SAN JOAQUIN VALLEY UNIFIED
AIR POLLUTION CONTROL DISTRICT

Guideline for Expedited Application Review (GEAR) 27b
Stationary Agricultural Diesel-Fired IC Engine (Replacement)

Approved By: _____ Date: May 31, 2016
Arnaud Marjollet
Director of Permit Services

Purpose: To outline procedures for expedited processing of Authority to Construct (ATC) applications for stationary agricultural diesel-fired internal combustion (IC) engine replacements. These procedures will apply to processing of applications received over the counter or through the mail.

I. Applicability

This policy applies to processing of applications for ATC for new IC engines that are:

- Diesel-fired,
- at an agricultural operation that is subject to District permitting requirements,
- stationary (does not move from one location or "footprint" to another at least once per season),
- replaces an existing engine, and
- is not a "routine replacement" per Rule 2201, section 3.34.

II. Permit Application and Supplementary Forms

The applicant must provide the information requested by the District's regular permit application form and the "Compression-Ignited IC Engines for Agricultural Operations" supplemental application form (attached). In some cases, this information will be provided via a Heavy Duty Engine Program (HDEP) application form. If this is the case, it is not necessary for the applicant to duplicate the information on a permit or supplemental application form.

III. Priority Processing

The applications will be processed on an expedited basis, once complete application(s) are submitted. Complete applications include all the necessary information the District requires to process an application, as well as all application filing-fees.

Final action on all projects will occur within 30 days after the deemed-complete date. Processing will be delayed though, if:

- The application is subject to any public noticing requirements, including school notice per CH&SC 42301.6 (within 1,000 feet of any K-12 school), or
- The application is part of a stationary source project where issuance of the permit will affect the outcome of the stationary source project.

IV. Application Review Guidance

In order to standardize the application reviews for this source category, the application review GEAR 27b.doc (as found on the AIRnet, under Policies/GEARs) will be used as a base document. The following items are addressed in the application review:

A. Permit Applicability Determination

The document is based on an agricultural facility that is subject to District permit requirements. Per Rule 2020, Section 6.20, agricultural sources are exempt from District permit requirements to the extent provided by CH&SC, section 42301.16. The CH&SC permit exemption level is emissions less than ½ of any Major Source emissions threshold for the District.

Prior to proceeding with permit processing, it is necessary to quantify the emissions for the facility based on the new reduced-emissions engine(s). The emissions for the facility are based on the following:

<u>PE2 - Existing Permitted Engines</u>

- The maximum operating schedule of each engine (hr/year),
- The appropriate emission factors for each engine; Carl Moyer emission factors shall be used in absence of manufacturer or certification emissions data (the Carl Moyer emission factors are attached to this document),
- The maximum (intermittent) power rating of each engine, and
- A load factor of 65% (CARB - Assumed based on extensive discussions with engine dealers, manufacturers, and irrigation experts).

<u>PE2 - Engines obtaining ATCs</u>

- The maximum operating schedule of each engine (hr/year),
- The appropriate emission factors for each engine; manufacturer or certification emissions shall be used along with Carl Moyer emission factors for those pollutants not under certification, and
- Maximum engine load (bhp).*

*Background - Engines only consume fuel necessary to handle the load put on that engine, and emissions are directly proportional to the amount of fuel consumed by the engine. For irrigation pump engines, the load on the engine cannot exceed what the pump has the capacity to handle, plus efficiency losses due to gear head and line shaft, as well as parasitic losses such as an engine

fan and alternator. A conservative estimate for those losses is 15%. Therefore, the max load on the engine is the max power capacity or requirement of the pump plus 15%. The load on the engine is directly proportional to its emissions when coupled with that specific pump. In many cases, the applicant will be able to provide the power requirement (hp) of the irrigation pump directly. In some cases, the pump hp can be determined with certain parameters by the manufacturer pump curve (if available), fuel consumption, or by calculation.

Equation 1 - Total Dynamic Head (TDH):

$$TDH\ (ft) = [SH\ (ft) + PH\ (ft)] \times 1.05$$

Where:

SH = static head (ft) - total vertical distance pump must lift water

PH = pressure head (ft) - for booster pumps, the water pressure needed to boost irrigation system to required operational pressure (1 ft = 2.31 psi).

1.05 = multiplier that assumes 5% for friction head (pressure head loss due to friction in pipes and velocity head (energy to get water in motion, usually negligible)

Equation 2 - Water Pump Power Requirement

$$Pump\ Power\ (hp) = Q\ (gal/min) \times TDH\ (ft) \div 3{,}960$$

Where:

Q = maximum water flow rate pump can accommodate (gal/min)

TDH = total dynamic head (ft)

3,960 = constant, derived from:

$$hp \div \text{density of } H_2O = 33{,}000 \text{ ft-lb/min} \div 8.333 \text{ lb/gal}$$

Equation 3 - Engine Load

$$Engine\ Load\ (bhp) = Pump\ Power\ (hp) \times 1.15$$

$$PE2 = Max\ Op.\ Sch.\ (hr/yr) \times Engine\ Load\ (bhp) \times EF2\ (g/bhp\text{-}hr) \div 453.6$$

Once the PE2 is determined for the facility, they should be compared to the District's permitting thresholds for agricultural operations, as follows:

District Permit Applicability Determination (lbs/year)					
	NO_x	SO_x	PM_{10}	CO	VOC
Stationary Source Post Project Emissions					
½ Major Source Threshold	25,000	70,000	70,000	100,000	25,000
Permits Required?	**Yes/No**	**Yes/No**	**Yes/No**	**Yes/No**	**Yes/No**

If the facility will no longer be subject to permits, an ATC process is not necessary. Send the facility a permit-exemption letter based on their commitments to reducing emissions.

B. Existing Engines Not Permitted

In the event the engines to be replaced are not permitted, the processing engineer shall notify the facility and request PTO applications/filing-fees for those existing engines. If qualify (installed prior to 1/1/04), those engines can be grandfathered into permitting. Processing engineers should verify, i.e. obtain proof, that the engine(s) qualify for grandfathered PTOs. Grandfather permitting of these engines may take place within the application review for the ATCs, although there will be separate grandfather permitting project logged in. Annual permit fee billing for the existing engine shall begin upon receipt of the PTO application. In some cases, the permitting engineer may have the relevant information on file, via a Heavy Duty Engine Program (HDEP) irrigation pump application form. If this is the case, an actual PTO application is not necessary for the existing engines; only the application filing-fees for this existing grandfathered engines would be needed.

C. Facility Outreach

If prudent, inform the applicant of their options to take hour limits on new and existing engines to “fall out” of permits and qualify for Permit-Exempt Equipment Registration (PEER), or to avoid being a major source. If the facility would like to avoid being a major source due to hour limits on existing engines, ATCs will be required to incorporate those limits.

The need for a permit or a PEER is determined by the total emissions from each farm. Currently, farms with NOx or VOC emissions over 12.5 tons/year must obtain an ATC permit for each engine. Farms with lower emissions must obtain a PEER for each engine. Please note, the new agricultural permitting threshold is lowering to 5 tons/year (late 2008) and that owners/operators may proactively submit permit applications accordingly.

D. Transportable vs. Stationary

In regards to IC engines, the terms “transportable”, “portable”, “nonroad”, and “offroad” are equivalent and may be used interchangeably.

For the purposes of this GEAR, the term "transportable" will be utilized. Transportable means designed to be and capable of being carried or moved from one location (*or footprint*) to another. Indications of transportability include but are not limited to wheels, skids, carrying handles, dollies, trailers, or platforms, and:

> Moves from one location or site at a facility to another at least once every 12 months or once every season for seasonal sources.

The potential to emit (PE) from transportable engines do not add to the facility's major source determination. Per the CAA, Section 302(z), a major stationary source does not include "those emissions resulting directly from an internal combustion engine for transportation purposes or from a nonroad engine…" Therefore, the emissions from the transportable engines should be subtracted from the Major Source determination.

Also of note, transportable engines cannot trigger a major modification.

E. Pre-Project Emission Factors (EF1) - Existing Engines to be replaced

As is the case for all emission factor estimates, use best available data. If the actual EFs from the manufacturer are available or reasonably attainable, use them. If not, utilize the applicable EFs from the latest Carl Moyer Program table (attached to this document). The Carl Moyer EFs speciate NO_x, VOC, and PM10 based on the engine model year. If the model year is not known, assume the EFs as shown in the table below. AP-42 may be used for CO. The SOx EF shall be based on the use of ultra-low sulfur diesel-fuel (0.0015% S by weight).

EF1 (Existing Engines)		
Pollutant	**EF1 (g/bhp-hr)**	**Source**
NO_x	10.23	Carl Moyer Program
SO_x	0.0051	Ultra-Low Sulfur Fuel
PM_{10}	0.4	Carl Moyer Program
CO	3.04	AP-42 Table 3.3-1, 10/96
VOC	1.13	Carl Moyer Program

F. Post Project Emission Factors (EF2) - New Engines

As is the case for all emission factor estimates, use best available data. Since the engines are new, the EFs from the manufacturer should be attainable.

Until further notice, the "CERT" value for each pollutant from a CARB certification (Executive Order) **may not** provide the engine's max emissions. Therefore, this value is not to be used at this time. If the engine family does not have a FEL value for any pollutant, each engine in the family will then meet the

"STD" value. Meaning, the appropriate Tier standard may be used as the default EFs when manufacturer data is not available.

The SO_x EF shall be based on the use of ultra-low sulfur diesel-fuel (0.0015% S by weight).

EF2 for New Engines		
Pollutant	**EF2 (g/bhp-hr)**	**Source**
NO_x		Mfr or Tier X Level*
SO_x	0.0051	Ultra-Low Sulfur Fuel
PM_{10}		Mfr or Tier X Level
CO		Mfr or Tier X Level
VOC		Mfr or Tier X Level*

*The Carl Moyer program assumes the combined NOx + VOC emission factor is split 95% NOx and 5% VOC.

G. Pre-Project Potential to Emit (PE1) Calculations

For Engines not modified/replaced under this project (for SSPE purposes):

The PE1 calculation method will also be based on hours of operation, like the AE calculation above, except the hours of operation in the calculation should be the potential hours that the engine could operate in any one year. The potential hours may be referenced from the PTO, if the PTO contains an annual hour limit. Otherwise, the pre-project operating schedule of the existing engines will be assumed at a conservative 6,000 hr/year. Based on an industry survey, the maximum operating schedule of any engine is less than 6,000 hrs/year. As mentioned above, District staff should outreach to the facility to present options to modify the existing permits to add appropriate hour limits to the permits for the facility's benefit.

PE1 = Max Op. Sch. (hr/yr) $\times$ Max Power (bhp) $\times$ EF1 (g/bhp-hr) $\times$ 0.65 $\div$ 453.6

Background

For the initial farm permitting projects the District has processed, the District referred to the CAPCOA "Guidance for Estimating Potential To Emit From Irrigation Pump Engines" document. This guidance used an "acreage" calculation to estimate a facility PE. The acreage method may not be an accurate PE estimate due to the following variables in the equation: assumes an average facility head loss (been using 450 ft District-wide), assumes a facility crop water use (been using 2.89 acre-ft/acre water use even for double-crops), and assumes IC engines pump all the water (many farms have both electric motors and IC engines). The acreage method would be drastically over

estimating the PE for those facilities operating the majority of their pumps with electric motors.

For Engines being replaced under this project:

Follow the PE2 calculation method shown above. The load established for the new engine should be the same load as for the existing engine (if the only change to the operation is the engine replacement), so that load may be used in the PE1 calculation.

H. Permitted Hours of Operation vs. HDEP Contract Hours of Operation

As shown above, the PE of the facility is based on the operating schedule of each engine, in hr/year. The applicant-proposed potential operating schedule shall be incorporated into the ATC. Note, if the engine is being installed as a result of a District Heavy Duty Engine Program (HDEP), the HDEP contract will also establish a required operating schedule. The allowed HDEP operating schedule (based on the annual average over the life of the engine) must be at least 70% of the HDEP contract operating schedule. The processing engineer can use this as a "check" to ensure the permit limits do not conflict.

Example:
The HDEP application indicates 2,000 hr/year. If the HDEP contract is based on this, the engine must average an operating schedule of at least 1,400 hr/year over the life of the engine. A proposed permit limit of less than 1,400 hr/year would conflict with the HDEP contract.

I. Health Risk Assessment

District policy APR 1905 specifies that the increase in emissions associated with a proposed new source or modification not have acute or chronic indices, or a cancer risk greater than the District's significance levels (i.e. acute and/or chronic indices greater than 1 and a cancer risk greater than 20 in a million). Since the new engines are of the latest certification and are "cleaner" than the existing engines being replaced, there is a reduction in risk from the facility. Since there is a reduction in risk from the facility as a result of this project, the project is approvable. There is not an increase in emissions as a result of these projects; therefore, the risk from these projects is less than significant. HRAs will be ran though, solely to determine if individual engine units trigger Toxic Best Available Control Technology (TBACT).

V. Application Review Document

The following pages are a version of the standard application review. Minor revisions will be needed if necessary on case-by-case scenarios. This version for the GEAR Policy manual includes a copy of the supplemental application form, the Best Available Control Technology (BACT) analysis, and the standard Authority to Construct (ATC) conditions. To minimize the number of pages for the expedited

application review, these attachments will be referred to, but will not be included in the actual application review done for a specific application.

The use of this standard application review will ensure:

A. District-wide uniformity and quality,
B. Streamlined processing,
C. That Rule 2201 (NSR), including BACT, is satisfied,
D. That the permit has enforceable daily emission limitations (DELs),
E. That the proposed project complies with all applicable prohibitory rules,
F. The proposed project does not pose a significant health risk

VI. Equipment Description

Standard equipment descriptions shall be used, as identified in Section V of the application review below.

VII. Authority to Construct Conditions

A standard set of conditions will be used as a base for all applications (see Attached ATC Conditions). Additional conditions may be necessary on a site-specific basis due to Rule 2201 (New Source Review) requirements or health risk assessment. See Airnet Spreadsheet and/or PAS Category for GEAR 27b for general conditions.

VIII. Updates

This GEAR will be updated as necessary to accommodate any changes in prohibitory rules, changes in the BACT Clearinghouse, changes in cost information for the top-down BACT Analysis, or changes to assumptions and calculation methods.

The Permitting Handbook will also be updated whenever this GEAR document is updated.

Each update will be submitted to the GEAR coordinator for review and the coordinator will forward the updates for Director approval.

San Joaquin Valley Air Pollution Control District
Authority to Construct Application Review
Stationary Diesel-Fired Irrigation Pump IC Engine (Replacement)

Facility Name:	Date:
Mailing Address:	Engineer:
	Lead Engineer:
Contact Person:	
Telephone:	
ATC Application #(s):	
ATC Project #:	
PTO Application #(s):	Include PTO application # and PTO project # lines only if processing In-House PTO(s) for existing engines along with the ATCs
PTO Project #:	
Deemed Complete:	

I. PROPOSAL

******Prior to proceeding with this application review, determine if the facility will remain subject to District permitting requirements after the engine replacements by determining the post project emissions. If facility will no longer be subject to permits, an ATC process is not necessary.******

Note: This GEAR is to be used for **stationary agricultural irrigation compression-ignited replacement** IC engines only. It is also important to verify that prior to processing this application review, **the new IC engines** must be of the latest certification for that power rating class.

(if project involves one unit):
Facility name has requested an Authority to Construct (ATC) permit to replace an existing stationary xxx bhp diesel-fired IC engine powering an agricultural irrigation booster pump with a stationary xxx bhp diesel-fired IC engine, which is Tier 3 certified. The existing IC engine is currently permitted as X-XXXX-X. (If applicable, replace the previous sentence with: The existing IC engine currently does not have a District Permit to Operate (PTO); therefore, it will be permitted as unit X-XXXX-X and processed within in this application review as project X-XXXXXX.)

(if project involves multiple units):
Facility name has requested Authority to Construct (ATC) permits to replace # existing stationary diesel-fired IC engines powering agricultural irrigation booster pumps. The existing IC engines were permitted as units X-XXXX-X thru X-XXXX-X. (If applicable, replace the previous sentence with: The existing IC engines currently do not have District Permits to Operate (PTOs); therefore, they will be permitted as units X-XXXX-X thru X-XXXX-X and processed within in this application review as project X-XXXXXX.)

Each of the # new engines is a Tier 3 certified Make/Model diesel fired IC engine. The replacement proposals have been summarized in the table below:

Existing Engines		New Engines	
PTO #	**Max Power Rating (bhp)**	**ATC #**	**Max Power Rating (bhp)**
X-XXXX-X	###	X-XXXX-X	###
X-XXXX-X	###	X-XXXX-X	###
X-XXXX-X	###	X-XXXX-X	###

II. APPLICABLE RULES

- Rule 2010 Permits Required (12/17/92)
- Rule 2020 Exemptions (12/20/07)
- Rule 2201 New and Modified Stationary Source Review Rule (9/21/06)
- Rule 2520 Federally Mandated Operating Permits (6/21/01)
- Rule 4001 New Source Performance Standards (4/14/99)
- Rule 4002 National Emissions Standards for Hazardous Air Pollutants (5/20/04)
- Rule 4101 Visible Emissions (2/17/05)
- Rule 4102 Nuisance (12/17/92)
- Rule 4201 Particulate Matter Concentration (12/17/92)
- Rule 4202 Particulate Matter Emission Rate (12/17/92)
- Rule 4301 Fuel Burning Equipment (12/17/92)
- Rule 4701 Internal Combustion Engines - Phase 1 (8/21/03)
- Rule 4702 Internal Combustion Engines - Phase 2 (1/18/07)
- Rule 4801 Sulfur Compounds (12/17/92)
- CH&SC 41700 Health Risk Assessment
- CH&SC 42301.6 School Notice
- California Code of Regulations (CCR), Title 17 (Public Health), Division 3 (Air Resources), Chapter 1 (Air Resources Board), Subchapter 7.5 (Air Toxic Control Measures), Measure 93115 (Stationary Diesel Engines)
- California Code of Regulations (CCR), Title 17 (Public Health), Division 3 (Air Resources), Chapter 1 (Air Resources Board), Subchapter 7.5 (Air Toxic Control Measures), Measure 93116 (Portable Diesel Engines)

III. PROJECT LOCATION

(With a street address)
The facility is located at 1990 E Gettysburg in Fresno, CA. The equipment is not located within 1,000 feet of the outer boundary of a K-12 school. Therefore, the public notification requirement of California Health and Safety Code 42301.6 is not applicable to this project.

(With a Mount Diablo Base Meridian Location)
The equipment will be located within the SW/4 of Section 31, Township 29S, Range 21E. The equipment is not located within 1,000 feet of the outer boundary of a K-12 school. Therefore,

the public notification requirement of California Health and Safety Code 42301.6 is not applicable to this project.

(With a descriptive location)
The site is located on the eastern side of 25th Avenue, approximately one mile south of State Route (SR) 198, in Kings County. The equipment is not located within 1,000 feet of the outer boundary of a K-12 school. Therefore, the public notification requirement of California Health and Safety Code 42301.6 is not applicable to this project.

IV. PROCESS DESCRIPTION

The primary function of this facility is agricultural (growing of crops and/or raising of fowl or animals). The proposed stationary IC engine(s) will power an agricultural irrigation well pump.

(The following load discussions may be used, delete language that does not apply):

(Example 1):
No specific load information (e.g water pressures, pump information, or engine loads) were available from the applicant); therefore, the load the for new engine(s) will be assumed at 100%.

(Example 2):
The engine load will be determined as follows:

Total Dynamic Head (TDH):

$$TDH\ (ft) = [SH\ (ft) + PH\ (ft)] \times 1.05$$

Where:

SH = static head (ft) - total vertical distance pump must lift water

PH = pressure head (ft) - for booster pumps, the increase in water pressure needed to boost irrigation system to required operational pressure (1 ft = 2.31 psi). For well pumps, assume zero PH since irrigation is gravity-based from lift pipe.

1.05 = multiplier that assumes 5% for friction head (pressure head loss due to friction in pipes and velocity head (energy to get water in motion, usually negligible)

Water Pump Power Requirement

$$Pump\ Power\ (hp) = Q\ (gal/min) \times TDH\ (ft) \div 3{,}960$$

Where:

Q = max volumetric water flow rate (gal/min)

TDH = total dynamic head (ft)
3,960 = constant, derived from:
hp ÷ density of H_2O = 33,000 ft-lb/min ÷ 8.333 lb/gal

Engine Load

Engine Load (bhp) = Pump Power (hp) × 1.15

(If the total dynamic head and water flow rate are known, use the following otherwise delete):

The applicant has supplied the TDH and max water flow rate. The engine load is as follows:

Engine Load					
Permit Unit	**Pump Identifier (Well Site, Make/Model, etc.)**	**TDH - Total Dynamic Head (ft)**	**Q - Water Flow Rate (gal/min)**	**Pump Power (hp)**	**Engine Load (bhp)**
X-XXXX-X					
X-XXXX-X					
X-XXXX-X					

(If the max pump power is known, use the following otherwise delete):

The applicant has supplied the pump power requirement. The engine load is as follows:

Engine Load			
Permit Unit	**Pump Identifier (Well Site, Make/Model, etc.)**	**Pump Power (hp)**	**Engine Load (bhp)**
X-XXXX-X			
X-XXXX-X			
X-XXXX-X			

V. EQUIPMENT LISTING

PTO Equipment Description (Existing Engine to be Replaced):

X-XXX-X-X: PASTE EQUIPMENT DESCRIPTION FROM PTO HERE

ATC Equipment Description:

X-XXX-X-X: XXX BHP MAKE/MODEL/SERIAL TIER X DIESEL-FIRED IC ENGINE POWERING A MAKE/MODEL/SERIAL OR OTHER IDENTIFIER (WHERE POSSIBLE) AGRICULTURAL IRRIGATION PUMP (REPLACEMENT FOR PERMIT UNIT X-XXXX-X)

PTO Equipment Description:

X-XXX-X-X: XXX BHP MAKE/MODEL/SERIAL TIER X DIESEL-FIRED IC ENGINE POWERING A MAKE/MODEL/SERIAL OR OTHER IDENTIFIER AGRICULTURAL IRRIGATION PUMP

VI. EMISSION CONTROL TECHNOLOGY EVALUATION

Internal combustion engines production air contaminants such as sulfur oxides (SO_x), nitrogen oxides (NO_x), volatile organic compounds (VOC), carbon monoxide (CO), particulate matter 10 microns or less in aerodynamic diameter (PM_{10}).

Very low sulfur diesel fuel (0.0015% sulfur by weight maximum) reduces SO_x emissions by over 99% from standard diesel fuel. [1] This fuel is readily available and is considered AIP.

NO_x, VOC, CO, and PM_{10} emissions are minimized with the use of a compression-ignited engine that is EPA certified as specified in 40 CFR Part 89, which identifies Tier 1 thru Tier 3 emission levels, or the Federal Register, Vol. 69, No. 124, June 29, 2004, which identifies Tier 4 emission levels.

VII. GENERAL CALCULATIONS

A. Assumptions

- All calculations and physical constants used are corrected to Standard Conditions as defined in District Rule 1020, Section 3.47 (60 °F and 14.7 lb/in^2).
- Facility utilizes very low sulfur (0.0015% fuel S by weight) diesel fuel and will continue use very low sulfur diesel. Therefore, both the PE1 and PE2 will be based on the use of very low sulfur diesel.
- Density of diesel fuel: 7.1 lb/gal

[1] From *Non-catalytic NO_x Control of Stationary Diesel Engines*, by Don Koeberlein, CARB.

- EPA F-factor (adjusted to 60°F): 9,051 dscf/MMBtu
- Diesel fuel heating value: 137,000 Btu/gal
- BHP to Btu/hr conversion: 2,542.5 Btu/hp·hr
- Thermal efficiency of engine: commonly ≈ 35%

Existing Engines

- Operating schedule of existing engines was not limited on the PTOs. Based on an industry survey, the maximum operating schedule of any engine is less than 6,000 hrs/year. Therefore, the pre-project operating schedule of the existing engines will be assumed at a conservative 6,000 hr/year.

  OR

- The pre-project operating schedule of the existing engines will be based on the hour limits from their respective PTO(s).

- For Pre-Project Stationary Source Potential to Emit (SSPE1) and Post Project Stationary Source Potential to Emit (SSPE2) purposes, the existing irrigation pump IC engines at this facility that are not being replaced or modified as a result of this project, the District will assume they operate at an annual average load of 65% load (From District "Initial Farm" projects).

- For the existing engines being replaced or modified as a result of this project, the District will based the pre-project potential to emit (PE1) on the actual load to the engine (equivalent to the irrigation pump power requirement plus efficiency and parasitic losses). The load determined for the new engine(s) will be utilized for the existing engine since both the existing and new engine(s) are subject to the same load. See assumption below for the new engine load.

New Engines

- The new engine(s) can each potentially operate x,xxx hours/year (per applicant).

B. Emission Factors

1. Pre-Project Emission Factors (EF1)

Existing Engines

(As is the case for all emission factor estimates, use best available data. If the actual EFs from the manufacturer are available or reasonably attainable, use them. If not, utilize the applicable EFs from the latest Carl Moyer Program table (attached to this document). The Carl Moyer EFs speciate NOx, VOC, and PM10 based on

the engine model year. If the model year is not known, assume the EFs as shown in the table below.)

EF1 (Existing Engines)		
Pollutant	**g/bhp-hr**	**Source**
NO_x	10.23	Carl Moyer Program
SO_x	0.0051	Ultra-Low Sulfur Fuel*
PM_{10}	0.4	Carl Moyer Program
CO	3.04	AP-42 Table 3.3-1, 10/96
VOC	1.13	Carl Moyer Program

**This EF is based on the use of ultra-low sulfur diesel fuel with 0.0015% sulfur by weight, as shown in the equation below.*

EF = 0.0015% × 7.1 lb-fuel/gal × 2 lb-SO_2/lb-S × 1 gal-fuel/137,000 Btu × 1 hp input/0.35 hp output × 2,542.5 Btu/hp-hr × 453.6 lb

EF = 0.0051 g-SO_x/bhp-hr

New engines
Since these are new emissions units, EF1 = 0 for all pollutants.

2. Post Project Emission Factors (EF2)

Existing engines:
Since these units will be cancelled upon implementation of the new units, EF2 = 0 for all pollutants.

New engines:

(As is the case for all emission factor estimates, use best available data. Since the engines are new, the EFs from the manufacturer should be attainable.

*Until further notice, the "CERT" value for each pollutant from a CARB certification (Executive Order) **may not** provide the engine's max emissions. Therefore, this value is not to be used at this time. If the engine family does not have a FEL value for any pollutant, each engine in the family will then meet the "STD" value. Meaning, the appropriate Tier standard may be used as the default EFs when manufacturer data is not available.*

The SO_x EF shall be based on the use of ultra-low sulfur diesel-fuel (0.0015% S by weight).)

EF2 for New Engines		
Pollutant	EF2 (g/bhp-hr)	Source
NO_x		Mfr or Tier X Level*
SO_x	0.0051	Ultra-Low Sulfur Fuel
PM_{10}		Mfr or Tier X Level
CO		Mfr or Tier X Level
VOC		Mfr or Tier X Level*

*The Carl Moyer program assumes the combined NOx + VOC emission factor is split 95% NOx and 5% VOC.

C. Calculations

1. Pre-Project Potential to Emit (PE1)

Existing engines
The engine's potential emissions are based on the following equations:

$PE1_{daily}$ = Engine Load (bhp) × EF1 (g/bhp-hr) × 24 hr/day × lb/453.6 g

$PE1_{annual}$ = Engine Load (bhp) × EF1 (g/bhp-hr) × 6,000 hr/year × lb/453.6 g

PE1 for Each Existing Engines to be Replaced (*PTOs #*)				
Pollutant	Engine Load (bhp)	EF1 (g/bhp-hr)	PE1 (lb/day)	PE1 (lb/year)
NO_x				
SO_x				
PM_{10}				
CO				
VOC				

New engines
For new emissions units, PE1 = 0 for all pollutants.

2. Post Project Potential to Emit (PE2)

Existing engines:
Since this engine will be replaced upon implementation of the new engine, PE2 = 0 for all pollutants.

New engines:

The engine's potential emissions are based on the following equations:

$PE2_{daily}$ = Engine Load (bhp) × EF (g/bhp-hr) × 24 hr/day × lb/453.6 g

$PE2_{annual}$ = Engine Load (bhp) × EF (g/bhp-hr) × x,xxx hrs/year × lb/453.6 g

PE2 for Each New Engine (ATC #)				
Pollutant	Engine Load (bhp)	EF2 (g/bhp-hr)	PE2 (lb/day)	PE2 (lb/year)
NO_x				
SO_x				
PM_{10}				
CO				
VOC				

3. Pre-Project Stationary Source Potential to Emit (SSPE1)

Pursuant to Section 4.9 of District Rule 2201, the Pre-Project Stationary Source Potential to Emit (SSPE1) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

The Facility's SSPE1 calculations are attached as ***Appendix D***.

SSPE1 (lb/year)				
NO_x	SO_x	PM_{10}	CO	VOC

4. Post Project Stationary Source Potential to Emit (SSPE2)

Pursuant to Section 4.10 of District Rule 2201, the Post Project Stationary Source Potential to Emit (SSPE2) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

The Facility's SSPE2 calculations are attached as ***Appendix E***.

SSPE2 (lb/year)				
NO_x	SO_x	PM_{10}	CO	VOC

5. Major Source Determination

Pursuant to Section 3.25 of District Rule 2201, a major source is a stationary source with post-project emissions or a Stationary Source Potential to Emit (SSPE2), equal to or exceeding one or more of the following threshold values.

Major Source Determination (lb/year)					
	NO_x	SO_x	PM_{10}	CO	VOC
SSPE2					
PE Transportable Engines*					
SSPE2 Major Source					
Major Source Threshold	**50,000**	**140,000**	**140,000**	**200,000**	**50,000**
Major Source?	Yes/No	No	No	Yes/No	Yes/No

*Per the CAA, Section 302(z), a major stationary source does not include "those emissions resulting directly from an internal combustion engine for transportation purposes or from a nonroad engine…" Therefore, the emissions from the nonroad (also called transportable) engines have been subtracted from the Major Source determination.

As seen in the table above, the facility is not a major source for any pollutant.

Or

As seen in the table above, the facility is a major source for (list pollutants).

6. Baseline Emissions (BE)

The BE calculation (in lb/year) is performed on a pollutant-by-pollutant basis to determine the amount of offsets required, where necessary. However, agricultural operations are exempt from offsets (see offsets discussion in Section VIII below). Therefore, BE calculations are not required.

7. Major Modification

Major Modification is defined in 40 CFR Part 51.165 as "*any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act*."

(for minor sources):

As discussed in Section VII.C.5 above, the facility is not a Major Source for any criteria pollutant; therefore this project does not constitute a Major Modification.

(for existing Major Sources):
As discussed in Section VII.C.5 above, the facility is an existing Major Source for pollutant(s); however, the project by itself would need to be a significant increase in order to trigger a Major Modification. The new emissions unit within this project do not have a combined potential to emit which is greater than Major Modification thresholds (see table below). Therefore, the project cannot be a significant increase and the project does not constitute a Major Modification.

Major Modification Thresholds (Existing Major Source)			
Pollutant	Project PE2 (lb/year)	Threshold (lb/year)	Major Modification?
NO_x	XXX	50,000	No
SO_x	XXX	80,000	No
PM_{10}	XXX	30,000	No
VOC	XXX	50,000	No

8. Federal Major Modification

As shown above, this project does not constitute a Major Modification. Therefore, in accordance with District Rule 2201, Section 3.17, this project does not constitute a Federal Major Modification and no further discussion is required.

9. Quarterly Net Emissions Change (QNEC)

The QNEC is calculated solely to establish emissions that are used to complete the District's PAS emissions profile screen. Detailed QNEC calculations are included in ***Appendix I***.

VIII. COMPLIANCE

Rule 2010 Permits Required

This rule requires any person building, altering, or replacing any operation, article, machine, equipment, or other contrivance, the use of which may cause the issuance of air contaminants, to first obtain authorization from the District in the form of an ATC. By the submission of the above-described ATC application, the applicant is complying with the requirements of this Rule.

Rule 2020 Exemptions

Per Section 6.20, agricultural sources are exempt from District permit requirements to the extent provided by CH&SC, section 42301.16. However this facility does not qualify for

permit exemption since the NOx and/or VOC emissions are greater than 10,000 lb/year (equivalent to ½ the Major Source Threshold).

Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

1. BACT Applicability

BACT requirements are triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis for the following*:

a. Any new emissions unit with a potential to emit exceeding two pounds per day,
b. The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day,
c. Modifications to an existing emissions unit with a valid Permit to Operate resulting in an AIPE exceeding two pounds per day, and/or
d. Any new or modified emissions unit, in a stationary source project, which results in a Major Modification.

*Except for CO emissions from a new or modified emissions unit at a Stationary Source with an SSPE2 of less than 200,000 pounds per year of CO.

a. New emissions units – PE > 2 lb/day

As seen in Section VII.C.2 of this evaluation, the applicant is proposing to install a new diesel-fired IC engine with a PE greater than 2 lb/day for NO_x, PM_{10}, CO, and VOC. BACT is triggered for NO_x, PM_{10}, and VOC since the PEs are greater than 2 lbs/day. BACT is also (or is not) triggered for CO since the SSPE2 for CO is greater (or is less) than 200,000 lbs/year, as demonstrated in Section VII.C.5 of this document.

b. Relocation of emissions units – PE > 2 lb/day

As discussed in Section I above, there are no emissions units being relocated from one stationary source to another; therefore BACT is not triggered.

c. Modification of emissions units – AIPE > 2 lb/day

As discussed in Section I above, there are no modified emissions units associated with this project; therefore BACT is not triggered.

d. Major Modification

As discussed in Section VII.C.7 above, this project does not constitute a Major Modification; therefore, BACT is not triggered as a result of a Major Modification.

2. BACT Guideline

The BACT Guideline attached in ***Appendix H***, applies to new stationary AO diesel-fired IC engines greater than 50 bhp.

3. Top-Down BACT Analysis

Per Permit Services Policies and Procedures for BACT, a Top-Down BACT analysis shall be performed as a part of the application review for each application subject to the BACT requirements pursuant to the District's NSR Rule.

Pursuant to the attached Top-Down BACT Analyses (see ***Appendix H***), BACT has been satisfied with the following:

NO_x: Latest certification
PM_{10}: Latest certification
CO: Latest certification
VOC: Latest certification

Note, a table to determine the latest available Tier certification level is shown as ***Appendix G***.

B. Offsets

Per Section 4.6.9, offsets are not required for agricultural operations.

C. Public Notification

1. Applicability

Public noticing is required for:
a. Any new Major Source, which is a new facility that is also a Major Source,
b. Major Modifications,
c. Any new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one pollutant,
d. Any project which results in the offset thresholds being surpassed, and/or
e. Any project with an SSIPE of greater than 20,000 lb/year for any pollutant.

a. New Major Source

Since there is not an increase in emissions, this facility is not becoming a Major Source as a result of this project; public noticing is not required for this project for New Major Source purposes.

b. Major Modification

As demonstrated in Section VII.C.7 above, this project does not qualify as a Major Modification; public noticing is not required for Major Modification purposes.

c. PE > 100 lb/day

(For a project including a new emissions unit – PE ≤ 100 lb/day.)
Applications which include a new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any pollutant will trigger public noticing requirements. As seen in Section VII.C.2 above, this project does not include a new emissions unit which has daily emissions greater than 100 lb/day for any pollutant, therefore public noticing for PE > 100 lb/day purposes is not required.

(For a project including a new emissions unit – PE > 100 lb/day.)
The PE2 for this new unit is compared to the daily PE Public Notice thresholds in the following table:

PE > 100 lb/day Public Notice Thresholds			
Pollutant	PE2 (lb/day)	Public Notice Threshold	Public Notice Triggered?
NO_x	xxx.x	100 lb/day	Yes
SO_x	xx.x	100 lb/day	No
PM_{10}	xx.x	100 lb/day	No
CO	xx.x	100 lb/day	No
VOC	xx.x	100 lb/day	No

Therefore, public noticing for PE > 100 lb/day purposes is required.

d. Offset Threshold

Since there is not an increase in emissions as a result of this project, an offset threshold cannot be surpassed; therefore, public notice is not triggered due to offset thresholds.

e. SSIPE > 20,000 lb/year

An SSIPE exceeding 20,000 pounds per year for any one pollutant triggers public notice, where SSIPE = SSPE2 - SSPE1.

Since there is not an increase in emissions as a result of this project, the SSIPE is zero; therefore, public notice is not triggered due to offset thresholds.

2. Public Notice Action

(For a project not requiring public notification.)
As discussed above, this project will not result in emissions, for any criteria pollutant, which would subject the project to any of the noticing requirements listed above. Therefore, public notice will not be required for this project.

(For a project requiring public notification – PE > 100 lb/day.)
As discussed above, public noticing is required for this project for NO_x emissions in excess of 100 lb/day. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB) and a public notice will be published in a local newspaper of general circulation prior to the issuance of the ATC for this equipment.

D. Daily Emission Limits (DELs)

Daily Emissions Limitations (DELs) and other enforceable conditions are required by Section 3.15 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. Per Sections 3.15.1 and 3.15.2, the DEL must be contained in the latest ATC and contained in or enforced by the latest PTO and enforceable, in a practicable manner, on a daily basis. The following conditions will appear on the permit:

- Emissions from this unit shall not exceed any of the following limits: 2.85 g-NO_x/bhp-hr, 0.15 g-VOC/bhp-hr, or 0.45 g-CO/bhp-hr. [District Rules 2201 and 4702, and 17 CCR 93115]

- PM_{10} emissions shall not exceed 0.12 g/bhp-hr based on US EPA certification using ISO 8178 test procedure. [District Rules 2201 and 4102, and 17 CCR 93115]

- Only CARB certified diesel fuel containing not more than 0.0015% sulfur by weight is to be used. [District Rules 2201 and 4801, and 17 CCR 93115]

E. Compliance Assurance

1. Source Testing

Pursuant to District Policy APR 1705, source testing is not required to demonstrate compliance with Rule 2201.

2. Monitoring

No monitoring is required to demonstrate compliance with Rule 2201. However, monitoring is required per Rule 4702 (Internal Combustion Engines - Phase 2), see the 4702 discussion below.

3. Recordkeeping

Recordkeeping is required to demonstrate compliance with the offset, public notification and daily emission limit requirements of Rule 2201, where applicable. The following conditions will appear on the permit:

- The permittee shall record the total time the engine operates, in hours per calendar year. [District Rule 2201]

- All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rule 4702]

4. Reporting

No reporting is required to demonstrate compliance with Rule 2201.

F. Ambient Air Quality Analysis

(Note: Applicable only when public notice is triggered, otherwise delete this section.)

Section 4.14.1 of this Rule requires that an ambient air quality analysis (AAQA) be conducted for the purpose of determining whether a new or modified Stationary Source will cause or make worse a violation of an air quality standard. The Technical Services Division of the SJVAPCD conducted the required analysis. Refer to ***Appendix A*** of this document for the AAQA summary sheet.

The proposed location is in an attainment area for NO_x, CO, and SO_x. As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for NO_x, CO, or SO_x.

The proposed location is in a non-attainment area for PM_{10}. The increase in the ambient PM_{10} concentration due to the proposed equipment is shown on the table titled Calculated Contribution. The levels of significance, from 40 CFR Part 51.165 (b)(2), are shown on the table titled Significance Levels.

Significance Levels					
Pollutant	Significance Levels (μg/m³) - 40 CFR Part 51.165 (b)(2)				
	Annual Avg.	24 hr Avg.	8 hr Avg.	3 hr Avg.	1 hr Avg.
PM_{10}	1.0	5	N/A	N/A	N/A

Calculated Contribution					
Pollutant	Calculated Contributions (μg/m³)				
	Annual Avg.	24 hr Avg.	8 hr Avg.	3 hr Avg.	1 hr Avg.
PM_{10}	0.XX	X.XX	N/A	N/A	N/A

As shown, the calculated contribution of PM_{10} will not exceed the EPA significance level. This project is not expected to cause or make worse a violation of an air quality standard.

Rule 2520 Federally Mandated Operating Permits

(for minor sources):
As discussed in Section VII.C.5 above, this facility is not a Major Source for any pollutant; therefore, Rule 2520 does not apply.

(for major sources):
As discussed in Section VII.C.5 above, this facility is an existing Major Source for pollutant(s), and is therefore subject to this rule. This rule will be addressed in the facility's initial Title V project.

Rule 4001 New Source Performance Standards (NSPS)

This rule incorporates NSPS from Part 60, Chapter 1, Title 40, Code of Federal Regulations (CFR); and applies to all new sources of air pollution and modifications of existing sources of air pollution listed in 40 CFR Part 60. However, no subparts of 40 CFR Part 60 apply to reciprocating IC engines.

Rule 4002 National Emission Standards for Hazardous Air Pollutants (NESHAPs)

This rule incorporates NESHAPs from Part 61, Chapter I, Subchapter C, Title 40, CFR and the NESHAPs from Part 63, Chapter I, Subchapter C, Title 40, CFR; and applies to all sources of hazardous air pollution listed in 40 CFR Part 61 or 40 CFR Part 63.

The requirements of 40 CFR Part 63, Subpart ZZZZ (*National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*) covers stationary engines greater than 500 bhp located at Major HAP sources. Since the proposed engines are less than 500 bhp, this NESHAPs subpart does not apply.

There are no additional potentially applicable NESHAPs subparts.

Rule 4101 Visible Emissions

Rule 4101 states that no air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. Therefore, the following condition will be listed on the ATC to ensure compliance:

- {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]

Rule 4102 Nuisance

Rule 4102 states that no air contaminant shall be released into the atmosphere which causes a public nuisance. Section 4.0 prohibits discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public. Public nuisance conditions are not expected as a result of these operations, provided the equipment is well maintained. Therefore, compliance with this rule is expected. Therefore, the following condition will be listed on the ATC to ensure compliance:

- {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]

California Health & Safety Code 41700 (Health Risk Assessment)

District Policy APR 1905 - Risk Management Policy for Permitting New and Modified Sources specifies that for an increase in emissions associated with a proposed new source or modification, the District perform an analysis to determine the possible impact to the nearest resident or worksite. Therefore pursuant to the policy, a risk management review has been performed for this project to analyze the impact of toxic emissions

The HRA results for each new engine proposed for this project are shown below (see the HRA Summary in ***Appendix A***):

HRA Results (ATCs #'s)			
Acute Hazard Index	Chronic Hazard Index	Cancer Risk	T-BACT Required for each engine?
Negligible	Negligible	xx in a million	Yes/No

District policy APR 1905 also specifies that the increase in emissions associated with a proposed new source or modification not have acute or chronic indices, or a cancer risk greater than the District's significance levels (i.e. acute and/or chronic indices greater than 1 and a cancer risk greater than 20 in a million). Since the new engine(s) are Tier 3 certified and are replacing non-certified engines, the project is approvable since there is a reduction in risk from the facility. That is, since there is a reduction in risk from the facility as a result of this project, the project is approvable. There is not an increase in emissions as a result of this project; therefore, the risk from this project is less than significant.

Discussion of T-BACT

*(For a project where TBACT **is** triggered):*
BACT for toxic emission control (T-BACT) is required on an emissions unit by emissions unit basis if the cancer risk exceeds one in one million (District thresholds for triggering T-BACT). As demonstrated above, T-BACT is required for each engine since the HRA indicates that the cancer risk for each engine exceeds one in one million.

T-BACT is satisfied with BACT for PM_{10} (see ***Appendix H***), which is the latest available certified engine. The applicant has proposed the latest available certified engines (Tier 3); therefore, compliance with the District's Risk Management Policy is expected.

*(For a project where TBACT **is not** triggered):*
BACT for toxic emission control (TBACT) is required if the cancer risk exceeds one in one million. As demonstrated above, T-BACT is not required because the HRA indicates that the risk from each unit is not above the District's thresholds for triggering T-BACT requirements (1 in a million); therefore, compliance with the District's Risk Management Policy is expected.

Rule 4201 Particulate Matter Concentration

Particulate matter emissions from the engine will be less than or equal to the rule limit of 0.1 grain per cubic foot of gas at dry standard conditions as shown by the following:

$$\text{PM Conc.} = 0.13 \text{ g-PM}_{10}/\text{bhp-hr} \times 1 \text{ g-PM}/0.96 \text{ g-PM}_{10} \times 1 \text{ bhp-hr}/2{,}542.5 \text{ Btu} \times 1{,}000{,}000 \text{ Btu}/9{,}051 \text{ dscf} \times 0.35 \text{ Btu}_{out}/1 \text{ Btu}_{in} \times 15.43 \text{ gr/g}$$

$$\text{PM Conc.} = 0.03 \text{ gr-PM/dscf}$$

Since 0.03 grain-PM/dscf is ≤ to 0.1 grain per dscf, compliance with Rule 4201 is expected.

Therefore, the following condition will be listed on the ATCs to ensure compliance:

- {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

Rule 4202 Particulate Matter - Emission Rate

This rule establishes PM emission limits as a function of process weight rate in tons/hr. Gas and liquid fuels are excluded from the definition of process weight. Therefore, Rule 4202 does not apply to the IC engine(s).

Rule 4301 Fuel Burning Equipment

Pursuant to section 2.0, the provisions of this rule apply to any piece of fuel burning equipment. Section 3.1 defines fuel burning equipment as "any furnace, boiler, apparatus, stack, and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer".

IC engines produce power mechanically, not by indirect heat transfer. Therefore, the IC engine(s) do not meet the definition of fuel burning equipment. Therefore, Rule 4301 does not apply.

Rule 4701 Internal Combustion Engines - Phase 1

The provisions of this rule do not apply to engines in agricultural operations in the growing of crops or raising of fowl or animals. Therefore, the following condition will be included on the permit(s):

- This IC engine shall only be used for the growing of crops or raising of fowl or animals.

Rule 4702 Stationary Internal Combustion Engines - Phase 2

Purpose:

The purpose of this rule is to limit the emissions of nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC) from internal combustion engines.

Applicability:

This rule applies to any internal combustion engine with a rated brake horsepower greater than 50 horsepower.

Requirements:

Section 5.1 requires that the owner of an internal combustion engine shall not operate it in such a manner that results in emissions exceeding the limits in the Engine Emission Limits table below for the appropriate engine type, according to the compliance schedule listed in Section 7.0. An engine shall be restricted by permit condition to emissions limits, in ppmv (corrected to 15% oxygen on a dry basis), that meet or exceed the following applicable emission limits pursuant to Section 5.1 or Section 8.2.

Engine Type	Emission Limit/ Standard	Compliance Date
1. Non-Certified Compression-Ignited Engine		
a. Greater than 50 bhp but not more than 500 bhp	EPA Tier 3 or Tier 4	1/1/2010
b. Greater than 500 bhp but not more than 750 bhp and less than 1000 annual operating hours	EPA Tier 3	1/1/2010
c. Greater than 750 bhp and less than 1000 annual operating hours	EPA Tier 4	7/1/2011
d. Greater than 500 bhp and greater than or equal to 1000 annual operating hours	80 ppm NOx, 2,000 ppm CO, 750 ppm VOC	1/1/2008 or, if owner has an agreement to electrify, comply by 1/1/2010
2. Certified Compression-Ignited Engine		
a. EPA Certified Tier 1 or Tier 2 Engine	EPA Tier 4	1/1/2015 or 12 years after installation date, whichever is later
b. EPA Certified Tier 3 or Tier 4 Engine	Meet Certified Compression-Ignited Engine Standard in effect at time of installation	At time of installation

Per Section 5.1.3, on and after June 1, 2006, the owner of an AO rich-burn spark-ignited engine, AO lean-burn spark-ignited engine, or AO compression-ignited engine that is subject to the requirements of Section 5.1 shall not replace such engine with a rich-burn spark-ignited, lean-burn spark-ignited, or compression-ignited engine, respectively, that emits more emissions of NOx, VOC, and CO, on a ppmv basis, (corrected to 15% oxygen on a dry basis) than the engine being replaced.

Per Section 5.1.4, The owner of a non-certified compression-ignited engine, in place on June 1, 2006, shall comply with the Emission Limit/Standard and Compliance Date in Table 2 based on the non-certified compression-ignited engine that was in place on June 1, 2006, unless the owner meets one of the following conditions:

5.1.4.1 Replaces the non-certified compression-ignited engine with a non-modified Tier 3 or a non-modified Tier 4 engine after June 1, 2006,

5.1.4.2 Controls the non-certified compression-ignited engine after June 1, 2006, to emit emissions less than, or equal to, 80 ppm NOx, 2,000 ppm CO, and 750 ppm VOC, (corrected to 15% oxygen on a dry basis), or

5.1.4.3 Replaces the non-certified compression-ignited engine after June 1, 2006, with an engine or other source with emissions less than, or equal to, 80 ppm NOx, 2,000 ppm CO, and 750 ppm VOC (corrected to 15% oxygen on a dry basis).

Explain how the engine complies with the requirements above. You may have to customize the language for your situation. The key is the date the engine was installed (before or after June 1, 2006). Here are some examples:

*(Example 1 – Tier 2 in place **prior to** June 1, 2006):*
The proposed engine is EPA certified Tier 2 and was installed prior to June 1, 2006. Therefore, the proposed IC engine falls under row 2a of the table and is in compliance with the emission requirements of the rule until 2015 or 12 years after first installation, which ever is later (not exceed 2018 – District Compliance Policy).

*(Example 2 – Tier 3 in place **prior to** June 1, 2006):*
The proposed engine is EPA certified Tier 3 and was installed prior to June 1, 2006. Therefore, the proposed IC engine falls under row 2b of the table and is in compliance with the emission requirements of the rule for the life of the engine.

*(Example 3 – Tier 3/4 replacing a Tier 0 **after** June 1, 2006):*
The proposed engine is EPA certified Tier 3/4 and will replace a non-certified (Tier 0) engine after June 1, 2006. The engine meets the requirements of the rule due to Section 5.1.4.1 and falls under Row 2b of the table. Therefore, the engine is in compliance with the emission requirements of the rule for the life of the engine.

*(Example 4 – Tier 3/4 replacing a Tier 1/2 **after** June 1, 2006):*
The proposed engine is EPA certified Tier 3/4 and will replace a Tier 1/2 engine after June 1, 2006. The engine meets the requirements of the rule due to Section 5.1.4.1 and falls under Row 2b of the table. Therefore, the engine is in compliance with the emission requirements of the rule for the life of the engine.

*(Example 5 – Tier 2 replacing a Tier 0 **after** June 1, 2006) – recommend against, and would not meet BACT after 1/1/08:*
The proposed engine is EPA certified Tier 2 and will replace a non-certified (Tier 0) engine after to June 1, 2006. Therefore, the proposed IC engine falls under row 1a/b/c/d of the table and is in compliance with the emission requirements of the rule until (applicable date 1/1/10, 7/1/11, etc). The Tier 2 engine shall be replaced with a Tier 3 or better by that date.

Monitoring:

Section 5.7.1 requires that the owner of an engine subject to the requirements of Section 5.1 or 4.2 shall comply with the requirements specified in Sections 5.7.2 through 5.7.5.

Section 5.7.2 requires the owner to properly operate and maintain each engine as recommended by the engine manufacturer or emission control system supplier.

Section 5.7.3 requires the owner to monitor the operational characteristics of each engine as recommended by the engine manufacturer or emission control system supplier.

Section 5.7.4 requires each engine to install and operate a nonresettable elapsed operating time meter. In lieu of installing a nonresettable time meter, the owner of an engine may use an alternative device, method, or technique, in determining operating time provided that the alternative is approved by the APCO and is allowed by Permit-to-Operate or Stationary Equipment Registration condition. The owner of the engine shall properly maintain and operate the time meter or alternative device in accordance with the manufacturer's instructions.

Section 5.7.5 is applicable to engines retrofitted with a NOx exhaust control. The engines in this project do not have add-on NOx controls. Therefore, the requirements of Section 5.7.5 are not applicable.

Emission Control Plan:

Section 6.1 requires that the owner of an engine subject to the requirements of Section 5.1 or Section 8.0, except for an engine specified in Section 6.1.1, shall submit to the APCO an emission control plan (ECP) of all actions to be taken to satisfy the emission requirements of Section 5.1 and the compliance schedules of Section 7.0.

Section 6.1.1 states Sections 6.1.2 through Section 6.1.3 shall not apply to an engine specified below:

6.1.1.1 A certified compression-ignited engine that has not been retrofitted with an exhaust control and is not subject to the requirements of Section 8.0.

The engines in this project are certified compression-ignited engines not retrofitted with exhaust control and are not subject to Section 8.0. Therefore, an ECP is not required.

Recordkeeping:

Section 6.2 requires that except for engines subject to Section 4.0, the owner of an engine subject to the requirements of Section 5.1 shall maintain an engine operating log to demonstrate compliance with this rule. This information shall be retained for a period of at least five years, shall be readily available, and be made available to the APCO upon request. The engine-operating log shall include, on a monthly basis, the following information:

- Total hours of operation,
- Type of fuel used,
- Maintenance or modifications performed,
- Monitoring data,
- Compliance source test results, and
- Any other information necessary to demonstrate compliance with this rule.

Section 6.2.2 requires that the data collected pursuant to the requirements of Section 5.7 shall be maintained for at least five years, shall be readily available, and made available to the APCO upon request.

Compliance Testing:

Section 6.3 requires that the owner of an engine subject to the requirements of Section 5.1 or the requirements of Section 8.0, shall comply with the requirements of Section 6.3, except for an engine specified in Section 6.3.1.

Section 6.3.1 states Sections 6.3.2 through Section 6.3.4 shall not apply to an engine specified below:

6.3.1.1 A certified compression-ignited engine that has not been retrofitted with an exhaust control and is not subject to the requirements of Section 8.0.

The engines in this project are certified compression-ignited engines not retrofitted with exhaust control and are not subject to Section 8.0. Therefore, source testing is not applicable.

Inspection and Monitoring (I&M) Plan:

Section 6.5 requires that the owner of an engine subject to the requirements of Section 5.1 or the requirements of Section 8.0, except for an engine specified in Section 6.5.1, shall submit to the APCO for approval, an I&M plan that specified all actions to be taken to satisfy the requirements of Section 6.5 and 5.7.

Section 6.5.1 states Sections 6.5.2 through Section 6.5.9 shall not apply to an engine specified below:

6.5.1.1 A certified compression-ignited engine that has not been retrofitted with an exhaust control and is not subject to the requirements of Section 8.0.

The engines in this project are certified compression-ignited engines not retrofitted with exhaust control and are not subject to Section 8.0. Therefore, an I&M Plan is not applicable.

Compliance Schedule

Section 7.3.1.2 requires the owner of an engine that is subject to Section 5.1 and that is required to submit an ECP, an I&M Plan, or an Authority to Construct in order to

comply with the requirements of Rule 4702, shall submit such documents 6 months before the engine is required to be in compliance with the requirements of Section 5.1 of Rule 4702. The engine currently is in compliance with rule, no further action is required at this time.

Rule 4801 Sulfur Compounds

This rule contains a limit on sulfur compounds. The limit at the point of discharge is 0.2 percent by volume, 2000 ppmv, calculated as sulfur dioxide (SO_2), on a dry basis averaged over 15 consecutive minutes.

The maximum sulfur content of the diesel combusted shall not exceed 0.0015% by weight. Therefore, the sulfur concentration is:

S Conc. = 0.0015% S × 7.1 lb/gal × 64 lb-SO_2/32 lb-S × MMBtu/9,051 scf × gal-fuel/0.137 MMBtu × lb-mol/64 lb-SO_2 × 10.73 psi-ft^3/lb-mol-°R × 520 °R/14.7 psi

S Conc. = 1 ppmv

Since 1 ppmv is ≤ 2000 ppmv, this project is expected to comply with Rule 4801. Therefore, the following condition will be listed on the ATC to ensure compliance:

- Only CARB certified diesel fuel containing not more than 0.0015% sulfur by weight is to be used. [District Rules 2201 and 4801 and 17 CCR 93116]

California Code of Regulations (CCR), Title 17 (Public Health), Division 3 (Air Resources), Chapter 1 (Air Resources Board), Subchapter 7.5 (Air Toxic Control Measures), Measure 93115 (Stationary Diesel Engines)

This regulation is satisfied by District Rule 4702 (*Stationary Internal Combustion Engines - Phase 2*) in combination with the District's permitting program. That is, these District regulations are considered equivalent to the Stationary ATCM for agricultural engines.

California Code of Regulations (CCR), Title 17 (Public Health), Division 3 (Air Resources), Chapter 1 (Air Resources Board), Subchapter 7.5 (Air Toxic Control Measures), Measure 93116 (Portable Diesel Engines)

This regulation does not apply to any stationary engines.

California Health & Safety Code 42301.6 (School Notice)

(For a Non-School Notice project outside of 1,000 feet.)
The District has verified that this site is not located within 1,000 feet of a school. Therefore, pursuant to California Health and Safety Code 42301.6, a school notice is not required.

(For a Non-School Notice project within 1,000 feet.)

The District has verified that this site is located within 1,000 feet of a school. However, pursuant to California Health and Safety Code 42301.6, since this project will not result in an increase in emissions, a school notice is not required.

IX. Recommendation

*(Use the conditions attached as **Appendix K** as a reference in order to draft your ATC. Delete **Appendix K** upon completion.)*

Compliance with all applicable rules and regulations is expected. Issue ATCs #'s subject to the permit conditions on the attached draft ATCs in ***Appendix C***.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
ATC #	3020-10-X	XXX bhp IC engine	$

Appendices

A: HRA Summary
B: PTO(s) to be Replaced
C: Draft ATC(s)
D: SSPE1
E: SSPE2
F: Carl Moyer EFs
G: Certification EFs
H: BACT/TBACT Analyses
I: QNEC
J: Emission Profile(s)
K: List of possible ATC conditions (this appendix is for your reference, do not attach to final evaluation)

(Note: For the applicants who have submitted HDEP applications for these engines, send a cover letter with the ATCs.)

(Note: For public notice projects, the QNEC and the emission profile are not included as a part of the engineering evaluation package. Instead, put those appendices in the project file.)

APPENDIX A

HRA and AAQA Summary

APPENDIX B

PTO(s) to be Replaced

APPENDIX C

Draft ATC(s)

APPENDIX D

SSPE1

APPENDIX E

SSPE2

APPENDIX F

Carl Moyer EFs

OFF-ROAD EQUIPMENT
AND
STATIONARY AND PORTABLE AGRICULTURAL ENGINES

Table B-12 (Emission Factors for Off-Road Diesel Engines) (g/bhp-hr) [(a)]

Horsepower	Tier	NOx	ROG	PM10
25 – 49	Uncontrolled pre-1988	6.51	2.21	0.547
	Uncontrolled 1988 +	6.42	2.17	0.547
	1	5.26	1.74	0.480
	2	4.63	0.29	0.280
	4 Interim	4.55	0.12	0.128
	4 Final	2.75	0.12	0.008
50 – 74	Uncontrolled pre-1988	12.09	1.73	0.605
	Uncontrolled 1988+	8.14	1.19	0.497
	1	6.54	1.19	0.552
	2	4.75	0.23	0.192
	3	2.74	0.12	0.192
	4 Interim	2.74	0.12	0.064
	4 Final	2.74	0.12	0.008
75 – 99	Uncontrolled pre-1988	12.09	1.73	0.605
	Uncontrolled 1988+	8.14	1.19	0.497
	1	6.54	1.19	0.552
	2	4.75	0.23	0.192
	3	2.74	0.12	0.192
	4 Interim	2.15	0.11	0.008
	4 Final	0.26	0.06	0.008
100 – 174	Uncontrolled pre-1970	13.02	1.59	0.554
	Uncontrolled 1970 – 1971	12.09	1.32	0.475
	Uncontrolled 1972 – 1979	11.16	1.20	0.396
	Uncontrolled 1980 – 1984	10.23	1.13	0.396
	Uncontrolled 1985 – 1987	10.23	1.06	0.396
	Uncontrolled post-1987	7.60	0.82	0.274
	1	6.54	0.82	0.304
	2	4.17	0.19	0.128
	3	2.32	0.12	0.112
	4 Interim	2.15	0.11	0.008
	4 Final	0.26	0.06	0.008
175 – 299	Uncontrolled pre-1970	13.02	1.52	0.554
	Uncontrolled 1970 – 1971	12.09	1.26	0.475
	Uncontrolled 1972 – 1979	11.16	1.14	0.396
	Uncontrolled 1980 – 1984	10.23	1.08	0.396

Horsepower	Tier	NOX	ROG	PM10
	Uncontrolled 1985 – 1987	10.23	1.01	0.396
	Uncontrolled post-1987	7.60	0.82	0.274
	1	5.93	0.38	0.120
	2	4.15	0.12	0.088
	3	2.32	0.12	0.088
	4 Interim	1.29	0.08	0.008
	4 Final	0.26	0.06	0.008
300 – 750	Uncontrolled pre- 1970	13.02	1.52	0.533
	Uncontrolled 1970 – 1971	12.09	1.26	0.454
	Uncontrolled 1972 – 1979	11.16	1.14	0.382
	Uncontrolled 1980 – 1984	10.23	1.08	0.382
	Uncontrolled 1985 – 1987	10.23	1.01	0.382
	Uncontrolled post- 1987	7.60	0.82	0.274
	1	5.93	0.38	0.120
	2	3.79	0.12	0.088
	3	2.32	0.12	0.088
	4 Interim	1.29	0.08	0.008
	4 Final	0.26	0.06	0.008
>750	Uncontrolled pre- 1970	13.02	1.52	0.533
	Uncontrolled 1970 – 1971	12.09	1.26	0.454
	Uncontrolled 1972 – 1979	11.16	1.14	0.382
	Uncontrolled 1980 – 1984	10.23	1.08	0.382
	Uncontrolled 1985 – 1987	10.23	1.01	0.382
	Uncontrolled post- 1987	7.60	0.82	0.274
	1	5.93	0.38	0.120
	2	3.87	0.12	0.088
	4 Interim	2.24	0.12	0.048
	4 Final	2.24	0.06	0.016

a - Emission factors were converted using the **ultra low-sulfur diesel fuel** correction factors listed in table B-25.

APPENDIX G

Certification EFs

Title 13 CCR 2423

(December 2005)

Tier 1, Tier 2, and Tier 3 Exhaust Emission Standards

(grams per brake horsepower-hour)

Power Rating (hp)	Tier	Model Year	NO_x	HC	NMHC +NO_x	CO	PM
49.6 ≤ hp < 75.1	1	1998 – 2003	6.9	-	-	-	-
	2	2004 - 2007	-		5.6	3.7	0.3
	3*	2008 - 2011			3.5		
75.1 ≤ hp < 100.5	1	1998 – 2003	6.9	-	-	-	-
	2	2004 – 2007	-		5.6	3.7	0.3
	3	2008 – 2011			3.5		
100.5 ≤ hp < 174.3	1	1997 – 2002	6.9	-	-	-	-
	2	2003 – 2006	-		4.9	3.7	0.22
	3	2007 – 2011			3.0		
174.3 ≤ hp < 301.6	1	1996 – 2002	6.9	1.0	-	8.5	0.4
	2	2003 – 2005	-	-	4.9	2.6	0.149
	3	2006 - 2010			3.0		
301.6 ≤ hp < 603.2	1	1996 – 2000	6.9	1.0	-	8.5	0.4
	2	2001 – 2005	-	-	4.8	2.6	0.149
	3	2006 – 2010			3.0		
603.2 ≤ hp ≤ 750.7	1	1996 – 2001	6.9	1.0	-	8.5	0.4
	2	2002 – 2005	-	-	4.8	2.6	0.149
	3	2006 – 2010			3.0		
> 750.7	1	2000 – 2005	6.9	1.0	-	8.5	0.4
	2	2006 – 2010	-	-	4.8	2.6	0.149

* Manufacturers may optionally certify engine families to the interim Tier 4 standards below (Table 1b) for this power category through 2012.

Tier 4 Exhaust Emission Standards

(grams per brake horsepower-hour)

Power Rating (hp)	Model Year	Type	NO_x	HC	NMHC +NO_x	CO	PM
49.6 ≤ hp < 75.1[1]	2008 – 2012	Interim	-	-	3.51	3.73	0.22
	2013 & later	Final					0.022
75.1 ≤ hp < 100.5	2012 – 2014[2]	Phase-In	0.30	0.14	-	3.73	0.0149
		Phase-Out	-	-	3.51		
		or/Alt NOx	2.54[3]	0.14	-		
	2015 & later	Final	0.30		-		
100.5 ≤ hp < 174.3	2012 – 2014[2]	Phase-In	0.30	0.14	-	3.73	0.0149
		Phase-Out	-	-	2.98		
		or/Alt NOx	2.54[3]	0.14	-		
	2015 & later	Final	0.30				
174.3 ≤ hp ≤ 750.7	2011 – 2013	Phase-In	0.30	0.14	-	2.61	0.0149
		Phase-Out	-	-	2.98		
		or/Alt NOx	1.49	0.14	-		
	2014 & later	Final	0.30				
750.7 < GEN[4] ≤ 1206.4	2011 – 2014	Interim	2.61	0.30	-	2.61	0.075
	2015 & later	Final	0.50	0.14			0.022
GEN[4] > 1206.4	2011 – 2014	Interim	0.50	0.30	-	2.61	0.075
	2015 & later	Final		0.14			0.022
ELSE[5] > 750.7	2011 – 2014	Interim	2.61	0.30	-	2.61	0.075
	2015 & later	Final		0.14			0.030

Notes:

1. Engine families in this power category may alternately meet Tier 3 PM standards from 2008-2011 in exchange for introducing final PM standards in 2012.
2. Manufactures have the option of complying with the Tier 4 standards over a two year period at 50% per year using banked Tier 2 credits or over a three year period at 25% per year without the use of Tier 2 credits. The three year phase-in period is shown. The 2014 model year cannot extend beyond December 30, 2014, when the 3 year phase-in option is used.
3. Manufacturers may comply with the standards during the transitional implementation years using either a phase-in / phase-out approach or by using the Alternate NOx approach. The three year 25% alternate NOx standard is shown in the table. The two year 50% phase-in NOx standard would be 1.716 g/bhp-hr (2.3 g/kW-hr).
4. "GEN" refers to generator engines only.
5. "ELSE" refers to all mobile machinery excluding generator engines.

APPENDIX H

BACT Analysis
(ATC X-XXXX-X-X)

San Joaquin Valley Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline

Emission Unit: Stationary Compression-Ignited AO IC Engines

Industry Type: Agriculture

Equipment Rating: ≤ 1,000 bhp

Last Update: June 1, 2006

Pollutant	Achieved in Practice	Technologically Feasible	Alternate Basic Equipment
VOC	• The proposed engine shall meet the latest available CARB certification standard for the particular horsepower range. (Example: a 200 bhp engine proposed in 2007 shall emit ≤ 0.149 g-PM10/bhp-hr if triggers BACT for PM10)		• Electrification • NG Fired Engine to meet 4702 • LPG/Propane Fired Engine to meet 4702
NO_x		SCR	
CO			
PM_{10}		PM Filter	• Electrification • NG Fired Engine • LPG/Propane Fired Engine
SO_x	• Very Low Sulfur Fuel (0.0015% fuel S by weight)		

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a state implementation plan must be cost effective as well as feasible. A cost effectiveness analysis is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

*This is a Summary Page for this Class of Source

Top-Down BACT Analysis for VOC, NO_x, CO, and PM_{10} Emissions

I. Step 1 - Identify All Possible Control Technologies

Option 1: Latest Available Certified Compression-Ignited Engine, Achieved in Practice (AIP)

Option 2: Natural Gas Fueled Engine, Alternate Basic Equipment (ABE)

Option 3: Propane/Liquid Petroleum Gas (ABE)

Option 4: Electrification (ABE)

Option 5: SCR, Technologically Feasible (TF)

II. Step 2 - Eliminate Technologically Infeasible Options

There are no technologically infeasible options shown in Step 1.

III. Step 3 - Rank Technologies

Control Technology	Rank	Emissions	Technology Classification for BACT
Electrification	1	0	ABE
SCR	2	≥ 85% NO_x reduction (≤ 0.8 g/bhp-hr)	TF
Natural Gas Engine	3	4702 Level for NO_x (≤ 1.1 g/bhp-hr)	ABE
LPG Engine	4		
Latest Certification	5	Latest Tier Certification Level	AIP

IV. Step 4 - Cost Effectiveness Analyses

(Modify discussions of these as necessary):

Cost Effectiveness Analysis: Electrification

As demonstrated in the cost analysis below, electrification for any engine 50 – 1,000 bhp is not cost effective. Therefore, electrification is not cost effective for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: Natural Gas Engine

As demonstrated in the cost analysis below, any NG engine 50 – 1,000 bhp is not cost effective. Therefore, NG engines are not cost effective as ABE for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: LPG Engine

As demonstrated in the cost analysis below, any LPG engine 50 – 600 bhp is not cost effective. Therefore, LPG engines are not cost effective as ABE for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: SCR

As demonstrated in the cost analysis below, a PM filter for any engine 50 – 1,000 bhp is not cost effective. Therefore, PM filters are not cost effective for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: Latest Available Certified Compression-Ignited Engine

Per District BACT Policy, a cost effectiveness analysis is not required for AIP controls since the control must be implemented.

V. Step 5 - Select BACT

The remaining control not eliminated in Step 4 (latest available certification) is considered AIP BACT for this class and category of source. The applicant has proposed the latest certification; therefore, BACT is satisfied.

BACT Analysis for VOC Emissions

Step 1 - Identify All Possible Control Technologies

Option 1: Latest Available Certified Compression-Ignited Engine, Achieved in Practice (AIP)

Option 2: Natural Gas Fueled Engine, Alternate Basic Equipment (ABE)

Option 3: Propane/Liquid Petroleum Gas (ABE)

Option 4: Electrification (ABE)

Step 2 - Eliminate Technologically Infeasible Options

All options from Step 1 are technologically feasible.

Step 3 - Rank Remaining Control Technologies

Control Technology	Rank	Emissions	Technology Classification for BACT
Electrification	1	0	ABE
Natural Gas Engine	2	4702 Level for VOC (≤ 1.1 g/bhp-hr)	ABE
LPG Engine	3		
Latest Certification	4	Latest Tier Certification Level	AIP

Step 4 - Cost Effectiveness Analyses

(Modify discussion of these as necessary):

Cost Effectiveness Analysis: Electrification

As demonstrated in the cost analysis below, electrification for any engine 50 – 600 bhp is not cost effective. Therefore, electrification is not cost effective for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: Natural Gas Engine

As demonstrated in the cost analysis below, any NG engine 50 – 600 bhp is not cost effective. Therefore, NG engines are not cost effective as ABE for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: LPG Engine

As demonstrated in the cost analysis below, any LPG engine 50 – 600 bhp is not cost effective. Therefore, LPG engines are not cost effective as ABE for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: Latest Available Certified Compression-Ignited Engine

Per District BACT Policy, a cost effectiveness analysis is not required for AIP controls since the control must be implemented.

V. Step 5 - Select BACT

The remaining control not eliminated in Step 4 (latest available certification) is considered AIP BACT for this class and category of source. The applicant has proposed the latest certification (Tier 3); therefore, BACT is satisfied.

BACT Analysis for CO Emissions

Step 1 - Identify All Possible Control Technologies

Option 1: Latest Available Certified Compression-Ignited Engine, Achieved in Practice (AIP)

Option 2: Natural Gas Fueled Engine, Alternate Basic Equipment (ABE)

Option 3: Propane/Liquid Petroleum Gas (ABE)

Option 4: Electrification (ABE)

Step 2 - Eliminate Technologically Infeasible Options

All options from Step 1 are technologically feasible.

Step 3 - Rank Remaining Control Technologies

Control Technology	Rank	Emissions	Technology Classification for BACT
Electrification	1	0	ABE
Natural Gas Engine	2	4702 levels and 3-way catalyst (≤ 3.0 g/bhp-hr)	ABE
LPG Engine	3		
Latest Certification	4	Latest Tier Certification Level	AIP

Step 4 - Cost Effectiveness Analyses

(Modify discussion of these as necessary):

Cost Effectiveness Analysis: Electrification

As demonstrated in the cost analysis below, electrification for any engine 50 – 600 bhp is not cost effective. Therefore, electrification is not cost effective for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: Natural Gas Engine

As demonstrated in the cost analysis below, any NG engine 50 – 600 bhp is not cost effective. Therefore, NG engines are not cost effective as ABE for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: LPG Engine

As demonstrated in the cost analysis below, any LPG engine 50 – 600 bhp is not cost effective. Therefore, LPG engines are not cost effective as ABE for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: Latest Available Certified Compression-Ignited Engine

Per District BACT Policy, a cost effectiveness analysis is not required for AIP controls since the control must be implemented.

V. Step 5 - Select BACT

The remaining control not eliminated in Step 4 (latest available certification) is considered AIP BACT for this class and category of source. The applicant has proposed the latest certification (Tier 3); therefore, BACT is satisfied.

BACT Analysis for PM_{10} Emissions

Step 1 - Identify All Possible Control Technologies

Option 1: Latest Available Certified Compression-Ignited Engine, Achieved in Practice (AIP)

Option 2: Natural Gas Fueled Engine, Alternate Basic Equipment (ABE)

Option 3: Propane/Liquid Petroleum Gas (ABE)

Option 4: Electrification (ABE)

Option 5: Particulate Matter Filter, Technologically Feasible (TF)

Step 2 - Eliminate Technologically Infeasible Options

All options from Step 1 are technologically feasible.

Step 3 - Rank Remaining Control Technologies

Control Technology	Rank	Emissions	Technology Classification for BACT
Electrification	1	0	ABE
PM Filter	2	≥ 85% control (results in ≤ 0.045 g-PM_{10}/bhp-hr)	TF
Natural Gas Engine	3	≈ 0.063 g-PM_{10}/bhp-hr	ABE
LPG Engine	4		
Latest Certification	5	Latest Tier Certification Level (0.149 to 0.3 g-PM_{10}/bhp-hr)	AIP

Step 4 - Cost Effectiveness Analyses

Cost Effectiveness Analysis: Electrification

As demonstrated in the cost analysis below, electrification for any engine 50 – 600 bhp is not cost effective. Therefore, electrification is not cost effective for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: Natural Gas Engine

As demonstrated in the cost analysis below, any NG engine 50 – 600 bhp is not cost effective. Therefore, NG engines are not cost effective as ABE for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: LPG Engine

As demonstrated in the cost analysis below, any LPG engine 50 – 600 bhp is not cost effective. Therefore, LPG engines are not cost effective as ABE for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: PM Filter

As demonstrated in the cost analysis below, a PM filter for any engine 50 – 1,000 bhp is not cost effective. Therefore, PM filters are not cost effective for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: Latest Available Certified Compression-Ignited Engine

Per District BACT Policy, a cost effectiveness analysis is not required for AIP controls since the control must be implemented.

V. Step 5 - Select BACT

The remaining control not eliminated in Step 4 (latest available certification) is considered AIP BACT for this class and category of source. The applicant has proposed the latest certification (Tier 3); therefore, BACT is satisfied.

BACT Analysis for SO_x Emissions

Step 1 - Identify All Possible Control Technologies

Option 1: Very Low Sulfur Diesel Fuel (0.0015% fuel sulfur content by weight), Achieved in Practice (AIP)

Option 2: Electrification, Alternate Basic Equipment (ABE)

Step 2 - Eliminate Technologically Infeasible Options

All options from Step 1 are technologically feasible.

Step 3 - Rank Remaining Control Technologies

Control Technology	Rank	Emissions	Technology Classification for BACT
Electrification	1	0	ABE
Very Low S Fuel	2	0.0015% fuel sulfur content by weight	AIP

Step 4 - Cost Effectiveness Analyses

(Modify discussion of these as necessary):

Cost Effectiveness Analysis: Electrification

As demonstrated in the cost analysis below, electrification for any engine 50 – 600 bhp is not cost effective. Therefore, electrification is not cost effective for the proposed xxx bhp diesel fired IC engines.

Cost Effectiveness Analysis: Latest Available Certified Compression-Ignited Engine

Per District BACT Policy, a cost effectiveness analysis is not required for AIP controls since the control must be implemented.

V. Step 5 - Select BACT

The remaining control not eliminated in Step 4 (latest available certification) is considered AIP BACT for this class and category of source. The applicant has proposed the latest certification (Tier 3); therefore, BACT is satisfied.

Attach cost analyses here

APPENDIX I

Quarterly Net Emissions Change (QNEC)

Quarterly Net Emissions Change (QNEC)

The QNEC is entered into PAS database and subsequently reported to CARB. The QNEC is calculated for each pollutant, for each unit, as the difference between the post-project quarterly potential to emit (PE2) and the quarterly pre-project potantial to emit (PE1).

The Quarterly Net Emissions Change is used to complete the emission profile screen for the District's PAS database. The QNEC shall be calculated as follows:

QNEC = PE2 – PE1, where:

QNEC = Quarterly Net Emissions Change for each emissions unit, lb/qtr.
PE2 = Post Project Potential to Emit for each emissions unit, lb/qtr.
PE1 = 0 (since these are new units)

Using the values from Sections VII.C.2 in the evaluation above, the QNEC for each new unit can be summarized as follows:

QNEC (ATCs #)		
Pollutant	PE2 (lb/year)	QNEC (lb/qtr)
NO_x		
SO_x		
PM_{10}		
CO		
VOC		

APPENDIX J

Emission Profiles

APPENDIX K

ATC Conditions

(this appendix is for your reference, do not attach to final evaluation)

ATC Conditions

1. Within 90 days after startup of the equipment authorized by this Authority to Construct, Permit to Operate *C-XXXX-X* shall be surrendered to the District and the associated equipment shall be removed or rendered inoperable. [District Rule 2201]

2. This IC engine shall only be used for the growing of crops or raising of fowl or animals. [District Rules 2201, 4701, and 4702]

3. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]

4. {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

5. {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]

6. This engine shall be equipped with an operational nonresettable elapsed time meter or other APCO approved alternative. [District Rule 4702]

7. {4036} Operation of this engine shall not exceed X,XXX hours per year. [District Rule 2201] N

8. Emissions from this IC engine shall not exceed any of the following limits: *X.XX* g-NO_x/bhp-hr, *X.XX* g-CO/bhp-hr, or *X.XX* g-VOC/bhp-hr. [District Rules 2201 and 4702, and 17 CCR 93115]

9. Emissions from this IC engine shall not exceed *X.XX* g-PM_{10}/bhp-hr based on US EPA certification using ISO 8178 test procedure. [District Rules 2201 and 4102, and 17 CCR 93115]

10. {3395} Only CARB certified diesel fuel containing not more than 0.0015% sulfur by weight is to be used. [District Rules 2201 and 4801 and 17 CCR 93115]

11. {3405} The engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [District Rule 4702]

12. {4037} During periods of operation, the permittee shall monitor the operational characteristics of the engine as recommended by the manufacturer or emission control system supplier (for example: check engine fluid levels, battery, cables and connections; change engine oil and filters; replace engine coolant; and/or other operational characteristics as recommended by the manufacturer or supplier). [District Rule 4702]

13. {4050} The permittee shall maintain an engine-operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: total hours of operation, type of fuel used, maintenance or modifications performed, monitoring data, and any other information necessary to demonstrate compliance. [District Rule 4702]

14. {4051} The permittee shall record the total time the engine operates, in hours per calendar year. [District Rule 2201] N

15. {3497} All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rule 2201 and 4702]

Supplemental Application Form

San Joaquin Valley Air Pollution Control District
Supplemental Application Form

Compression-Ignited IC Engines for Agricultural Operations

Please complete one form for each engine.

This form must be accompanied by a completed Application for Authority to Construct or Permit to Operate

PERMIT TO BE ISSUED TO (FACILITY NAME):	
LOCATION WHERE THE EQUIPMENT WILL BE OPERATED:	
HAVE YOU APPLIED FOR FUNDING THROUGH THE DISTRICT FOR THIS ENGINE? ☐ YES ☐ NO	

Engine Details	Engine Manufacturer:	Engine Model:
	Engine Serial Number:	Engine Certification level: Tier
	Please attach a manufacturer specification sheet that shows the guaranteed emission levels. Please attach the engine's Executive Order to this application.	
	Engine Manufacturer's ***Maximum*** Rated Power Output (per the data plate): _____ bhp	
	Maximum Engine Operating Schedule: _____ hours per year	
	Fuel Type: ☐ Diesel ☐ Other (please specify): _____	
Process Data	Process the Engine Serves: ☐ Well Pump ☐ Booster Pump ☐ Electric Generator ☐ Other (please specify):_____	
	For irrigation pump engines only, please provide the following information where possible: Max water pump power requirement: _____ hp Max water flow rate of pump: _____ gal/min Static head (total vertical distance pump must lift water): _____ ft Booster pump pressure (if applicable): _____ ft (note: 1 ft = 2.31 psi)	
	Is the Engine: ☐ Stationary ☐ Transportable (is moved to operate at another location or "footprint" at least once during each operating season)	
	For stationary irrigation pump engines only, please provide all of the following information: The distance from the engine to the nearest electric power line: _____ ft The distance from the engine to the nearest natural gas distribution line: _____ ft Your facility's diesel fuel cost: _____ $/gallon Your facility's electricity rate, if available: _____ $/kW-hr Your facility's natural gas cost, if available: _____ $/1,000 scf	

Receptor Data	Distance to nearest Residence	_____yards	Distance from the proposed stack location to the nearest residential property boundary. If the engine is transportable, the distance is from the residential property boundary to the nearest location the engine may be operated at your facility.
	Direction to nearest Residence	_____	Direction from the stack to the nearest residence (examples: Northeast, South, etc.)
	Distance to nearest Business	_____yards	Distance from the proposed stack location to the nearest business property boundary. If the engine is transportable, the distance is from the business property boundary to the nearest location the engine may be operated at your facility.
	Direction to nearest Business	_____	Direction from the stack to the nearest business (examples: Northeast, South, etc.)