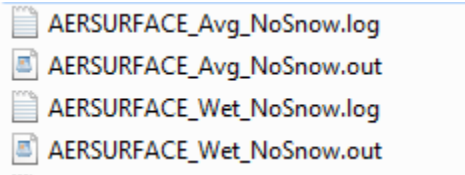


The use of hourly-averaged wind directions from AERMINUTE eliminates the need to randomize the wind directions associated with standard NWS observations, which are reported to the nearest 10 degrees.

Ref: Fox, Tyler, EPA Air Quality Modeling Group, Use of ASOS meteorological data in AERMOD dispersion modeling, March 8, 2013, http://www.epa.gov/scram001/guidance/clarification/20130308_Met_Data_Clarification.pdf

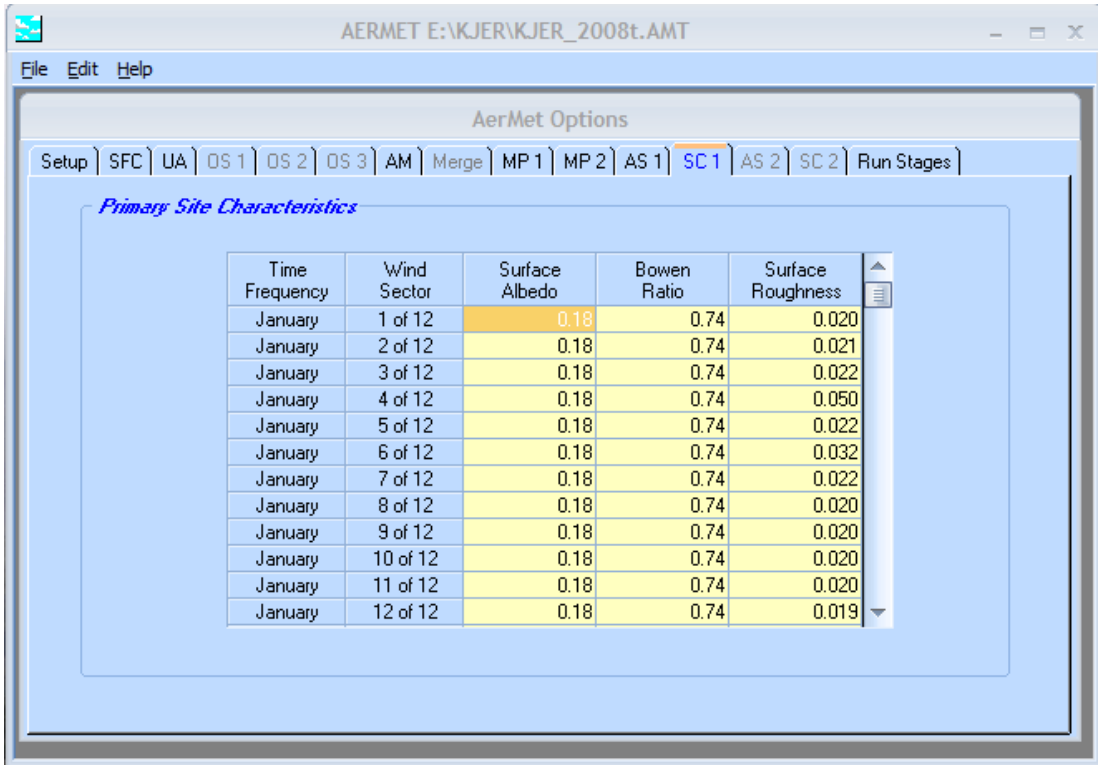
Run AERSURFACE for average conditions, without snow. Run AERMET for years 2008-2010 and 2012. Change the settings and output file name for wet conditions without snow. Rerun AERSURFACE, then run AERMET for 2011





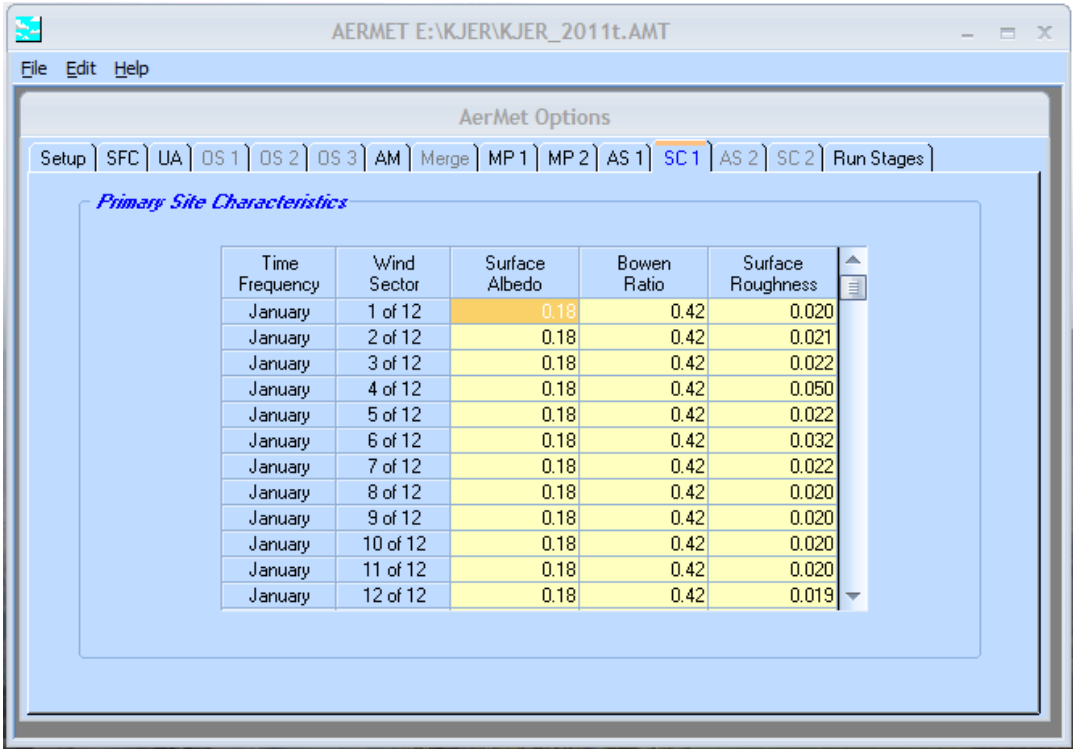
SCREEN SHOTS – Oris Solutions' BEEST AERMET – SC1 TAB

MOISTURE = AVERAGE, NO SNOW, used for years 2008-2010 and 2012



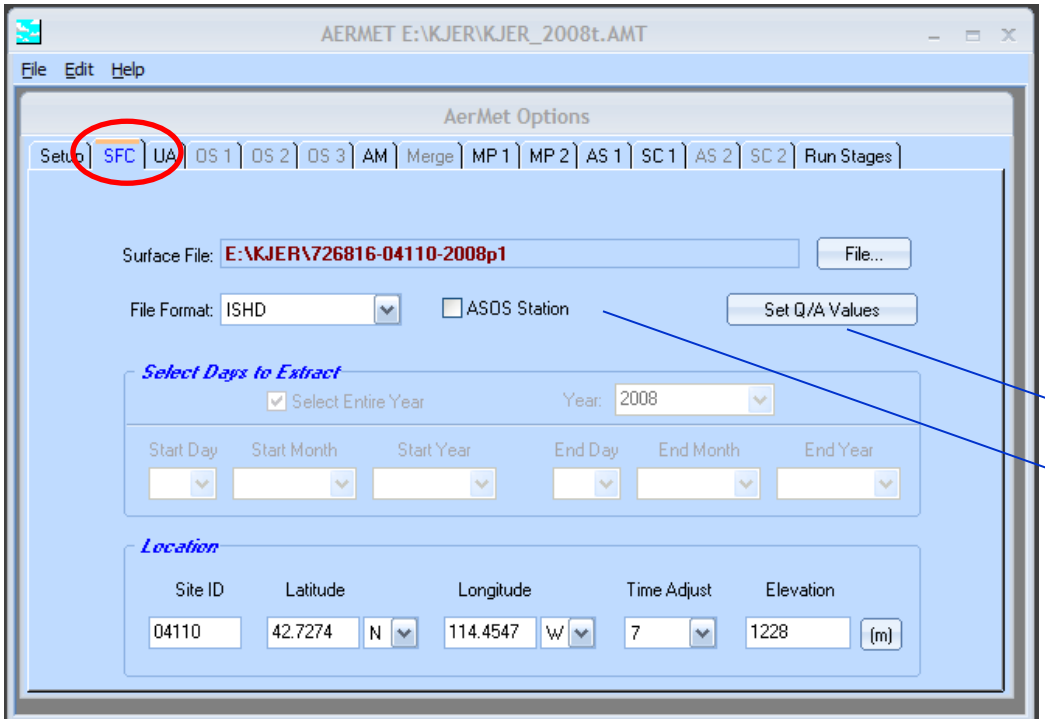
Time Frequency	Wind Sector	Surface Albedo	Bowen Ratio	Surface Roughness
January	1 of 12	0.18	0.74	0.020
January	2 of 12	0.18	0.74	0.021
January	3 of 12	0.18	0.74	0.022
January	4 of 12	0.18	0.74	0.050
January	5 of 12	0.18	0.74	0.022
January	6 of 12	0.18	0.74	0.032
January	7 of 12	0.18	0.74	0.022
January	8 of 12	0.18	0.74	0.020
January	9 of 12	0.18	0.74	0.020
January	10 of 12	0.18	0.74	0.020
January	11 of 12	0.18	0.74	0.020
January	12 of 12	0.18	0.74	0.019

MOISTURE = WET, NO SNOW, used for year 2011



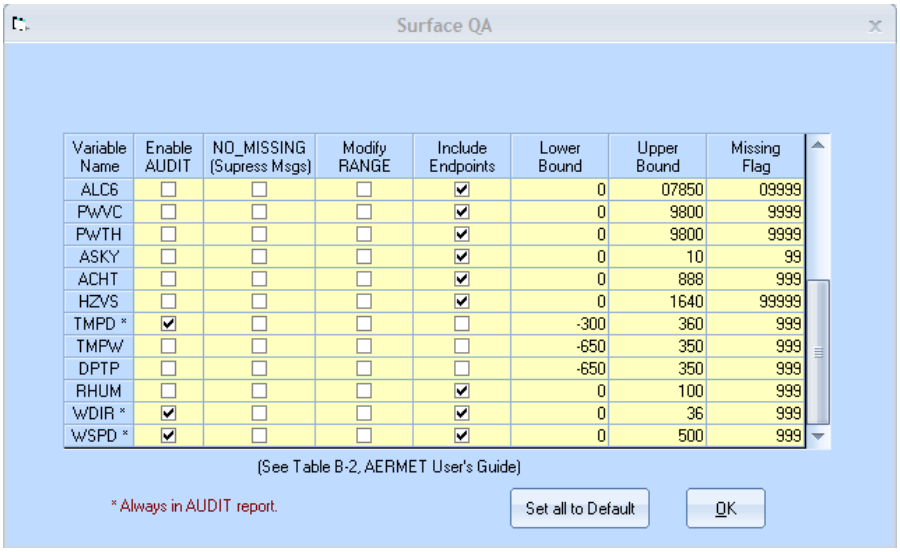
Time Frequency	Wind Sector	Surface Albedo	Bowen Ratio	Surface Roughness
January	1 of 12	0.18	0.42	0.020
January	2 of 12	0.18	0.42	0.021
January	3 of 12	0.18	0.42	0.022
January	4 of 12	0.18	0.42	0.050
January	5 of 12	0.18	0.42	0.022
January	6 of 12	0.18	0.42	0.032
January	7 of 12	0.18	0.42	0.022
January	8 of 12	0.18	0.42	0.020
January	9 of 12	0.18	0.42	0.020
January	10 of 12	0.18	0.42	0.020
January	11 of 12	0.18	0.42	0.020
January	12 of 12	0.18	0.42	0.019

SCREEN SHOTS – Oris Solutions' BEEST AERMET –Select SURFACE DATA



NOTE: If the ASOS Commission Date for the Surface Station is in the ASOS commission list (see AERMET source code, mod_AsosCommDates.for) *AND the ASOS Station box is checked, AERMET will return the following warning message in the Stage 1 Report (*.RP1):*

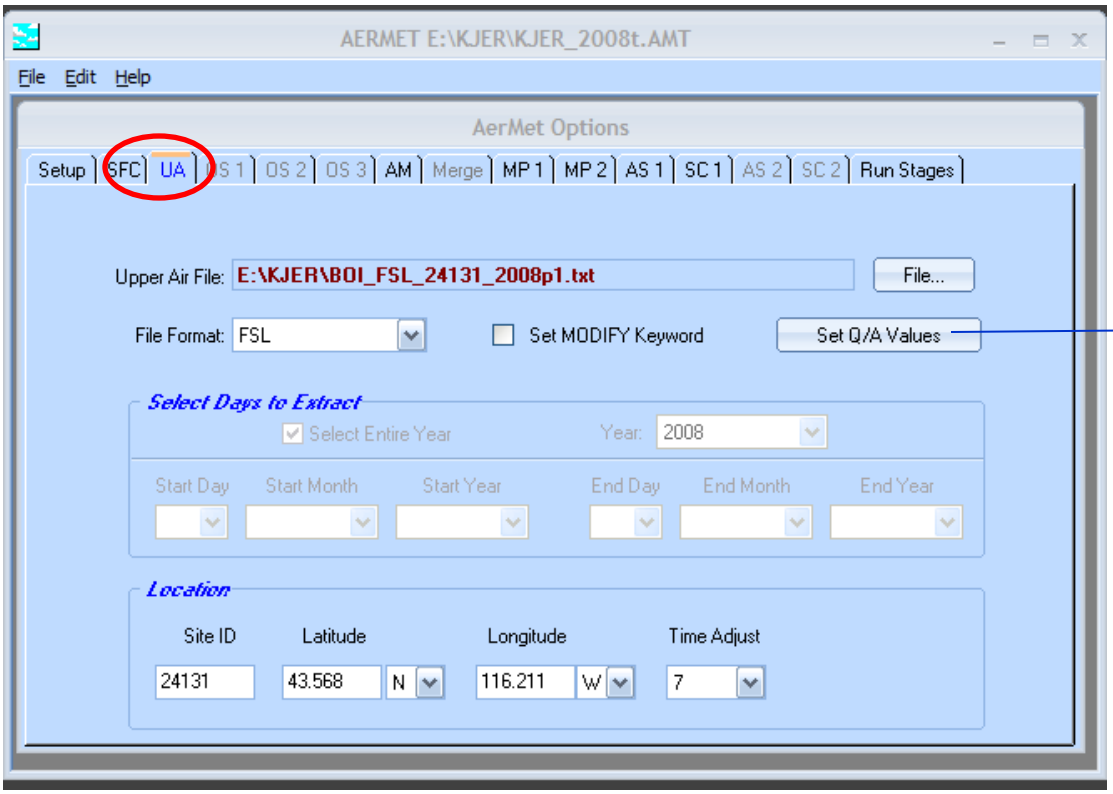
**** WARNING MESSAGES ****
9 SURFACE W06 DATCRD : ASOS flag specified for ISHD on DATA keyword - use only if not in AERMET ASOS commission list.



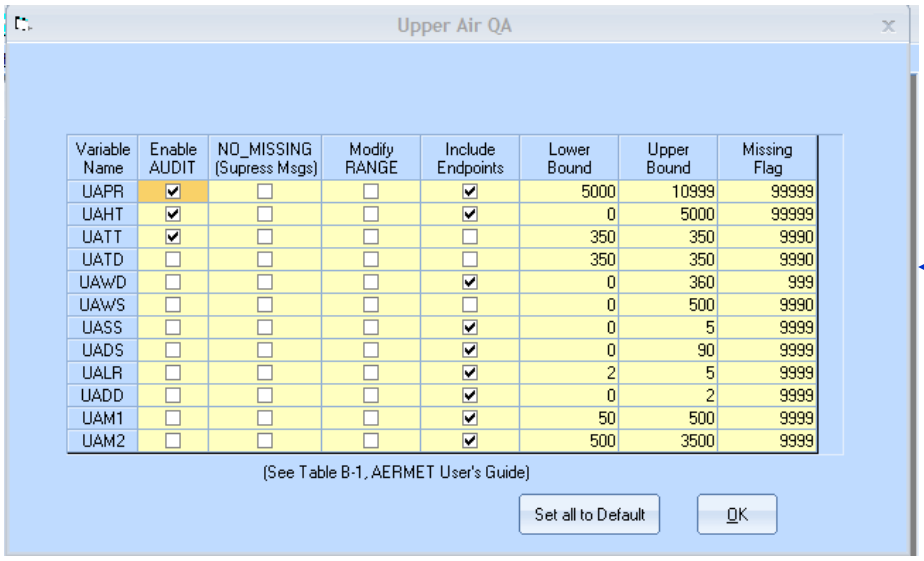
Variable Name	Enable AUDIT	NO_MISSING (Supress Msgs)	Modify RANGE	Include Endpoints	Lower Bound	Upper Bound	Missing Flag
ALC6	☐	☐	☐	☑	0	07850	09999
PWVC	☐	☐	☐	☑	0	9800	9999
PWTH	☐	☐	☐	☑	0	9800	9999
ASKY	☐	☐	☐	☑	0	10	99
ACHT	☐	☐	☐	☑	0	888	999
HZVS	☐	☐	☐	☑	0	1640	99999
TMPD *	☑	☐	☐	☐	-300	360	999
TMPW	☐	☐	☐	☐	-650	350	999
DPTP	☐	☐	☐	☐	-650	350	999
RHUM	☐	☐	☐	☑	0	100	999
WDIR *	☑	☐	☐	☑	0	36	999
WSPD *	☑	☐	☐	☑	0	500	999

Default surface data quality assurance audit parameters: Dry bulb temperature, wind direction, and wind speed.

SCREEN SHOTS – Oris Solutions' BEEST AERMET –Select UPPER AIR DATA

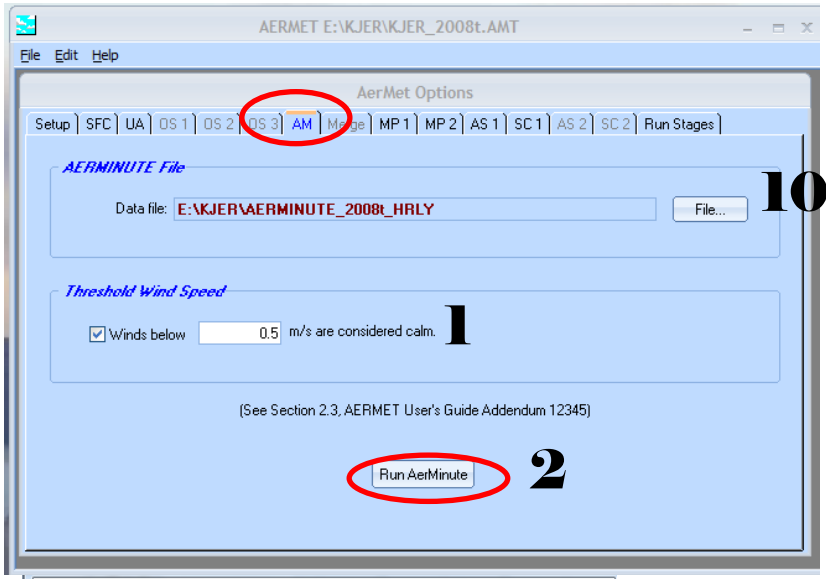


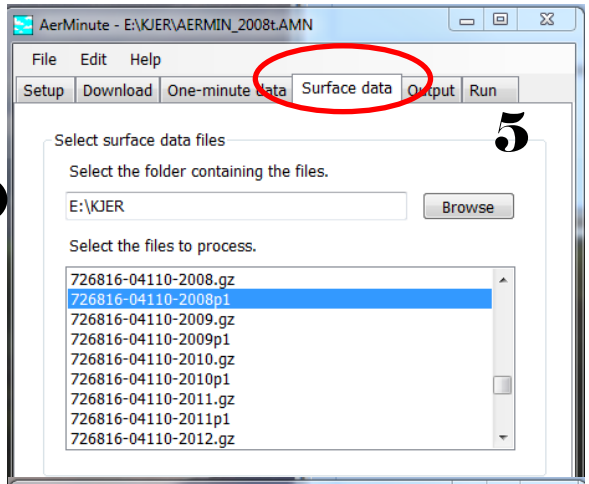
AERMET uses only height, pressure, and temperature from the upper air soundings. Suggested upper air data quality assurance audit parameters: Pressure, height, and temperature.

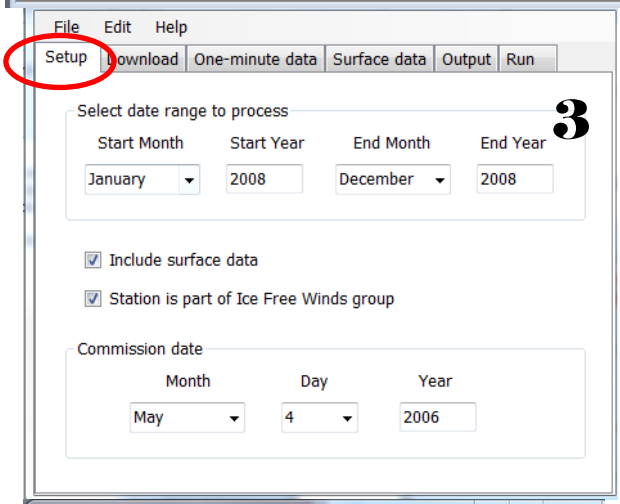


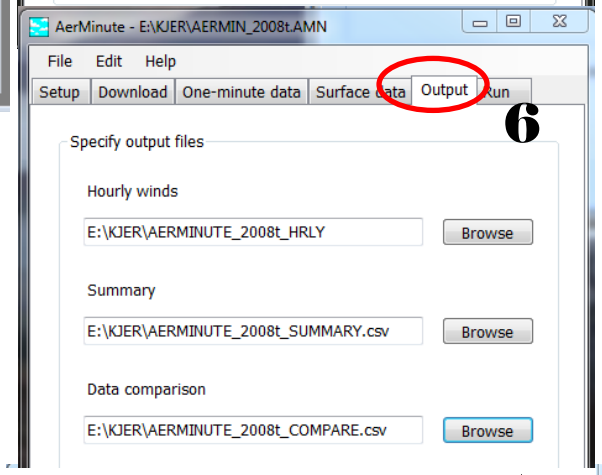
Variable Name	Enable AUDIT	NO_MISSING (Supress Msgs)	Modify RANGE	Include Endpoints	Lower Bound	Upper Bound	Missing Flag
UAPR	☑	☐	☐	☑	5000	10999	99999
UAHT	☑	☐	☐	☑	0	5000	99999
UATT	☑	☐	☐	☐	350	350	9990
UATD	☐	☐	☐	☐	350	350	9990
UAWD	☐	☐	☐	☑	0	360	999
UAWS	☐	☐	☐	☐	0	500	9990
UASS	☐	☐	☐	☑	0	5	9999
UADS	☐	☐	☐	☑	0	90	9999
UALR	☐	☐	☐	☑	2	5	9999
UADD	☐	☐	☐	☑	0	2	9999
UAM1	☐	☐	☐	☑	50	500	9999
UAM2	☐	☐	☐	☑	500	3500	9999

SCREEN SHOTS – Oris Solutions' BEEST AERMET –AERMINUTE (AM) TAB, *RUN AERMINUTE*

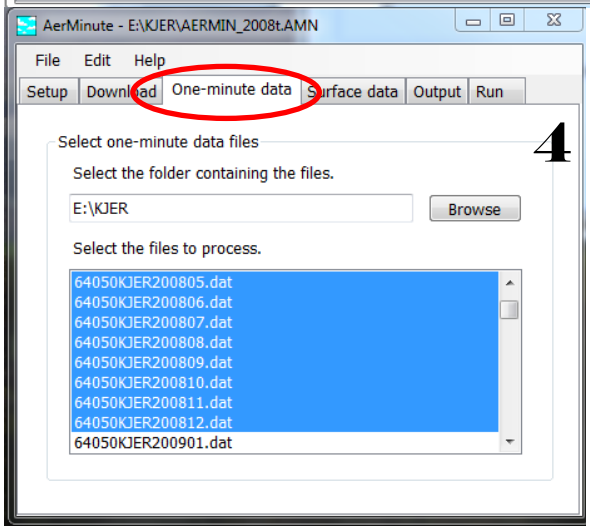


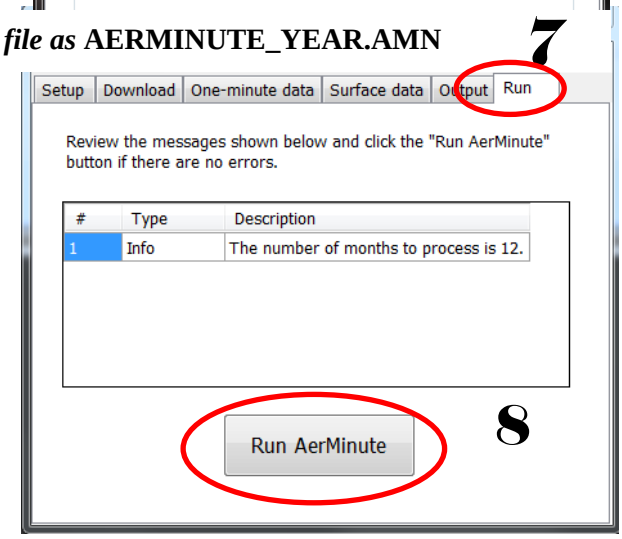






***Save file as* AERMINUTE_YEAR.AMN**



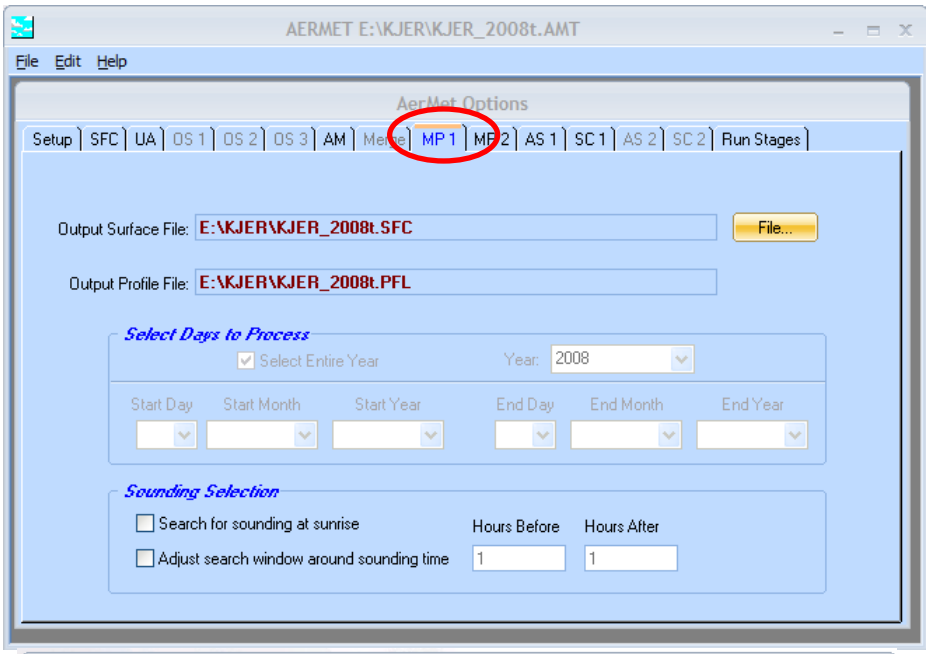


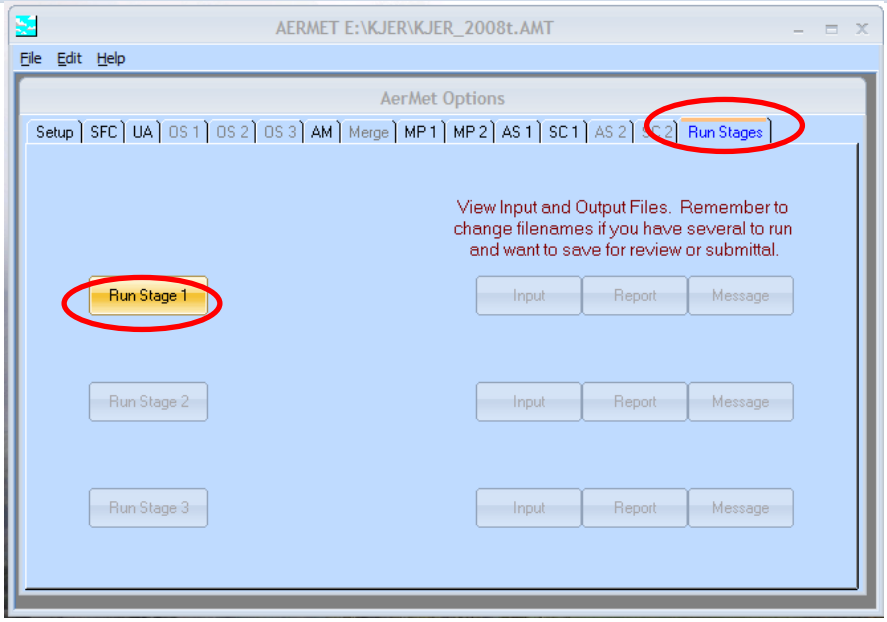
Rename: **9**

aerminute.log	to	aerminute_YEAR.log
bad_records.dat	to	bad_records_YEAR.dat
check_records.dat	to	check_records_YEAR.dat
good_records.dat	to	good_records_YEAR.dat

*.AMT file: *Save as* KBOI_YEAR, increasing to the next year. Repeat steps 1 through 10.

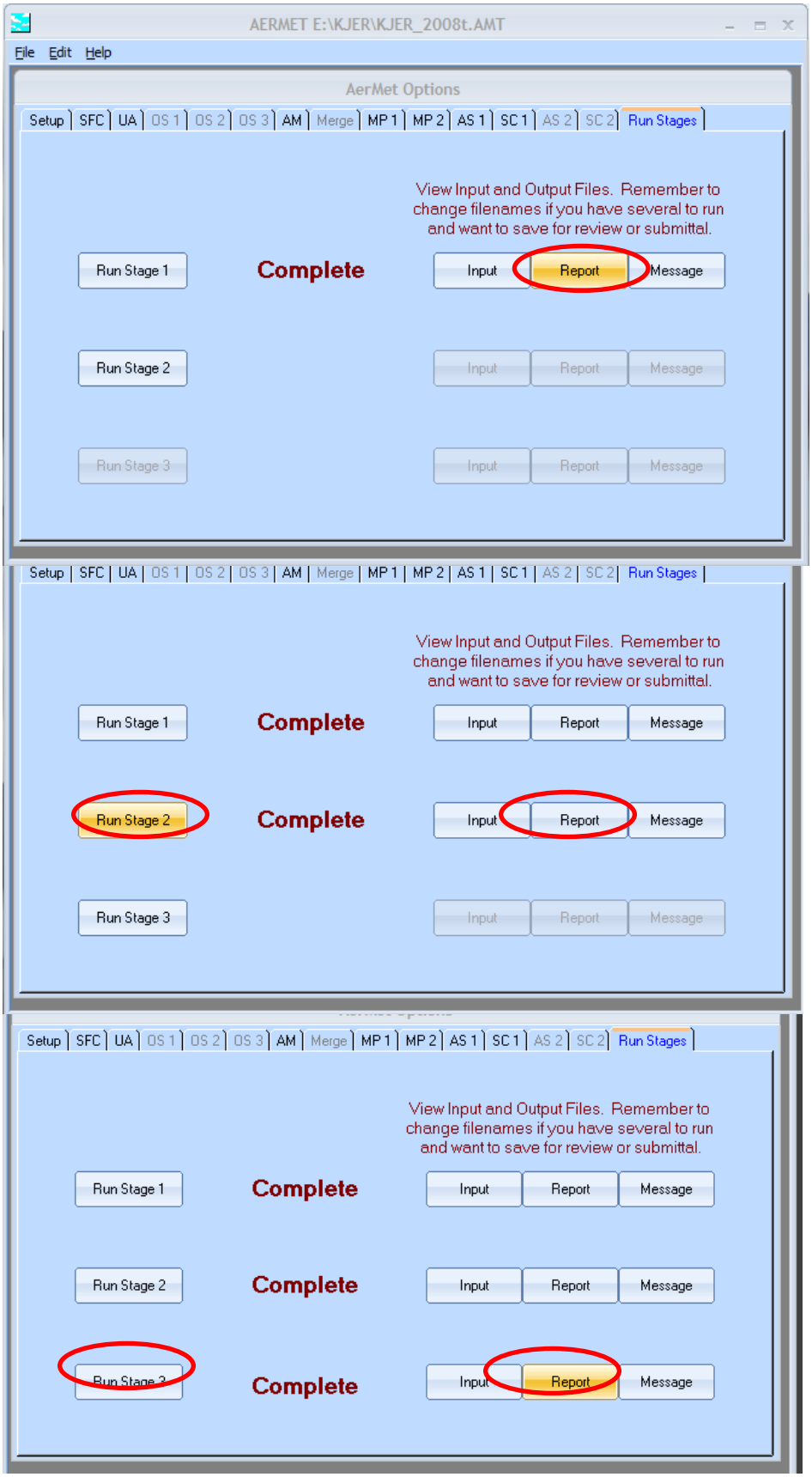
SCREEN SHOTS – Oris Solutions' BEEST AERMET – MP1 TAB AND **RUN** AERMET STAGE 1





Rename Discarded_ISHD_Records.dat to
Discarded_ISHD_Records_YEARt.dat

SCREEN SHOTS – Oris Solutions' BEEST AERMET – RUN AERMET STAGE 2 & STAGE 3



10. AERMOD, SIMPLE STACK, DATA COMPLETENESS RESULTS

AERMOD was run using each year of the met data sets as well as concatenated five-year SFC and PFL files for the following simple case:

Output: High 1st high, 1-hr averaging period, pollutant = OTHER

Emission Rate: 1 lb/hr

Source: Simple Stack

- Release Type: Vertical, uncapped
- Stack Height: 10 m
- Stack Dia: 0.5 m
- Exit Velocity: 25 m/s
- Exit Temp: 0 K (Ambient)
- Base Elev: 436 m

Terrain: Flat

Downwash: None

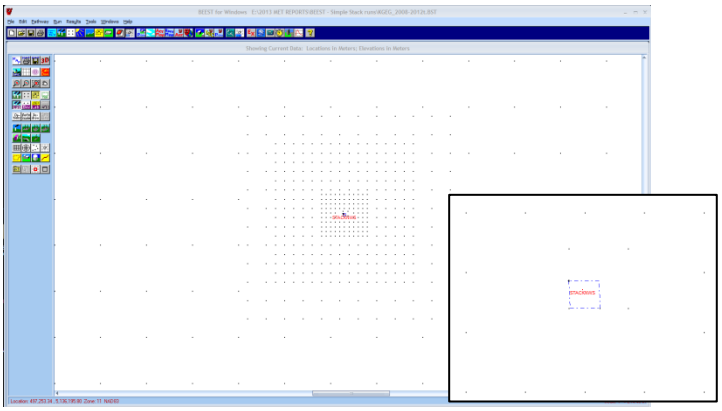
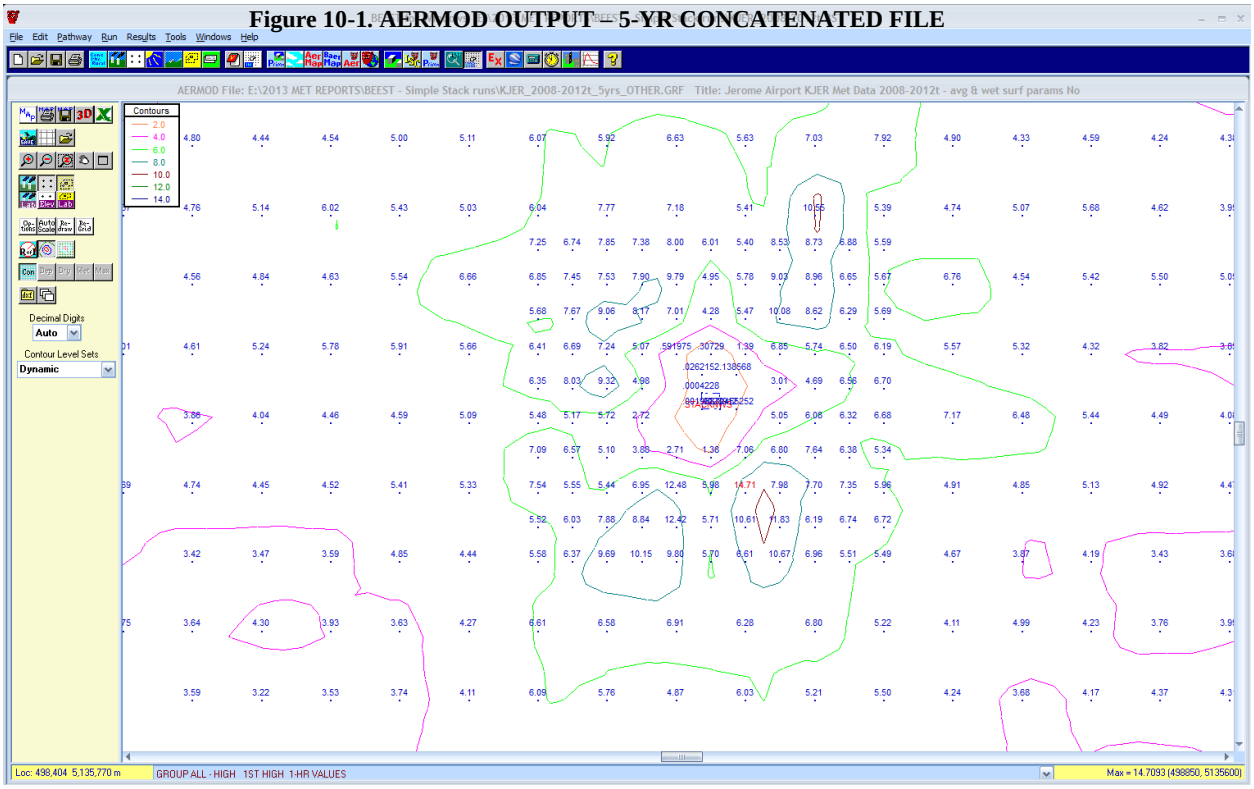


Table 10-1. AERMOD RESULTS

Year(s)	Max Impact µg/m^3	Max Hour	Percent Missing	Percent Complete
2008	9.32	08073107	1.40%	98.6%
2009	14.7	09082619	1.10%	98.9%
2010	9.01	10103017	0.48%	99.5%
2011	10.1	11103109	2.31%	97.7%
2012	12.5	12102117	2.03%	98.0%
2008-2012	14.7	09082619	1.46%	98.5%

Figure 10-1. AERMOD OUTPUT – 5-YR CONCATENATED FILE



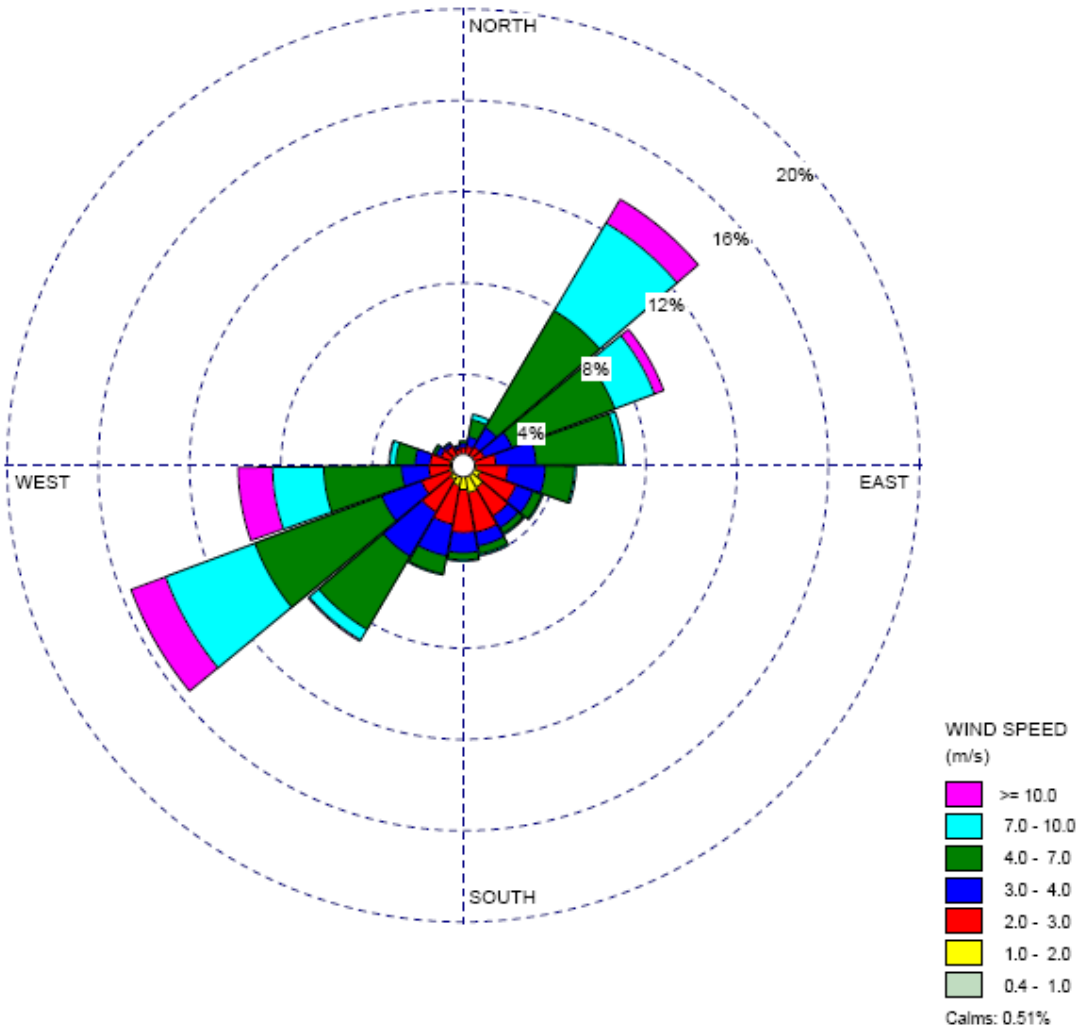
11. WIND ROSE

WIND ROSE PLOT:

JEROME COUNTY AIRPORT 2008-2012t
NWS Surface Data, ASOS, 1-Min Wind Threshold = 0.5 m/s

DISPLAY:

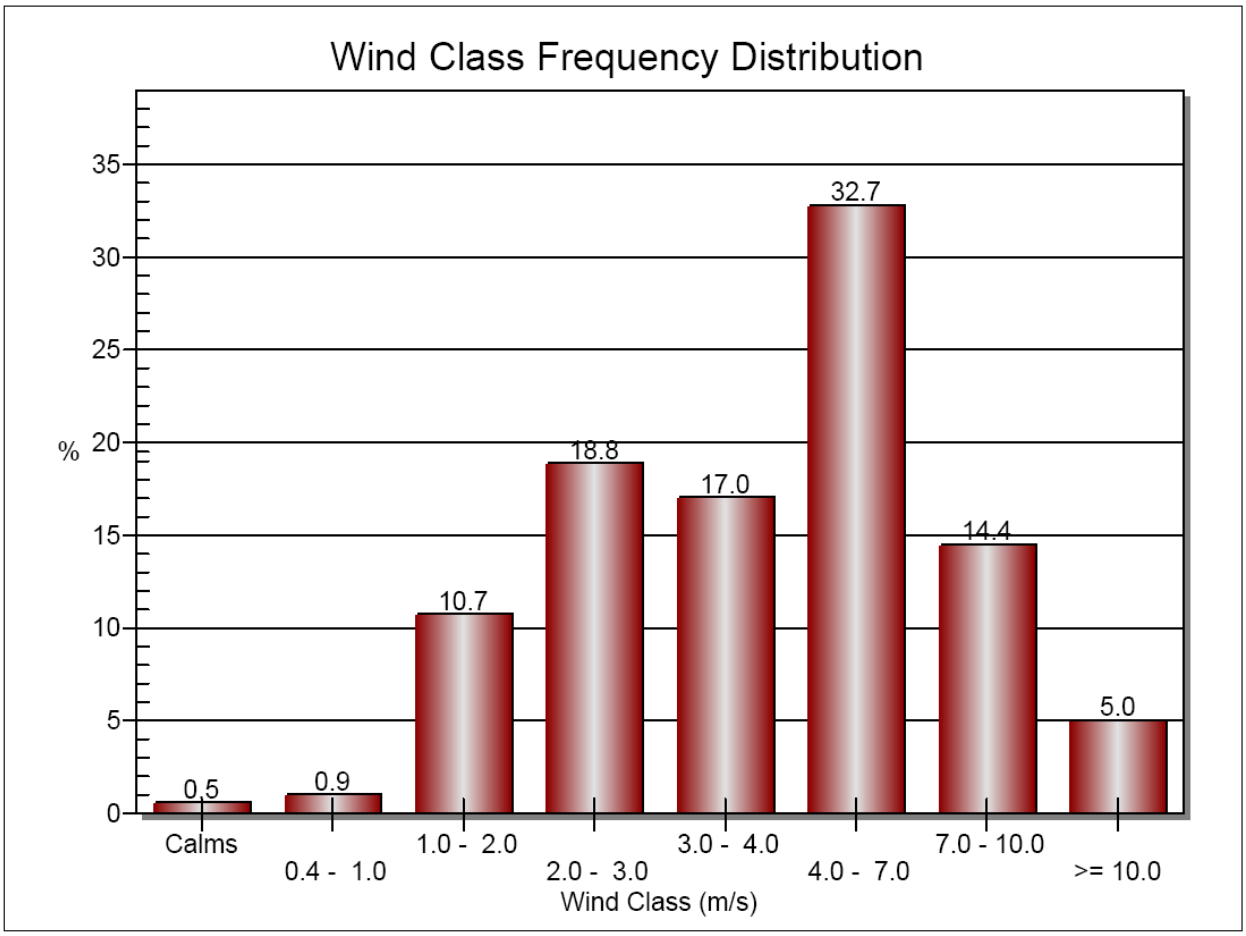
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
JEROME AIRPORT (KJER) 726816-04110 42.7274, -114.4647, 1228m ASOS Winds at 7.92 m BOISE UPPER AIR BOI, 24131 43.568, -116.211, 871m WIND DIRECTIONS = 18	**Start Date: 1/1/2008 - 00:00** **End Date: 12/31/2012 - 17:00**	**IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY**	
		MODELER: **Cheryl Robinson, P.E.**	
	CALM WINDS: **0.51%**	TOTAL COUNT: **43654 hrs.**	
	AVG. WIND SPEED: **4.75 m/s**	DATE: **10/31/2013**	PROJECT NO.: **DEQ 2013**

WRPLOT View - Lakes Environmental Software

12. WIND CLASS FREQUENCY PROFILE



WRPLOT View 8.1.0 - Lakes Environmental Software

Jerome County Airport, KJER, 2008-2012t 10/31/13

APPENDIX F: METEOROLOGICAL DATA MEMO

STATE OF IDAHO
DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
1410 NORTH HILTON, BOISE, ID 83706 · (208) 373-0502
TIFFANY FLOYD, ADMINISTRATOR
BRUCE LOUKS, MANAGER, MONITORING, MODELING, & EMISSION INVENTORY

To: Kevin Schilling, NSR Modeling Coordinator, MMEI, Air Quality Division

From: Cheryl Robinson, P.E., NSR Modeling Analyst, MMEI, Air Quality Division

Date: November 4, 2013

Subject: Met Data Processing for NSR Modeling: JEROME COUNTY AIRPORT, 2008-2012t

SUMMARY:

National Weather Service (NWS) surface Hourly Met Data (ISHD, 04110, GMT-7) and 1-minute ASOS winds (KJER, LST) were collected at the Jerome County Airport for the years 2008 through 2012. The locations of surface and upper air stations were determined using Google Earth and Bing Maps. The ASOS has been upgraded to an Ice Free Wind (IFW) sensor. NWS winds were not randomized, NWS data were supplemented by ASOS winds, ASOS winds were adjusted upward by 0.5 m/s to account for truncation, and the ASOS wind threshold was set to the EPA-recommended value of 0.5 m/sec. Upper air soundings collected at the Boise NWS station (24131, BOI, GMT-7) were obtained in FSL format for the same period.

The average Palmer Z Index for the representative state climate division was used to determine relative moisture conditions for each year of the met data set based on a 30-year average covering the period from 1983 through 2012. Snow accumulation during winter months for each year was determined by reviewing NCDC daily snow depth data. Surface roughness, albedo, and Bowen ratio values were adjusted as needed to reflect the number of days of snow cover during winter months. Monthly surface roughness values were determined for each of 12 sectors within a 1-kilometer radius of the surface met station using land use data drawn from a 1992 NLCD file, at an airport, for average and wet conditions, without snow cover during the winter months of December, January, and February. Monthly values for the albedo and Bowen ratio were also based on the 1992 NLCD file for a 10-kilometer domain centered on the surface met station. No adjustments were made to the surface friction, u*.

Data were processed by DEQ with AERSURFACE v. 13016, AERMINUTE v. 11325, and AERMET v. 12345 using Oris Solutions' BEEST graphical user interface. The SFC and PFL files were flagged with a "t" to indicate that the wind threshold was set to 0.5 m/s.

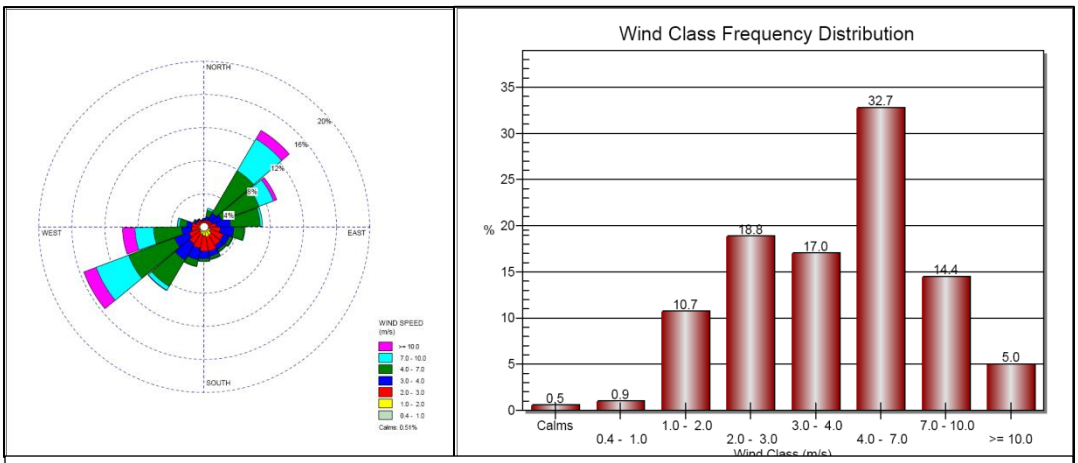


Figure S-1. WIND ROSE and WIND CLASS FREQUENCY PROFILE, KJER (WRPLOT View)

Report Contents

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3. DATA SOURCES 8
4. AERMET SETTINGS 9
5. METEOROLOGICAL STATION LOCATIONS 10
6. LAND COVER 11
7. CLIMATE/SURFACE MOISTURE CONDITIONS 13
8. SNOW COVER 14
9. SCREEN SHOTS OF DATA PROCESSING STEPS 15
10. AERMOD, SIMPLE STACK, DATA COMPLETENESS RESULTS 22
11. WIND ROSE 23
12. WIND CLASS FREQUENCY PROFILE 24

1. ACRONYMS

AERMET	AERMOD Meteorological pre-Processor
AERMINUTE	ASOS winds pre-processor for AERMET
AERMOD	**A**merican Meteorological Society/**E**nvironmental Protection Agency **R**egulatory **Mod**el
AERSURFACE	Surface characteristics pre-processor for AERMET
ASOS	Automated Surface Observing System
DEQ	Idaho Department of Environmental Quality
EPA	Environmental Protection Agency
ESRL	Earth Systems Research Laboratory
FAA	Federal Aviation Administration
FSL	Forecast Systems Laboratory
ft	feet
GMT	Greenwich Mean Time
IFW	Ice Free Wind
ISHD	Integrated Surface Hourly Data
km	kilometer
LST	local standard time
m	meter
NAD83	North American Datum, 1983
NED	National Elevation Dataset
NESDIS	National Environmental Satellite, Data, and Information Service
NLCD	National Land Cover Database
NCDC	National Climatic Data Center
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
MRLC	Multi-Resolution Land Characteristics Consortium (the current source for obtaining NED files)
PFL	Wind profile meteorology files, output from AERMET
SCRAM	Support Center for Regulatory Atmospheric Modeling
SFC	Surface meteorology files, output from AERMET
UTC	Coordinated Universal Time
WGS84	World Geodetic System, 1984

2. MET DATA PROCESSING FOR NWS AND ASOS SURFACE STATIONS AT AIRPORTS

On December 10, 2012, EPA issued versions 12345 of the regulatory dispersion modeling program AERMOD and the regulatory meteorological data processor AERMET. AERMOD v. 12335 will accept met data processed using AERMET v. 12345 or v. 11059 (released February 28, 2011), but will not accept met data processed using AERMET v. 06341 (issued December 7, 2006) or earlier.

An update to AERMINUTE, the non-regulatory pre-processor for one-minute ASOS winds, was released on November 21, 2011. In addition, on January 16, 2013, EPA released a new version of AERSURFACE which incorporated adjustments to the spatial averaging of land cover parameters to be consistent with published guidance. Although not part of the regulatory AERMOD system, AERSURFACE is commonly used to streamline processing and produce reproducible values for three important surface characteristics: the albedo, Bowen ratio, and surface roughness length. On March 8, 2013, EPA issued a clarification memo regarding the use of ASOS wind data, including a recommendation that the wind speed threshold be set to 0.5 m/sec. These changes triggered the need to update "default" AERMOD-ready met data sets provided by DEQ to applicants for non-PSD air quality permit dispersion modeling.

Obtain Recent Meteorological Data

Integrated Surface Hourly Data (ISHD) were downloaded as zipped *.gz files from the NCDC's Integrated Surface Database (ISD) ftp site for the years 2008-2013. These data are reported in Coordinated Universal Time Code (UTC), which is the same as Greenwich Mean Time (GMT). Data for January 1 of the following year (or a duplicate of the data for December 31st, if January 1 data were missing) were copied and pasted at the end of each year's data to ensure hourly data were available for the last few hours on December 31st when data were converted from GMT to local time. The adjusted data files were saved using the same naming convention as the downloaded files: 123456-54321-YEARp1, where the first number is the met station USAF ID code, followed by the station WBAN ID number, the four-digit year, and "p1" indicating plus one day.

EPA recommends using one-minute ASOS winds when available, which provide minute-by-minute 2-minute-averaged wind speed and direction, in addition to the hourly ISHD data collected at NWS stations. ASOS data for each month of the years 2008 through 2012 were downloaded as plain text files from the NCDC's ftp site. These data are reported in local standard time. No changes were made to the file names, which follow the naming convention 64050CALLYEAR01.dat, where 64050 denotes ASOS wind data, followed by the station call sign, the four-digit year, and a two-digit code from 01 to 12 denoting the month the data was collected.

Upper air soundings in FSL (ACSII text) format were downloaded from the NOAA/Earth Systems Research Laboratory (ESRL) Radiosonde Database ftp site. These data are reported in Coordinated Universal Time Code (UTC), which is the same as Greenwich Mean Time (GMT). The data request submitted for each year was for January 1, hour 0 of each year through January 1, hour 23 of the following year, to ensure hourly data were available for the data is available for the last few hours on December 31st when data were converted from GMT to local time. Soundings were requested for all times and all levels with wind units in tenths of meters per second. ASCII data from the resulting *.tmp file were selected (CNTL+A), copied (CNTL+C), pasted (CNTL+V) into a blank Notepad text file and saved as a plain text file using the naming convention: FAA_FSL_54321_YEARp1.txt, where FAA is the three-letter call sign for the airport, FSL denotes the data format, followed by the station WBAN ID number, the four-digit year, and "p1" indicating plus one day. No actions were taken to fill missing upper air soundings.

Obtain ASOS Station Information

The AERMET source code was downloaded from the EPA SCRAM website. ASOS station commissioning dates are contained in the subroutine called "mod_AsosCommDates.for," which can be opened using a text editor such as Notepad or WordPad.

Note: If the ASOS Commission Date for the Surface Station is in the ASOS commission list (see AERMET source code, mod_AsosCommDates.for) and the "ASOS Station" box is ticked when setting up the run in AERMET View, AERMET will return the following warning message in the Stage 1 Report: ASOS flag on ISHD DATA keyword should NOT be used! Station included in ASOS commission list.

The pdf file of Ice Free Wind installation dates was downloaded from the NOAA website. These are ASOS stations that have been upgraded with a sonic anemometer. The most current listing of IFW installation dates as of October 2013 was issued on October 27, 2009.

The Excel file containing a February 11, 2009 list of ASOS anemometer heights was downloaded from the NOAA website. Anemometer heights for ASOS stations in Idaho and in nearby states are either 33.0 feet (10.05 m) or 26.0 ft (7.92 m).

Determine or Confirm Meteorological Station Coordinates and Elevations

The actual location of surface met towers is very important in determining appropriate surface parameters used in the AERMOD model. This is especially true when determining the surface roughness length, which affects the reduction in wind speed and the level of turbulence and vertical mixing in the wind layers as the air flows over the ground surface. The surface roughness length is calculated based on land use within a one-kilometer radius of the surface met station location.

The location coordinates provided by the FAA or NWS for ASOS stations in Idaho and nearby states typically refer to a point near the center of the runways. On August 6, 2013, DEQ contacted Mr. Christopher Stark, NOAA's ASOS manager, to ask whether better location data were available. Mr. Stark replied that ASOS locations are recorded only to the nearest minute (lat/long), and provided a link to a page on the NOAA website: http://www.nws.noaa.gov/tg/siteloc.shtml (Note: the correct url is http://www.nws.noaa.gov/tg/siteloc.php). Unfortunately, DEQ had already reviewed the locations provided on that web site, which had prompted the attempt to obtain more accurate coordinates. Similarly, location coordinates and base elevations provided by NWS sources were found to vary depending on the source of the information.

DEQ reviewed online sources of aerial photography, including Google Earth and Bing Maps (aerial and bird's eye views), to determine or confirm the published coordinates and base elevations for NWS and ASOS surface meteorological stations and for NWS upper air stations (datum WGS84/NAD83). Where there appeared to be a substantial difference in the published elevation and the elevation shown in Google Earth, the elevation was verified against the value contained in the National Elevation Database (NED) for the "confirmed" coordinates. Where possible, lat/long coordinates were determined to four decimal places.

Based on this review, it appeared that NWS and ASOS instrument towers were collocated at airport locations in Idaho and neighboring states. Coordinates of the upper air stations were based on the observed location of the rawinsonde balloon inflation shelter/ radiotheodolite dome at each site. All of the upper air sounding stations in Idaho and nearby states are located at NWS offices.

Determine Pairings of Surface and Upper Air Data

DEQ used three criteria to determine which upper air soundings should be paired with the surface station data being processed:

1) Geographic proximity to the surface station site,
2) Influence of elevated terrain and mountain ranges, and
3) Ground-level elevation similar to the elevation at the surface data collection site. A profile interpolation scheme is used in AERMET if the surface station elevation is lower than the elevation at the upper air station. Selecting an upper air station located at a similar elevation as the surface site helps reduce the use of this profile interpolation scheme. In addition, AERMET disregards soundings at levels higher than 5,000 meters above mean sea level. If the surface station is

considerably higher than the upper air sounding location, the upper air profile used in AERMET will be truncated, which may result in underpredicting ambient air concentrations.

Thiessen polygons were used to determine the upper air station located closest to the surface data collection site. The polygons, defined by the perpendicular bisectors of the lines between the locations of the upper air data collection sites, are shown in Figure 2-1. As shown in the figure, upper air sounding sites in or near Idaho include Spokane, Boise, Great Falls, Salt Lake City, Elko, and Riverton.

The Snake River Plain (SRP) stretches across southern Idaho, with Boise and Jerome located in the western SRP. The prevailing westerly winds typically follow the plain, strongly suggesting that upper air soundings collected in Boise are best representative of conditions in Jerome. Surface data collected at the Jerome County Airport (KJER) were therefore paired with upper air soundings collected at the Boise NWS station.

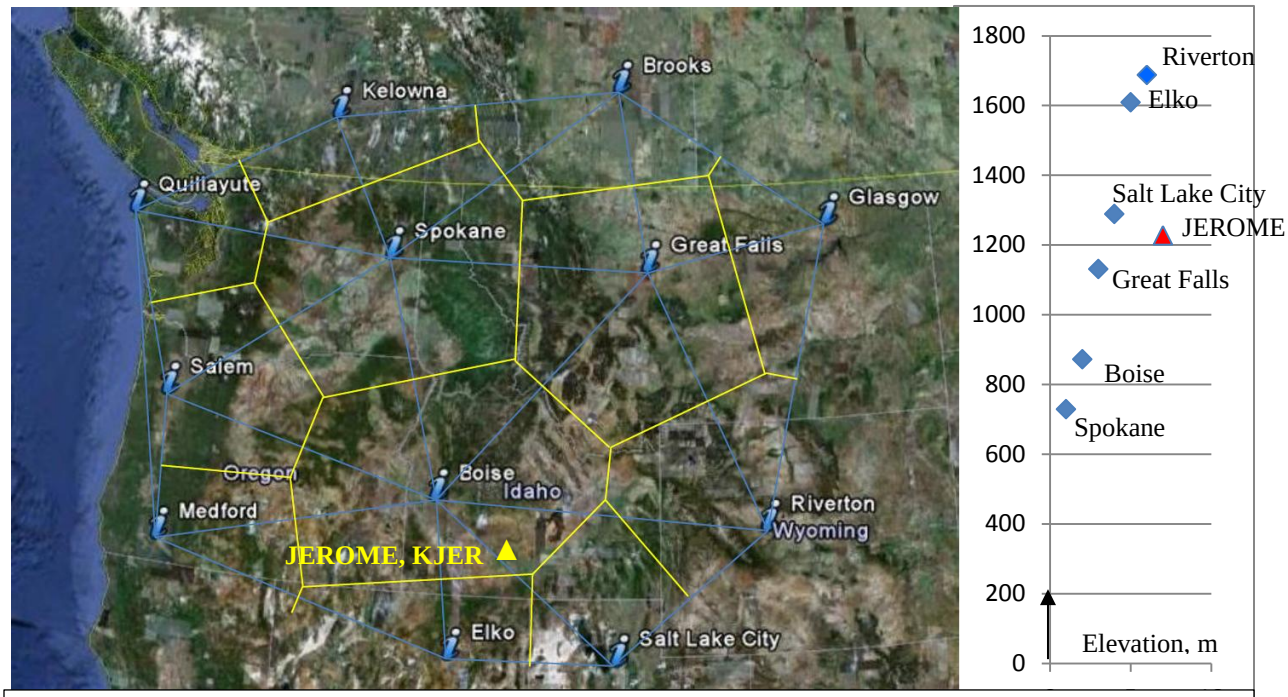


Figure 2-1. SURFACE STATION GEOGRAPHIC PROXIMITY (THIESSEN POLYGONS) AND ELEVATION COMPARISON TO UPPER AIR SOUNDINGS STATIONS

Site characteristics for these six upper air soundings locations are shown in Table 2-1.

Table 2-1. UPPER AIR SOUNDINGS STATIONS

Location	State	FAA/ ICS	WMO ID	WBAN ID	FSL Header		Local Time
					Elevation AMSL	Lat/Lon (degrees)	
Spokane, Washington 2601 N. Rambo Rd.	WA	OTX	72797	04106	728 m (2388 ft)	47.68 / -117.63	Pacific (GMT-8)
Boise, Idaho 3833 Development Ave #3807	ID	BOI	72681	24131	871 m (2858 ft)	43.57 / -116.22	Mountain (GMT-7)
Great Falls, Montana 5324 Tri-Hill Frontage Rd	MT	TFX	72776	04102	1130 m (3707 ft)	47.45 / -111.38	Mountain (GMT-7)
Salt Lake City, Utah 2242 West North Temple	UT	SLC	72572	24127	1288 m (4226 ft)	40.77 / -111.97	Mountain (GMT-7)
Elko, Nevada 3720 Paradise Drive	NV	LKN	72582	04105	1608 m (5276 ft)	40.87 / -115.73	Pacific (GMT-8)
Riverton, Wyoming 12744 West U.S. Hwy 26	WY	RIW	72672	24061	1688 m (5538 ft)	43.06 / -108.47	Mountain (GMT-7)

Obtain and Review Land Use, Moisture Conditions, and Snow Cover Data

At this time, AERSURFACE is compatible only with NLCD land use data collected in or around the year 1992 and reported for 21 land use categories. State-wide NLCD 1992 data for Idaho, Montana, Nevada, Oregon, Wyoming, and Washington were downloaded as zipped bin and tiff files from the Multi-Resolution Land Characteristics Consortium (MRLC) website. In order to review the acceptability of using the 1992 dataset, however, 2006 NLCD was also downloaded for a few locations (until October 1, 2013, when the federal government websites were shut down). After October 1, 2013, DEQ reviewed alternative sources of online aerial photography, including Google Earth, which offered relatively current images as well as historical images in the areas surrounding the airport surface site locations.

Surface characteristics calculated in AERMET depend on whether conditions have been dry, average, or wet compared to normal conditions for the area. The Palmer Drought Severity Index (PDSI) is based on a relatively simple water balance model that considers both precipitation and temperature as well as the influence of these on evapotranspiration, soil moisture, and runoff.[1] The Palmer Z-index (anomaly value) is a measure of the conditions during a particular month from the average moisture conditions for that month and location. As a starting point for the "default" met data sets, DEQ downloaded the Palmer Z-index values and anomaly values (averaged over each year, January through December) from the NCDC website for the years 1895 through 2012. Data were obtained for all nine climate divisions in Idaho, Montana division 1 (Western), Nevada divisions 1 (North West) and 2 (North East), Oregon divisions 8 (Northeast) and 9 (Southeast), Utah divisions 3 (North Central) and 5 (Northern Mountains), and Washington divisions 9 (North Eastern) and 10 (Palouse/Blue Mountains). The upper and lower 30th percentiles were calculated based on the annual average Z-index values and anomaly values reported for the 30-year period from 1983 through 2012. Years with average anomaly values in the lower 30th percentile were considered "dry," years with anomaly values in the upper 30th percentile were considered "wet," and conditions for all other years were considered "average."

Daily snow depth records, if available, for the surface met station or a nearby location considered by DEQ to be representative, were downloaded from the NCDC (or during the federal government shutdown beginning October 1, 2013, from the U.S. Historical Climatology Network operated by UT-Battelle for Oak Ridge National Laboratory) website for the years 2008 through 2012.

Run AERMINUTE

AERMINUTE was run to pre-process the one-minute ASOS wind data for each year. The ISHD file for the same year was included to allow the program to conduct quality assurance checks on the data. The AERMINUTE log for each year was reviewed to assess the validity of the ASOS wind data.

Run AERSURFACE

AERSURFACE inputs included the state-wide 1992 NLCD file and lat/long coordinates (corrected to reflect the actual location) for the surface station. The station is at an airport, the number of sectors was set to 12, the surface characteristic frequency was set to monthly using the default seasonal settings, and the radius for the surface roughness calculation was set to the default value of 1.0 km. Unless supported by additional information included in Section 9 of this report, the location was presumed not to be in an arid region. AERSURFACE was run for each moisture condition (dry, average, or wet) determined to apply to the surface station location in any of the years 2008 through 2012 for two cases: no snow and for continuous snow during the winter months of December, January, and February. The AERSURFACE log for each run was reviewed to ensure the correct input parameters had been used and to check for any warning or error messages.

Note: For surface met stations located near a state border, an appropriately sized domain was selected using the 1992 NLCD seamless data. When using seamless data rather than a tif file encompassing an

[1] William M. Alley, The Palmer Drought Severity Index: Limitations and Assumptions, *Journal of Climate and Applied Meteorology* 23 (1984): 1100, accessed at http://www.engr.colostate.edu/~jsalas/classes/ce624/Handouts/Palmer%20Index-alley%201984.pdf

entire state, AERSURFACE appears to require that the location be entered in UTM coordinates rather than in lat/long. In these cases, the EPA DOS version of AERSURFACE was used rather than the AERSURFACE version incorporated into Lakes Environmental's AERMOD View or Oris Solutions' BEEST suite.

Adjust AERSURFACE Output Values to Reflect Actual Snow Cover (as needed)

The resulting AERSURFACE output values for surface roughness, albedo, and Bowen ratio for each year were adjusted as needed to reflect the relative number of days with and without snow cover during winter months. For example, presume that AERSURFACE outputs a January 2008 albedo of 0.15 for no snow conditions, and a value of 0.33 presuming continuous snow cover. Following a convention developed by EPA Region 5 and states within Region 5,[2] the value for the January 2008 albedo value would be manually adjusted in the input text file to:

$$\frac{(2)(0.15) + (29)(0.33)}{31} = 0.32$$

After making adjustments to the albedo, Bowen ratio, and surface roughness length for January, February, and December, the AERSURFACE output file for each year of the met data set using a descriptive naming convention: AERSURFACE_YEAR_XXX_Snow.out, where YEAR is the four-digit year and XXX denotes whether the moisture conditions for that year were considered to be Dry, average (Avg), or Wet.

Because of the challenges associated with maintaining the appropriate spacing in the AERSURFACE output text file, the AERSURFACE output text file was imported into AERMET (when using Lakes Environmental's AERMET View) or imported into Excel and then copied and pasted directly into the primary site characteristics table (tab SC1, when using Oris Solutions' BEEST AERMET).

Run AERMET

AERMET was run for each year using the information and settings shown in Section 4 of this report. The message and report files were reviewed for each of the three processing stages in AERMET.

Edit SFC and PFL Files

If necessary, edit the SFC and PFL files for each year to remove January 1 hours for the following year. The surface and profile files for each year were also combined into concatenated 5-year SFC and PFL file.

Produce Wind Rose and Wind Frequency Plot

The wind rose and wind frequency plots for this five-year met data set were produced using Lakes Environmental WRPLOT.

Run AERMOD for Data Completeness Check

AERMOD was run using each year of the met data sets as well as concatenated five-year SFC and PFL files for a simple case involving a single stack, flat terrain, and no downwash. The maximum impacts and percentage of missing hours shown in the output files were summarized in a table in Section 10 of this met data processing report.

[2] EPA Region 5 and States, *Regional Meteorological Data Processing Protocol*, Draft, May 6, 2011, accessed October 9, 2013 at http://www.pca.state.mn.us/index.php/view-document.html?gid=17386

3. DATA SOURCES

NOAA Met Station Lookup, http://www.nws.noaa.gov/tg/siteloc.php
Note: Do not use the lat/long or elevation data from this site.

NWS/ISHD Surface Data: National Climatic Data Center (NCDC), NOAA Satellite and Information Service
http://www.ncdc.noaa.gov/oa/climate/isd/index.php

ASOS Wind Data: NCDC, NOAA Satellite and Information Service
ftp://ftp.ncdc.noaa.gov/pub/data/asos-onemin/

FSL Upper Air Soundings: NOAA/Earth Systems Research Laboratory (ESRL) Radiosonde Database
http://esrl.noaa.gov/raobs/

ASOS Station Information:

AERMET Source Code, EPA Support Center for Regulatory Atmospheric Modeling (SCRAM)
http://www.epa.gov/ttn/scram/metobsdata_procaccprogs.htm#aermet

NWS, ASOS Anemometer Heights, Excel file, 2/11/09
http://www.nws.noaa.gov/ops2/Surface/asosimplementation.htm

NWS, Ice Free Wind Installation Dates for NWS and FAA Owned ASOS Sites, October 27, 2009
http://www.nws.noaa.gov/ops2/Surface/documents/IFW_stat.pdf

Surface Weather Observation Stations, ASOS/AWOS (interactive map)
http://www.faa.gov/air_traffic/weather/asos/?state=ID

Land Use Data: Multi-Resolution Land Characteristics Consortium (MRLC)
http://www.mrlc.gov/

National Land Cover 1992 Database, zipped *.gz file for the entire state of Idaho
http://landcover.usgs.gov/show_data.php?code=ID&state=Idaho

Source Cite: Vogelmann, J.E., S.M. Howard, L. Yang, C. R. Larson, B. K. Wylie, and J. N. Van Driel, 2001, Completion of the 1990's National Land Cover Data Set for the conterminous United States, Photogrammetric Engineering and Remote Sensing 67:650-662.

U.S. Palmer Drought Indices: NCDC
http://www.ncdc.noaa.gov

Snow Depth Historical Data, National Operational Hydrologic Remote Sensing Center. 2004. *Snow Data Assimilation System (SNODAS) data products at NSIDC*. Boulder, CO: National Snow and Ice Data Center. Digital media. http://www.nohrsc.noaa.gov/

Note: Data were unavailable from the NCDC site due to the federal government shutdown beginning October 1, 2013. Data were obtained from the U.S. Historical Climatology Network operated by UT-Battelle for the Department of Energy, Oak Ridge National Laboratory. Data for all days from January 2008 through December 2012 were accessed on October 9, 2013 at http://cdiac.ornl.gov/cgi-bin/broker?_PROGRAM=prog.climsite_daily.sas&_SERVICE=default&id=457938

4. AERMET SETTINGS

SURFACE DATA (NWS)	JEROME COUNTY AIRPORT JEROME, IDAHO					**Time Zone** Mountain, GMT-7	
Data Collection	**Data Format**	**Time Format**	**Call**	**WBAN**	**USAF**	**Height 1 (T, RH)**	**Height 2 (Winds)**
NWS	ISHD	UTC/GMT	KJER	04110	726816	2.0 m	10.0 m
Coordinates/Elevation	**Latitude/ Northing (m)**	**Longitude/ Easting (m)**	**Elevation (m)**	**(ft)**			
ISHD Header	42.727	-114.450	1234	4049			
Google Earth, WGS84	**42.7274**	**-114.4547**	**1228**	4029			
NED, NAD83							

SURFACE DATA ASOS Winds	JEROME COUNTY AIRPORT JEROME, IDAHO					**Time Zone** Mountain, GMT-7	
Data Collection	**Data Format**	**Time Format**	**Call**	**WBAN**	**ASOS Commission Date**	**IFW Sensor Install Date**	**Height 2 (Winds)**
FAA	Metric	LST	KJER	04110	19970201	5/4/2006	7.92 m (26.00 ft)
Coordinates/Elevation	**Latitude/ Northing (m)**	**Longitude/ Easting (m)**	**Elevation (m)**	**(ft)**			
ASOS Comm. Date File	42.72	-114.45					
FAA ASOS Map	42.727	-114.457					
Google Earth, WGS84	**42.7274**	**-114.4547**	**1228**	4029			

UPPER AIR DATA:	NWS, BOISE STATION 3833 Development Ave #3807, Boise, Idaho					**Time Zone** Mountain, GMT-7	
Data Collection	**Data Format**	**Time Format**	**Call**	**WBAN**	**USAF**		
NWS	FSL	UTC/GMT	BOI	24131	72681		
Coordinates/Elevation	**Latitude/ Northing (m)**	**Longitude/ Easting (m)**	**Elevation (m)**	**(ft)**			
FSL Header	43.57	-116.22	871	2858			
Google Earth, WGS84	**43.568**	**-116.211**	**871**	2858			
NED, NAD83							

Surface data quality assurance audit parameters: Dry bulb temperature, wind direction, and wind speed.

Upper air data quality assurance audit parameters: Pressure, height, and temperature.

Randomize NWS winds? No

The use of hourly-averaged wind directions from AERMINUTE eliminates the need to randomize the wind directions associated with standard NWS observations, which are reported to the nearest 10 degrees.

Ref: Fox, Tyler, EPA Air Quality Modeling Group, Use of ASOS meteorological data in AERMOD dispersion modeling, March 8, 2013, http://www.epa.gov/scram001/guidance/clarification/20130308_Met_Data_Clarification.pdf

Adjust ASOS winds for truncation? Yes

Wind speed threshold for 1-minute ASOS winds: 0.5 m/s, per March 8, 2013 Fox memo.

5. METEOROLOGICAL STATION LOCATIONS

Figure 5-1. SURFACE AND UPPER AIR MET STATIONS

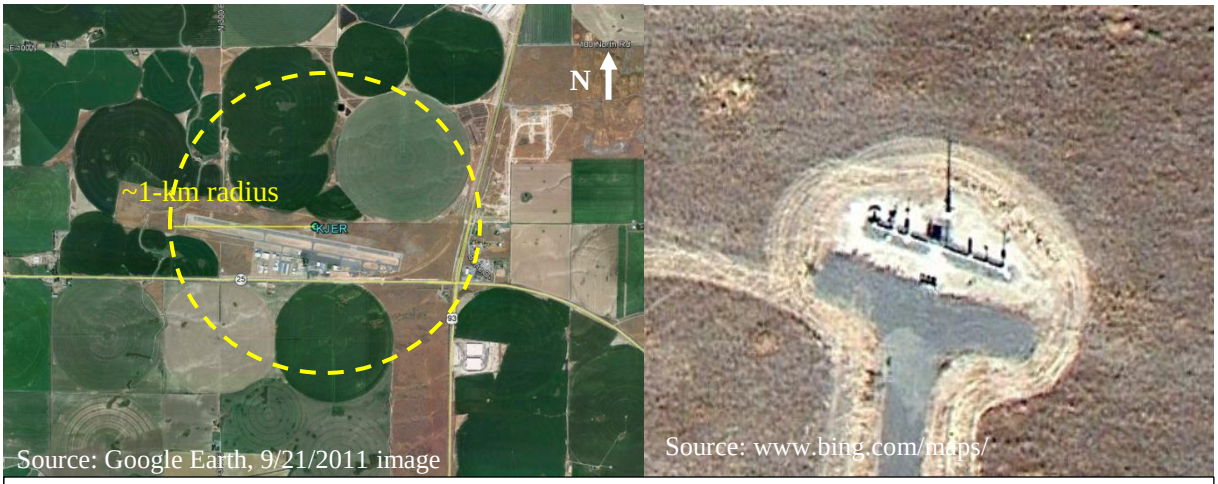


Figure 5-2. SURFACE DATA LOCATION: JEROME COUNTY AIRPORT, NWS AND ASOS

Figure 5-3. UPPER AIR SOUNDINGS LOCATION – BOISE NATIONAL WEATHER SERVICE STATION

6. LAND COVER

At this time, AERSURFACE accepts only 1992 NLCD data as input for determining three surface characteristics: the surface roughness length z_0, albedo, and Bowen ratio. Of the three, changes in the surface roughness length typically have the greatest effect on modeled concentrations.[3] The surface roughness length is calculated as the inverse-distance weighted geometric mean of gridded roughness values within 1 km of the wind measurement site, based on a maximum of 12 user-defined wind sectors.

A comparison of a July 15, 1992 image and a September 21, 2011 image in Google Earth shows that land use within a 1- km radius of the surface station has not changed substantially since 1992.

Based on the 2008-2012 wind rose, changes to land use in the 0°-30°, 90°-210° and 270°-360° sectors will have little or no effect on modeled concentrations, because winds rarely come from these directions. No adjustments have been made to the 1992 NLCD data set in this case because 1) the observed changes to land use appear to be minor, 2) of the uncertainties associated with using NLCD data to determine surface roughness lengths, and 3) DEQ's goals include streamlining data processing and ensuring that calculated surface characteristics are reproducible as well as representative.

In AERMET, selecting the "airport" option assigns more weight to runways and roads than buildings for the Commercial/Industrial/Transportation land cover category. The "non-airport" option assigns more weight to buildings for this category. *Use the "airport" option for the Jerome met data set.*

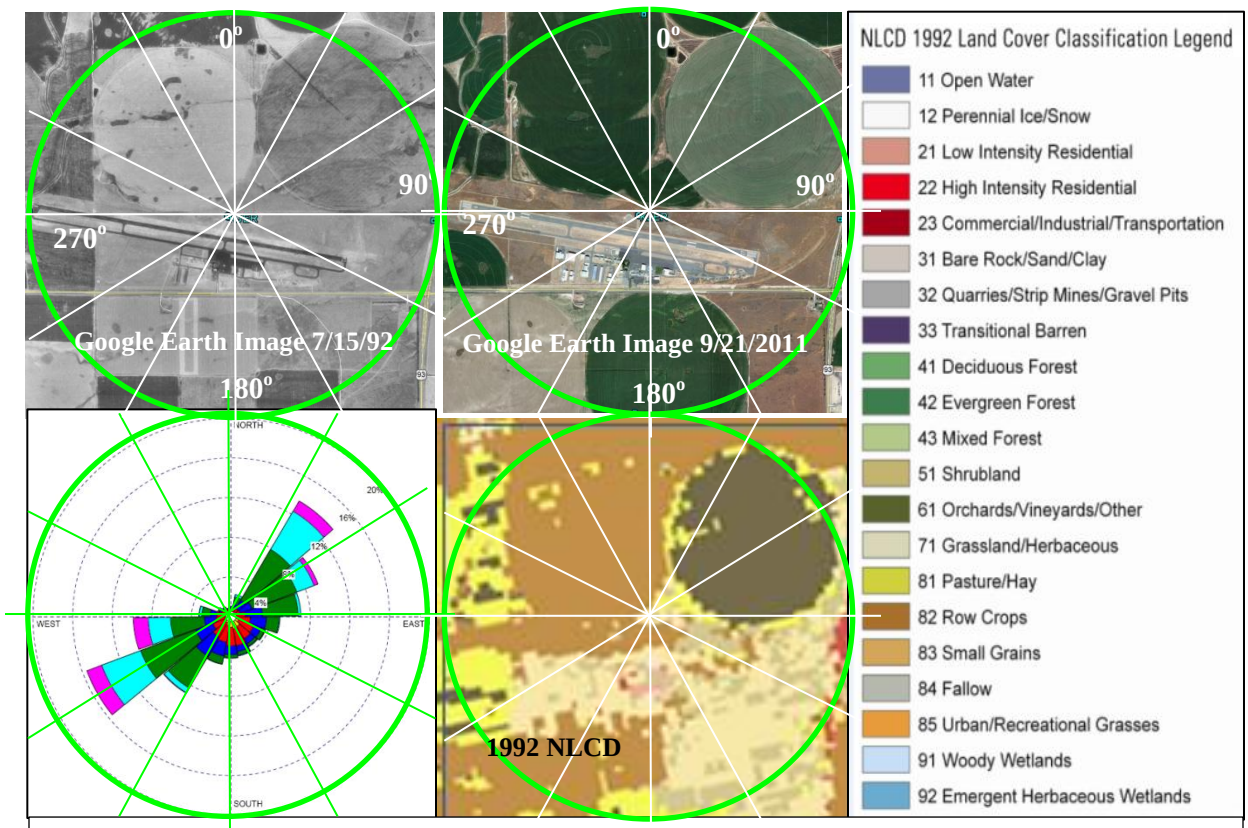


Figure 6-1. COMPARISON OF LAND USEWITHIN 1 KM OF SURFACE SITE (1992 AND 2011 IMAGES)

[3] Carper, E. and E. Ottersburg. *Sensitivity Analysis Study Considering the Selection of Appropriate Land-Use Parameters in AERMOD Modeling Analysis.* Presented at the 2004 A&WMA Annual Conference, June 2004, accessed October 9, 2013 at www.trinityconsultants.com/WorkArea/DownloadAsset.aspx?id=1627

The Bowen ratio is the ratio of sensible heat to latent heat flux from the ground to the atmosphere, which determines how much solar heating goes to evaporation of surface moisture. The Bowen ratio is based on a simple unweighted geometric mean for a 10 km square domain centered on the surface station site. The albedo is a measure of the reflectivity of a surface, and is calculated based on a simple unweighted arithmetic mean for a 10 km by 10 km domain centered on the surface station site.

As shown in Figure 6-2, land use in the vicinity of the Jerome County Airport has not changed substantially during the past two decades. Values of the Bowen ratio and albedo calculated using 1992 NLCD data should still be representative for processing meteorological data collected during the period from 2008 through 2012.

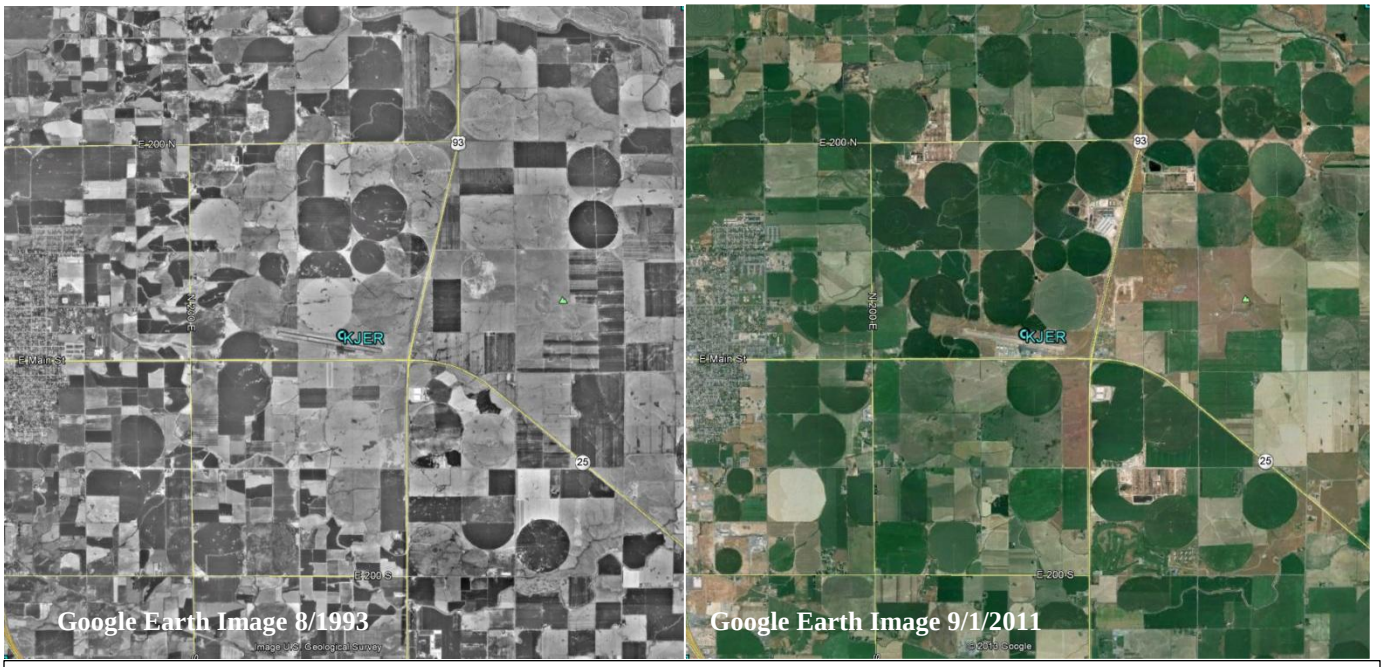


Figure 6-2. COMPARISON OF LAND USEIN A 10-KM DOMAIN CENTERED ON SURFACE SITE (1993 & 2011 IMAGES)

7. CLIMATE/SURFACE MOISTURE CONDITIONS

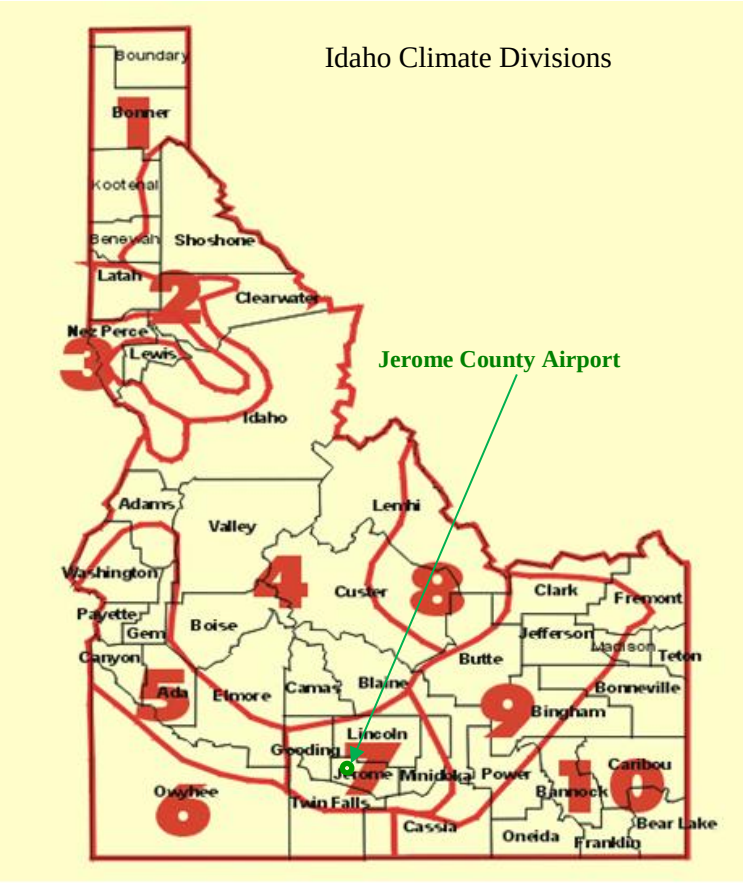
The Jerome County Airport is located near the center of Idaho Climate Division 7 (Central Plains). This division can be described as a cold semi-arid steppe climate. [4] The Jerome area is predominantly irrigated farmland, however, which has an effect on the typical temperatures and humidity ranges.

Table 7-1. Idaho, Climate Division 7

Date	Palmer Z-Index Jan-Dec		AERMET Moisture Conditions
	Value	Anomaly	
198312	2.42	2.38	WET
198412	1.65	1.61	WET
198512	-0.19	-0.23	AVERAGE
198612	0.57	0.53	AVERAGE
198712	-1.53	-1.57	DRY
198812	-0.86	-0.9	DRY
1989			AVERAGE
199012	-1.22	-1.26	DRY
199112	-1.11	-1.15	DRY
199212	-2.28	-2.32	DRY
199312	1.01	0.97	WET
199412	-1.29	-1.33	DRY
199512	1.9	1.86	WET
199612	1.45	1.41	WET
199712	0.82	0.78	AVERAGE
199812	1.42	1.38	WET
199912	0.51	0.47	AVERAGE
200012	-0.73	-0.77	AVERAGE
200112	-1.37	-1.41	DRY
200212	-0.86	-0.9	DRY
200312	-1.01	-1.05	DRY
200412	-0.13	-0.17	AVERAGE
200512	1.47	1.43	WET
200612	1.49	1.45	WET
200712	-1.01	-1.05	DRY
200812	-0.39	-0.43	AVERAGE
200912	0.53	0.49	AVERAGE
201012	0.85	0.81	AVERAGE
201112	1.22	1.18	WET
201212	0.03	-0.01	AVERAGE

The annual average Palmer Z Index anomaly for the representative state climate division was used to determine relative moisture conditions for each year of the met data set based on the 30-year period from 1983 through 2012. Years with annual anomaly values in the lower 30th percentile were considered "Dry" and years with values in the upper 30th percentile were considered "Wet."

30-YEARS	1983-2012 Anomaly
Top 30th percentile, above	**0.906**
Lower 30th percentile, below	**-0.900**



[4] http://weatherspark.com/averages/30637/Jerome-Idaho-United-States

8. SNOW COVER

Snow accumulation during winter months for each year was determined by reviewing NCDC daily snow depth data collected near Jerome (Jerome, Station ID 104670). AERSURFACE was run for average and wet surface moisture conditions and for no snow cover during the winter months of December, January, and February.

The resulting AERSURFACE output values for surface roughness, albedo, and Bowen ratio were NOT adjusted to reflect the relative number of days with and without snow cover during winter months. For example, presume that AERSURFACE outputs a January 2008 albedo of 0.15 for no snow conditions, and a value of 0.33 presuming continuous snow cover. Following a convention developed by EPA Region 5 and states within Region 5,[5] the value for the January 2008 albedo value is manually adjusted in the input text file to:

$$\frac{(2)(0.15) + (29)(0.33)}{31} = 0.32$$

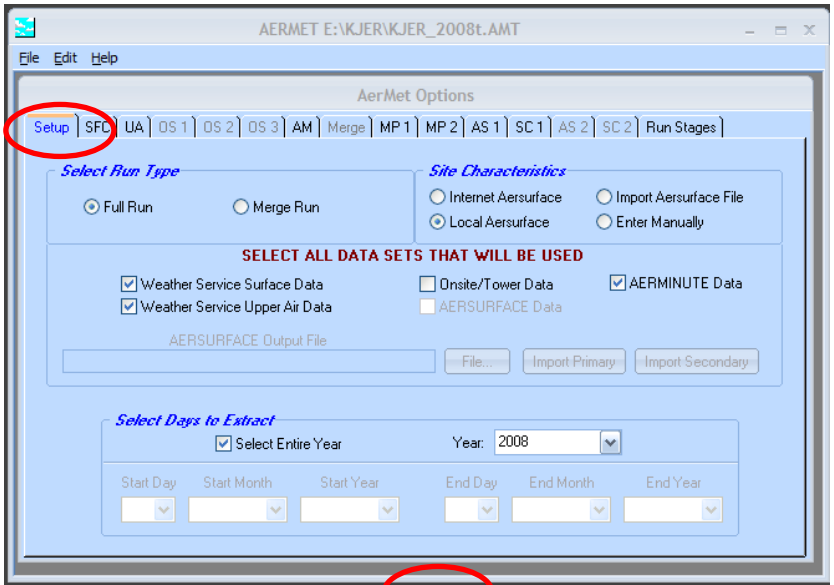
Table 8-1. DAILY SNOW DEPTHS (INCHES) AT JEROME WINTER MONTHS 2008-2012

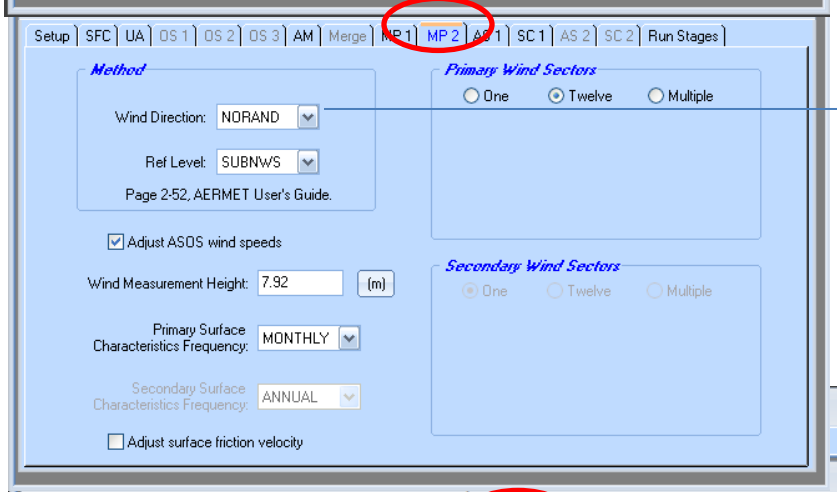
Day: MO_YR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Days	DAYS w/o Snow Cover
JAN2008																																**31**	31
FEB2008																																**29**	29
DEC2008																																**31**	31
JAN2009																																**31**	31
FEB2009																																**28**	28
DEC2009																																**31**	31
JAN2010																																**31**	31
FEB2010																																**28**	28
DEC2010	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	0	0	0	0	0	0	0	**31**	31
JAN2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**31**	31
FEB2011	0	0	0	0	0	0	0	0	0	0	--	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				**28**	28
DEC2011	0	0	--	0	0	0	0	0	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	**31**	31
JAN2012	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	0	0	0	0	**31**	31
FEB2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				**29**	29
DEC2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	0	0	0	0	0	0	0	0	**31**	31

[5] EPA Region 5 and States, *Regional Meteorological Data Processing Protocol*, Draft, May 6, 2011, accessed October 9, 2013 at http://www.pca.state.mn.us/index.php/view-document.html?gid=17386

9. SCREEN SHOTS OF DATA PROCESSING STEPS

SCREEN SHOTS – Oris Solutions' BEEST AERMET – SETUP, MP2, AND AERSURFACE TABS

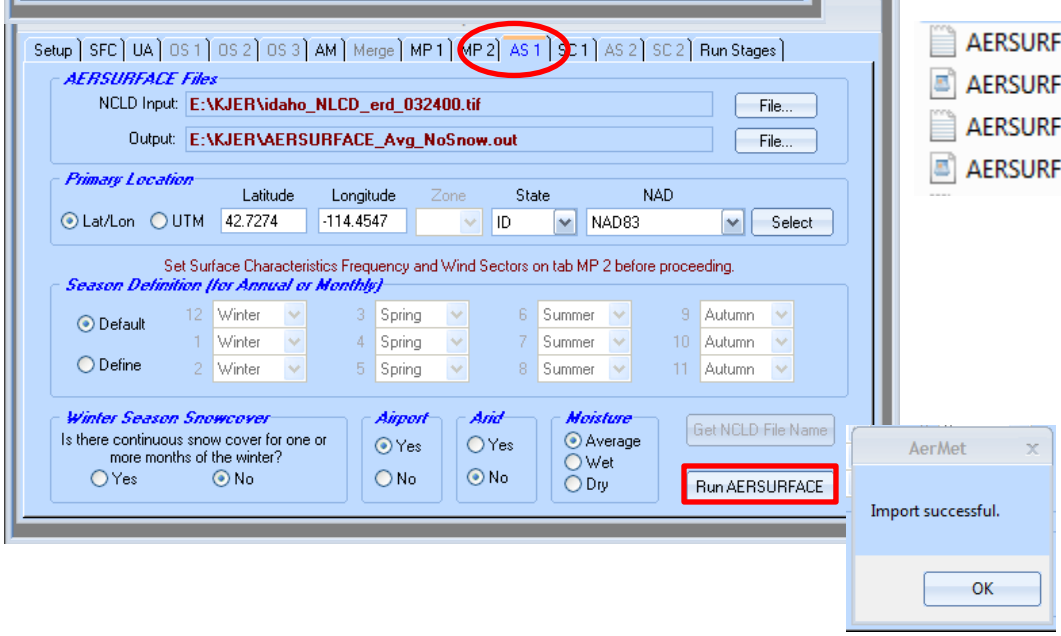


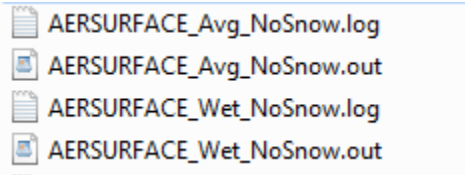


The use of hourly-averaged wind directions from AERMINUTE eliminates the need to randomize the wind directions associated with standard NWS observations, which are reported to the nearest 10 degrees.

Ref: Fox, Tyler, EPA Air Quality Modeling Group, Use of ASOS meteorological data in AERMOD dispersion modeling, March 8, 2013, http://www.epa.gov/scram001/guidance/clarification/20130308_Met_Data_Clarification.pdf

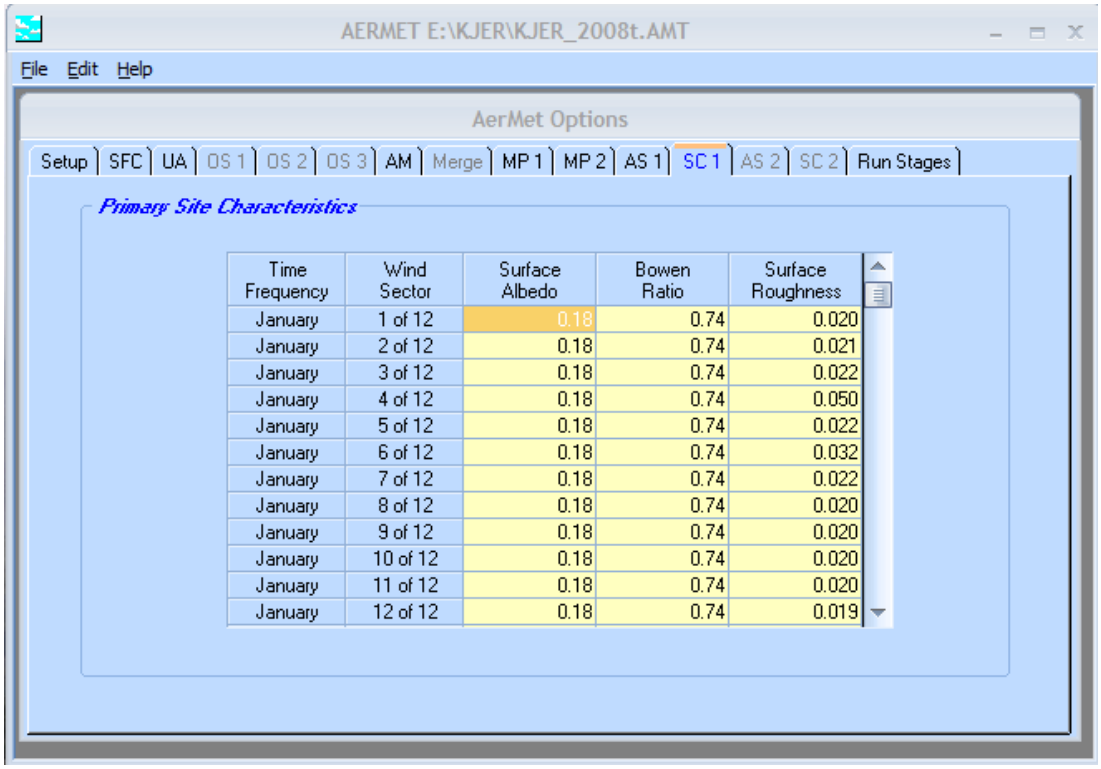
Run AERSURFACE for average conditions, without snow. Run AERMET for years 2008-2010 and 2012. Change the settings and output file name for wet conditions without snow. Rerun AERSURFACE, then run AERMET for 2011





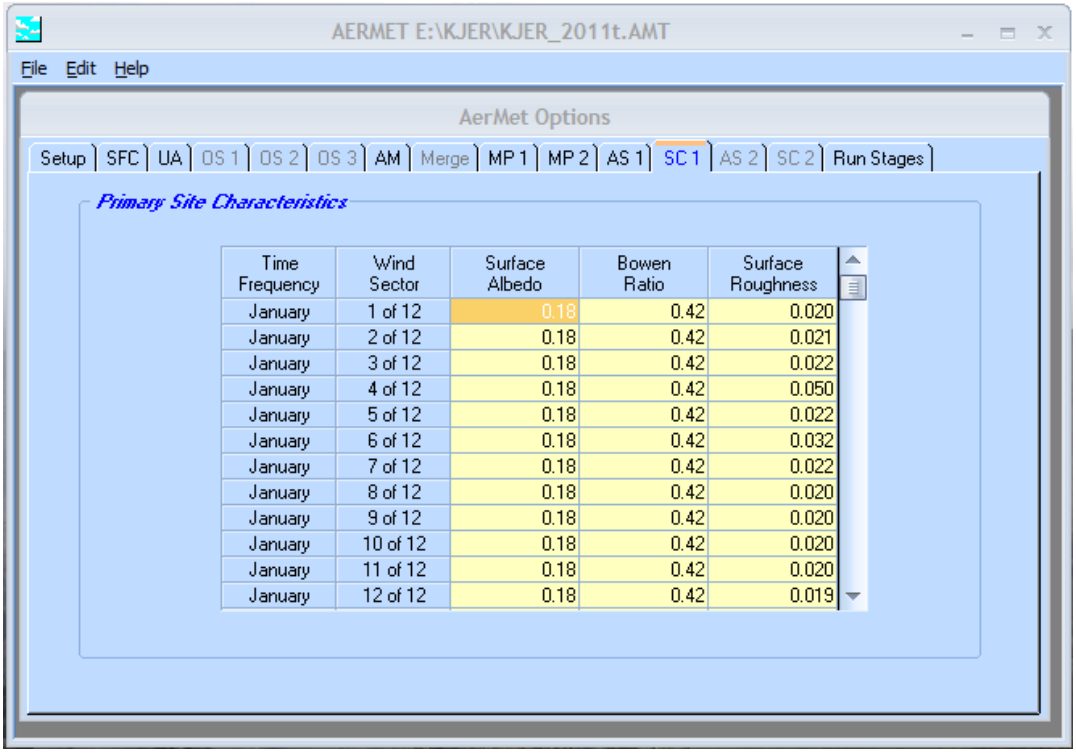
SCREEN SHOTS – Oris Solutions' BEEST AERMET – SC1 TAB

MOISTURE = AVERAGE, NO SNOW, used for years 2008-2010 and 2012



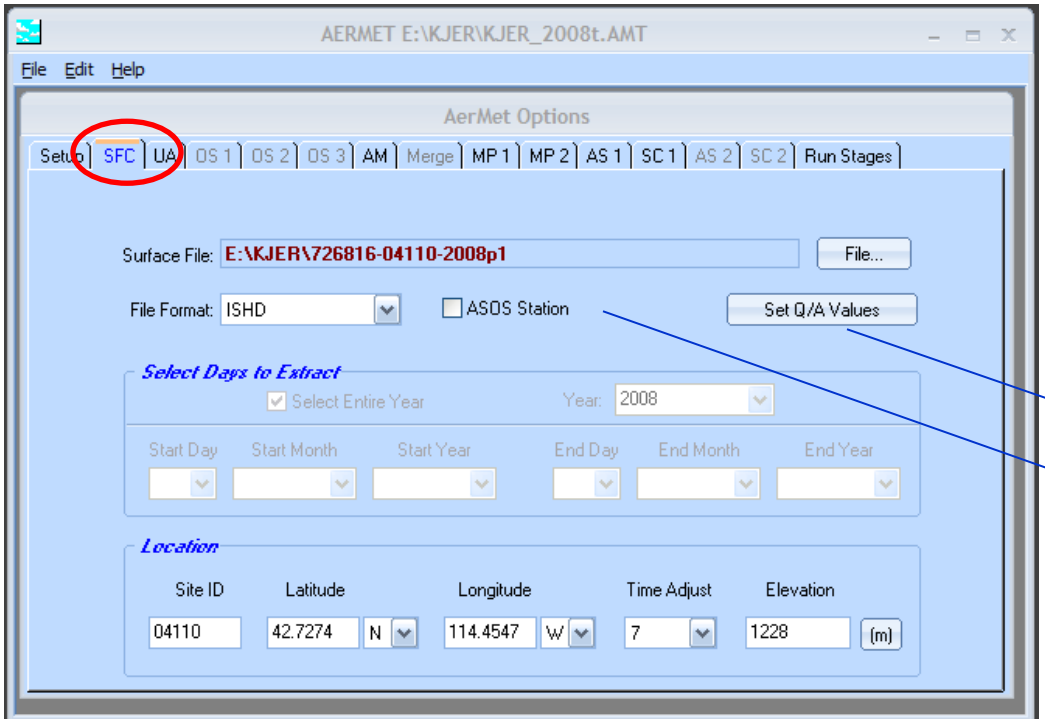
Time Frequency	Wind Sector	Surface Albedo	Bowen Ratio	Surface Roughness
January	1 of 12	0.18	0.74	0.020
January	2 of 12	0.18	0.74	0.021
January	3 of 12	0.18	0.74	0.022
January	4 of 12	0.18	0.74	0.050
January	5 of 12	0.18	0.74	0.022
January	6 of 12	0.18	0.74	0.032
January	7 of 12	0.18	0.74	0.022
January	8 of 12	0.18	0.74	0.020
January	9 of 12	0.18	0.74	0.020
January	10 of 12	0.18	0.74	0.020
January	11 of 12	0.18	0.74	0.020
January	12 of 12	0.18	0.74	0.019

MOISTURE = WET, NO SNOW, used for year 2011



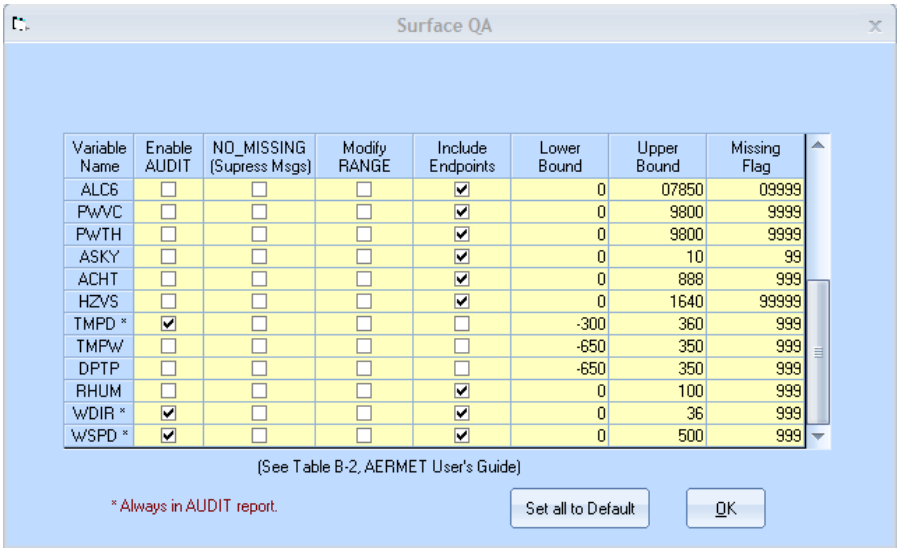
Time Frequency	Wind Sector	Surface Albedo	Bowen Ratio	Surface Roughness
January	1 of 12	0.18	0.42	0.020
January	2 of 12	0.18	0.42	0.021
January	3 of 12	0.18	0.42	0.022
January	4 of 12	0.18	0.42	0.050
January	5 of 12	0.18	0.42	0.022
January	6 of 12	0.18	0.42	0.032
January	7 of 12	0.18	0.42	0.022
January	8 of 12	0.18	0.42	0.020
January	9 of 12	0.18	0.42	0.020
January	10 of 12	0.18	0.42	0.020
January	11 of 12	0.18	0.42	0.020
January	12 of 12	0.18	0.42	0.019

SCREEN SHOTS – Oris Solutions' BEEST AERMET –Select SURFACE DATA



NOTE: If the ASOS Commission Date for the Surface Station is in the ASOS commission list (see AERMET source code, mod_AsosCommDates.for) *AND the ASOS Station box is checked, AERMET will return the following warning message in the Stage 1 Report (*.RP1):*

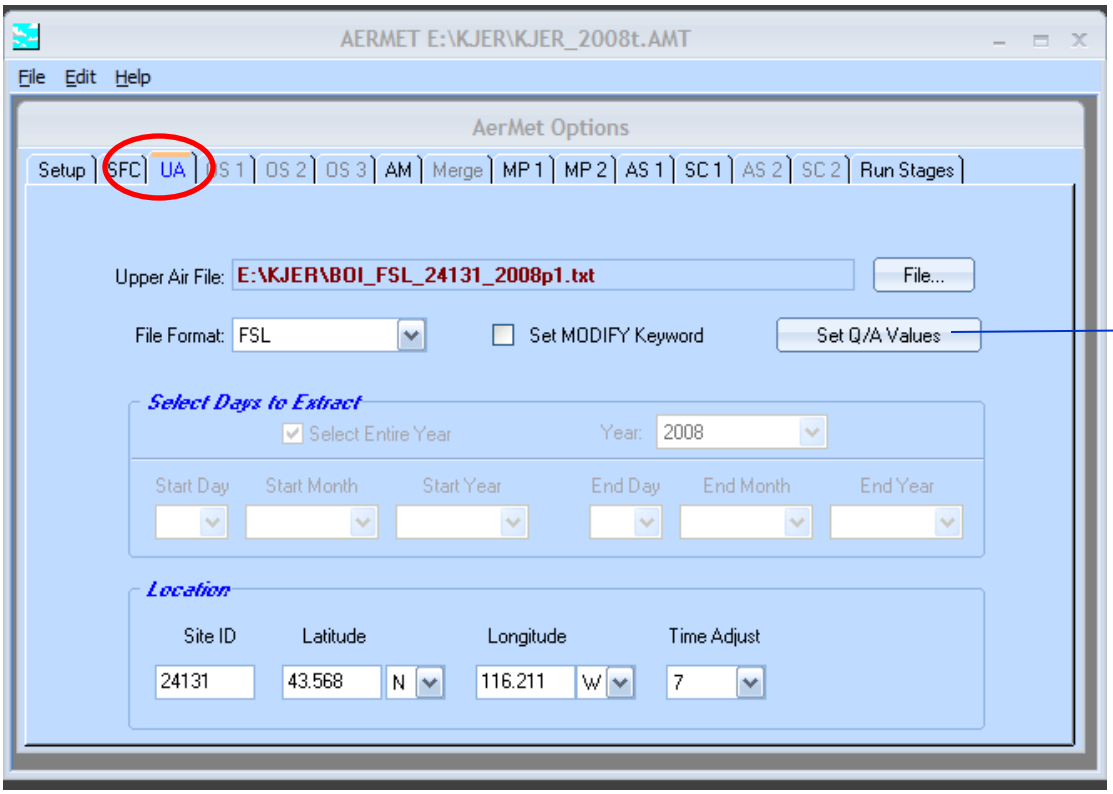
**** WARNING MESSAGES ****
9 SURFACE W06 DATCRD : ASOS flag specified for ISHD on DATA keyword - use only if not in AERMET ASOS commission list.



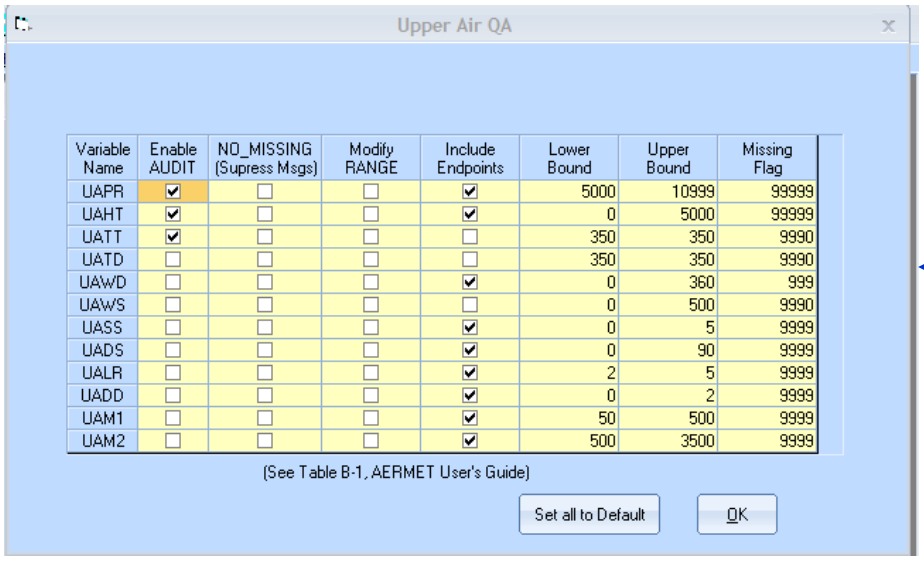
Variable Name	Enable AUDIT	NO_MISSING (Supress Msgs)	Modify RANGE	Include Endpoints	Lower Bound	Upper Bound	Missing Flag
ALC6	☐	☐	☐	☑	0	07850	09999
PWVC	☐	☐	☐	☑	0	9800	9999
PWTH	☐	☐	☐	☑	0	9800	9999
ASKY	☐	☐	☐	☑	0	10	99
ACHT	☐	☐	☐	☑	0	888	999
HZVS	☐	☐	☐	☑	0	1640	99999
TMPD *	☑	☐	☐	☐	-300	360	999
TMPW	☐	☐	☐	☐	-650	350	999
DPTP	☐	☐	☐	☐	-650	350	999
RHUM	☐	☐	☐	☑	0	100	999
WDIR *	☑	☐	☐	☑	0	36	999
WSPD *	☑	☐	☐	☑	0	500	999

Default surface data quality assurance audit parameters: Dry bulb temperature, wind direction, and wind speed.

SCREEN SHOTS – Oris Solutions' BEEST AERMET –Select UPPER AIR DATA

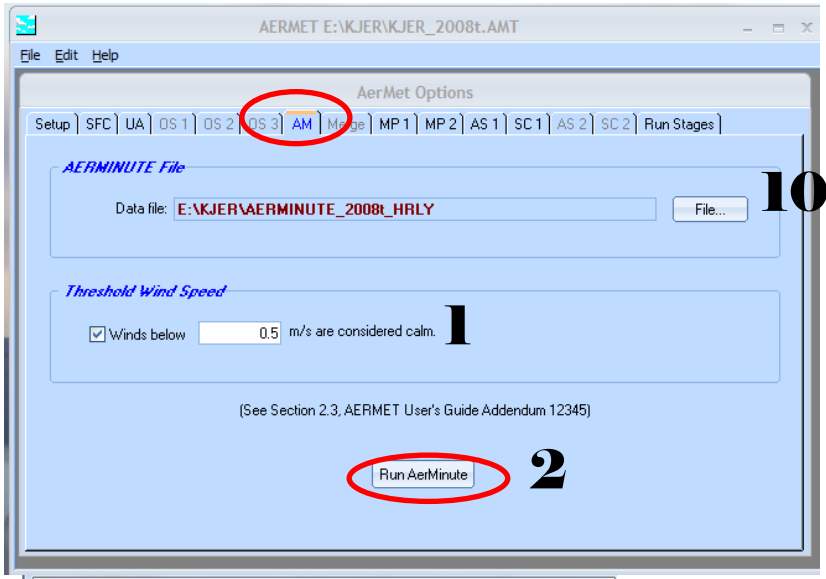


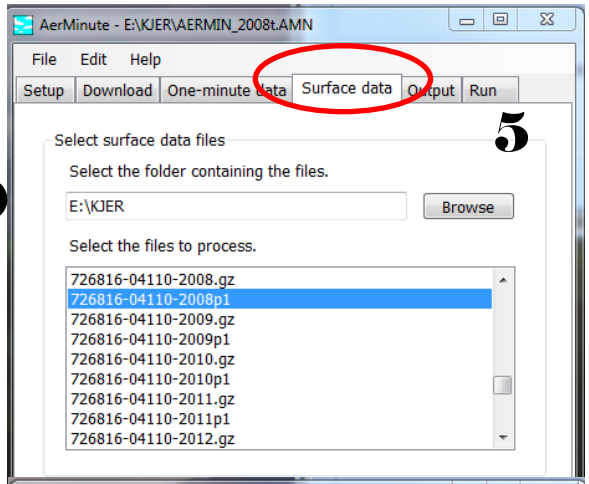
AERMET uses only height, pressure, and temperature from the upper air soundings. Suggested upper air data quality assurance audit parameters: Pressure, height, and temperature.

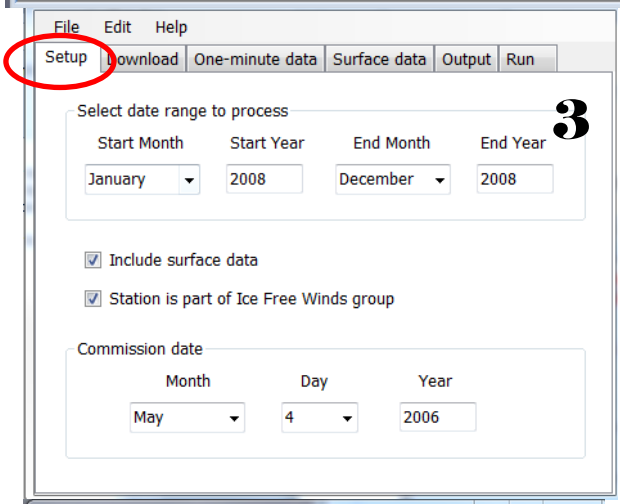


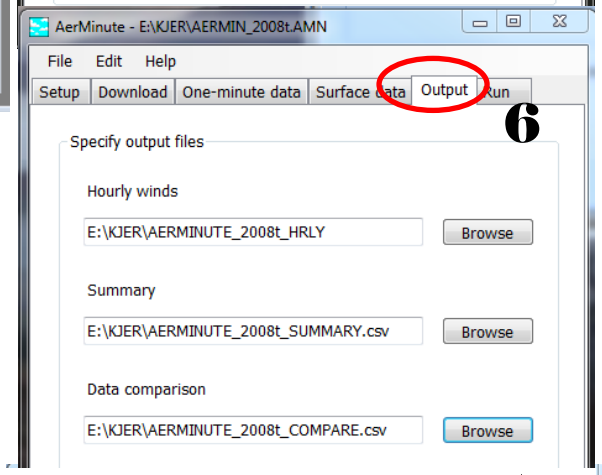
Variable Name	Enable AUDIT	NO_MISSING (Supress Msgs)	Modify RANGE	Include Endpoints	Lower Bound	Upper Bound	Missing Flag
UAPR	☑	☐	☐	☑	5000	10999	99999
UAHT	☑	☐	☐	☑	0	5000	99999
UATT	☑	☐	☐	☐	350	350	9990
UATD	☐	☐	☐	☐	350	350	9990
UAWD	☐	☐	☐	☑	0	360	999
UAWS	☐	☐	☐	☐	0	500	9990
UASS	☐	☐	☐	☑	0	5	9999
UADS	☐	☐	☐	☑	0	90	9999
UALR	☐	☐	☐	☑	2	5	9999
UADD	☐	☐	☐	☑	0	2	9999
UAM1	☐	☐	☐	☑	50	500	9999
UAM2	☐	☐	☐	☑	500	3500	9999

SCREEN SHOTS – Oris Solutions' BEEST AERMET –AERMINUTE (AM) TAB, *RUN AERMINUTE*

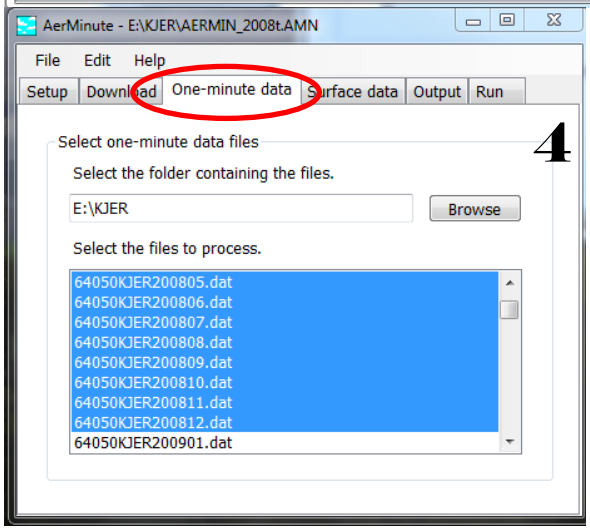


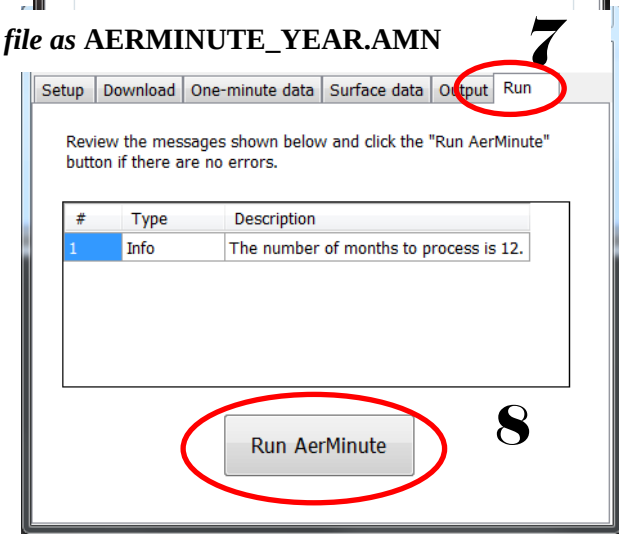






***Save file as* AERMINUTE_YEAR.AMN**



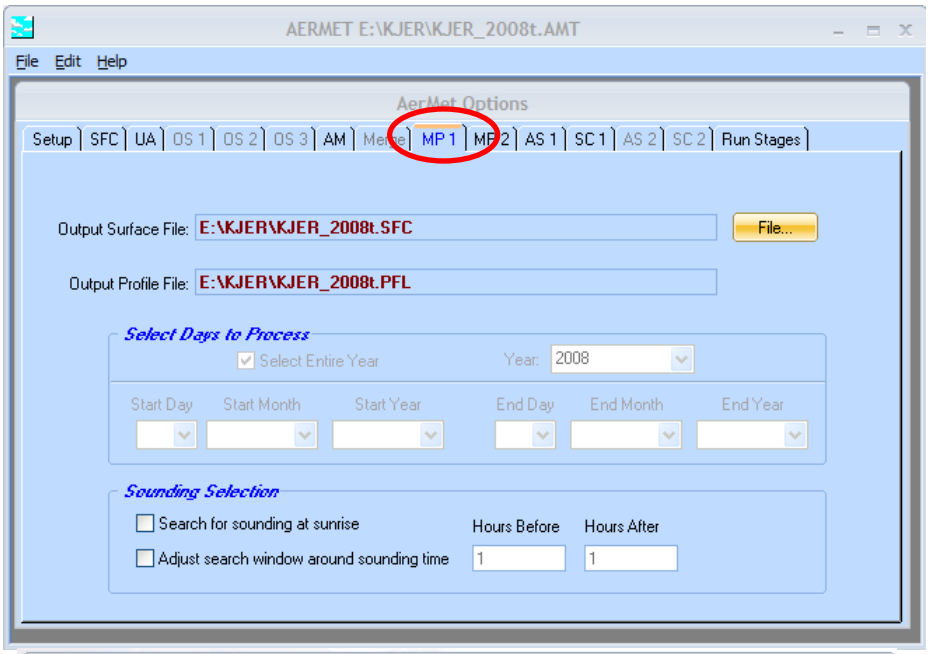


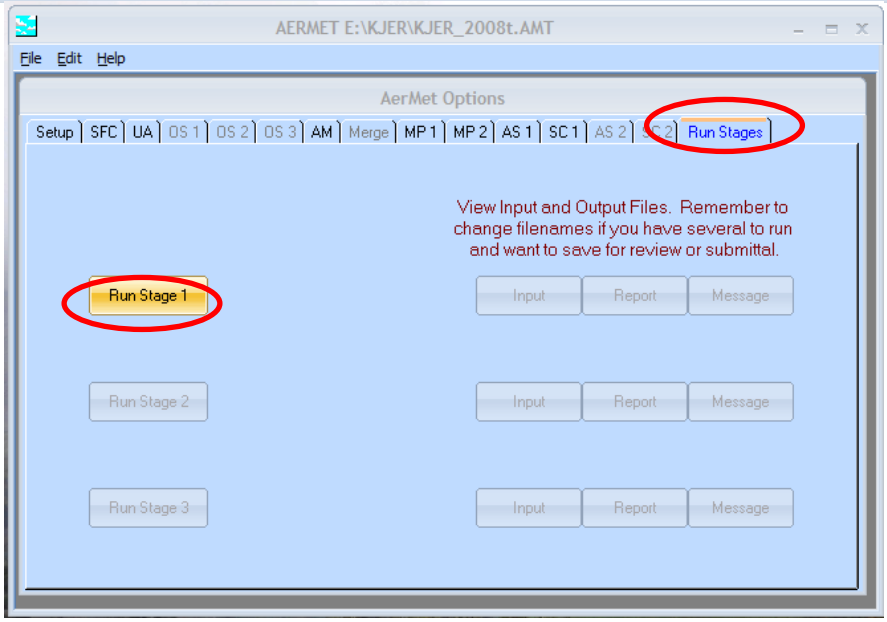
Rename: **9**

aerminute.log	to	aerminute_YEAR.log
bad_records.dat	to	bad_records_YEAR.dat
check_records.dat	to	check_records_YEAR.dat
good_records.dat	to	good_records_YEAR.dat

*.AMT file: *Save as* KBOI_YEAR, increasing to the next year. Repeat steps 1 through 10.

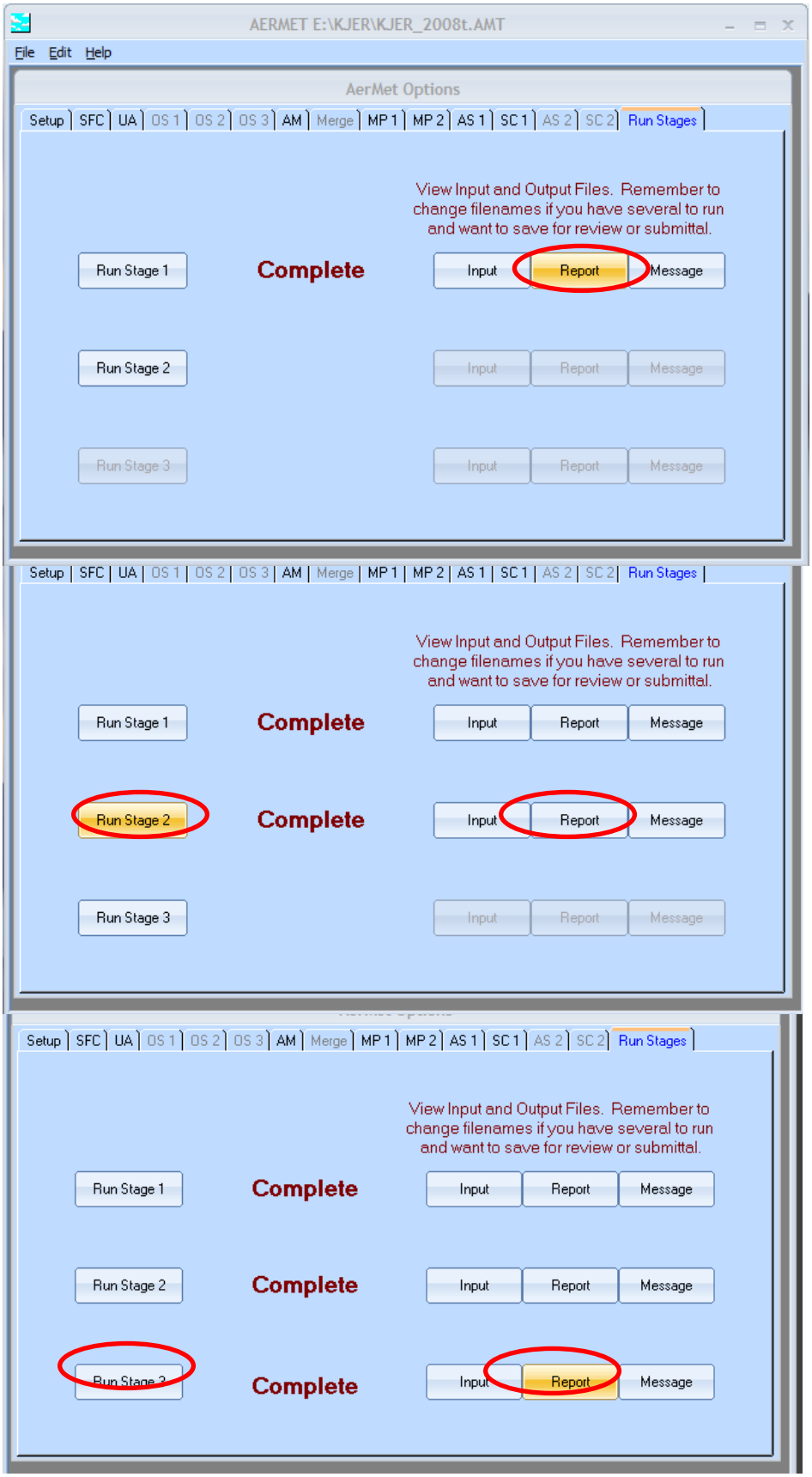
SCREEN SHOTS – Oris Solutions' BEEST AERMET – MP1 TAB AND **RUN** AERMET STAGE 1





Rename Discarded_ISHD_Records.dat to
Discarded_ISHD_Records_YEARt.dat

SCREEN SHOTS – Oris Solutions' BEEST AERMET – RUN AERMET STAGE 2 & STAGE 3



10. AERMOD, SIMPLE STACK, DATA COMPLETENESS RESULTS

AERMOD was run using each year of the met data sets as well as concatenated five-year SFC and PFL files for the following simple case:

Output: High 1st high, 1-hr averaging period, pollutant = OTHER

Emission Rate: 1 lb/hr

Source: Simple Stack

- Release Type: Vertical, uncapped
- Stack Height: 10 m
- Stack Dia: 0.5 m
- Exit Velocity: 25 m/s
- Exit Temp: 0 K (Ambient)
- Base Elev: 436 m

Terrain: Flat

Downwash: None

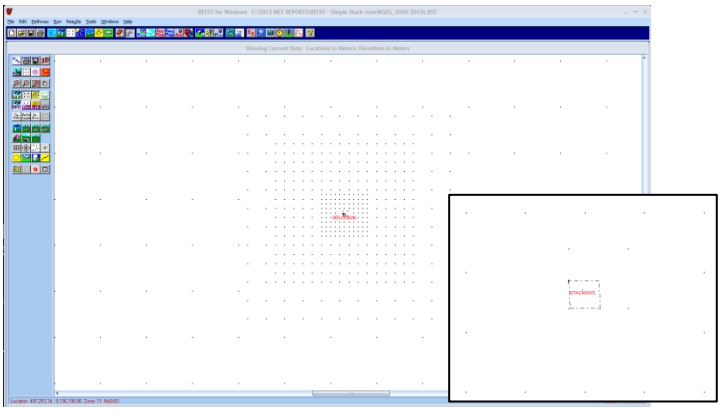
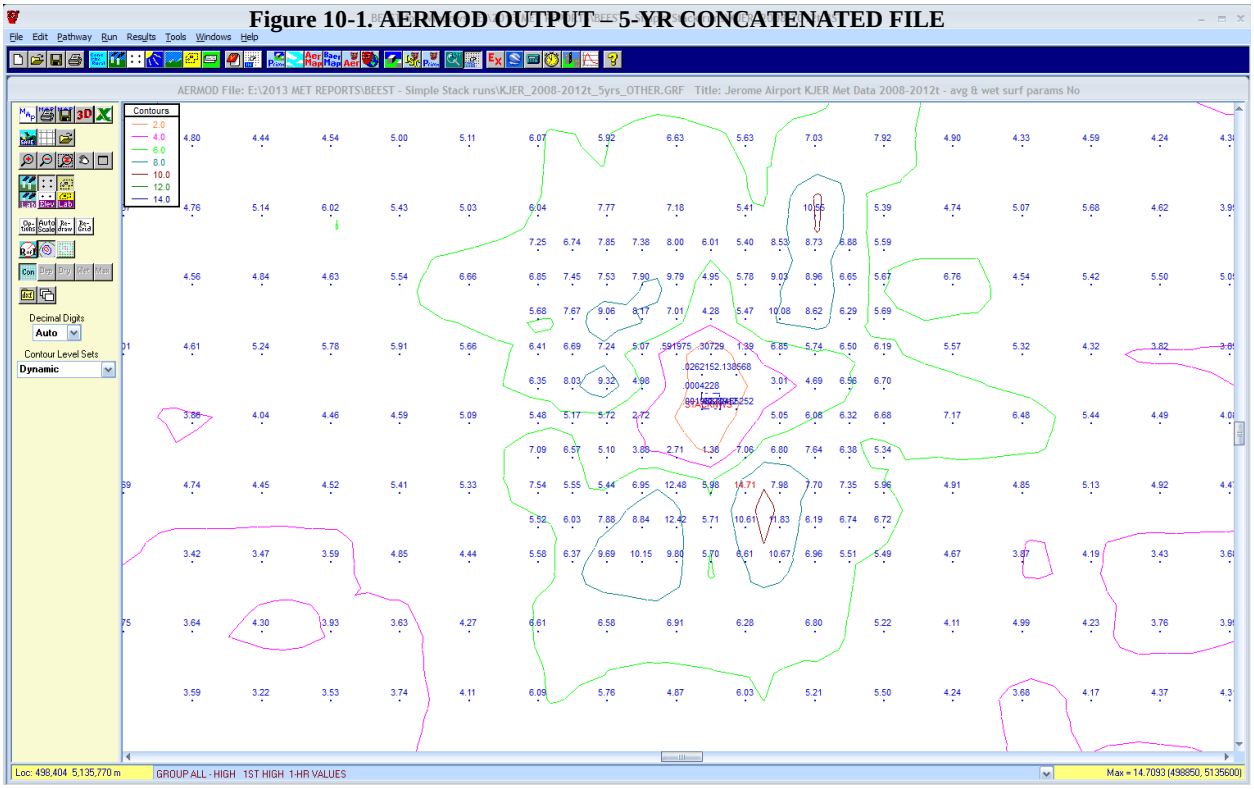


Table 10-1. AERMOD RESULTS

Year(s)	Max Impact µg/m^3	Max Hour	Percent Missing	Percent Complete
2008	9.32	08073107	1.40%	98.6%
2009	14.7	09082619	1.10%	98.9%
2010	9.01	10103017	0.48%	99.5%
2011	10.1	11103109	2.31%	97.7%
2012	12.5	12102117	2.03%	98.0%
2008-2012	14.7	09082619	1.46%	98.5%

Figure 10-1. AERMOD OUTPUT – 5-YR CONCATENATED FILE



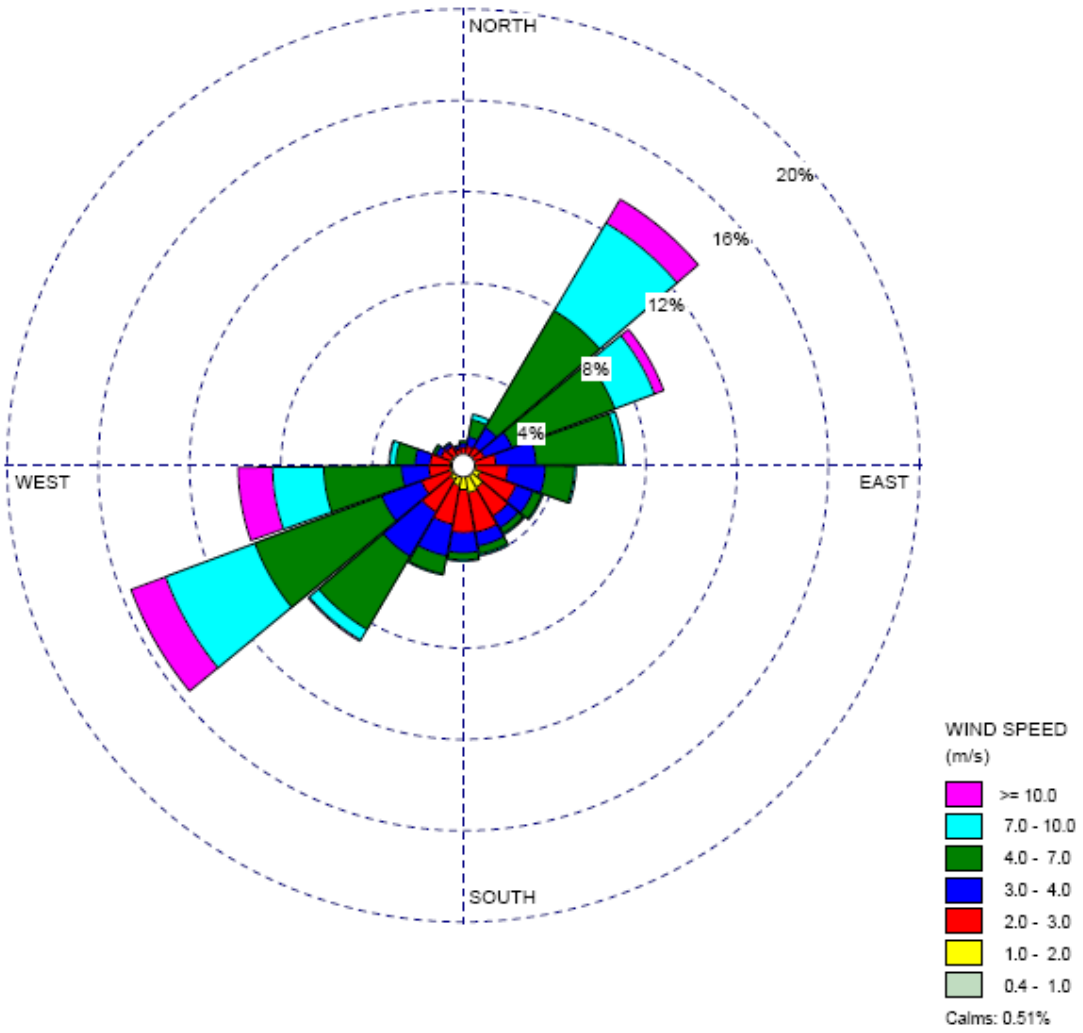
11. WIND ROSE

WIND ROSE PLOT:

JEROME COUNTY AIRPORT 2008-2012t
NWS Surface Data, ASOS, 1-Min Wind Threshold = 0.5 m/s

DISPLAY:

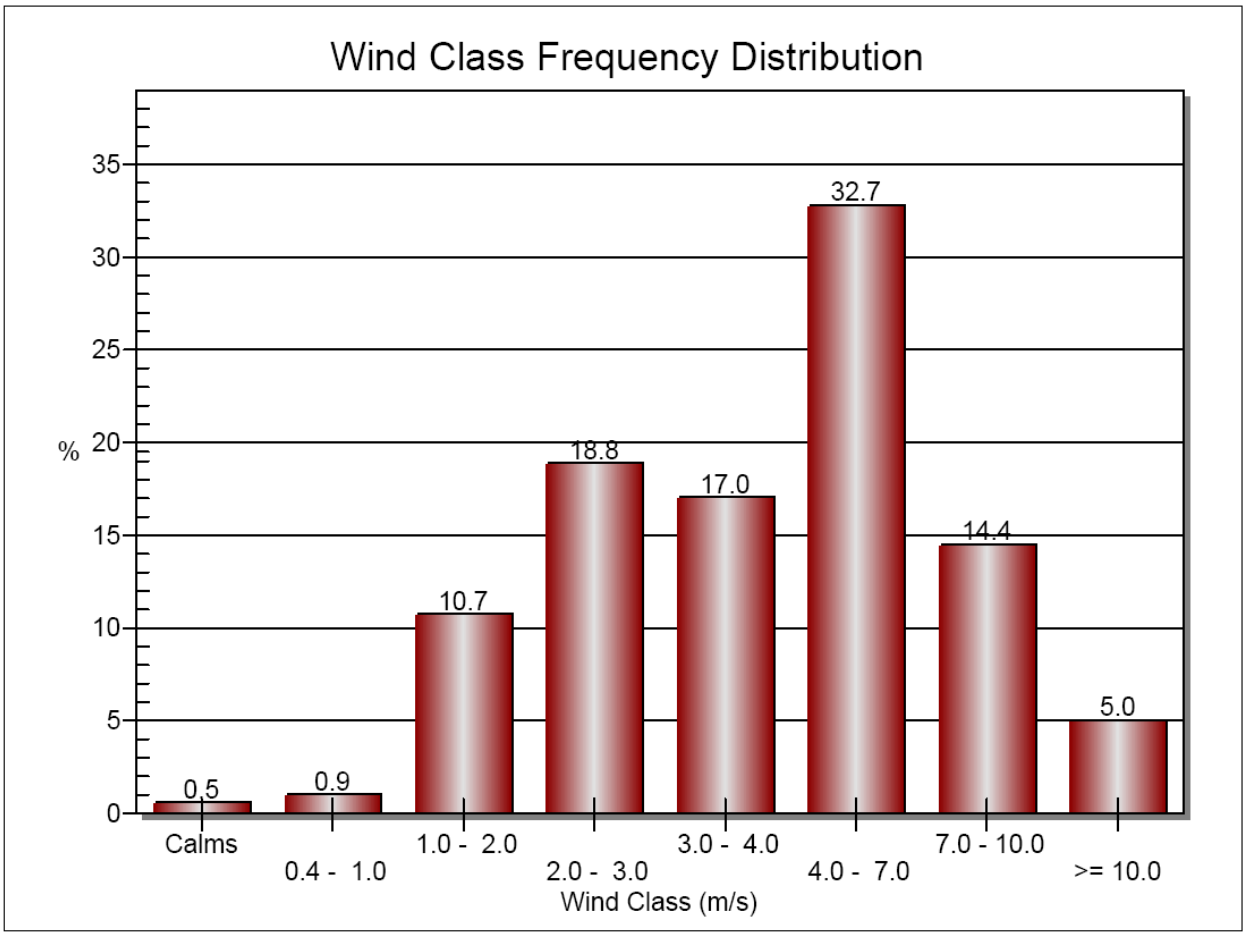
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
JEROME AIRPORT (KJER) 726816-04110 42.7274, -114.4647, 1228m ASOS Winds at 7.92 m BOISE UPPER AIR BOI, 24131 43.568, -116.211, 871m WIND DIRECTIONS = 18	**Start Date: 1/1/2008 - 00:00** **End Date: 12/31/2012 - 17:00**	**IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY**	
		MODELER: **Cheryl Robinson, P.E.**	
	CALM WINDS: **0.51%**	TOTAL COUNT: **43654 hrs.**	
	AVG. WIND SPEED: **4.75 m/s**	DATE: **10/31/2013**	PROJECT NO.: **DEQ 2013**

WRPLOT View - Lakes Environmental Software

12. WIND CLASS FREQUENCY PROFILE



WRPLOT View 8.1.0 - Lakes Environmental Software

Jerome County Airport, KJER, 2008-2012t 10/31/13

APPENDIX G: MODELING INPUT AND OUTPUT FILES