TECHNICAL REVIEW DOCUMENT
For
OPERATING PERMIT 04OPJE272
to be issued to:

Plains End, LLC – Plains End Generating Station
Jefferson County
Source ID 0590864

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March, June and July, 2009
Revised September and December 2009 and January 2010

I. Purpose:

This document establishes the basis for decisions made regarding the Applicable Requirements, Emission Factors, Monitoring Plan and Compliance Status of Emission Units covered within the Operating Permit proposed for this site. It is designed for reference during review of the proposed permit by the EPA, the Public and other interested parties.

A transitional Title V permit application was originally submitted for this facility on March 24, 2003. At that time, it was expected that the facility would obtain a minor construction permit that would limit emissions below the major source level and would not be subject to the Title V permit program. A complete Title V permit application was submitted on March 24, 2004 for the facility and at the time it was expected that the facility would obtain minor source status in the near future. In August 2004, the source submitted a construction permit application to expand the facility and a construction permit was issued for the proposed new equipment on December 21, 2004. With the issuance of a construction permit for the expansion, the facility would not be able to obtain minor source status; however, the installation of the proposed new equipment was dependent on Plains End being awarded a contract to provide additional power to Xcel Energy. As a result, the Division indicated in a letter dated August 9, 2005 that we would continue to delay processing of the Title V permit application but that we would expect that a revised Title V permit application be submitted within six months of startup of the proposed new equipment. A revised Title V permit application was submitted on October 7, 2008.

Conclusions made in this report are based on information provided by the applicant in the revised Title V permit application submitted October 7, 2008 (which replace the March 24, 2004 application), additional information received on August 4, 2009, comments on the draft permit and technical review document submitted on October 22, 2009, comments on the draft permit and technical review document submit on January 11, 2010 during the public comment period, various telephone conversations and e-mail correspondence with the source and review of Division files. This narrative is intended

as an adjunct to the reviewer and has no legal standing.

Any revisions made to the underlying construction permits associated with this facility made in conjunction with the processing of this operating permit application have been reviewed in accordance with the requirements of Regulation No. 3, Part B, Construction Permits, and have been found to meet all applicable substantive and procedural requirements. This operating permit incorporates and shall be considered to be a combined construction/operating permit for any such revision, and the permittee shall be allowed to operate under the revised conditions upon issuance of this operating permit without applying for a revision to this permit or for an additional or revised Construction Permit.

II. Source Description

The Plains End Generating Station consists of thirty four (34) natural gas fired internal combustion engines used to generate electricity. The facility was initially constructed with twenty (20) engines, each rated at 5,650 kW, for a total capacity of 113 MW (referred to as Plains End I). A second phase to the facility was added later with fourteen (14) engines, each rated at 8,439 kW, for a capacity of 118 MW (referred to as Plains End II). The engines are each equipped with selective catalytic reduction (SCR) to reduce NO_X emissions and oxidation catalysts to reduce CO, VOC and HAP emissions. At Plains End I, the engines each have a dedicated stack and these stacks are bundled into groups of five. At Plains End II, each engine has a dedicated stack. In addition, there are two diesel fuel-fired internal combustion engines that drive an emergency generator and fire pump located at the facility that are included as significant emission units in Section II of the permit.

The facility is located at 8950 Highway 93 (~ one mile south of the intersection of Highways 93 and 72), in Golden, which is in Jefferson County, Colorado. The area in which the plant operates is designated as attainment/maintenance for particulate matter less than 10 microns in diameter (PM_{10}). Under that classification, all SIP-approved requirements for PM_{10} will continue to apply in order to prevent backsliding under the provisions of Section 110(l) of the Federal Clean Air Act. The area is classified as non-attainment for ozone and is part of the 8-hour Ozone Control Area as defined in Colorado Regulation No. 7, Section II.A.1.

There are no affected states within 50 miles of the facility. Rocky Mountain National Park and Eagles Nest and Rawah National Wilderness Areas, all Federal Class I designated areas, are within 100 km of the facility.

The facility is considered to be a major stationary source (potential to emit > 100 tpy of any criteria pollutant). Facility wide emissions are as follows:

	Potential To Emit							
Emission Unit	PM	PM_{10}	SO_2	NO_X	CO	VOC	Ammonia[1]	HAPS
Twenty Engines (Plains End I)	98.7	98.7	2.1	97.2	89.9	97.2	31.8	See Table on Page 29
Fourteen Engines (Plains End II)	145.9	145.9	2.4	83.3	135.4	135.4	52.1	
Emergency Generator	0.09	0.09	0.08	3.62	0.50	0.19		
Fire Pump Engine	0.05	0.05	0.05	1.19	0.08	0.05		
Insignificant Heaters[2]	0.14	0.14	0.01	1.86	1.56	0.10		
Total	244.88	244.88	4.64	187.17	227.44	232.94	83.9	12.22

[1]Ammonia is a non-criteria reportable pollutant but is not a HAP. Ammonia emissions are based on the manufacturer's estimated emission rates provided in the Title V permit application.
[2]This equipment is included in the insignificant activity list in Appendix A of the permit but emissions from the equipment have been included here for completeness.

Potential to emit of criteria pollutants in the above table is based on permitted emission limitations for the 34 engines. Potential to emit for the emergency generator is based on the following: for NO_X permitted emissions, for PM, PM_{10}, VOC and CO emissions are based on manufacturer's data, maximum hp and 1,000 hrs per year of operation (which is the basis for the emission and fuel consumption limits in the permit); and for SO_2, emissions are based on the NSPS fuel sulfur limit (500 ppm). Potential to emit from the fire pump is based on the following: for PM, PM_{10}, NO_X VOC and CO emissions are based on manufacturer's data, maximum hp and 1,450 hours per year of operation (the insignificant level specified in Reg 3, Part C, Section II.E.3.xxx(i)) and for SO_2, emissions are based on the NSPS fuel sulfur limit (500 ppm). Emissions from the insignificant heaters are based on the design heat input rate, 8760 hours per year of operation and emission factors from AP-42, Section 1.4 (dated 3/98), Tables 1.4-1 and 1.4-2 (AP-42 emission factors were converted to units of lbs/mmBtu based on a heat content of 1020 Btu/scf as indicated in footnotes).

The breakdown of HAP emissions for each emission unit is provided for in the table on page 29 of this document. HAPs were estimated as follows:

<u>Plains End I</u> – Formaldehyde emissions were based on the highest performance test result for formaldehyde multiplied by 1.2. Other HAPs were estimated based on the ratio of individual HAPS as indicated in AP-42, Section 3.1 (dated 7/00), Table 3.2-2. AP-42 HAP emission factors were summed and a ratio was determined for each HAP. A "total" HAP emission factor was estimated by dividing the highest performance test result for formaldehyde by the AP-42 formaldehyde ratio. Emission factors for other HAPS were determined by multiplying this total HAP emission factor by the AP-42 ratio for the individual HAP. Emissions were based on the permitted fuel consumption limit and a natural gas heat content of 941 Btu/scf.

Plains End II – Formaldehyde emissions were based on the average performance test result multiplied by 5. Other HAPS were estimated using performance test based HAP emission factors using the AP-42 methodology discussed above for Plains End I. Emissions were based on the permitted fuel consumption limit and a natural gas heat content of 941 Btu/scf.

Emergency generator – HAP emissions from the emergency generator were based on emission factors from AP-42, Section 3.4 (dated 10/96), Tables 3.4-3 and 3.4-4, the design heat input rate and 1,000 hours per year of operation.

Fire pump engine – HAP emissions from the fire pump engine were based on emission factors from AP-42, Section 3.3 (dated 10/96), Table 3.3-2, the design heat input rate and 1,450 hours per year of operation (insignificant level per Reg 3, Part C, Section II.E.3.xxx(i)).

Insignificant heaters – HAP emission from the heaters were based on emission factors from AP-42, Section 1.4 (dated 3/98), Tables1.4-2 and 1.4-4 (AP-42 emission factors were converted to units of lbs/mmBtu based on a heat content of 1020 Btu/scf as indicated in footnotes), design rate and 8760 hrs per year of operation.

Actual emissions (in tons/yr) are as follows.

	Actual Emissions (tons/yr)						
Emission Unit	PM	PM_{10}	SO_2	NO_X	CO	VOC	HAPS
Plains End I (20 engines)	5.22	5.22	0.33	9.09	12.87	9.84	0.36
Plains End II (14 engines)	5.60	5.60	0.55	7.38	2.46	9.02	
Emergency Generator	0.01	0.01	0.21	0.97	0.12	0.01	1.05
Fire Pump Engine				0.02			
Total	10.83	10.83	1.09	17.46	15.45	18.87	1.41

Actual emissions from Plains End I are based on the actual emissions identified in the Title V permit application submitted on October 7, 2008 (2007 data). Actual emissions from the Plains End II and emergency generator are based on the APENS submitted on May 1, 2009 (2008 data). Actual emissions from the fire pump engine are based on the APEN submitted on August 4, 2009 (2008 data)

Accidental Release Prevention Program (Section 112(r) of the Clean Air Act)

The source indicated that the facility contains no listed substances above the threshold level and therefore is not subject to the risk management plan provisions in section 112(r) of the Act.

Maximum Achievable Control Technology (MACT) Requirements

As indicated previously, the facility was constructed in two phases; the initial phase Plains End I (20 engines) and the final phase Plains End II (14 engines). The initial construction permit application for Plains End I was submitted in 2001 and at the time of application submittal, the area in which the facility was located was designated non-attainment for both ozone (VOC) and PM_{10}; hence the source kept emissions for VOC, PM_{10} and NO_X (a precursor for PM_{10} only at that time) below 100 tons/yr in order to avoid major stationary source non-attainment area new source review (NANSR) requirements. As a result, the application indicated that the engines would be equipped with SCR (to reduce NO_X emissions) and oxidation catalysts (to reduce VOC emissions). Requested emissions in this application were based on manufacturer's data and estimated HAP emissions from the facility, including controls (oxidation catalyst), were above the major source level (10 tons/yr of any individual HAP and 25 tons/yr of combined HAPS). Therefore, since the project was a major source for HAPs and no MACT standards had been promulgated for reciprocating internal combustion engines (RICE) yet, a case-by-case 112(g) MACT analysis was conducted for the facility and the appropriate provisions were included in the initial approval construction permit (01JE0057, issued May 17, 2001).

As required by the construction permit, testing was conducted on the Plains End I engines to verify compliance with the emission limitations, including formaldehyde emissions. On March 24, 2003, the source submitted an application to revise their construction permit to lower the permitted CO emissions and to be designated an area source for HAPS. The application indicates that as a result of the compliance testing conducted that both CO and HAP emissions were much lower than originally anticipated. In this application, the source requested that the Division include HAP emission limits at 8 tons/yr of formaldehyde and 24.8 tons/yr of combined HAPS. In the revised permit that was issued on December 28, 2004, the Division included HAP limits of 8 tons/yr for any single HAP and 20 tons/yr of combined HAPs for the Plains End I equipment; however, the facility was not considered a minor source for HAPS because the construction permit for Plains End II (04JE1140) was issued on December 21, 2004. Even though the facility was still considered major for HAPS, the Plains End I engines were not subject to MACT requirements, because the MACT (which was promulgated on June 15, 2004) specified that existing 4-cycle lean burn engines located at major sources are not subject to the MACT requirements (40 CFR Part 63 Subpart ZZZZ § 63.6590(b)(3)).

In the permit application for the Plains End II equipment, HAP emissions were estimated using manufacturer's data, which indicated that HAP emissions from the Plains End II equipment, including controls (oxidation catalyst) were above the major source level (formaldehyde emissions were estimated at 8.3 tons/yr, combined HAP emissions were over 25 tons/yr). The construction permit that was issued for Plains End II, included MACT requirements for the engines and the source has been complying with the MACT requirements. However, in their Title V permit application, the source indicated that based on performance test results that HAP emissions from the facility (Plains End I

and II) were below the major source level and requested that the Division consider classifying the source as a synthetic minor source for HAP emissions.

The Division reviewed the information on HAP emissions provided in the Title V permit application. Each of the Plains End I engines were tested three to five times for formaldehyde on different occasions from May 2002 through August 2007. Each of the Plains End II engines were tested at least once, with a few engines tested twice. In their Title V permit application the source used the average formaldehyde performance test result, multiplied it by five and then used that emission factor to calculate annual formaldehyde emissions from the engines. Since performance test data was not available for all HAP emissions, the source calculated a ratio for each HAP based on AP-42 emission factors, calculated the total HAP emission rate by dividing the formaldehyde performance test emission factor by its AP-42 ratio, and then determined an emission rate for each HAP by multiplying the calculated total HAP emission rate by its AP-42 ratio. In general, the Division accepts this method. However, in the case of Plains End I two of the individual performance test results were above the average rate multiplied by five. Therefore, for the Plains End I, the Division calculated HAP emissions based on the highest performance test result multiplied by 1.2. Based on the Division's calculations HAP emission from the facility are below the major source level, with the highest single HAP emissions at 8.93 tons/yr (formaldehyde) and total HAPS for 12.22 tons/yr.

This analysis is dependent on the ratio of formaldehyde to total HAP emissions as indicated in AP-42. If formaldehyde is significant compared to other HAPS, the total HAPS are well below the major source level. The proposed RICE MACT (published in the Federal Register on December 19, 2002) indicates that the hazardous air pollutant emitted in the highest quantities from RICE is formaldehyde, with other significant HAP being acetaldehyde, acrolein and methanol. By calculation, if formaldehyde is approximately 35% or less of all HAPS then the facility would be over the major source level for total HAPS. The Division reviewed GRI HAPCalc emission factors for 4-cycle clean and lean burn engines and those factors indicate that formaldehyde emissions are well over 35% of total HAPS. Therefore, the Division agrees that HAP emissions from this facility are below the major source level.

Although the facility is currently meeting the RICE MACT requirements for the Plains End II engines the Division does not consider this a case that falls under the "once-in-always-in" situation, but rather a situation where projected emissions were much higher that actual emissions. For the Plains End II project the controls on the engine (SCR and oxidation catalyst) were necessary to keep emissions from the project below the major stationary source threshold in order to avoid PSD review requirements for NO_X, CO and VOC. HAP emissions were estimated based on manufacturer's emission estimates and took credit for the control device. Subsequent performance testing has shown that HAP emission rates are much lower than those predicted by the manufacturer's data. In fact, had the source based requested emissions from the Plains End II engines on the performance test data from Plains End I (which was available) the facility could have been determined at that time to be a synthetic minor source for HAPS. Therefore, the

Division agrees that this facility is a synthetic minor source of HAPS. The Division will include appropriate HAP emission limitations and monitoring requirements in the permit.

Although the Division considers this facility a minor source for HAPS, the EPA has been promulgating rules for area sources (sources that are not major). Those requirements that could potentially apply to this facility are discussed below:

Paint Stripping and Miscellaneous Surface Coating at Area Sources (40 CFR Part 63 Subpart HHHHHH)

The final rules for paint stripping and miscellaneous surface coating were published in the federal register on January 9, 2008 and apply to area sources that perform paint stripping operations using methylene chloride, spray application of coatings to motor vehicles and mobile equipment and spray application of coatings that contain the target HAPS (chromium, lead, manganese, nickel or cadmium). As indicated in 40 CFR Part 63 § 63.11170(a)(2) and (3), spray applications (to motor vehicles and using coatings that contain the target HAPS) that meet the definition of facility maintenance are not subject to the requirements in this rule. The Division considers that any spray coatings of motor vehicles and mobile equipment and spray application of coatings that contain the target HAP at this facility would meet the definition of facility maintenance. The source indicated that no paint stripping activities occur at the facility; therefore, the provisions in 40 CFR Part 63 Subpart HHHHHH do not apply.

Reciprocating Internal Combustion Engines (40 CFR Part 63 Subpart ZZZZ)

The reciprocating internal combustion engine (RICE) MACT was signed as final on February 26, 2004 and was published in the Federal Register on June 15, 2004. Under this rulemaking only RICE that were > 500 hp and located at major sources of HAPS were subject to the requirements.

However, revisions were made to the RICE MACT to address engines $\leq$ 500 hp at major sources and all size engines at area (minor) sources. These revisions were published in the federal register on January 18, 2008. Under these revisions, existing compression ignition (CI) engines, 2-stroke lean burn (2SLB) and 4-stroke lean burn (4SLB) engines were not subject to any requirements in either Subparts A or ZZZZ (40 CFR Part 63 Subpart ZZZZ § 63.6590(b)(3)). For purposes of the MACT, engines located at area sources are considered existing if they commenced construction or reconstruction before June 12, 2006. The Plains End I engines are considered existing engines and are not subject to the RICE MACT requirements. The Plains End II engines are considered new and as specified in 40 CFR Part 63 Subpart ZZZZ § 63.6590(c) must meet the requirements of Subpart ZZZZ by meeting the requirements in 40 CFR Part 60 Subpart JJJJ.

40 CFR Part 60 Subpart JJJJ requirements apply to the Plains End II engines provided that construction commenced after June 12, 2006 (date engines were ordered) and that they were manufactured after July 1, 2007. In the Title V permit application, the source indicated that the engines commenced construction after June 12, 2006 and were

manufactured after July 1, 2007; therefore, the requirements in Subpart JJJJ apply and the appropriate requirements will be included in the permit.

It should be noted that the EPA has proposed revisions to the RICE MACT to address existing engines at both major and area sources. This proposal was published in the Federal Register on March 5, 2009. The proposed rule sets emission limitations for the Plains End I engines at 9 ppmvd CO or 90% reduction of CO, with a CO limit of 95 ppmvd CO during periods of startup, shutdown and malfunction. Note that since the rule is proposed at this time, no requirements will be included. However, if the rule is made final prior to permit issuance, the Division will include the appropriate requirements.

Compliance Assurance Monitoring (CAM) Requirements

CAM applies to any emission unit that is subject to an emission limitation, uses a control device to achieve compliance with that emission limitation and has potential pre-control emissions greater than major source levels.

All 34 engines at this facility are equipped with SCR to reduce NO_X emissions and oxidation catalysts to reduce CO, VOC and HAP emissions. The control devices are necessary to meet permitted emission limitations. However, except for the Plains End II engines (with respect to CO emissions only), the potential pre-control emissions for a single engine operating at 8760 hrs/yr are not above the major source threshold as indicated in the table below. Therefore, except for the Plains End II engines (with respect to CO emissions only) CAM does not apply to any of the engines. Since controlled CO emissions from one Plains End II engine is 10.64 tons/yr, which is below the major source level, in accordance with 40 CFR Part 64 § 64.5(b), CAM does not apply until renewal of this permit.

Pollutant	Uncontrolled Emissions (tpy)	Emission Factor	Emission Factor Source
Plains End I			
NO_X	38.15	0.1607 lbs/mmBtu	manufacturer (uncontrolled)
CO	72.12	0.3038 lbs/mmBtu	
VOC	23.5	0.099 lb/mmBtu	
Formaldehdye[1]	1.4	0.026 g/kW-hr	Manufacturer (uncontrolled)
Plains End II			
NO_X	35.2	0.0203 lb/mmBtu	from manufacturer (controlled – uncontrolled emissions are based on the following control efficiencies: NO_X 81.4%, CO 93% & VOC 69.8%)
CO	152	0.0330 lb/mmBtu	
VOC	35.2	0.0330 lb/mmBtu	
Formaldehdye	2.1	0.026 g/kW-hr	Manufacturer (uncontrolled)

[1]The uncontrolled emission factor provided for Plains End II was used to estimate uncontrolled formaldehyde emissions.

III. Emission Sources

The following sources are specifically regulated under terms and conditions of the Operating Permit for this Site.

Plains End I: S001 – S020/E01 – E20 - Twenty (20), Wartsilla, Model No. 18V34SG, Natural Gas-Fired Internal Combustion Engines, Each Rated at 54.2 mmBtu/hr and 7,900 hp and Driving an Electric Generator Rated at 5,650 kW. The Engines are 4-Cycle Lean Burn Engines Equipped with Selective Catalytic Reduction (SCR) and Oxidation Catalysts. Serial Nos. 21350 through 21369.

1. Applicable Requirements: The initial approval construction permit (01JE0057) was initially issued on May 17, 2001, with subsequent modifications issued on August 21, 2001 (initial approval, modification no. 1), March 4, 2002 (initial approval, modification no. 2), March 27, 2003 (final approval, modification no. 3), December 28, 2004 (initial approval, modification no. 4) and December 27, 2006 (initial approval, modification no. 5).

The engines commenced operation in March 2002. The source self-certified compliance with construction permit 01JE0057 on September 16, 2002 (prior to issuance of the final approval permit in March 2003) and February 14, 2007. Therefore, under the provisions of Colorado Regulation No. 3, Part C, Section V.A.3, the Division will not issue a final approval construction permit and is allowing the initial approval construction permit to continue in full force and effect. The appropriate applicable requirements from the modified initial approval construction permit have been incorporated into the permit as follows:

- Within 180 days after issuance of this permit, compliance with these conditions shall be demonstrated (condition 2).

  Self-certifications were submitted for this permit on September 16, 2002 and February 14, 2007; therefore, this requirement will not be included in the permit.

- Visible emissions shall not exceed twenty percent (20%) opacity during normal operation of the source. During periods of startup, process modification, or adjustment of control equipment visible emissions shall not exceed 30% opacity for more than six minutes in any sixty consecutive minutes (condition 4).

  Note that Colorado Regulation No. 1 does not identify the 20% opacity requirement as a condition that only applies during normal operation. In addition, there are more specific activities under which the 30% opacity requirement applies than identified in the construction permit. The specific activities under which the 30% opacity standard applies are: building a new fire, cleaning of fire boxes, soot blowing, startup, any process modification, or adjustment or

occasional cleaning of control equipment. Based on engineering judgment the Division considers that building a new fire, cleaning of fire boxes and soot-blowing does not apply to the operation of internal combustion engines. Although these engines have control devices, they do not control PM emissions and therefore would not affect opacity emissions. Process modifications may apply to the engines; however, based on engineering judgment, the Division believes that such activities would be unlikely to occur for longer than six minutes. Therefore, the 30% opacity requirement has been included in the operating permit for startup of these units.

- Catalytic oxidizers shall be installed, inspected, monitored, maintained and operated to control emissions for organic hazardous air pollutant emissions (condition 5)

- PSD requirements shall apply to this source at any such time that this source becomes major solely by virtue of relaxation of any permit condition (condition 6)

  The Plains End I engines, by themselves, are still a synthetic minor source for purposes of PSD review (and also synthetic minor for major stationary source non-attainment area new source review (NANSR) requirements). However, this condition will not be included in the operating permit, since no actual requirements apply, unless certain modifications to the permit conditions for these engines are made. Although this requirement will not be included in the permit, future modifications that cause the Plains End I engines to become major, by themselves, for purposes of PSD and NANSR review, by virtue of relaxation of any of these permit conditions will result in the application of PSD and/or NANSR review.

- The reciprocating internal combustion engines are “existing” 4-stroke, lean-burn engines and therefore are not subject to 40 CFR Part 63 Subpart ZZZZ requirements (condition 7)

  Since these engines are not currently subject to the requirements in 40 CFR Part 63 Subpart ZZZZ (for either major or area sources), this condition will not be included in the operating permit. Note that as discussed previously in this document, in the future they may become subject to requirements in 40 CFR Part 63 Subpart ZZZZ, since EPA has proposed revisions to the RICE MACT to cover “existing” engines 4-stroke lean burn engines. If such revisions become final before issuance of this operating permit, the appropriate requirements will be included in this permit.

- Prior to final approval being issued, the source shall submit an operating and maintenance plan (condition 8)

  An operating and maintenance plan was submitted on February 14, 2007 and was approved by the Division on May 21, 2007. The appropriate provisions from the plan will be included in the permit.

- The catalytic oxidizers shall achieve a control of at least 90.9% for carbon monoxide (condition 9)

  The percent efficiency requirement for the catalytic oxidizers with respect to CO emissions has not been included in the permit. As long as the source meets the outlet emission limitations, meeting a specific percent reduction of CO is not necessary.

- The engines shall be equipped with selective catalytic reduction systems to achieve a control of at least 81.4% for NO_X, this satisfies the RACT requirements (condition 10).

  The percent reduction requirement was not included in the Title V permit. The Division replaced the percent reduction requirement with an outlet emission rate of 0.030 lb/mmBtu. This was the outlet hourly emission rate used to set the permit limits and is based on an 81.4% reduction in NO_X emissions.

- Good combustion practices shall be applied to minimize emissions of particulate matter (including condensables), this satisfies the RACT requirements (condition 11).

  The original construction permit (issued 5/17/01) included an emission limit for PM or 0.0185 lb/mmBtu, which included condensable PM. In the second modification of this permit (issued 3/4/02), the RACT limit was increased to 0.031 lb/mmBtu. The emission limitation was removed in the permit issued on March 27, 2003 (final approval, modification No. 3) and no limit has been included in the permit since then. The Division considers that while it may have been appropriate to increase the PM limit to reflect the actual operation of the engines, it was not appropriate to remove the PM emission limitation. Therefore, the Division is restoring the RACT limit that was in the March 27, 2003 permit.

  In addition, the Division considers that RACT should be revised to take credit for the coalescing filters on the fuel inlet line as the filters were necessary to consistently reduce PM_{10} emissions.

- APEN reporting requirements (condition 12)

  The APEN reporting requirements will not be identified in the permit as a specific condition but are included in Section IV (General Conditions) of the permit, condition 22.e.

- All engines together shall be limited to the following fuel consumption limits (condition 13):

  Natural gas 6,912 mmSCF/yr

- Emissions from all engines together shall be limited to the following (condition 14):

- o PM 98.7 tons/yr
- o PM_{10} 98.7 tons/yr
- o SO_2 2.1 tons/yr
- o NO_X 97.2 tons/yr
- o VOC 97.2 tons/yr
- o CO 89.9 tons/yr

- The applicant shall track emissions from all insignificant activities on a yearly basis (condition 15).

  Typically emissions from insignificant activities are tracked when potential emissions are at 90% or more of the major stationary source threshold (i.e. greater than 225 tons/yr of any criteria pollutant). For this particular facility (Plains End I and II), emissions of PM, PM_{10}, and CO are above 225 tons/yr; therefore, the Division will require tracking of insignificant activities from these pollutants on a facility wide basis. Note that although VOC emissions are above 225 tons/yr, since the area is now non-attainment for ozone, the threshold is 100 tons/yr and the facility is a major stationary source for purposes of non-attainment area new source review. Note that tracking of insignificant activities will be on a facility wide basis.

Although not specifically identified in Colorado Construction Permit 01JE0057, the engines are subject to the following applicable requirements:

- Colorado Regulation No. 7, Section II.C.2. All new sources shall utilize RACT.

  The construction permit did not include RACT requirements for VOC. At the time the initial approval construction permit was issued (May 17, 2001), Regulation No. 7 did not specifically address internal combustion engines, therefore, a case-by-case RACT analysis should have been conducted and included in the permit. The Division considers that RACT for VOC is the use of the oxidation catalysts. In addition, the Division considers that an emission limitation is also required and has set a limit of 0.030 lb/mmBtu. This value is based on a 69.8 % control efficiency that was used to set the permit limits for VOC.

- Colorado Regulation No. 7, Section XVI. Specifically these requirements apply to engines greater than 500 hp, located in the 8-hr ozone control area and each lean burn engine is to be equipped with an oxidation catalyst (Section XVI.B.2). Such

- Colorado Regulation No. 7, Section XVII.E.3 **– State-only Requirement**. Specifically these requirements apply to existing engines and apply statewide. These requirements also require that lean burn engines greater than 500 hp be equipped with an oxidation catalyst (Section XVII.E.3.b.(i)).

Note that since these engines commenced operation prior to July 1, 2007, the provisions in Colorado Regulation No. 7, Section XVII.E.2 do not apply.

- Acid Rain requirements for new unit exemptions

  For units that can take the new unit exemption and have or will be issued operating permits, the requirements in 40 CFR Part 72 §§ 72.7(a), (b)(1), (d) and (f) must be included in the operating permit.

Finally, as indicated previously the source indicated in their application that based on performance test results they were always a minor source for HAPS. The Division agreed with the source's position; however, HAP emission limitations will be included in this permit. Based on our analysis, the Division will set the HAP limit at 9 tons/yr of any single HAP and 20 tons/yr of combined HAPS. Note that the HAP limits will be facility wide. In addition, as discussed above, since the limit for single HAP emissions is set at 9 tons/yr, the source will be required to track HAP emissions from insignificant activities and keep emissions below 1 ton/yr of any single HAP. Since the highest single HAP is formaldehyde emissions the analysis will be required for formaldehyde.

Streamlining of Applicable Requirements

Colorado Regulation No. 7, Section XVI and Section XVII.E.3 (state-only) specify that the engines shall be equipped with oxidation catalysts. The construction permit also specifies that the engines shall be equipped with oxidation catalysts and a control efficiency for CO as specified in the construction permit. Therefore, the Division considers that the construction permit requirements are more specific (although no control efficiency is specified for VOC, there are VOC emission limitations); therefore, the two Reg 7 requirements for installing oxidation catalysts will be streamlined in favor of the construction permit requirements.

2. Emission Factors: The following emission factors shall be used to demonstrate compliance with the emission limitations:

Pollutant	Emission Factor	Emission Factor Source
PM	0.0303 lb/mmBtu	Manufacturer
PM_{10}	0.0303 lb/mmBtu	Manufacturer
SO_2	5.88×10^{-4} lb/mmBtu	AP-42, Section 3.2(dated 7/00), Table 3.2.2 (4-stroke lean burn engines)
NO_X	0.030 lb/mmBtu	Manufacturer (includes control efficiency of 81.4%)
CO	0.028 lb/mmBtu	Manufacturer (includes control efficiency of 90.9%)
VOC	0.030 lb/mmBtu	Manufacturer (includes control efficiency of 69.8%)
Formaldehyde*	1.5×10^{-3} lb/mmBtu	Maximum stack test result x 1.2 divided by design heat rate of engine

*the maximum stack test result for formaldehyde was from a test conducted in October 2002 on Unit 10. The maximum result (0.068 lb/hr) multiplied by 1.2 equals 0.0816 lb/hr.

Emission factors for other HAPS were determined in the following manner. An AP-42 ratio was determined by summing all the HAP emission factors indicated in AP-42 Section 3.2 (dated 7/00), Table 3.2-2 (for 4-stroke lean burn engines) and then calculating a ratio or "fraction of total" for each individual pollutant. A total HAP emission rate (in lbs/hr) was determined by dividing the formaldehyde emission rate (0.0816 lbs/hr, the maximum stack test result x 1.2) by the AP-42 ratio for formaldehyde. Individual HAP emission rates (in lbs/hr) were calculated by multiplying the total HAP emission rate by its AP-42 ratio. Individual HAP emission factors (in lb/mmBtu) were determined by dividing the lb/hr emission rate by the design heat input rate (mmBtu/hr) of the engine.

3. Monitoring Plan: Compliance with the annual PM, PM_{10}, SO_2, NO_X, CO and VOC emission limitations shall be monitored by recording fuel consumption and calculating emissions monthly. Compliance with the annual and short term CO and NO_X emission limitations shall be monitored by conducting portable monitoring semi-annually. Compliance with the annual and short term PM, PM_{10}, NO_X, CO and VOC emissions limitations shall be monitored by conducting performance tests annually on four engines. The performance test schedule specifies testing of four different engines each year.

Compliance with the facility wide HAP limits for both single and combined HAPS shall be monitored by recording fuel consumption and calculating emissions from all equipment monthly. Compliance with the single HAP limit (formaldehyde) will be monitored by conducting performance tests annually on four engines. The performance test schedule specifies testing of four different engines each year.

The Division has developed monitoring requirements for engines with catalysts (see page 28 for the 10/28/04 monitoring grid). Therefore, in accordance with the monitoring grid, the source will be required to record the pressure drop across the catalysts monthly and monitor catalyst inlet temperature daily. The monitoring grid also requires semi-annual portable monitoring to verify the percent reduction of CO emissions; however, the source has indicated that the engines do not have an appropriate inlet location from which to conduct representative sampling. Therefore, since the CO emission factor is based on 90.9% reduction, the semi-annual portable monitoring conducted to verify the CO emission fact will be used as a surrogate for monitoring formaldehyde emissions. Note that although the monitoring grid specifies quarterly portable monitoring for CO and NO_X outlet emissions, the Division considers that due to the number of engines at this facility, semi-annual monitoring is appropriate. Since the Division's monitoring grid, didn't anticipate SCR for engines, the Division considers that a daily check to record the urea injection rate verify will also be required.

In the absence of credible evidence to the contrary, compliance with the Reg 1 opacity limits shall be presumed since only natural gas is permitted to be used as fuel.

4. Compliance Status: The source indicated in the Title V permit application that these engines were in compliance with all applicable requirements.

Plains End II: S021 – S034/E21 – E34: Fourteen (14), Wartsilla, Model No. 20V34SG, Natural Gas-Fired Internal Combustion Engines, Each Rated at 73.6 mmBtu/hr and 11,352 hp and Driving an Electric Generator Rated at 8,439 kW. The Engines are 4-Cycle Lean Burn Engines Equipped with SCR and Oxidation Catalysts. Serial Nos. PAAE063701, 063703 – 063705, 063707 – 063712, 063717, 063721, 063722 & 063726.

1. Applicable Requirements: The initial approval construction permit (04JE1140) was issued on December 21, 2004. The engines commenced operation in April 2008. The source self-certified compliance with construction permit 04JE1140 on October 3, 2008. Therefore, under the provisions of Colorado Regulation No. 3, Part C, Section V.A.3, the Division will not issue a final approval construction permit and is allowing the initial approval construction permit to continue in full force and effect. The appropriate applicable requirements from the modified initial approval construction permit have been incorporated into the permit as follows:

- Construction shall commence within 18 months of permit issuance (condition 1)

  These units commenced operation in April 2008, therefore, this requirement will not be included in the Title V permit.

- The manufacturer, model and serial number of the subject equipment shall be provided prior to final approval (condition 2)

  The manufacturer, model and serial number have been provided with the Title V permit application; therefore, this requirement will not be included in the Title v permit.

- Within 180 days after commencement of operation, compliance with the conditions contained on this permit shall be demonstrated to the Division (condition 3)

  As indicated previously, the source submitted their self-certification on October 3, 2008; therefore, this requirement will not be included in the Title V permit.

- The source is subject to the odor requirements of Regulation No. 2 (condition 5)

  Engines are not generally a source of odor therefore this condition will not be specifically included in the permit but is included in the General Conditions (Section IV) of the permit.

- Visible emissions shall not exceed twenty percent (20%) opacity during normal operation of the source. During periods of startup, process modification, or adjustment of control equipment visible emissions shall not exceed 30% opacity

for more than six minutes in any sixty consecutive minutes (condition 6).

As discussed above for Plains End I, the 20% opacity requirement will not be identified as a limit that applies during normal operation and the 30% opacity requirement will apply for startup only.

- PSD requirements shall apply to this source at any such time that this source becomes major solely by virtue of relaxation of any permit condition (condition 7)

  As discussed above for Plains End I, this requirement will not be included in the operating permit as there are no applicable requirements unless modifications are made to the permit conditions for this equipment.

- Prior to final approval being issued, the source shall submit an operating and maintenance plan (condition 8)

  The operating and maintenance plan was submitted by the source on September 18, 2008 and approved on September 19, 2008. The operating permit will include the appropriate provisions from the operating and maintenance plan.

- Each of the engines are subject to the requirements in 40 CFR Part 63 Subpart ZZZZ (condition 9)

  The permittee had previously been complying with the major source requirements in Subpart ZZZZ, since the Division has agreed that this source was always a minor source for HAPS, the source is subject to the area source requirements in Subpart ZZZZ and those requirements will be included in the permit. Engines at area sources meet the requirements of Subpart ZZZZ by meeting the requirements in 40 CFR Part 60 Subpart JJJJ.

- Each of the engines shall be equipped with selective catalytic reduction (SCR) systems capable of reducing NO_X emissions by at least 81.4% and oxidation catalysts capable of reducing CO emissions by at least 93%, VOC emissions by at least 69.8% and HAPs by at least 69.8% (condition 10)

  The percent efficiency requirements will not be included in the permit for the following reasons.

  For HAPS, the construction permit did not include any annual HAP limits in the permit. The construction permit did include the Subpart ZZZZ MACT requirements; however, the percent reduction requirement for HAPS specified in this permit condition is unrelated to the MACT ZZZZ requirements (the MACT required that 4-stroke lean burn engines at major sources meet either a percent CO reduction requirement (93%) or an outlet formaldehyde emission limit (14 ppmvd @ 15% O_2)). Although HAP limits have been included in the Title V permit (tons/yr limitations), as long as the source meets the outlet emission limitations, meeting a percent reduction is not necessary.

For CO, as long as the source meets the outlet emission limitations, meeting a specific percent reduction is not necessary.

At the time this permit was issued, these engines would have been subject to RACT for NO_X (as a precursor for PM_{10} only) as required by Reg 3 and VOC as required by both Reg 3 and Reg 7. The permit does not address RACT for either pollutant. The control requirements specified in this permit condition for NO_X would satisfy the NO_X RACT requirements and the Division will indicate that is the case in the Title V permit. In addition, the NO_X percent reduction requirements will be replaced with an outlet emission limitation of 0.0203 lb/mmBtu, which will be identified as a NO_X RACT emission limit.

For VOC, since the Plains II engines were subject to control requirements specified in Colorado Regulation No. 7, Section XVI, which represents RACT, case-by-case RACT (required by Reg 3 and Reg 7 (Section II.C)) wasn't applicable. The control requirements in this condition meet the Reg 7, Section XVI requirements (RACT) and the Division will indicate that is the case in the Title V permit. In addition, for CO, as long as the source meets the outlet emission limitations, meeting a specific percent reduction requirement is not necessary (nor is a specified percent reduction or emission limitation required by Reg 7, Section XVI), therefore, the percent reduction requirement will not be included in the permit.

- The emission control devices shall be inspected monitored, maintained as per the recommendations of the manufacturer to ensure satisfactory on-going performance (condition 11)

- All engines together shall be limited to the following fuel consumption limits (condition 12)

Natural gas	815 mmSCF/mo	and	8,765 mmSCF/yr

  The monthly limits apply for the first twelve months of operation. Since the engines have been operating for more than twelve months the monthly limitations will not be included in the permit.

- Emissions from all engines together shall be limited to the following (condition 13):

o PM	12.4 tons/mo	and	145.9 tons/yr
o PM_{10}	12.4 tons/mo	and	145.9 tons/yr
o SO_2			2.4 tons/yr
o NO_X	7.0 tons/mo	and	83.3 tons/yr
o VOC	11.6 tons/mo	and	135.4 tons/yr
o CO	11.5 tons/mo	and	135.4 tons/yr

The monthly limits apply for the first twelve months of operation. Since the engines have been operating for more than twelve months the monthly limitations will not be included in the permit.

- APEN reporting requirements (condition 14)

  As discussed above for Plains End I, the APEN reporting requirements are included in Section IV, Condition 22.e.

- The applicant shall track emissions from all insignificant activities on a yearly basis (condition 15)

  As discussed above for Plains End I, tracking emissions from insignificant activities will only apply with respect to PM, PM_{10} and CO emissions and will be tracked on a facility wide basis.

- Performance tests shall be conducted on the engines to demonstrate compliance with PM (including condensables), NO_X, VOC, CO and HAP emission limitations (condition 16)

  The performance test requirements in the construction permit appear to be for an initial test, not subsequent tests. The initial tests were conducted in 2008 for these engines; therefore, the initial performance test requirements will not be included in the permit. Note that for purposes of periodic monitoring, subsequent performance tests will be required.

Although not specifically identified in Colorado Construction Permit 04JE1140, the engines are subject to the following applicable requirements:

- Colorado Regulation No. 3, Part B, Section III.D.2.a (RACT for PM_{10})

  Since the facility is located in an attainment/maintenance area for PM_{10}, RACT applies to these units. The Division considers that RACT for these units should be the considered the same as for Plains End I (good combustion practices, use of natural gas as fuel and coalescing filters on the fuel inlet). In addition, the Division also considers that an emission limit is appropriate and is including an emission limit of 0.0355 lb/mmBtu; which is the hourly emission rate used to set the permit limits.

- NSPS Subpart JJJJ

  The source indicated in their Title V permit application that these engines commenced construction after June 12, 2006 and were manufactured after July 1, 2007; therefore, the engines are subject to these requirements. Compliance with the NSPS requirements can be demonstrated by either purchasing a certified engine or by performance testing. These engines are not certified engines; therefore, performance testing will be required.

- Colorado Regulation No. 7, Section XVI. Specifically these requirements apply to engines greater than 500 hp, located in the 8-hr ozone control area and each lean burn engine is to be equipped with an oxidation catalyst (Section XVI.B.2).

  Note that as provided for in Colorado Regulation No. 7, Section XVII.B.4, since these engines are subject to requirements in NSPS Subpart JJJJ, they are not subject to the requirements in Colorado Regulation No. 7, Section XVII.E.2 (emission limitations) and Section XVII.E.3 (control device requirements).

- Acid Rain requirements for new unit exemptions

  For units that can take the new unit exemption and have or will be issued operating permits, the requirements in 40 CFR Part 72 §§ 72.7(a), (b)(1), (d) and (f) must be included in the operating permit.

Finally, as discussed above for Plains End I, facility wide HAP limits will be included in the permit and single HAP emissions from insignificant activities will be tracked, both on a facility wide basis.

Streamlining of Applicable Requirements

As discussed above for Plains End I, the requirements in Colorado Regulation No. 7, Section XVI just requires the installation of an oxidation catalyst and the construction permit required installation of an oxidation catalyst and specified a control efficiency (for CO, VOC and HAPS) and emission limitations; therefore, the Reg 7 requirements will be streamlined in favor of the construction permit requirements.

2. Emission Factors: The following emission factors shall be used to demonstrate compliance with the emission limitations:

Pollutant	Emission Factor	Emission Factor Source
PM	0.0355 lb/mmBtu	Manufacturer
PM_{10}	0.0355 lb/mmBtu	Manufacturer
SO_2	5.88×10^{-4} lb/mmBtu	AP-42, Section 3.2(dated 7/00), Table 3.2.2 (4-stroke lean burn engines)
NO_X	0.0203 lb/mmBtu	Manufacturer (includes control efficiency of 81.4%)
CO	0.033 lb/mmBtu	Manufacturer (includes control efficiency of 93 %)
VOC	0.033 lb/mmBtu	Manufacturer (includes control efficiency of 69.8%)
Formaldehyde*	9.78×10^{-4} lb/mmBtu	average stack test result x 5 divided by design heat rate of engine

*the average stack test result for formaldehyde from initial testing in 2008 on the Plains End engines was 0.014 lbs/hr, the average x 5 was 0.072 lbs/hr (note that the average times five was more than two times higher than the maximum test result of 0.025 lbs/hr).

Emission factors for other HAPS were determined in the same manner as indicated in the Plains End I – Emission Factor discussion, except that the formaldehyde emission rate used in the analysis was the average test result x 5 (0.072 lbs/hr).

3. Monitoring Plan: Compliance with the annual PM, PM_{10}, SO_2, NO_X, CO and VOC emission limitations shall be monitored by recording fuel consumption and calculating emissions monthly. Compliance with the annual and short term CO and NO_X emission limitations shall be monitored by conducting portable monitoring semi-annually. Compliance with the annual and short term PM, PM_{10}, NO_X, CO and VOC emissions limitations shall be monitored by conducting performance tests annually on four to five engines. The performance test schedule specifies testing of four to five different engines each year. Performance tests are also required under NSPS Subpart JJJJ. Frequency for testing is after 8760 hrs of operation or every 3 three years, whichever comes first. The performance testing schedule set for periodic monitoring will fulfill the three year testing requirement, although additional testing may be required depending on hours of operation for individual engines.

Compliance with the facility wide HAP limits for both single and combined HAPS shall be monitored by recording fuel consumption and calculating emissions from all equipment monthly. Compliance with the single HAP limit (formaldehyde) will be monitored by conducting performance tests annually on four engines. The performance test schedule specifies testing of four to five different engines each year.

The Division has developed monitoring requirements for engines with catalysts (see page 28 for the 10/28/04 monitoring grid). Therefore, in accordance with the monitoring grid, the source will be required to record the pressure drop across the catalysts monthly and monitor catalyst inlet temperature daily. The monitoring grid also requires semi-annual portable monitoring to verify the percent reduction of CO emissions; however, the source has indicated that the engines do not have an appropriate inlet location from which to conduct representative sampling. Therefore, since the CO emission factor is based on 90.9% reduction, the semi-annual portable monitoring conducted to verify the CO emission fact will be used as a surrogate for monitoring formaldehyde emissions. Note that although the monitoring grid specifies quarterly portable monitoring for CO and NO_X outlet emissions, the Division considers that due to the number of engines at this facility, semi-annual monitoring is appropriate. Since the Division's monitoring grid, didn't anticipate SCR for engines, the Division considers that a daily check to record the urea injection rate verify will also be required.

In the absence of credible evidence to the contrary, compliance with the Reg 1 opacity, limits shall be presumed since only natural gas is permitted to be used as fuel.

4. Compliance Status: The source indicated in the Title V permit application that these engines were in compliance with all applicable requirements.

S035/E35: Cummins, Model No. QSX15-G9, Diesel Fuel-Fired Internal Combustion Engine, Rated at 3.33 mmBtu/hr and 755 hp and Driving an Electric Generator Rated at 350 kW. Serial No. 79274049.

1. Applicable Requirements: The initial approval construction permit (07JE1120) was issued on January 18, 2008. The engine commenced operation in April 2008. This engine replaced an engine that was previously permitted under construction permit 04JE1141. The engine is used to start the large engines, in the event of a loss of power at the facility; therefore, it is classified as an emergency engine. The source self-certified compliance with construction permit 07JE1120 on October 7, 2008. Therefore, under the provisions of Colorado Regulation No. 3, Part C, Section V.A.3, the Division will not issue a final approval construction permit and is allowing the initial approval construction permit to continue in full force and effect. The appropriate applicable requirements from the modified initial approval construction permit have been incorporated into the renewal permit as follows:

- Construction shall commence within 18 months of permit issuance (condition 1)

  This unit commenced operation in April 2008; therefore, this requirement will not be included in the Title V permit.

- Within 180 days after commencement of operation, compliance with the conditions contained on this permit shall be demonstrated to the Division (condition 4)

  As indicated previously, the source submitted their self-certification on October 7, 2008, therefore, this requirement will not be included in the Title V permit.

- The source is subject to the requirements in NSPS Subpart IIII (condition 5)

  It should be noted that the construction permit includes the incorrect NSPS emission limitations. The correct limits will be included in the Title V permit.

- The source is also subject to the NSPS general provisions (condition 6)

  Most of the general provisions that were included in the construction permit do not apply to this engine. Therefore, the appropriate general provisions will be included in the Title V permit.

- PSD requirements shall apply to this source at any such time that this source becomes major solely by virtue of relaxation of any permit condition (condition 7)

  As discussed above for Plains End I, this requirement will not be included in the operating permit as there are no applicable requirements unless modifications are made to the permit conditions for this equipment.

- APEN reporting (condition 8)

  As discussed above for Plains End I, the APEN reporting requirements are included in Section IV, Condition 22.e.

- This engine is limited to the following fuel consumption limit (condition 9):

  Diesel Fuel 24,300 gal/yr

- Emissions from this engine are limited to the following (condition 10):

  - NO_X 3.2 tons/yr

  In their Title V permit application, the source indicated that based on the fuel consumption rate and the manufacturer's emission factor that permitted NO_X emissions should be 3.62 tons/yr. The source submitted an APEN on October 7, 2008 with the Title V permit application to request the higher NO_X emission limit and that NO_X limit was included in the Title V permit.

It should be noted that the construction permit issued for this unit indicates that the engine is a 500 hp engine (heat input of 3.33 mmBtu/hr); however, in their Title V permit application, the source indicated that the unit was rated at 755 hp. The engine size has been corrected in the Title V permit. The heat input rate indicated on the construction permit was correct (assuming a diesel fuel heat content of 137,000 Btu/gal).

Although not specifically identified in Colorado Construction Permit 07JE1120, the engine is subject to the following applicable requirements:

- Except as provided for below, visible emissions shall not exceed 20% opacity (Reg 1, Section II.A.1)

- Visible emissions shall not exceed 30% opacity, for a period or periods aggregating more than six (6) minutes in any sixty (60) minute period, during fire building, cleaning of fire boxes, soot blowing, start-up, process modifications, or adjustment or occasional cleaning of control equipment, when burning coal (Reg 1, Section II.A.4)

  Based on engineering judgment, the Division believes that the operational activities of fire building, cleaning of fire boxes and soot blowing do not apply to diesel engines. In addition, since this engine is not equipped with control equipment the operational activities of adjustment or occasional cleaning of control equipment also do not apply to this engine. Finally, based on engineering judgment, it is unlikely that process modifications will occur with the emergency generator. Therefore, for this unit the 30% opacity provision only applies during startup.

- SO_2 emission shall not exceed 0.8 lbs/mmBtu (Reg 1, Section VI.B.4.b.(i)).

2. Emission Factors: The emission factors used to estimate emissions for this unit are shown in the table below:

Pollutant	Emission Factor	Emission Factor Source	Converted Emission Factor
PM	0.11 g/hp-hr	Manufacturer (at ¼ stand-by)	7.53×10^{-3} lb/gal
CO	0.60 g/hp-hr	Manufacturer (at ¼ stand-by)	4.11×10^{-2} lb/gal
NO_X	4.35 g/hp-hr	Manufacturer (at full stand-by)	0.298 lb/gal
VOC	0.23 g/hp-hr	Manufacturer (at ¼ stand-by)	1.58×10^{-2} lb/gal
PM_{10}	0.11 g/hp-hr	PM_{10} presumed to equal PM. Manufacturer (at ¼ stand-by)	7.53×10^{-3} lb/gal
SO_2	7.05×10^{-3} lb/gal	NSPS fuel limit (500 ppm) and a presumed diesel density of 7.05 lb/gal.	

The above g/hp-hr emission factors in the above table were converted to units of lb/gal, using the equation below:

$$EF\ (lb/gal) = \frac{EF\ (g\text{-}hp\text{-}hr) \times max\ hp\ (755\ hp)}{max\ fuel\ (24.3\ gal/hr) \times 453.6\ g/lb}$$

Note that since PM, PM_{10}, SO_2 and VOC emissions are below the APEN de minimis levels at the requested fuel consumption rate, emission limits for these pollutants were not included in the construction permit and will not be included in the Title V permit.

Although CO emissions are below the APEN de minimis level, an emission limit for CO was included in the permit, since the source is basing emissions on the manufacturer's guaranteed emission rates, which is much lower than the NSPS emission limitation. At the NSPS emission limitation, CO emissions exceed the APEN de mimimis level.

3. Monitoring Plan: Compliance with the annual NO_X and CO emission limitations shall be monitored by recording fuel consumption and calculating emissions monthly. Compliance with the NSPS limitations is presumed since the engine is certified by the manufacturer. In the absence of credible evidence to the contrary, compliance with the Reg 1 SO_2 emission limit is presumed since only diesel fuel meeting the NSPS requirements is permitted to be used as fuel (based on the 500 ppm sulfur limit, a fuel density of 7.05 lb/gal and a heat content of 137,000 Btu/gal, SO_2 emissions are 0.051 lb/mmBtu). The NSPS does not specify how the permittee is required to demonstrate compliance with the fuel limitations; therefore, the permit will require that the source initially sample the tank (if the tank is full prior to permit issuance) and to sample each shipment of diesel fuel. In lieu of sampling, the permittee may use vendor data to demonstrate compliance with the fuel limitation. Compliance with the opacity limitations shall be monitored by conducting a Method 9 observation annually.

4. Compliance Status: The source indicated in the Title V permit application that these engines were in compliance with all applicable requirements.

S036/E36: John Deere, Model No. 6068TF220, Diesel Fuel-Fired Emergency Fire Pump Engine, Rated at 149 hp (9.5 gal/hr), Serial No. PE6068T696483

1. Applicable Requirements: This engine was identified as an insignificant activity in the Title V permit application. Although this engine would qualify as an insignificant activity (provided it is operated less than 1,450 hrs/yr), since it is subject to the New Source Performance Standards for Compression Ignition Internal Combustion Engines (40 CFR Part 60 Subpart IIII) under the "catch-all" language in Colorado Regulation No. 3, Part A, Section II.D.1, Part B, Section II.D and Part C, Section II.E, this engine is not exempt from APEN reporting requirements, minor source permitting (construction permit) requirements and cannot be considered an insignificant activity. Therefore, it will be included in Section II of the Title v permit and the Division is including it in the Operating Permit as a combined construction/operating permit. The appropriate applicable requirements for this engine are as follows:

- Except as provided for below, visible emissions shall not exceed 20% opacity (Reg 1, Section II.A.1)

- Visible emissions shall not exceed 30% opacity, for a period or periods aggregating more than six (6) minutes in any sixty (60) minute period, during fire building, cleaning of fire boxes, soot blowing, start-up, process modifications, or adjustment or occasional cleaning of control equipment, when burning coal (Reg 1, Section II.A.4)

  Based on engineering judgment, the Division believes that the operational activities of fire building, cleaning of fire boxes and soot blowing do not apply to diesel engines. In addition, since this engine is not equipped with control equipment the operational activities of adjustment or occasional cleaning of control equipment also do not apply to this engine. Finally, based on engineering judgment, it is unlikely that process modifications will occur with the emergency generator. Therefore, for this unit the 30% opacity provision only applies during startup.

- SO_2 emission shall not exceed 0.8 lbs/mmBtu (Reg 1, Section VI.B.4.b.(i)).

- 40 CFR Part 60 Subpart IIII, "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines", as adopted by reference in Colorado Regulation No. 6, Part A, as follows:

  - Emission limitations per § 60.4205(b)

  - Emission limitations shall be met for the time period specified in § 60.4206

  - Fuel requirements per § 60.4205(b)

  - Monitoring requirements per § 60.4209

- o Compliance requirements per § 60.4211

- o Notification, reporting and recordkeeping requirements in § 60.4214

- 40 CFR Part 60 Subpart A, "General Provisions", as adopted by reference in Colorado Regulation No. 6, Part A, as follows:

  - o Circumvention (§ 60.12)

  40 CFR Part 60 Subpart IIII § 60.4218 identifies the general provisions that apply. According to the table, the provisions in § 60.7 (notification and recordkeeping) apply as specified in § 60.4214(a) and this section does not apply to this engine, therefore, the provisions in § 60.7 do not apply. The table also indicates that § 60.8 (performance testing) and § 60.13 (monitoring requirements) only apply to engines with a displacement greater than or equal to 30 liters per cylinder and therefore do not apply to this engine. In addition, the table indicates that the provisions in § 60.11 do not apply as the requirements are specified in Subpart IIII.

- APEN reporting requirements (Reg 3, Part A, Section II)

- Construction permit requirements in Reg 3, Part B.

2. Emission Factors: The emission factors used to estimate emissions from this unit are shown in the table below:

Pollutant	Emission Factor	Emission Factor Source
PM	0.19 g/hp-hr	Manufacturer
CO	0.33 g/hp-hr	Manufacturer
NO_X	4.99 g/hp-hr	Manufacturer
VOC	0.21 g/hp-hr	Manufacturer
PM_{10}	0.19 g/hp-hr	PM_{10} presumed to equal PM. Manufacturer
SO_2	7.05×10^{-3} lb/gal	NSPS fuel limit (500 ppm) and a presumed diesel density of 7.05 lb/gal.

3. Monitoring Plan: The fire pump engine would normally be exempt from the APEN reporting requirements (and subsequently exempt from construction permit requirements) if it were operated for no more than 1,450 hours per year except it is subject to NSPS requirements. In addition, if this unit were not subject to NSPS requirements and it operated for more than 1,450 hours per year but actual emissions were less than 5 tons/yr of any criteria pollutant, an APEN would be required for this unit but it would be exempt from construction permit requirements. The source submitted an APEN on August 4, 2009 based on 100 hours per year of operation. Therefore, the Division will not require that annual emission calculations be conducted unless the unit is operated for more than 1,450 hours per year.

Typically a construction permit would include annual fuel consumption and emission limitations. However, since this unit is only required to have the construction permit because it is subject to the NSPS, the Division is not including annual fuel consumption and emissions limits in the permit. In the event that this unit is operated for more than 1,450 hours per year, the permit requires that the source submit an application to include annual fuel consumption and emission limitations.

In the absence of credible evidence to the contrary, compliance with the Reg 1 SO_2 emission limit is presumed since only diesel fuel meeting the NSPS requirements is permitted to be used as fuel (based on the 500 ppm sulfur limit, a fuel density of 7.05 lb/gal and a heat content of 137,000 Btu/gal, SO_2 emissions are 0.051 lb/mmBtu). The NSPS does not specify how the permittee is required to demonstrate compliance with the fuel limitations; therefore, the permit will require that the source initially sample the tank (if the tank if full prior to permit issuance) and to sample each shipment of diesel fuel. In lieu of sampling, the permittee may use vendor data to demonstrate compliance with the fuel limitation. Compliance with the opacity limitations shall be monitored by conducting a Method 9 observation annually.

4: Compliance Status: The fire pump engine was not included in the Title V permit application as a significant emission unit, but was identified as an insignificant activity. Upon submittal of an APEN for this unit, the Division considers that the fire pump engine is in compliance with all applicable requirements.

IV. Insignificant Activities

The source indicated that the following general categories of insignificant activities at this site include: fuel burning (gaseous) equipment < 5 mmBtu/hr, lube oil tanks < 40,000 gal and fuel burning (gaseous) equipment < 10 mmBtu/hr used for comfort heat. A specific list of insignificant activities was included in the Title V permit application and the list includes the following:

<u>Fuel (gaseous) burning equipment < 5 mmBtu/hr (Reg 3, Part C.II.E.3.k)</u>

Fuel gas heater 1.9 mmBtu/hr (H1)
Fuel gas heater 1.9 mmBtu/hr (H2)
Twenty-one (21) space heaters – each at 0.252 mmBtu/hr

<u>Lube oil tanks < 40,000 gal (Reg 3, Part C.II.3.aaa)</u>

Three (3) lube oil storage tanks

V. Alternative Operating Scenarios

No alternative operating scenarios were requested for this facility.

VI. Permit Shield

Permit Shield for Non-Applicable Requirements

The source did not request the permit shield for any non-applicable requirements.

Permit Shield for Streamlined Requirements

These requirements are applicable to the emission units at the Plains End Generating Station. As discussed previously in this document, under streamlining of applicable requirements, the Division has included the above requirements, as appropriate in the permit shield for streamlined/subsumed conditions.

The following applicable requirements were streamlined out of the permit **for Plains End I** and have been included in the permit shield.

- Lean Burn engines greater than 500 hp shall be equipped with an oxidation catalyst (Colorado Regulation No. 7, Section XVI.) streamlined out since the construction permit requirement sets a control efficiency and emission limitations.

- **State-only –** Lean Burn engines greater than 500 hp shall be equipped with an oxidation catalyst (Colorado Regulation No. 7, Section XVII.E.3.b.(i)) streamlined out since the construction permit requirement sets a control efficiency and emission limitations.

The following applicable requirements were streamlined out of the permit **for Plains End II** and have been included in the permit shield.

- Lean Burn engines greater than 500 hp shall be equipped with an oxidation catalyst (Colorado Regulation No. 7, Section XVI.) streamlined out since the construction permit requirement sets a control efficiency and emission limitations.

T5 Monitoring for Engines with Control Devices

ver 10/28/04

Parameter	T5 Source (Periodic Monitoring)	T5 Source Syn minor for HAPS (≤ 8/20 TPY)	T5 Source Syn minor for HAPS (> 8/20 TPY)	T5 Source Subject to CAM
Inlet temp	Monthly, keep inlet temp within mfgrs range	Monthly, keep temp within mfgrs range	Daily, keep temp within mfgrs range	Daily (small PSEU) Continuously (large PSEU), keep temp within mfgrs range
Outlet temp				
Δ T				
Δ P	Monthly	Monthly	Monthly	Monthly
Portable Monitoring	Quarterly CO and NO_X outlet emissions	Quarterly CO and NO_X outlet emissions	Quarterly CO and NO_X outlet emissions	Quarterly CO and NO_X outlet emissions
Inlet/outlet CO **for lean burn with cats only**			Semi-annual & compare to mfg % reduction range	Semi-annual & compare to mfg % reduction range **– only if CAM for HAPS**
AFR controller (mV value) **for NSCR only**	Monthly	Monthly	Monthly	Monthly
O_2 concentration in exhaust	During portable monitoring	During portable monitoring. When measuring inlet and outlet CO, measure inlet and outlet O_2	During portable monitoring. When measuring inlet and outlet CO, measure inlet and outlet O_2	During portable monitoring

Plains End Generating Station – Hazardous Air Pollutant Emissions

	Plains End I	Plains End II	Emergency Generator	Fire Pump Engine	Insignificant Heaters	Total
Pollutant	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	tons/yr
1,1,2,2 - tetrachloroethane	3.71E-03	3.06E-03				6.77E-03
1,1,2 - trichloroethane	2.95E-03	2.43E-03				5.38E-03
1,3 - butadiene	2.48E-02	2.04E-02		3.69E-05		4.52E-02
1,3 - dichloropropene	2.45E-03	2.02E-03				4.47E-03
2 - methlynaphthalene	3.08E-03	2.54E-03				5.62E-03
2,2,4 - trimethylpentane	2.32E-02	1.91E-02				4.23E-02
acenaphthene	1.16E-04	9.55E-05			3.34E-08	2.11E-04
acenaphthylene	5.13E-04	4.23E-04			3.34E-08	9.35E-04
acetaldehyde	7.75E-01	6.39E-01	4.20E-05	7.23E-04		1.41E-00
acrolein	4.77E-01	3.93E-01	1.31E-05	8.72E-05		8.69E-01
benzene	4.08E-02	3.36E-02	**1.29E-03**	8.79E-04	3.90E-05	7.66E-02
benzo(b)fluoranthene	1.54E-05	1.27E-05			3.34E-08	2.81E-05
benzo(e)pyrene	3.85E-05	3.17E-05			2.23E-08	7.02E-05
benzo(g,h,I)perlyene	3.84E-05	3.16E-05			2.23E-08	7.00E-05
biphenyl	1.97E-02	1.62E-02				3.59E-02
carbon tetratchloride	3.40E-03	2.80E-03				6.21E-03
chlorobenzene	2.82E-03	2.32E-03				5.14E-03
chloroform	2.64E-03	2.18E-03				4.82E-03
chrysene	6.43E-05	5.29E-05			3.34E-08	1.17E-04
ethylbenzene	3.68E-03	3.03E-03				6.71E-03
ethylene dibromide	4.11E-03	3.38E-03				7.49E-03
fluoranthene	1.03E-04	8.48E-05			5.57E-08	1.88E-04
fluorene	5.26E-04	4.33E-04			5.20E-08	9.59E-04
formaldehdye	**4.90E-00**	**4.03E-00**	**1.31E-04**	**1.11E-03**	**1.39E-03**	**8.93E-00**
methanol	2.32E-01	1.91E-01				4.23E-01
mehylene chloride	1.85E-03	1.53E-03				3.38E-03
n-hexane	1.03E-01	8.48E-02			**2.90E-03**	1.91E-01
naphthalene	6.90E-03	5.68E-03	2.16E-04	7.99E-05	1.13E-05	1.29E-02
PAH	2.49E-03	2.06E-03				4.55E-03
phenanthrene	9.64E-04	7.95E-04			3.16E-07	1.76E-03
phenol	2.23E-03	1.83E-03				4.06E-03
pyrene	1.26E-04	1.04E-04			9.29E-08	2.30E-04
styrene	2.19E-03	1.80E-03				3.99E-03
tetrachloroethane	2.30E-04	1.89E-04				4.19E-04
toluene	3.78E-02	3.12E-02	4.68E-04	3.85E-04	6.31E-05	6.99E-02
vinyl chloride	1.38E-03	1.14E-03				2.52E-03
xylene	1.71E-02	1.41E-02	3.21E-04	2.69E-04		3.17E-02
metals					1.03E-04	1.03E-04
Total	6.69	5.52	2.48E-03	3.57E-03	4.51E-03	12.22
Highest Single HAP	4.90	4.03	1.29E-03	1.11E-03	2.90E-03	8.93